BID DOCUMENT

For

Development of IT Infrastructure (HMIS, PACS, LAN, EMS, LMS & QMS) for Kalpana Chawla Govt. Medical College & Hospital, Karnal, Haryana

VOLUME – IV

Technical Specification

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Tender No: - HSCC/KCGMC/IT/2015/02

IT Infrastructure for KCGMC, Karnal

(Hospital, OPD and Teaching Block)

1. HMIS (Hospital Management and Information System) for Hospital including Hardware & Software requirement for HMIS & PACS.
2. PACS (Picture Archiving and Communication System) for the Hospital and integration with HMIS
3. Computer Network Infrastructure – LAN (Local Area Network) and Wi-Fi system for Teaching, OPD and Hospital.
4. Queue Management System (QMS)/ Token system for OPD and Consultant's rooms
5. Education Management System (EMS)
6. Library Management System (LMS)
7. Telemedicine

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Hospital Infrastructure and facilities & services

Proposed Kalpna Chawla Government Medical College & Hospital (KCGMC) is to be set-up at Karnal, Haryana with 550 bed capacity and 100 intake Medical College.

Hospital facilities divided into 3 zones/ blocks:

(i) Hospital Block
(ii) OPD
(iii) Teaching Block
(iv) Hostels (Girls & Boys)
(v) Auditorium

Departments and Services

Sl.No		Facilities
1	**Teaching Block (G+4)**	
	Basement	Autopsy
	Ground Floor	Anatomy & Central Library
	1st Floor	Biochemistry
	2nd Floor	Pathology
	3rd Floor	Microbiology & Pharmacology
	4th Floor	Forensic Medicine & Community Medicine
2	**OPD Block (G+6)***	
	Ground Floor Area	
	1st Floor	
	2nd Floor	
	3rd Floor	
	Basement	
	* 4th, 5th & 6th Floor is considered in Phase-II	
3	**Hospital Block (G+6)**	
	Ground Floor	Emergency, Reception, Wards
	1st Floor	Wards & Labs, Blood Bank
	2nd Floor	11 OTs, ICUs, PICU
	3rd Floor	Wards, Public Waiting, Mechanical Services
	4th Floor	Wards
	5th Floor	Wards
	6th Floor	Wards
	Total	
	Basement	
	B1	Diagnostics, Mechanical & Hospital Services, Radiotherapy, Admin Parking
4	**Auditorium (G+1)**	
	Ground Floor	850 capacity auditorium 250 person exam hall Library & Miscellaneous facility
	1st floor	
5	**Girls Hostel-1 (G+7)**	182 rooms
6	**Boys Hostel-2 (G+7)**	182 rooms

DEPARTMENT-WISE BED DISTRIBUTION (PROPOSED)

As Per MCI		Beds Proposed			
Bed/Unit	Department	Block-A	Block-B	Block-C	Total
120/4	General Surgery	60	60	-	120
120/4	General Medicine	60	60	-	120
60/2	Paediatrics	30	30	-	60
60/2	Orthopaedics	-	30	30	60
20/1	Ophthalmology	-	-	30	30
20/1	Otorhinolaryngology	-	-	20	20
20/1	Tuberculosis (TB) & Respiratory Diseases	-	-	20	20
10/1	Psychiatry	-	-	10	10
10/1	Dermatology, Venereology & Leprosy	-	-	10	10
					450
60/2	Obstetrics & Gynaecology				90
	Sub Total				540

	Casualty	40
	ICU	40
	Private Rooms	22
	Day Care	15

SYSTEMS and SERVICES

The following Systems & Services play important roles in proper and efficient functioning of the Hospital.

1. Modular Operation Theatre
2. Central Sterile Supply Department (CSSD)-2 Nos.
3. Medical Gases Manifold System
4. Kitchen
5. Laundry
6. Bio- Medicals Waste Management System
7. Mortuary Chamber (4 Body)-5 Nos.

Scope of Work

The information technology establishment of Hospital, OPD & Teaching Block would be done in following stages;

1. Requirements gathering
2. Customization
3. Integration
4. Implementation
5. Training

Broadly, the activities to be covered shall include:

- Project Initiation
- Procurement, Customization, Installation and Maintenance of Packaged Solution
- Development, installation, integration and maintenance of components which are not part of packaged solution
- Installation, testing, operation and maintenance of integrated HMIS & PACS solution
- Supply, installation, configuration and commissioning of central hardware for application hosting.
- Installation and maintenance of Server room for the Hardware and Software.
- Supply, installation, configuration and commissioning of departmental / user level Hardware & Software (system software and any other software required).
- Supply, installation, configuration and commissioning of Telemedicine.
- Development, Customization, Installation, Integration and maintenance of Hospital's website
- Supply, Customization, Installation, Commissioning, Testing, Integration and maintenance of Library Management system
- Supply, Customization, Installation, Integration and maintenance of Education Management system
- Supply, installation, configuration and commissioning of LAN/WAN network as per the requirement and scope of work mentioned.
- Supply, installation, testing and commissioning of Queue Management System for OPD and Consultant's room as per the requirement and scope of work mentioned.
- Creation of Master Data- To deploy minimum two data entry operator for atleast six months period (during implementation period) or as per the requirement of the project.
- Training of the Hospital users for effectively using the system.
- Operation and Maintenance of Hospital HMIS application and all associated hardware and network equipment.
- Documentation of the KCGMC, Karnal Hospital HMIS Project.
- Development/Customization and implementation of web based Project Management tool
- Database training
- Development/Customization of web-based Monitoring and Evaluation Tool.
- **SI/lead member of Consortium for HMIS Solution ensure that proposed HMIS application including back office application for KCGMC should be user friendly, interactive and easily understandable by the end users. This is also a part of successful implementation of HMIS application. This is the mandatory part of this project.**

KCGMC expects to deal with a single vendor, who shall be a System Integrator Technology firm (hereinafter referred to as —SI)

The scope shall include the following:

I. Supply, Installation, Configuration, and Maintenance of an integrated Hospital Management and Information System (HMIS) for KCGMC, Karnal Hospital that should meet the General, Functional, Technical and Security requirements as specified.

II. Provide an integrated Hospital Management and Information System (HMIS) with core capabilities of:
   1. Clinical
   2. Administrative modules
   3. Diagnostic Investigations
   4. Inventory control
   5. Accounts and Billing
   6. Miscellaneous services

III. The KCGMC will have the option to implement the various modules/products in a phased manner.(In 2 to 3 phase)

IV. Develop and propose an implementation methodology with schedule for the desired integrated Hospital Management and Information System (HMIS) setup from the installation through deployment of the System.

V. Deliver training services for the staff for knowledge transfer both on the functional and technical aspects.

VI. Deliver documentation of the System from the installation, customization to deployment.

VII. Provision of on-going maintenance and support, including software upgrades.

VIII. Provide support and assistance for resolution of major technical problems or technical issues.

IX. Installation of Hardware, including –

a) Appropriate Server(s) along with OS, associated database & other related software, for --
   - HMIS, LMS, PACS , Telemedicine, QMS ;
   - System security, including firewall, anti-virus solution, etc.

b) Desktop PCs or thin clients (as applicable) with OS & other related software;
c) Printers with associated software;
d) Associated hardware for Business Continuity & Backup;

X. Providing post-implementation Maintenance Support for all components listed above. The SI is expected to provide complete specifications of all the products and services quoted for, together with the details of the manufacturer. The KCGMC reserves the right to make appropriate verifications on all the products / components.

XI. Supervisory Committee Formation

A supervisory committee shall be constituted which will review the progress and provide necessary advice for mid-course corrections to the service provider. The committee will comprise of representatives of the KCGMC and SI.

XII. Documentation

It is the responsibility of SI to provide at least the following documents to KCGMC:

- Gap Analysis Document (GAD) or System Requirement Specification (SRS)
- Software Design Documentation (SDD)
- User Manuals
- Training Manuals
- Implementation Manuals

XIII. Maintenance Support

The SI, which will be finally awarded the project, shall be fully responsible for the entire HMIS, PACS, EMS, QMS, Telemedicine and LMS project integration, its implementation on the LAN and provide onsite comprehensive (manpower and parts) maintenance support to maintain the same. The SI shall provide complete onsite maintenance support including upgrade & maintenance for a period of 3 years and this will be extendable. The SI shall permanently post its personnel for the period of contract in KCGMC, who shall be responsible for the overall maintenance of the system – Network, Hardware and the entire software HMIS, EMS, LMS, PACS, Telemedicine. This would also include addressing and fixing any technical snags reported by the end user. The personnel should have minimum qualification of MCA or B. Tech/BE with minimum three years experience.

Post project sign-off during 3 years maintenance support, service provider/SI shall do customization in application as per the requirements of the client without any extra cost. Scope of customization would be mutually agreed between client and service provider/SI.

SI shall be responsible for complete maintenance support for all the items supplied for IT infrastructure.

XIV. Guaranteed Uptime

Maintenance support shall ensure a guaranteed uptime of not less than 98%, which shall be calculated as follows:

On all 24x7 hrs x 365 days a year, the network shall be up and running. It is assumed that KCGMC hospital will be working, 24 hrs round the clock for 365 days in a year and hence the total up time works out to 365 x 24= 8760 hour/annum. 2.0% downtime accordingly shall mean 175 hours in a year. However, the network shall be maintained in such a manner that on no occasion the network shall be down for more than 8 hours at a stretch and 14 hours in a calendar month. The same shall be construed as failure of maintenance support to rectify the system within the stipulated period and the penalty as indicated below shall be recovered, even though the total down time in the year up to that point of time/month/year may be less than the permissible downtime.

XV. Downtime Penalty

For whole network downtime as defined above beyond the permissible period in a day/month/year a penalty at the rate of Rs.10000/- per hour will be recovered for every additional hour of failure. However, if only a portion of the network or sub-network is down beyond the permissible limits, a penalty of Rs.2000/- per hour will be levied. The penalty time shall be arrived on the basis of 24 hours operation on each working day.

XVI. Services & Service Level Requirements

The total outsourcing model expected by the KCGMC includes service requirements related to the solution for Hospital and Medical College/ Institute, within scope of this Bid

The services would include, but will not be limited to - hardware and software installation, maintenance, administration, network access, user support, training etc.

- Definitions & Reference

1. The general working hours for the reference of the services are from 0800 Hrs. to 1800 Hrs. However, the service availability for certain critical functions is a must as and when requirement arises. Such critical functions are:
   a) OPD: 0800 Hrs to 1400 Hrs - 6 days a week (may be revised as per the requirement of the KCGMC)
   b) Casualty / Emergency support services : 24 x 7 Hrs
   c) ICU/ CCU/ NICU/ NSICU : 24 X 7 Hrs
   d) IPD : 24 x 7 Hrs.
   e) All other support services of the Hospital : 24 x 7 Hrs
   f) Administrative services : 24 x 7 Hrs
   (Above may be rescheduled as per the requirement of the KCGMC)

2. Services shall include standard maintenance services, complaint tracking and record keeping. These would apply for the IT related infrastructure of the KCGMC.

3. Hardware, Software & Peripherals :Maintenance.

4. A request for hardware or software maintenance shall be recorded as service request, which include requests such as installation / re-installation, to change software applications. Turn around for such service request expected is within 3 days of logging of service request. Suitable alternative arrangements be provided in such situation.

5. System Administration services shall include, for example, troubleshooting and user support, file / system / application management, data storage monitoring, and reporting, system error detection and correction, backup management, etc.

6. Turn around time expected for all the scheduled services shall be defined at the time of finalization of SLA with the SI Vendor for non-scheduled services (within working hours) is 1 day and during non-working hours is before the end of next working day. If however complaint is lodged on the last day of the week it should be rectified before end of the day of the subsequent working day. The critical functions defined above cannot have any failure, and thus proper redundancies must be built in to the solution design.

7. Centralized Help Desk service at each location (Hospital, OPD and Teaching block), covering complaint registration, resolution & tracking services shall be established by SI Vendor, to support service calls for hardware, application software as applicable. The help desk service shall also include the generation of trouble tickets and submitting unresolved problems to the appropriate internal service providers.

8. Server-class systems Service Level requirements shall provide for services to ensure availability of appropriate server platform (e.g. type & no. of processors, network card, memory, etc.) coupled with operating system and middleware, for each specified server type. The services shall also include installation of application as required. These services shall be available to the KCGMC on an ongoing basis.

9. Local Area Network availability

10. The KCGMC requires 98% network availability. Therefore the networking vendor must ensure this availability.

11. Data Storage availability.

12. The KCGMC requires the on-line storage capacity to be monitored and upgrade suggested whenever storage exceeds 70% of disk capacity. KCGMC also expects the solution to include provision for complete online storage with a view to ensure seamless & automatic retrieval of data from reasonable past periods.

13. Operations Management service

    a) The IT Vendor shall be responsible to identify, track, and report all vendor supplied application software. The Hardware and networking support will be provided by respective vendors, but the coordination responsibility will still be with the SI.
    b) The SI shall provide quarterly reports to support asset tracking, analysis, and strategic planning.
    c) Asset tracking and inventory data must be provided to the KCGMC authorized persons, upon request.

14. Security service

    The SI shall be responsible for development, documentation and implementation of IT and IS security management systems.

15. The performance of the SI will be monitored and recorded as necessary over the duration of the contract with respect to satisfactory fulfillment of all contractual obligations. Performance assessments may comprise of:

    a) Delivery of services
    b) Condition of delivered equipment
    c) Compliance with service levels
    d) Availability of services within established timelines

The SI shall assemble and create regular reports on the performance of application functions, in order to assist in the effective management of the Service

agreement, and enable continuous improvement of the in-scope services that the KCGMC receives.

Routine meetings and reporting processes must be defined to ensure a smooth interface and timely resolution of issues. The KCGMC requires a single interface to coordinate the delivery of all services from the SI.

There must be routine and continuous interaction between the SI's staff and the users at the KCGMC location. They shall contribute significantly to bridge gap between the users, the KCGMC and SI's management.

XVII. Project and Technical Risk Management Plan and Procedures

The SI will be responsible for assisting the KCGMC in Identifying and assessing potential technical risks of the project as well as identifying and managing actions to avoid, mitigate, or manage those risks. SI is responsible for providing appropriate methods, tools and techniques for active identification and assessment of project technical risk; development of risk avoidance, mitigation, or management strategies; and monitoring and reporting of risk status throughout the life of the project, the KCGMC shall fully co-operate with the SI in this regard.

XVIII. Time line

The entire work in the KCGMC, and all the associated hospital buildings of KCGMC shall be completed and 'Go Live' within 15 months from the 10th day of signing of MOU. Failing this, liquidated damages at a rate of 1/2 % of the contract amount per week of delay beyond the stipulated period, subject to a maximum of 5% of the total contract value for the delayed portion of the contract will be levied for delayed supply. The successful SI shall submit a Bar Chart / Programme for completion of supply, erection & commissioning of the various components & sub-assemblies along with manpower schedule.

XIX. Ownership of Data

a. The SI shall be the custodian of such data , and shall also ensure its security and integrity.
b. The SI shall ensure the provision of appropriate and adequate security levels, for protection of such data and other technology resources, which shall come into its custody during the implementation of the proposed solution.
c. The infrastructure for the proposed solution, at each of the sites, shall be strictly and exclusively used by the SI for processing data related to the KCGMC only. Under no circumstances shall the infrastructure be used for any other purpose by the SI.
d. The KCGMC / its authorized representative(s) shall conduct periodic / surprise security reviews and audits, to ensure the compliance by the SI to these control / access provisions.
e. The SI shall develop and implement an "IT Security Policy" for the proposed IT solution. This IT Security Policy shall be in line with international guidelines and standards. The SI shall also keep itself updated with the latest IT Security Policy of the Government.

XX. Change Management:

a. A Supervisory Committee shall be constituted by the KCGMC at the time of award of the final Contract / Agreement, which shall have a representative/s from the KCGMC as well as the SI.
b. In the event a change is requested (either by the KCGMC or the SI) post customization & implementation of the proposed HMIS solution, the Supervisory Committee shall consider the change in scope along with the development / change implementation time estimate for the same.
c. The Supervisory Committee shall evaluate the change Bid and if needed, recommend the change to the KCGMC.

Deliverables of the Project

The Project Plan/main deliverables, as a result of implementation of HMIS at KCGMC, Karnal, shall address:

- Project Organization and Management Plan
- Software Design and Development plan
- Pilot Implementation plan
- Pre-commissioning, Operational and User Acceptance Testing Plan
- Hardware design, Delivery and Installation Plan
- Network Design, Delivery and installation plan
- Training Plan
- Risk Management Plan
- Business Continuity Plan
- Sustenance Plan
- Master Data Entry plan
- Warranty Service Plan
- Task, Time, and Resource Schedules
- Post-Warranty Service Plan
- Technical Support Plan
- Quality Assurance and Control Process details which must include (but not limited to) detailing on Metrics, Reviews, Problem Reporting and Corrective action etc.
- Technical and Operational Process which must include (but not limited to) detailing on Methods, Tools, Techniques etc.

System Integrator IT firm should provide integrated **Hospital Management & Information System** that meets the requirements specified in the Technical Requirements.

SI/lead member of Consortium for HMIS Solution ensure that proposed HMIS application including back office application for KCGMC should be user friendly, interactive and easily understandable by the end users. This is also a part of successful implementation of HMIS application. This is the mandatory part of this project.

Upon completion of the project, the System Integrator IT firm shall provide a comprehensive report with details of the project. The hospital expects to receive from System Integrator IT firm the following outputs:

a. A fully installed, well integrated, customized and functioning integrated Hospital Management and Information System that meets the need of hospital's requirements as specified in the scope of the services.
b. A "live" demonstration to confirm and validate that the solution proposed by the System Integrator IT firm fully meets the requirements of the hospital.
c. An executive summary report validating the implementation process and the various functionalities specified in the Technical Requirements.
d. A proposal for the implementation of gaps that would have been identified by users both technical and functional.
e. The System Integrator IT firm should specify the qualifications and experience of the domain specialists and experts in the implementation team, the software design team at the software development center.

HMIS & PACS

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1. HMIS (Hospital Management & Information System)

Functional Requirements

The functional requirements along with the services for the functional modules and sub modules are described in this section. The functional scope as described in the document may be increased based on departmental requirements.
All the modules and sub modules are expected to integrate and exchange information seamlessly.

Hospital Management and Information System

This section describes the functional requirements along with the services for the functional modules and sub modules:

- **Clinical**
  - EMR
  - Nursing Management System
  - Order Management
  - OT management
  - Anesthesia Management System
  - Dietary Module
- **Administrative**
  - Registration – Out patient and Inpatient
  - Admission discharge and Transfer
  - Master Patient Index
  - Appointment Scheduling
- **Diagnostic Investigations**
  - Pathology (LMS)
  - Microbiology
  - Biochemistry, hematology and serology
  - Radiology information system (RIS)
  - Blood bank management system
- **Inventory control**
  - Pharmacy management system
  - CSSD
  - Laundry department
  - Equipment Management System
  - Inventory Management
- **Accounts and Billing**
  - Patient billing
- **Miscellaneous services**
  - H.R management
- **Academic Block**

Clinical

The clinical services take care of all system critical clinical information that has a patient context and ensures that proper care is delivered to the right patient at the right time by the right people.

Electronic Medical Records (EMR)

This module is an integrated patient viewer that provides a cross-disciplinary where a patient-focused view of clinical information resident in Clinical Data Repository is provided. This would constitute the view to the Electronic Medical Record (EMR). The EMR will provide access to information in the form of result data, text documents, scanned documents, images and waveforms from interfaced foreign systems and medical devices, as well as integrated or foreign clinical systems. Foreign data, or pointers to data stored in external systems, will be resident in the EMR.
The information will be displayed within tabs and sub-tabs for different types of data groups like clinical summary, history, observations, etc.

The EMR will enable the physician access to all other applications relevant to their role through this application. For example, physicians would be able to:

- View and update patient demographics
- Perform appointment scheduling of patients
- View appointment schedule lists
- Manage patient lists
- Manage problem lists
- Manage allergy information
- Manage care plans for a diagnosis and document the care outcomes
- Manage Orders from within the EMR Module
- Perform results review with ability to interface with LIS, RIS & PACS
- View patient bill including settled and outstanding values

The module will have the following capabilities:

- Ability to capture SOAP (Subject Objective Assessment & Plan)
- Ability to capture diagnosis with codes and status
- Ability to automatically generate and present treatment and discharge summaries
- Ability to capture outcomes
- Ability to make entries that are classified as being Critical Care Data (CCD) that may be visible to anyone – this information must be deemed to be critical for the survival of the patient and the lack of which may contribute directly towards fatal consequences for the patient
- Ability to generate, preview and print treatment summaries in OPD and discharge summaries in IPD/A&E settings

Nursing Management System

The Nurse Management System assists the nurses in the care provided to patients throughout the hospital. The application will also maintain the basic personal data about nurses including their qualification, training and experience to facilitate resource scheduling and workload planning. The system will also provide for analysis of nursing load patterns.
The various services under the Nursing Management System module are given below:
Services

- Patient List
- Work-lists
- Nursing Information
- Medication Administration
- Patient Assessment & Classification

Order Management

The Order Management application addresses order entries, order review and/or validation, inter-departmental communication, order inquiry, and reporting of order entries of the hospital. Any authorised user in the hospital will be able to place treatment orders. Similarly, authorised users will be able to view current order status and results.

The various services under the Order Management module are given below:
Services

- Manage Order Entry
- Medication Orders
- Order Tracking
- Results Reporting
- Charging

OT Management

The Operation Theatre will be managed as an isolated operational area that has its own scheduling, resource allocation, raising of appropriate alerts (non-availability of appointment slot, resource), ability to enter procedure notes, manage inventory control both for the area as well as during procedures (instruments and gauze counts), etc.

The various services under the OT Management module are given below:

- OT Scheduling
- Procedure Order sets
- Documentation
- Charging

Anesthesia Management System

The anaesthesia management system will take care of all the anaesthesia related activities including Pre-Anaesthetic Check-up, Pre-Induction, Induction, Post-Induction and Recovery Stages along with post-surgery order management.

The various services under the Anaesthesia Management System module are given below:
Services

- Pre-Anesthetic Check-up
- Pre-operation Management
- Post-operation Management

Dietary Module

The dietary module will assist the hospital kitchen in providing meals to inpatients as per the instructions of the dietician. The module facilitates the dietician to prescribe a diet as instructed by the physician to any given patient. The module also allows the maintenance of meal scheduling, customizing meals as per patient needs and recording of individual meal orders.

Administration Services

Administrative Services: The administration services take care of all system critical non-clinical information that has a patient context and ensures that proper and timely care is provided to the patients.

Patient Admission, Discharge and Transfer (ADT)

The patient administration module handles all functions like registrations, admissions, discharges, transfers and patient appointment scheduling for visits, admissions and investigations etc. It permits a comprehensive registration for most patients while allowing quick registration for rapid attention in the accidents & emergency (A&E) department. The system is additionally able to handle bed management of all beds within the hospital thereby enabling the reception clerks to locate available beds within a department or location and assign beds during admission process at the registration counter itself. Although bill payments can also be accepted simultaneously, the Billing functionality is explained in the Patient Billing sub-module.

The various services under the Patient Administration module are given below:
Services

- Registration
- Admission
- Discharge
- Transfer
- Pre-admissions & Waitlists
- Bed Management
- Bed charges

Master Patient Index

The Master Patient Index module manages the records of all patients registered in the hospital through a unique patient identification number (UPIN) and is generally demographic with some clinical and financial details. This centralized reference information is accessible from any patient-related modules via HL7 interfaces by authorized users. Typical locations where this module is to be used are the Receptions for Outpatients / Inpatients / Accident & Emergency, Appointment and Booking Desks and other departments for purposes of patient identification.

Appointment Scheduling

There needs to be an efficient, user friendly appointments system to enable new and follow-up appointments to be made rapidly for consultations and receiving services like investigations etc. Additionally, there is a requirement to allow for any other hospital-wide resource scheduling to be carried out, like, appointments for use of equipment or certain rooms or Operating Theatres etc. The system will allow appointment scheduling to be performed at any point of care within the hospital apart from reception.

All appointment related activities such as new appointments, cancellations, re-scheduling, wait-lists, etc. must be possible.

The various services under the Appointment Scheduling module are given below:
Services

- Appointments Management
- Patient Tracking

Diagnostic Investigation Services

Investigation Services: The investigation services take care of all system critical information related to investigations that has a patient context. It ensures that proper care is delivered to the right patient by the right people after proper evaluation and assessment of the patient's condition that can only be ascertained through investigations carried out in specialized laboratories and units and reporting them to the care provider to as high degree of accuracy as is possible under the current circumstances.

Pathology

The Pathology module of the Laboratory Information System module is to be used in the Pathology Department, serving the needs of the Inpatients, Outpatients, Emergency Departments and Operation Theatres.
All observations will use LOINC (Logical Observations Identifier Names and Codes) codes wherever applicable. All diagnosis will be coded using ICD10, when the former is not found to be satisfactorily able to address the correct diagnosis.
The various services under the Pathology Information System module are given below:
Services

- Ordering
- Collection Lists
- Specimen Registration
- Work lists
- Results Entry
- Results Verification
- Results Reporting
- Charging

Microbiology

The Microbiology module will be used in the Microbiology Department, serving the needs of the Inpatients, Outpatients, and A&E Departments.

All observations will use LOINC codes wherever applicable. All diagnosis will be coded using ICD10, when the former is not found to be satisfactorily able to address the correct diagnosis.
The various services under the Microbiology Information System module are given below:
Services

- Ordering
- Collection Lists
- Specimen Registration
- Work lists
- Results Entry
- Results Verification
- Results Reporting
- Charging

Biochemistry, Hematology & Serology

The Biochemistry and Serology module will be used in the Biochemistry and Serology Department, serving the needs of the Inpatients, Outpatients, and A&E Departments.
All observations will use LOINC codes wherever applicable. All diagnosis will be coded using ICD10 when the former is not found to be satisfactorily able to address the correct diagnosis.
The various services under the Biochemistry Information System module are given below:
Services

- Ordering
- Collection Lists
- Specimen Registration
- Work lists
- Results Entry
- Results Verification
- Results Reporting
- Charging
- Quality Control

Radio-Diagnostic Information System

The Radiology system will cater to all the requirements of the Radiology Department: it provides for scheduling of appointments for examinations, examination registration, results reporting, entry of post examination information, and film tracking
The system would interface to the Pharmacy Management and Inventory Control applications to update the consumption details directly.

The system should provide facility so that this module will interface with the Picture Archiving & Communications Systems (PACS).
The system will be able to seamlessly handle inbound and outbound HL7 messages from any system that has similar capabilities.
The system will be DICOM 3.0 compliant.
The system should provide facility so that the application is to be web-enabled
The various services under the Radio-Diagnostic Information System module are given below:
Services

- Radio-diagnostic Setup
- Appointments
- Investigations
- Results Reporting
- Post-investigation
- Management
- Film Tracking
- Charging
- Queries & Reports

Blood Bank Management System

The Blood Bank Management System module will cater for the management of all donor records, bloodstock, laboratory, inventory and patient-related operations for Blood Bank.
The system would interface with the Inventory Control, Patient Billing, Order Management, and Nursing Information System applications to update the consumption details directly.
The various services under the Blood Bank Management System module are given below:
Services

- Donor Management
- Blood Stock Management
- Laboratory Operations
- Charging
- Local Inventory Management

Inventory Control

Inventory Control: The inventory control services take care of all system critical information that ensure that all medication and materials required for properly treating a patient are adequately stocked and maintained. All equipment and buildings are in a status of perpetual readiness and all instruments are constantly at the disposal of the care providers in a state that allows no injury to be sustained by the patient during the course of receiving care.

Pharmacy Management

The Pharmacy Management System will take care of all drugs-related and other disposable items that have a definite expiry date.
Requirements
The system will maintain balances and a transaction history for each medication item including cost and suppliers.

Movements will be input manually and automatically from the sales/purchase order processing systems and transfer requests would automatically update stock balances. Stock would be valued on any of the following basis FIFO, weighted average and LIFO When a stock line is created the standard cost will be input. An issue note would optionally be printed for all issues. There would be no restriction on the number of stores held on the system. There would be no restriction on the number of bin locations held on the system.

Summarized monthly stock movements would be retained on the system for 3 years and be available for enquiries.
The system would interface with the purchase order processing system so as to produce purchase order recommendations.
A list of available and authorised medications with their suppliers will be maintained.
A list of suppliers/rate contractors will be maintained.
The various services under the Pharmacy Management System module are given below:
Services

- Demand
- Management/Indenting
- Drug Dispensing
- Drug Receipts
- Process Monitoring
- Interfacing

Central Sterile Supplies Department (CSSD)

The Central Sterile Supplies Department (CSSD) application manages information pertaining to loans, exchanges of sets of sterile supplies to any department in the hospital that requires sterile supplies. The CSSD Module provides facilities to enter details of drums, packs and trolleys. Packs can be assembled or broken down into components as required. The assembly operation will automatically decrease the stock of the components and increase the stock of the pack. Similarly, dismantling the pack will do the reverse.
1. The system will be linked to the OT Scheduling system to enable required trays to be prepared and sent to the OTs based on the schedule of surgeries
2. The system will be linked to the Patient Billing System to enable automatic charging based on items used
The service under the CSSD module is given below:
Services

- Issue Tray Sets
- Receive Tray Sets
- Quality Control

Laundry Department

Laundry service is responsible for providing an adequate, clean and constant supply of linen to all users. The basic tasks include: sorting, washing, extracting, drying, ironing folding, mending and delivery. A reliable laundry service is of utmost importance to the hospital. In today's medical care facilities, patients expect linen to be changed daily.

An adequate supply of clean linen is sufficient for the comfort and safety of the patient thus becomes essential.

The term 'hospital linen' includes all textiles used in the hospital including mattresses, pillow covers, blankets, bed sheets, towels, screens, curtains, doctors coats, theatre cloth and table cloths. Cotton is the most preferred and frequently used material. The hospital receives all these materials from different areas like Operation Theatres, wards, outpatient departments and office areas. The OT linen materials need special care since it has to be washed & sterilized carefully. So if possible, the hospital can go for separate laundry process for OT linen materials alone. The

hospital can either purchase washing machine or engage a washer man (dhobi) to manually wash the clothes

- The system should be able to maintain a Linen data base
- The system should maintain the following registers and provide reports for the same
    - Linen stock register
    - Daily transaction register for wards
    - Daily transaction register for other areas

Equipment Management System

There are two different aspects of this system, machinery and equipment management and planned preventive maintenance.

Machinery and Equipment Management

This system serves for the purpose of regulation, monitoring the Preventive Maintenance, Break Down and Over Haul works of the Components/Machines and costing thereof. The system envisages maintenance of equipment in multi-location environment. The Individual Unit History card will be maintained.

Planned Preventive Maintenance

The system will maintain a database of all equipment types by the preventive maintenance required, procedures they perform, spares required by them, services required by them, time duration of service (downtime of equipment during servicing), details of maintenance performed (in-house and through external agency), and services rendered by them.

The various services under the Equipment Management System module are given below:

- Maintenance Schedules
- Project Management
- Work Order Maintenance

Inventory Management

Inventory Management primarily deals with the optimization of inventory and the supply chain processes for all non-pharmacy related items.
The various services under the Inventory Management System module are given below:

- Purchase Order Processing
- Stock Control

Accounting and Billing

Accounting and Billing: **This module is to be customized as per the requirements of Accounts and billing department of Hospital and College both.**

The financial services take care of all system critical money-related information and ensure that the care provider is continuously maintained in a financially secure state. It permits the organization to take care of its current financial needs while being able to plan for future plan in order to provide better care on sustained basis. This module also to be covered the insurance requirements for private ward patients.

Patient Billing

The Patient Billing System provides the hospital with a comprehensive facility to track all charges cfor a patient from the point of registration to the point of discharge / completion of a visit. The module is largely parameter-oriented to make it more flexible to suit the hospital billing requirements. The billing process is flexible to enable inpatients billing to take place at pre-

defined periods or at end of the episode, while for outpatients it can take place at each service point (either at the point the order is placed or at the point it is completed), or at the end of the visit. This application is fully integrated or interfaced real-time with other patient-care modules so that billing transactions can be automatically posted to the patient's account from the laboratory, radiology, operation theatres, pharmacy, wards/clinics and so on. Patient Billing will be integrated with Accounts Receivable.

This module needs to customize based on the pricing policy and procedures of the hospital.
The various services under the Patient Billing module are given below:
Services

- Bed Charges
- Billing
- Payments Management
- Investigation charges

Miscellaneous Services

Miscellaneous Services: The miscellaneous services take care of all other system critical information that ensure the proper delivery of care to the right patient at the right time by the right people while maintaining the highest achievable degree of efficiency, quality and quantity of services at optimal costs

Human Resource Management

The Human Resources Management Department application captures information pertaining to various departments and the various human resources available. It maintains the records of recruitment, training, and severance records across the organisation. This application monitors the training details after receiving feedback from the departments; the system would be linked to the various departments to monitor data and details.

The various services under the Human Resource Management module are given below:

- Duty Roster
- Workforce Management
- Training Management
- Employee Performance Management
- Employee Self-service
- Payroll Management
- Grievance Redressal Management
- Attendance and Leave Management

Development, customization, integration and implementation of the following additional features with the HMIS

1. E-MLC- Electronic 'Medico Legal Case Sheet'

An electronic medical record system to be developed and implemented with the objective of creating a tamper – proof eMLC that would be printed in a format mandated by law thereby satisfying all legal requirements. This system simplifies the work of doctors so that they no longer have to waste time entering demographics of patient because all medical details in eMLC are easy to enter as they are template driven. Images of patient and injuries shall also be incorporated in the e-MLC.

2. Electronic Patient Waiting List System

This system is to be developed to simplify the process for admitting a patient or scheduling for routine/priority surgery. Current waiting list shall be viewed and patients will call for surgery according to their waiting number. Patients are called only by the number allotted in the waiting list. All the relevant information shall be displayed publically online in a real time manner on the LED TV.

3. Display information about Operation Theater

This system will provide an accurate and minute to minute update on the number of patients inside the OT (that is in each theatre) as well as the progress of surgery for the individual patient. All the relevant information shall be publicly displayed online in a real time manner on the LED TV.

4. Electronic Death Certificate

This system will simplify the system for obtaining death records and store it in a centralized database. Just a single entry is required; once the Patient Registration No. is entered, patient details are updated automatically. Only one single form needs to be updated which automatically feeds the data into centralized system from which all the other forms that is death card, death certificate, police application death report and OPD note will be obtained.

5. Electronic Medical and Fitness Certificates

This system will be used for creating and printing medical/fitness certificates as compared to the certificates made manually. For accessing this system, the senior resident would be required to login with unique ID and password provided by Nursing Informatics. After logging in, it will show the name of doctor issuing the certificate. Patient details will automatically be updated entering the Patient Registration No. Various fields would be made available for filling the certificates like issuing department, diagnosis, number of days of leave required and the EHS No for staff.

6. Online Publically Information to be displayed for patient related data on Hospital's e-portal and in the hospital (on LED TV).

Following information to be displayed in consultation with hospital administration:

a) Number of patients coming to the hospital.
b) Number of patients being admitted and discharged.
c) Total No of patients seen till date at KCGMC, Karnal.
d) No of Patients seen today.
e) On the statistics page of e-portal, department wise admission and discharges for the previous day as well as patients seen in OPD.
f) Clinical Audit for all departments in KCGMC, Karnal evaluating the performance on various clinical and administrative measures.
g) An integrated CRM on Homepage (login required) which displays personalized data for each clinician like patients admitted under him/her, patients scheduled for OPD and departmental data.

7. OPD Tablet

Keeping pace with the tradition of using cutting edge technology for patient care, KCGMC wants to introduce tablet based care in OPD. Implementation of the relevant software with functioning of the tablets for doctors would be required. Application software should be as per the requirement, scalable, integrated, secure, patient centered and interoperable environments to cater the entire functional requirement at OPD. It initiates a high performing healthcare system where all those engaged in the care of patients are linked together in secure and interoperable environments, and where the flow of clinical data directly enable the most comprehensive patient centered, safe, efficient and effective delivery of where and when is its needed most – at the point of care.

Salient Features:

- Appointments at single screen view.
- Simple patient search.
- Patient Appointment / Reminders.
- Easy capturing of Past History/ Vital Signs/ Clinical Parameters.
- Patient Medical Records Retrieval
- Current visit Complaints/Diagnosis entry
- Lab orders entry
- Medical advice entry
- Lab tests review
- Lab Image / Video/ Document retrieval
- Advice and Plans entry.
- Image Management
- Image comparison option
- Diagnosis entry
- Prescribing medicine
- Test results uploading provisions to Lab as Text/Image/Video including PACS
- OPD visits are now less grueling for the patients due to this amazing software where all is available at one touch.

8. SMS System

In this system SMS will be sent automatically by the system to the doctor/patient whenever predefined event triggered for emergency and OPD. Additional SMS can be sent anytime if need arises by the department. We expect SI to configure HMIS application to generate SMS alert for 5 different events (e.g. patient admission, lab result receipt etc.)
Procurement of SMS gateway is responsibility of hospital.

9. Electronic Blood Request

This is an electronic system through which requisition for blood will become a simpler and easier process as only one form needs to be filled electronically. Demographic details of patients will be automatically updated by just entering the Patient Registration No. Lab details and the components requirement will then be sent to the blood bank. All the requisitions made from any patient till date will be easily obtained through this system.

10. Online Duty Roster

This is a biometric system which describes the details of staff's duty. This will be provided with a login id and password to make and change the duties. It will help to keep an accurate track on the punctuality of employees and ensure the 100% compliance in biometric attendance. It also gives the report which shows the shift, leaves etc and calculates the number of person available in the shift. So the duty roster to be created online which is to be integrated with biometric attendance system.

Completeness of the system

In addition to the above, any other functionality to be added & customized as per the requirements of the KCGMC. Integration with the other system like library management system and Education management system etc. shall be done as per the requirement of the KCGMC.

System and Technical Requirements

The HMIS should be able to Interface with:

- SMS interface
- Lab equipment interface
- Tablet/Mobile
- Barcode Compatibility

- The proposed HMIS should have the following features that will benefit KCGMC:
  - Multiple level Security
  - Graphical User Interface
  - Online Help & User Manual
  - Web enabled
  - Voice transcription in PACS
- The system uptime will be 98% in non-critical areas
- The system uptime will be 100% in critical areas
- The system will support ICD-10/ICD-9CM.
- The system should be able to generate turn around time (TAT) report for OPD consultation and lab and radiology result reporting, patient discharge timing and also should generate average length of stay report.
- The system should facilitate creation of templates for capturing clinical assessment.
- The system should facilitate creation of requirement specific discharge summary templates.
- The system should store all data within 5 second of request.
- The system should complete the process of Registration, Discharge, Admission, OPD billing in not more than 5 second.
- The system shall support NABH requirements
- The system shall support EMR/EHR guidelines and other guidelines etc. provided by the Ministry of Health and Family Welfare, New Delhi.
- The application should have online updation of the transaction in to the Back office Finance/Inventory
- The application should have highly secure web interface for doctors and radiologists & secure Application should protect the patient data
- The application should have the Ability to create workflow (like forward for approval)

- The System Integrator Information Technology firm shall adherence to all relevant e-governance standards defined by Government of India (GOI) from time to time.
- Essential Standards

  The proposed HMIS shall adhere to, but shall not be limited to, the following international healthcare standards:

  a) American Society for Testing & Materials (ASTM)
     - For interfaces to laboratory equipments complying with ASTM

  b) Digital Imaging & Communication in Medicine (DICOM)
     - For images

  c) Health Level 7 (HL7)
     - For messaging & communicating with HL7 compliant systems

  d) International Statistical Classification of Diseases & Related Health Problems œ 10th Revision (ICD-10)
     - Controls for ICD coding of discharge diagnosis details

  e) Current Procedural Terminology (CPT)
     - Support for coding of services

  NOTE: The proposed HMIS solution must confirm to the above-mentioned standards currently, and the SI is expected to demonstrate these standards in existing reference customer.

- **Application Architecture**

  Proposed implementation of HMIS is aimed at deriving benefits for the patient, doctor as well as administrator in more ways than one. To site a few benefits -

  ➢ Patient
  - Computerized medical record
  - Preventive healthcare
  - Appointment booking on web, phone and mobile

  ➢ Physician
  - Online access to patient health records
  - Computerized prescription
  - Online referrals (internal)
  - Paperless virtual office

  ➢ Administrator
  - Optimum resource utilization
  - Computerized scheduling of staff and services
  - Online reports

  ➢ The application architecture should be such that it has capability to deliver the expectations of the KCGMC. Following are some of the salient points that are desired from the architecture design:

  ➢ Scalability
  - New servers can be added dynamically to increase capacity
  - Load balancing can be used to ensure that the servers are proportionately utilized

- Performance
  - Application framework designed to ensure good performance
  - Use of caching techniques

- Security
  SSL
  - Data encryption
  - Firewall and DMZ provides security from outside attacks
  - Application level security in terms of user roles & responsibilities

  o Security must be addressed through OS security and application Security. Please give details of the security architecture for the following
    - Log in security
    - Network security
    - Operating System security
    - Application related security
    - Antivirus measures
    - Intrusion Detection measures
    - Intrusion prevention measures

- Availability
  24 x 7 availability

- The proposed HMIS should be based on fully redundant N -tier architecture allows for scalability, central management of business rules, reduced maintenance and single point of deployment. Platform independent, and open technology with web-based clients is what KCGMC is looking forward to implement.

- **Project Requirements**

  The project requirements given here are a high end view and only indicative in nature. The SI is expected to follow International Industry standards for project implementation. The SI is expected to perform the system study of the KCGMC Hospital and IMS and propose its own technically superior solution.

  SI/lead member of Consortium for HMIS Solution ensure that proposed HMIS application including back office application for KCGMC should be user friendly, interactive and easily understandable by the end users. This is also a part of successful implementation of HMIS application. This is the mandatory part of this project.

- **Other General features of HMIS**

1. **Audit Trail** – the data once entered cannot be changed without proper permissions. If any changes are made, then full audit trail information related to the date and time of user login and logout, data entered, data modified, data viewed etc. has to be kept to keep track of what changes are made by whom and when. Provision to modify/cancel all transactions (with their transaction details in audit trail) by only authorized officials should also be there.

2. **Alerts** – Provision to define configurable alerts for every critical event should be available along with capability to send these alerts to the concerned officials on their mobile phones (including SMS) / e-mails should be available. In-built automatic alerts, wherever appropriate, shall be incorporated.
3. **Reports** – All reports should be available for downloading in Excel and PDF format to authorized users.
4. **Validation** – Each input field shall be properly validated before the acceptance of input according to the type and range of the input. In-built validation checks for each field should be available to avoid invalid data entry.
5. All policies of KCGMC, Karnal (functional/administrative) should be implementable in terms of parameters.
6. Ability to access processes of any module/sub-module wherever required and in whichever module as per the KCGMC, Karnal functionalities.
7. General purpose workflow features such as document management, time office functions, time sheet, tracking and archiving, change priority of works etc.
8. Provision for workflow status monitoring, authentication and security, distributed user administration so that each manager can be responsible for the administration of his or her subordinates.
9. Patient's episode based record creation along with tracking.
10. Regular onsite training to be provided to respective users of all modules during implementation till handling over of the system to Client.
11. Helpdesk services to be provided. Helpdesk services should include problem resolution to the level of the end user's desk.
12. Propose Administration/ user Data access policy as per industry's standard practices and submission of same to KCGMC, Karnal for approval. After approval implementation of same in HMIS.
13. Easy and customized data backup and retrieval facility.

14. DOCUMENTATION

a. Documentation in respect of all sub-modules (general user manuals and admin user manuals) is to be provided after implementation/acceptance of each of the sub-module and implementation of amendments in the sub-module. The manuals should also include instruction manuals.
b. Documentation in respect of approved and implemented Data Access Policy.
c. Documentation shall include User manuals, Administration manuals detailing out all HMIS administrative activities from the point of view of HMIS's Installation procedure, Configuration, Backup and Recovery, Security policy, Access policy etc.

2. Picture Archiving and Communication System (PACS)

The Picture Archiving and Communications System (PACS) is intended to setup a film-less system in Hospital Block for performing radiology services within the institution. Anticipated benefits of implementation of the system include significant reduction in the costs associated with film and it's processing, handling, and storage, improved operational efficiency and enhanced patient care within the hospital. The function of the PACS is to acquire, distribute, display and archive imaging data and related information used by the institution. This data will be incorporated into and stored in the PACS at the full contrast and spatial resolution originally obtained by the acquisition devices. Access to the data will be limited to the authorized person. The system shall be interfaced to HMIS to support display of HMIS diagnostic reports alongside medical images on user-friendly, high performance, applications-oriented workstations, and automated image management and distribution. The PACS image storage and management subsystem must allow the rules for image management to be determined by the customer.

System and Technical Requirements for PACS

- The system will be web-enabled
- The system will be able to seamlessly handle inbound and outbound HL7 messages and HIPAA from any system that has similar capabilities
- The system should store all data within 5 second of request
- The system should populate all data within 5 second of request
- The system should make the pre-set/pre-formatted reports available within 5 seconds of request
- The system should allow all DICOM digital images to be available for viewing and manipulation within 5 seconds of request
- PACS for radiology and radiotherapy should be integrated and dicom enabled
- PACS should be incorporated with VNA (Vendor Neutral Archive)
- It should be accessible through the internet
- Data on one click should appear in readable mode
- PACS images should be 3D
- Unlimited licenses should be provided – we can add the no of users as per the requirement of hospital in future without any financial implication
- The system should be enable for teleradiology (PACS server should have static IP)
- System should be truly web based
- It should be compatible with mobile application
- Any image can be seen anywhere within a hospital
- Company should be ISO certified
- The system uptime will be 98% in non-critical areas
- The system uptime will be 100% in critical areas
- Fully integrated RIS and PACS
- Easily Deployable with simple web based interface.
- Multimodality connectivity, advanced work list, image processing tools
- Archiving, Reports.
- Teleradiology module allowing access of images remotely with all tools using low internet bandwidth.
- CD /DVD writing support with embedded DICOM viewer
- Advanced and Intelligent worklist.
- Stat reads highlighted and automatically take priority.

- Search criterion on various parameters like Patient ID, Name, Accession No, Date Hospital Name, AE TITLE, Referring Physicians etc.
- Auto refresh and Page size settings.
- The application should have Streaming technology for facilitating faster viewing of the images over the net (for PACS)
- Web based image viewer operated directly from the browser.
- Compressed image support for faster downloads.
- Prefetch option to download priors automatically reducing waiting time for the radiologists.
- Ability to load different studies, side by side for comparison.
- Multiple monitor support allowing the radiologist to review images, Worklist and reports together.
- PACS Solution should be Truly web based with all features like CD/DVD Writing, Film printing, Image viewer and Reporting module available through browser from any station. No installable software should be required to use these functions from any station.
- It should be possible to import images from external CD/DVD directly into the system without any external software/workstation.
- PACS Solution should support image viewing from Tabs
- Report text search engine should be available
- Should support DICOM MWL integration with all modalities
- Roaming profile – user definable settings
- Should be possible to edit the DICOM information of images
- It should be possible to create a image library of interesting cases with keywords
- It should support scanning of documents and attach as DICOM files
- IT dashboard should be available.
- The system should be able to take voice response while processing diagnostics reports and convert the same into word format.

The PACS is required for the following equipment in the department of Radiology:

1.	X –Ray	-	300mA - 1, 500mA - 1, 1000mA - 1
2.	MRI (1.5 Tesla)	-	1
3.	Mammography (Digital)	-	1
4.	CT (64 Slice)	-	1
5.	US	-	3
6.	IITV system	-	1

Backup Server:

SI needs to propose backup server for the Image storage solution. The Backup server should be able to take-over if the Primary Server fails (in case of server crash, disaster/fire, etc). As and when the Primary Server becomes live again, it should automatically synchronize with the data on Secondary Server. This is to avoid Doctors from being stranded without access to patient images at any point of time. Backup Server should consist of RAID-5 storage. The backup Server should be able to be used as Primary Archive also.

- Central Short-Term and Long-Term Image Storage
- Calculate Primary Storage for the given data. The proposed Archive Server should be compatible to RAID-5 Technology.
- Calculate Long-Term Storage equal to 5 years worth of volume according to the data provided. The proposed Archive should be proposed on the following technologies:
- Spinning disk based storage for Long term Archive.
- NAS Archive

Please include in your response a PACS logical diagram that depicts the entire PACS configuration including modalities. To prevent bandwidth clogging, it is proposed that only 20 concurrent users be allowed to access the PACS from any terminal. There should be provision to upgrade this number in future, if required.

PACS Structure

Please indicate your compliance with the following points:-

- **HMIS Integration**

Please propose a broker-less HMIS integration with image management solution. Few of the top-level tasks to consider are as follows.

Flow of Patient demographics from the Hospital Management System (HMIS) to the QC workstation as sometimes the technician at the modality has limited information on the patient or procedure he or she is about to perform.

Facility to save the study instance UID to the information system.

EMR accessing the images from the HMIS client directly. The HMIS integration solution should be configured to match the patient demographics from the information system with the incoming exams. If it is not matching automatically, the solution should be proposed so that it can be done manually. The EMR of the hospital can be configured to display the images without logging into the image management solution in a single window. In addition to above integration, the Quality Control feature should also be provided for checking whether all images made it across the network from the modality.

1. **Web Server**

The Web Server proposed should be a complete DICOM solution. SI shall supply a cache-less web server as an Intranet or Internet solution to permit access to radiographic image data and their relevant reports from a HMIS to Clinician Offices. This should be a cache-less system where images and reports from the Primary Storage are readily available to privileged users. Access to the server shall be accomplished via a normal Web Browser, (preferably Microsoft Internet Explorer latest version).

Please keep in mind the following server sizing considerations for the same-

The relation between user roles and server performance is influenced by the ratio of user roles within the concurrent user group. A radiologist user would open a lot more images and perform more processing than Referring physicians. Server performance is also determined by the number of requests being processed by the server at a time. Even though sizing documents are not requested now, the KCGMC can later, request server-sizing documents to understand the sizing calculations of the vendor .To prevent unauthorized access to Patient data the web server must provide data security with a user Login and Password. Based on user logon, the system shall know what privileges and studies a user has access to. These access rights and privileges shall be configurable by the administrator.

Other special Terms and conditions for implementation of PACS

System Integrator Information Technology firm/service provider should have experience for implementation of the PACS in large Hospital.

3. Telemedicine

Basic infrastructure to be provided for setting up Telemedicine unit in the main Hospital building as per the requirement of the Hospital.

- Ability to have Voice and video connectivity
- Ability to provide unique patient number. Ability to make appointments over telemedicine network from clients (remote patient location).
- Ability to use the telemedicine network to possibly support tele-education
- Ability to attach the medical data transmitted to be part of the patient EMR
- Ability for the remote doctor (client) to access patients EMR
- Ability to transfer the EMR data of the patient upon the request from the telemedicine client

4. Hospital's Website / e-portal

KCGMC's website to be used for projecting the organization worldwide and provides the information about Hospital for various services and facilities. Website shall contain information but not limited to the followings:

- Details about the College and Hospital infrastructure
- Various facilities and services like Emergency, Blood Bank, CT-Scan, MRI, ICU etc.
- Departments
- Appointment booking for Consulting doctors in OPD/IPD
- Appointment cancellation / re-scheduling
- Reminder via e-mail, SMS etc.
- Health related news and tips
- Course and training program organize by college
- Other information and functionality to be covered as per the requirement of the hospital

Hospital's website shall contain all the guidelines issued by MCI for Hospital's website such as-

- Details of Dean, Principal and Medical Supt. Including their name, qualification complete address with telephone and STD code, fax and email etc.
- Details of Teaching s well as non teaching staff.
- Details of sanctioned intake capacity of various courses UG as well PGs by the MCI.
- List of students admitted merit-wise category wise (UG & PG) for the current and previous year.
- Any research publication during the last one year.
- Details of any CME programmes, conferences and/or any academic activities conducted by the institution.
- Details of any awards and achievement received by the students or faculty.
- Details of the affiliated university and its Vice- Chancellor and Registrars i.e. Result of all the examinations of last one year.
- Detailed status of recognition of all the courses.
- Details of clinical material in the hospital.

(Hospital's website is the part of HMIS solution)

Completeness of the system

In addition to the above, any other functionality to be added & customized as per the requirements of the KCGMC. Integration with the other system like HMIS, Library Management System and Education Management System etc. shall be done as per the requirement of the KCGMC.

5. Education Management System

This system will deal with all the activities for the Education and Research of the students in the Institute.

FUNCTIONAL REQUIREMENTS :

Broadly following modules to be provided in the Education Management System Application to cover the various functionality of the Institute.

1. **General Administration, File Management, Tender & Procurement.**

2. **Admission Management**

   This module covers management of entire admission process starting from the admission offer announcement / advertisements to the final admission (Pre-admission Application process & admission process), in between including issue of offline application forms / online processing of application forms, admitting students to various courses through the process of selection (Online Entrance exam, GD, Personal Interviews or Counseling).

3. **Academics Management**

   This module forms the control centre for the institution where key MIS information and reports be extracted. Creation of syllabus, detailing of course, class scheduling, attendance, batch allocations, batch transfers, issuance of certificates *et al*, and academic activities are all covered under this module.

4. **Examination Management System**

   This module covers all activities in conducting examinations - Scheduling, Allocation, Evaluation & Reporting. This includes generating and publishing grade sheets / mark sheets, promotion list based on the given parameters.

   Pre – Exams

   - Preparation of mark registers
   - Issue of circular regarding attendances
   - Issue of circular for examination application
   - Consolidating attendance reports and shortage of attendance report generation
   - Issue of hall tickets
   - Printing dispatch list

Post Exams

- Receiving the marks from schools/ depts. /centres
- Processing and generation of results
- Preparing mark sheets
- Preparing failure list
- Consolidation of marks of all four semesters wherever required.
- Processing the requests for repeat / recourse examination

5. Student Portal

This module forms the control centre for the institution where key MIS information and reports can be extracted.

- Creation of syllabus, detailing of course, class scheduling.
- Handles Student attendance, Batch allocations, batch transfers, issuance of certificates etc.
- Maintains comprehensive up-to-date profiles of students – address, courses registered, progress, grades, honours received, hostel allotment

6. Fee Management

This module lets users setup and define fee structure. No hard coded values, allow users to setup the any complicated fee structure. Fee collection, exemption, fine or refund activities are part of this module.

- Maintains personalized, updated fee details with alert mechanisms built-in for dues tracking
- Automatically generates fee payment alerts to students before the due dates
- Provides for all common modes of payment - cash, cheques and credit cards. The college can also collect advance fee's from parents which will be adjusted to the students' fee account at regular fee due intervals.
- The various e-forms can be designed, executed, easily customized according to changes.
- Handles scholarships, Waivers, Sponsorships and other adjustments.

7. Facilities Management

General functionalities required for administering any institute / facility are part of this module.

- Database of bills, legal contracts through a comprehensive file-management system
- Flow of document like memo or any generic requests (apart from leave and purchase – which are taken care of in HR & Purchase modules respectively)
- IT administration

8. Placement Cell

This module manages the work of placement cell in an institute making the placement process streamlined and effective.

- Enables the placement officer, students and the potential employer to seamlessly interact.

- Automated CV generation for students
- Job postings / Placement activities on the intranet
- Conduct of placement activities like pre-placement talk, group discussion and interviews.

9. Research

This module manages all the requirements for Research related work and associated projects. Functions to be covered:

1. Project Monitoring
2. Maintaining Project details like scope, duration, funding agencies, Project Leader, Project team, Subject of Research & its related fields and objectives.
3. Interlink with HMIS System and Library Management System as per the requirement of the institute.
4. Assisting in the preparation of Research documentation.
5. Progress status of each research project
6. New membership card with all details and membership cancellation etc.
7. Provision for various queries and reports as per the requirements.

Salient Features of the system :

Sl. No.	Modules	Features
01	**Log In at Home Page**	**LAN, WEB & Mobile Browser enable**, General User & Admin Log In, Change Password & Forgot Password.
02	**Administration**	Software Registration, Institute Details, Employees Privilege, Vendor Registration, Tender & Advertisement, **Staff& Student Biometric Attendance System.**
03	**Master Forms**	Department/Course/Designation, Special Category Master, Qualifying Exam Master, Language Master, Currency Master, Holiday Master, Funding Source Master & Tax Master, State & City Master for HR Calculation, Special Allowance, DA Master, Children Allowance, Conveyance Master, Leave Master, Pay Scale (VI th Pay), Student Fee Master etc.
04	**Stores & Asset Management**	Fund receipt, Budgeting (Fund Allocation), Proposal, Approval (Direct & through Proposal), Tender Preparation, Quotation Calling, Committee Formation, Tender Receipt, Preparation of Comparative, Order Processing (Direct & through Approval), Vender Transaction, Product Item Details, Product Movement Record etc.
05	**Finance & Accounts** **(Can be Customised)**	Fee Collection, Preparation of Cash Book Entry & Ledger, Preparation of Institute Budget, Salary Calculation & Reimbursement, Annual Increment & Promotion, **Loan &**

		Advance Management, Pension, and Calculation of Arrear for Promotion linked salary hike. Vender Payment, Hostel & Transport Fee Collection etc.
06	**Staff Details**	On Line Application, Print Application, Scrutiny & Call for Interview, Staff Selection, Employee Registration, HR Record Creation and Leave Management etc.
07	**Student Details**	Student On Line Registration, Student Admission, Update Student Information, Promotion to Next Class/Semester etc .
08	**Academic**	Batch Code Master, Class Code Master, Section Code Master, Course Curriculum, Subject Curriculum, Student Attendance, Subject Content Upload, Time Table Master, Class Period Master, Time Table Scheduling etc.
09	**Examination**	Examination Grade Master, Exam Scheduling, Examination Form, Admit Card Printing, Sitting Arrangement etc.
10	**Hostel & Transport**	Hostel Detail Master, Hostel Accommodation, Hostel Requisition, Hostel Allotment Form, Transport Route Master etc.
11	**Search**	Course Curriculum Search, Course & Seat Availability, Hostel Availability, Fee Collection, Examination Schedule, Course Materials on Line, List of Selected Student in Campus Interview, List of Selected Staff in interview etc.
12	**Reports (Printable)**	Members Student & Staff, Venders details exportable into Excel format etc.
	Reports on Acquisition	Printable reports in Excel & PDF format for Proposal, Approval, Tender Comparative, Order & Vender Transaction details etc.
	Other Reports	Publishing of Marks, Grades & Result, Salary Slip, Pension Slip, Issuing Smart Card as Institute Identity Card for Staff & Student. Provision for customised Reports as suggested by the Institute.
13	**Alumni & Placement Cell**	Maintaining Alumni of Institution & Managing Placement Cell.

Note:- Above modules shall be customized as per the requirement of the KCGMC.

TECHNICAL REQUIREMENTS :

Sr. No.	Hardware and Software requirements
A)	Server with Clustering (based on latest Technology) with Operating System, associated software, Database Licenses etc. as per the requirements Complete in all respect.
B)	Server should be on High availability mode (Active- Active cluster mode except database server). Database server will be configured as Active-Passive mode. (One set of two servers)
C)	Software shall be Multiuser LAN &WEB Accessible with Unicode supported Multilingual Entry Facility. Proprietary Database Software such as MS SQL 2008 or Oracle to manage its ever incremental data.

Library Automation Unicode Based Multi Lingual , Multi user , Browser enabled , capable of creating data in to ISO 2709Format , AACR 2R Compliant for catalog. Capable of RFID & Barcode compliant with OPAC facility for books, periodicals, thesis, non print media & standards. Reports such as Member, Accession Register, Stock verification and Library card printing facility.

ADDITIONAL SPECIFIC TERMS AND CONDITION FOR EMS :

1. The Vender shall have capacity to provide support On-Line on the Software and Software Training to the college / institute Staff.
2. The Vender shall provide at least 3 Years on Site comprehensive maintenance support.
3. There shall be scope for customisation of the Software as per institute requirement.
4. The Vender shall provide the complete Hardware & Networking required for smooth running of the Software.

Completeness of the system

In addition to the above, any other functionality to be added & customized as per the requirements of the KCGMC. Integration with the other system like Library Management System and HMIS etc. shall be done as per the requirement of the KCGMC.

6. Library Management System (LMS)

Complete infrastructure to be provided for automation of the Library for institute with all the modern facilities etc.

As per the plan, floor wise no. of Libraries at Teaching Block is mentioned below:

Sr. No.	Floor at Teaching Block	No. of Library
1.	Ground Floor	1 (Central Library) 1 (Departmental Library)

2.	First Floor	2 (Departmental Library)
3.	Third Floor	2 (Departmental Library)
4.	Fourth Floor	2 (Departmental Library)

LMS is to be setup for mainly Central Library.

Functional and Technical requirements.

Automation of Library Management system is to automate, manage and look after the overall processing of Library. Complete solution would be capable of managing Book Issue, Book returns, Magazine / Newspaper subscriptions, calculating / managing fines and generating various reports for Records, Book Inventory and theft detection. It also provides the self-check out/in.

Library Management system should efficiently manage libraries, provides the ease of use and convenience to the users as well as librarians. System should be RFID enabled technology based to cater all the requirements of the institute.

Salient features of the Library Management System:

1. Centralized database for student and staff
2. Books should be identified by unique id using RFID chip.
3. Each student and staff should be identifying by a unique RFID card
4. Manual and self-issue/return of book facility.
5. Report of all transactional details.
6. Theft Detection through RFID Gates.
7. Handheld Inventory device with audible and visual and also provide the missing Book records & stock taking.
8. Self-Check out/In with receipt.
9. Automatic calculation of the Fine and payment.
10. Application should be web based.
11. Other features as per the requirement of the college/institute
12. Technical specification of the system is mentioned in Annexure- D enclosed herewith.

System Integrator Information Technology firm/service provider should have experience for implementation of the RFID based Library Management system in large institution.

Completeness of the system

In addition to the above, any other functionality to be added & customized as per the requirements of the KCGMC. Integration with the other system like Education Management System etc. shall be done as per the requirement of the KCGMC.

7. Special Terms and conditions for development of IT infrastructure

I. IT infrastructure shall be provided for college and hospital.

II. HMIS and PACS shall be provided with 3 years onsite maintenance support. For all

Hardware, System Software, Networking, 3 years onsite comprehensive support (labour and parts) will be provided.

III. System will be run 24x7.

IV. All the latest hardware and software should be provided with latest Technology, maximum up to six months old. Beyond that it will not be acceptable.

V. Cost of the any additional hardware and software to be required for completeness of the system as per the hospital requirement to be covered in the present scope and Bill of Quantity. No additional charges to be paid for extra item.

VI. All the licenses of the software will be provided in the name of the client (KCGMC, Karnal).

VII. All the server Hardware and storage shall be provided **from day 1** as per the specification mentioned.

VIII. **Server Hardware and Software** - No. of servers, associated hardware & software and their specifications proposed by SI/lead member of Consortium for HMIS Solution, PACS and Education Management System should meet the System and Technical requirements of the tender. In case during the implementation of HMIS, PACS and Education Management System, if additional Server hardware, Software etc. (not quoted in the present BOQ) is required to meet these system and technical requirements (performance of the system, system uptime etc. as per the requirements) then SI/lead member of consortium should be provided additional Hardware, Software etc. without any extra charges to meet the above requirements.

IX. **Training -** Training for all users as per the requirement of the institute shall be provided by SI/lead member of Consortium for HMIS Solution.

In case after completion of 1st session of training, if additional session is required for any existing user or new staffs joining the organization (KCGMC), then separate training program shall be organized without any extra charges. This is applicable for one year (duration of the project) or till completion of the project.

Kindly consider all above condition during submission of the bid.

X. SI/lead member of Consortium for HMIS Solution ensure that proposed HMIS application including back office application for KCGMC should be very user friendly and interactive and easily understandable by the end users. This is also a part of successful implementation of HMIS application.

XI. The System Integrator Information Technology firm shall be responsible for the followings:

A. Implementation of **Hospital Management and Information System(HMIS) and PACS (Picture Archival and Communication System)**
B. Development, Customization, Installation, Integration and maintenance of **KCGMC's website**
C. Supply, Customization, Installation, Integration and maintenance **of Library Management system**
D. Supply, installation, configuration and commissioning of **Telemedicine**.
E. Supply, Customization, Installation, Integration and maintenance of **Education Management system**
F. Establishment of **Network Infrastructure** (Local Area Network & Wi-Fi System) for Hospital and College (complete for institute)
G. Implementation of **Queue Management System** for OPD and Consultant's room

All the above items shall be provided with 3 years onsite comprehensive maintenance including manpower and parts.

XII. Bidders are requested to submit detailed Item wise un-priced BOQ (Bill of Quantity) for the following items along with technical bid as per the format enclosed at Annexure –E.

Sr. No.	Item	Reference in BOQ
1	Hospital Management and Information System (HMIS)	Sr. no. 1.0 of HMIS BOQ in (PART-A)- I.
2	Server Hardware and System Software	Sr. no. 2.0 of HMIS BOQ in (PART-A)- I.
3	Education Management System (EMS)	Sr. no. 35.0 of HMIS BOQ in (PART-A)- I
4	Telemedicine	Sr. no.36 .0 of HMIS BOQ in (PART-A)- I

XIII. Approval of Materials

Technology (Hardware and Software) used on the Works shall be latest, new and of the best quality available, confirming to the relevant specifications and as per good Engineering practice. Prior approval shall be obtained in writing from the Engineer for all materials proposed and when necessary approved sample duly identified and labeled shall be deposited with the Engineer and shall be kept at site. List of approval make indicates make/manufacturer generally acceptable but final choice of make/manufacturer of material & models shall be with the engineer.

8. Scope of work for onsite comprehensive maintenance support after Go-Live and completion of Final Acceptance Test (FAT) and handling over to the client. (For 1st, 2nd, 3rd, 4th and 5th year)

Day to day Onsite comprehensive Maintenance support including labor and parts shall be provided for all IT components i.e. Hardware, Software, Servers, Networking equipment, cabling etc. and all application software mainly for the followings:

1. HMIS & PACS including Hospital's website
2. Network Infrastructure (LAN & Wi-Fi)
3. QMS
4. EMS
5. LMS
6. Telemedicine

1. Day to day operation and maintenance work for complete IT infrastructure
2. Maintenance support should be provided as per the standard practices and as per the specification and manual of the equipment, complete in all respect and as per the satisfaction of the client.
3. For Application software (HMIS, PACS, QMS, EMS, LMS, Telemedicine) -

Up-gradation of the application, new requirement of the user like new report preparation, new patches/bugs up-gradation etc. to be covered.

4. Up-dation of Antivirus software (after completion of 1 year maintenance support)- licenses of the Antivirus software to be renewed yearly and maintained.
5. Regular Data backup and related activities.
6. Licenses for all networking devices (Firewall, NMS, Wireless Access Points, Wireless controller etc.) to be Upgraded time to time.
7. Licenses and up-gradation of the OS.
8. Preventing maintenance of the hardware and software etc. to be maintained under maintenance support.
9. Website maintenance- website of Institute to be maintained on regular basis as per the requirement of the institute. Necessary modification/up-gradation etc. will be done time to time and as required.

Necessary manpower to be deployed for the above work.

Following is the minimum requirement of manpower for maintenance support :

Sr. no.	Manpower	Quantity
1	Administrator/Team leader with minimum 3 years of experience in relevant area	1 no.
2	Application support/Operation support engineers with minimum 3 years of experience in relevant area. Minimum one application support/operation support engineer should be available 24x7 onsite.	2 nos.
3	Senior Network support engineer with minimum 5 years of experience in relevant area.	1 no.
4	Hardware and Network engineers with 3 years experience in relevant area. Minimum 1 no. Hardware and Network engineer should be available 24x7 onsite.	3 nos.

In addition to the above manpower, additional manpower/expert shall also be deployed at site and also to provide offsite support as per the requirement of the Hospital/Institute.

9. Details of Appendix Mentioned at Annexure-E of Volume- IV to be submitted along with Technical Bid (without price)

Sr. No.	Name of Appendix	Description
1	Appendix-T1	Item wise breakup for HMIS (Item mentioned in Sr. No. 1 in Volume-V-BOQ - (PART A-I)) such as Training, licenses, manpower etc.

2	Appendix-T2	Item wise breakup for Server hardware and storage etc. for HMIS and PACS (Item mentioned in Sr. No. 2 in Volume-V –BOQ-(PART A-I)) such as Server hardware and software including storage etc.
3	Appendix-T3	Item wise breakup for Education Management System (Item mentioned in Sr. No. 35 in Volume-V –BOQ - (PART A-I)) such as Hardware, Software, equipments, licenses, manpower etc.
4	Appendix-T4	Item wise breakup for Telemedicine (Item mentioned in Sr. No. 36 in Volume-V- BOQ - (PART A-I)) such as Hardware, Software, equipments, licenses, manpower etc.

10. Details of Appendix Mentioned BOQ of Volume- V to be submitted along with Price Bid (with price)

Sr. No.	Name of Appendix	Description
1	Appendix-P1	Cost wise breakup for HMIS (Item mentioned in Sr. No. 1 in Volume-V-BOQ - (PART A-I)) such as Training, licenses, manpower etc.
2	Appendix-P2	Cost wise breakup for Server hardware and storage etc. for HMIS and PACS (Item mentioned in Sr. No. 2 in Volume-V –BOQ- (PART A-I)) such as Server hardware and software including storage etc.
3	Appendix-P3	Cost wise breakup for Education Management System (Item mentioned in Sr. No. 35 in Volume-V –BOQ - (PART A-I)) such as Hardware, Software, equipments, licenses, manpower etc.
4	Appendix-P4	Cost wise breakup for Telemedicine (Item mentioned in Sr. No. 36 in Volume-V- BOQ - (PART A-I)) such as Hardware, Software, equipments, licenses, manpower etc.

Note- All the items mentioned in cost breakup should also be mentioned in the respective Appendix in technical bid. There should be no mismatch of the items in both the Appendixes i.e. in technical bid and respective Appendix in the price bid.

11. List of Annexure of Volume-IV

Sr. No.	Name of Annexure	Description
1	Annexure-A	Details for No. Of Network Points, Desktop and Printers etc.

2	Annexure-B	Proposed Network diagram
3	Annexure-C	Technical Specification for Active and Passive items of LAN and Wi-Fi
4	Annexure-D	Technical Specification for Hardware and Software of Library Management System
5	Annexure-E	Details of Appendixes to be submitted along with Technical Bid (without price) i.e. T1, T2, T3, T4
6	Annexure-F	Details to be submitted by bidder for make and model of the items for Desktop, Printer, LAN and Wi-Fi
7	Annexure-G	Technical Specification for Desktop, Printer, Tablet & PACS Workstations etc.
8	Annexure-H	List of approved makes
9	Annexure-I	Tentative phase wise item distribution
9	Annexure-J	Technical Specification for Server Hardware and Storage for HMIS

LAN & Wi-Fi

7. Network Infrastructure

Establishment of Local Area Network (LAN) and Wi-Fi system for Hospital, OPD and Teaching Block at KCGMC, Karnal

Introduction

At its new upcoming Hospital, OPD and Teaching blocks at KCGMC campus, Karnal, Institute wishes to setup a State-of-the-Art, high performance, fault-tolerant, secure and highly available IT Networking infrastructure and shall utilize the best of products and latest, open standards based technology, high quality services and workmanship.

Scope of work

1. Cable (U/FTP Cat 6A & Optical Fibre Cable) based network shall be established at College, OPD and Hospital building. In addition to the cable based network, secured wireless network shall also be established for College, OPD and Hospital Building. Two hostels are also connected with Wireless network connected with main hospital network through fibre.

2. The entire Local Area Network shall be established on 10 Gigabit connectivity.

Followings are the major areas to cover for network connectivity:

1. Hospital Building – Ground + 6 Floor, Basement (550 bed capacity)

   Server room exist at Basement (Details mentioned at Annexure-A)

2. OPD – Ground + 5 Floor, Basement (Details mentioned at Annexure-A)

3. Teaching Block – Ground + 4 (Details of the hostels are mentioned at Annexure-A enclosed.)
4. Hostel- 2 nos. – Ground + 8 (only Wi-Fi is to be done)

No. of Indoor/outdoor wireless units would be installed to cover all the area of the above buildings as per the requirements depending on the physical layout and capacity of the wireless units for establishing wireless connectivity.

An Internet Gateway (suitable leased line connection etc.) would be installed for Internet connectivity at College/Hospital building. Internet Bandwidth management and wireless security solution (Firewall) shall also be installed.

The network architecture shall be comprise with two nos. of Layer 3 Chassis Core switch having redundant fan and Power supply working in highly available Active-Active mode. The switches shall be deployed one each at the server room. Both would be connected to each other on 10G fibre.

The network infrastructure thus provisioned shall be resilient and scalable to support high availability and future expansion without compromising on performance and forklift upgrades.

LAN will be used for running Hospital Management and Information System, PACS (Picture Archival and Communication System), Education Management System, Library Management System, Telemedicine, Internet and network facility and any other application as per the requirement of the Institute.

All the necessary infrastructure to be developed for providing above facilities with adequate speed and security as per the requirement.

Approx. 1000 Network points shall be required for the Hospital and Teaching blocks through LAN connectivity.

The scope of work of the System Integrator Information Technology firm shall include, but not limited to the following:

Design, configure, testing at works, packaging, transportation, supply, handling at site, installation, laying, erection, testing, integration, training, acceptance test, commissioning of communication networks, as applicable along with associated equipment, hardware, software on a turnkey basis, inclusive of warrantee period support services.

1. Structured communication network comprising of Fibre Optics (FO) Cable, U/FTP Cat 6A cables, switches, patch panels, connectors, racks, etc. for communication.
2. Network management solution as per the requirements.
3. Internal Wireless network as per the requirements.
4. Firewall – Appliance based firewall with internal/external IPS/IDS for network security with at-least 3 years subscriptions include Anti Malware, Anti-Spam, Web and Application Filter, Intrusion Prevention system and 24 x 7 support and as per the requirement.
5. Necessary cables including power cable and accessories as may be required for smooth and reliable operation of networking equipment.
6. Supply, Installation, Configuration, Testing and Maintenance for the followings:

    - Core switch, Distribution switch & Access switches
    - Network Management Solution (NMS)
    - Wireless Access point (indoor)
    - Wireless Access Controller
    - Firewall

7. All the necessary licenses for the above equipment (Sr. no. 6) to be provided as per the requirements.
8. The SI shall furnish complete details of acceptance tests proposed to be conducted before handing over the installation to the KCGMC.
9. Racks for mounting of network equipment including dressing of cables with proper marking in the rack.
10. All pipes & cable laying including termination, accessories including HDPE pipes, PVC conduits/channels, supporting structures, clamps, identification tags, ferules etc. required for laying of cables.
11. All cable laying including fibre optics cables inside and outside the buildings including excavation work required for laying of cables, conduit etc. Laying and installation of the cable should be as per the standard of industry norms.
12. Supply of all spares required during erection, testing, commissioning and warrantee maintenance.
13. System Integrator Information Technology firm/Service provider shall use his own sets of tools, tackles, etc. required for erection, testing, commissioning and warrantee maintenance of the system.

14. All the internal Conduit has been already done onsite with civil work during the construction stage according to the requirement if any modification need during cabling it is to be done by the SI without any extra cost.
15. Minor civil works (if required) such as chipping/ cutting of floors for making grooves, making holes/ opening through walls, ceiling or floors, drilling of holes through steel structures and frames, grouting of frames, hooks on walls/ceiling etc. required for execution of work. After erection, surface shall be made good by plastering/painting to their original shape and finish.
16. Necessary Training for IT staff of the KCGMC as per the requirements.
17. **System Integrator Information Technology firm/Service provider shall provide comprehensive onsite warranty services for the complete hardware, software & cabling system of the proposed networking system for minimum period of 3 years. Necessary manpower on regular basis to be posted at site for the above Maintenance period.**
18. System Integrator Information Technology firm/Service provider shall arrange for posting of required technical supervision staffs during erection, testing and commissioning and maintenance of the system.
19. Floor wise network points for Hospital building & Teaching Block are mentioned in the enclosed list.
20. Site certification is to be done by the agency for Penta-scanning and certificate to be submitted for the performance warranty of at-least 25 years.
21. OLTS test is to be done by the agency for OFC connectivity as per the requirement.
22. **Completeness**

    Any equipment, materials or supplies which may not be specifically mentioned, but are necessary for carrying out the contract work shall be in the scope of the service provider and the system must be complete in all respect.

Additional specific terms of the contract for establishment of Local Area Network (LAN) and Wi-Fi System.

1. System Integrator Information Technology firm should provide tender specific authorizations from their respective OEM's for Active and Passive items. The OEM's shall also undertake to provide support commitments during the warranty period and also take all warranty related responsibilities in the event.
2. **All products shall be offered with 3 years OEM warranty and maintenance support.**
3. Licensing – All the licenses of the software will be provided in the name of the client (KCGMC, Karnal)
4. System Integrator Information Technology firm sole responsible for all the maintenance support of all the items supplied and installed for the period of 3 years from the date of commissioning and handing over of all the items.
5. After award of work and at the time of implementation, in case the quoted model(s) are out-dated and new upgraded model introduce in the market then service provider shall supply the latest upgraded model without any extra charges. All the latest product and technology to be used at the time of establishment of the LAN and Wi-Fi System at site. Any product and

technology should not be six months old and should be as per the requirement of the proposed HMIS and PACS.

6. If any promotional scheme is launched by the manufacturer at the time of supply of the item, all the benefits of the scheme will be given to the client/consignee.
7. System Integrator Information Technology firm has to provide the plan, design and site preparation as per requirement and as directed to the satisfaction of engineer and as per terms of the technical specifications.
8. A detailed shop drawings indicating line diagram, route diagram showing details of laying underground, overhead or under wall cables showing details of cable, switches, joint etc. complete in all respect to be submitted to engineer for approval before ordering any items & start of execution work within 15 days of award of work. The design if required will be revised as per direction of engineer before approval.
9. System Integrator Information Technology firm is responsible for all unpacking, assembling, wiring, installation, cabling between equipment and components and connection to power supplies. They will test all Systems operations and perform all the necessary setup, configuration and customization for successful operation of the Network at site.
10. The Local Area Network (LAN) will be accepted only when authorized person from the KCGMC, Karnal / HSCC has given satisfactory performance report of the installation.
11. A technically qualified & experienced engineer (having good knowledge of Networking) will have to be posted at site after completion of the project (Commissioning and handing over) during the warranty maintenance period. Deputed engineer should have an experience of at least three to five years in the Networking and should have technical qualification in the relevant field. Your site engineer will co-ordinate with the authorized person of the KCGMC at site for all works including installation, commissioning and maintenance. The cost of this will be deemed to be including in price quoted.

    a. The site engineer deputed from the service provider for maintenance support should attain the breakdown call and make all efforts to rectify faults related to failure of hardware/software/network at site with minimum possible time and maximum up to 24 hours from the time of reporting of fault.

    b. Network up time should be continuous throughout the warranty period covering 24x7 without fail and as per the requirement of the hospital.

12. Inspection – The inspection shall be carried out by authorized representative.

    Client/Purchaser have the right to inspect and/or to test the material to confirm their conformity with the contract and in case any inspected/tested goods fail to perform to the specifications, the client may reject them and the supplier shall either replace the rejected goods or make alteration necessary to meet the specifications free of cost to the Client/purchaser.
13. System Integrator Information Technology firm should provide the standard technical literature (not photocopies) of the entire offered product.
14. LAN should be at least 10 Gigabit Ethernet on Optical fiber backbone. SI may propose a high performance system which is capable to handle the needs of KCGMC Hospital and support the proposed PACS.

15. The SI shall supply all the installation material/ accessories/ consumables (e.g. screws, clamps, fasteners, ties anchors, supports, grounding strips, wires, fiber connection kits etc.) necessary for the installation of the systems.
16. The SI shall be responsible for providing proper "Electrical ground" at all the required points as per the approved IEEE standards for Grounding of Sensitive Electronic Equipment and as per the OEM guidelines.
17. The SI shall install, wire the UPS power at required locations and provide proper electrical ground for the same before installation of the equipment. Civil works if any required for installation of the system will be the responsibility of the SI.
18. All the work shall be done in a conscientious manner as per the OEM guidelines and best industry practices. The system shall be subjected to inspection at various stages. The SI shall follow all Safety Regulations and practices.
19. The SI shall configure quality of service parameters on network switching devices for end-to-end QoS for critical traffic over the network.
20. SI shall be responsible for integration of security components in the network to ensure a secured network access for users.
21. SI shall configure network management policies for managing all the network and security devices using network management systems.
22. SI shall prepare detailed acceptance testing plan (ATP) for each of the components i.e. Network, Image & Data and submit the same to KCGMC.
23. All the functionality, features and configuration shall be documented for all the equipments/components and shall be demonstrated with respect to the documentation prepared.
24. The SI shall be responsible for obtaining approvals (if any) for any Statutory &Regulatory requirements from any of the authorities.
25. Bidders are requested to submit make and model details for the following items along with technical bid as per the format enclosed at Annexure –F

Sr. No.	**Item**	**Reference in BOQ**
1	Active devices	Sr. no. 1.0 to 7.0 of LAN BOQ in (PART-A)-II.
2	Passive devices	Sr. no. 8.0 to 10.0 of LAN BOQ in (PART-A)-II.

Queue Management System

8. Queue Management System

Background

The number of seriously ill patients admitted to the hospitals has increased steadily over the years. Overcrowding of Out Patient Department (OPDs) and the wards is now a common scenario. This can largely be attributed to the number of the patients receiving care, healthcare professionals providing that care, and often people visiting the patients. Overcrowding may affect patient's symptoms, clinical outcome and satisfaction levels. It can also affect physician's effectiveness and lead to frustration and sometimes violence.

The Problem needs urgent redressal lest public may not rely on the quality of the care provided by the hospitals. The OPD in any hospital is considered as the mirror of the hospitals which reflects the functionality- being first point of contact between the patient and the hospital staff.

As such, providing best OPD services are one of the primacies of the hospital. This can, to a great extent, be overcome by using IT, leading to enhanced productivity and reduction in waiting time. Queue Management system can be deployed to streamline the patient flow in the hospitals.

The System

Queue Management System essentially comprises of Token Dispenser Unit with touch screen, Master Display (LED TVs), Computer desktops (each with a different client operator software) installed at the registration counter connected through LAN, Counter Display, and Server with Manager Console server software.

The location of these would, however, depend upon the current OPD setup in a hospital. The visiting patients could be categorised as – General, Ladies, Hospital Staff, Senior Citizens/Handicap.

Complete infrastructure for Queue Management System for all the OPD and Doctor/Consultant's room in the entire hospital to be provided and this is to be linked with the Hospital Management Information System through Appointment module. All the customization and integration shall be done in the Application Software of the QMS as per the requirement of the Hospital.

Functional and Technical Requirements

Queue Management System shall be required for the OPD for waiting of the patient at OPD area and further required in each Consultant's room for waiting of the doctor/consultant in the hospital.
Technology should be latest for all the equipment.

QMS shall also be linked with the OPD appointment module of the HMIS to cater all the patients who have already taken the appointment (online through web-portal etc.) for a particular consultant and visit to the OPD. QMS system will be used for both visiting patients and those who have taken the prior appointment.

Details of the Registration Counter, Token Counter and Consultant's room in OPD building

Sr. no.	Floor	No. of Registration Counter	No. of Proposed Token counter	Proposed QMS System for Consultant's Room
1	Ground Floor	14	5	-
2	First Floor	-	-	18
3	Second Floor	-	-	18
4	Third Floor	-	-	21
5	Fourth Floor	-	-	**25**
	Total	**14**	**5**	**82**

Technical Requirements

1. System - Based on Controller/Server with latest technology

- The system should be able to connect to 2 or more Separate token display units.
- The system should manage queue in real time and integrated with speakers.
- The system GUI should have multi-lingual Support (English & Hindi).
- The system should provide touch screens for selecting services.
- The system should support single / multiple selection of service/s at the time of dispensing the token.
- The system should support the nested services under the services which can be selected by the patient/operator.
- In nested services/ multiple services, the system should automatically move as the next service to the next counter immediately once the customer has finished with previous Service at the previous counter.
- The system should support generation of unique token number for the day & station.
- The System should allow the administrator to modify the details to be printed on the token.
- The system should provide generation of alphanumeric token numbers.
- The system should be able to print the token in the language selected by the customer.
- The QMS system should flash promotional / compliance messages while idle.
- Admin should be able to change the promotional messages and edit the list of services and customer types displayed in the input module.
- The system should have facility of displaying the token number to be serviced.
- The status of the token should be displayed on the LED screen tokens and in an easy format.

- Display should be able to accommodate additional counters added by admin or any changes to the counters without affecting the view ability.
- The system should generate the audio alerts (voice) and display the information on the LED.
- The system should provide multiple languages for voice notification.
- The voice call should be in the language selected by the customer at the time of taking the token.
- The system should have facility of categorizing the customers.
- The system should have facility of prioritizing the services for priority customers.
- The system should keep information of skipped token/s
- Operator should be able to view the services aligned against his counter, upcoming token no., past token nos. serviced, tokens missed.
- Ability to service a customer out of turn.
- Ability to invoke an idle counter by calling the next customer on the counter through administrator access.
- The system should be able to redirect / reassign between service to service,
- Operator should be able to stop or pause operations. On pausing, the counter should not be available to the scheduler for allocating a customer during this time
- The system should allow system administrator to activate / deactivate services across the counters.
- Group calling: During the rush hours (configurable for each branch), 2, 3 or 4 successive token tickets carry same token numbers and separate subscripts. Customers carrying token tickets of same token numbers are called together to a counter and are served as per their respective subscripts.
- Multi-counter services: Some services may require the customer to go the multiple counters to complete the process. Our system supports such functions. If a service is so configured, then after getting served at one counter, he will automatically be queued up at the next counter listed for that service. This feature can be used in addition to or in place of Multi-service selection by the customer.
- Built-in Information Kiosk in the touch screen based user panel. Not only it provides additional information about listed services, a customer can also use it to obtain detailed information about various services and schemes offered by the bank.
- Facility for user configurable form based data collection against each token
- Touch screen should use latest SAW based technology.
- Admin should be able to define counters, i.e. which counters will do what services and what are the timings of each counter
- Admin should be able to add or reduce counters or change counter definitions on the fly and token dispensations should change accordingly.
- Admin should be able to change some or the entire algorithm parameters basis the dynamic situation in his station.
- The system should allow text chat between operators and between manager & operators
- The system should allow system administrator to view the services available at any counter.
- The system should allow system administrator to monitor the workload across the counters.

- The system should be able to provide real time floor view to the admin and enable manager to send message to underperforming counter.
- **Facility to add remarks for each token.** The remarks are visible to every successive operator to whom this token is forwarded. Next operator can add his own remarks. Each remark carries the ID of the counter where the remark is added. Token wise remarks are also shown in the reports
- **Reports of breaks taken.** Whenever an operator takes a break, he is required to enter the reason. An operator wise report of breaks taken with Reason is available.
- **Internal Services**: Two types of internal services are available. First type are not available on Operator panel for selection. For second type, associated counters are not shown on the Master Display. Both services are independently selectable.
- **Single click** to complete current token and call next
- **Skipped tokens:** Detailed Report of skipped tokens
- **Max wait & transaction time.** Operator report shows maximum waiting time and maximum transaction time.
- **Priority Customer** : Facility for Manager to give priority to a particular customer
- **Delay alerts** Manager gets a pop up with a Beeper showing details of a token where in bench mark has exceeded (wait time, transaction time). In reports, all transaction times and waiting times exceeding preset Bench mark times are shown in red.
- **Forward-back a token.** An operator can forward-back a token to another service. On completion at forwarded service, the token is returned back to sender counter on priority.
- **Selective Master Displays**: Facility to have multiple master displays each one showing different counter groups.
- **Central Monitoring Software**: Central Monitoring software installed at the Central office provides three major functions.

  1. Remote configuration of system
  2. Central configuration of video and text promotion
  3. Central comparative reports of branches
  4. Detailed reports of individual branches
  5. Individual back up and restore.

- The system should have facility of assigning benchmark time for different services.
- Admin can view patient details such as arrival time, patient details, amount of time waited, expected wait time
- System administrator should have the permission of modifying the text on the LED scrolling display.
- The system should be able to use existing PC's at the stations for the implementation of the Q-Management software.
- The system should provide Web based access by the users through Station's standard web browser.
- The software should also be capable of running on thin clients.
- In the absence of the PC at the counter the system should have the capability, through some other gadget to include that counter in the QMS system.
- The system should have capability of integrating with the HMIS application.

- The system should be able to provide configuration like adding /deleting services, change the token machine display properties (color, width, fonts, etc), language, change LED display unit properties (fonts, logo, token no & counter no. layout, etc), change elements in token (logo, waiting customer count, promotional message, etc.)
- The system should be able to generate following reports with facility to drill down:

  - Ability to view end of day and period wise MIS reports on footfalls, patient mix, transaction mix.
  - Service wise break up of tokens
  - Average service time and wait time for operator/ Counter Operator productivity, view reasons for operator breaks pauses.
  - Service wise break-up for selected month
  - Average Service time and average wait time for selected month
  - Day-wise breakup of services offered for selected month
  - Benchmark service time for different services.
  - Consolidated report of the total no of service availed by the customers during the day.
  - The system should be able to export reports to
    MS word, excel & PDF formats.
- The system should be able to provide a non-interactive live view of real time statistics for all the stations remotely from central location.
- Should have Built-in digital signage, so that in addition to displaying Token Number-counter table, it can display promotional video/images and multilingual scrolling text as configured.
- Map services to multiple Operator counters
- Generate Statistical data on patient wait times and transaction times
- Generate Employee efficiency statistics
- Optimize staffing models on basis of work force efficiencies

2. Counter Display

- 4" character height 3 digit with Beeper (seven segments) or as per the requirements.
- Dimensions: 4"= 14"x6x1.75" or as per the requirements
- Support Multiple counter Display.
- Should give information of current tokens being serviced.

3. LED Display (Master display)

- LED TV with size of 15'' to 55" or as per the requirements (make – Sony/Samsung/Panasonic/Toshiba)
- HD Ready
- SVGA connectivity or use any latest technology for connectivity
- Support Multiple LED display
- The LED Master display can be configured to show promotional messages (images/flash) on the right side of the display and promotional scrolling text at the bottom.
- Should be integrated with speakers.
- Supports announcement of tokens in multiple languages (English, Branch language and user selected language).

- The status of the token should be displayed on the LED screen an easy format.
- Display module should give information of current tokens being serviced.
- Display should be able to accommodate additional counters added by admin or any changes to the counters without affecting the view ability.
- Should generate the alerts and display the information on the LED.
- In addition to the token, counter and service information, the LED should be able to display scrolling information that hospital may want to convey to their patients.
- Scrolling text should be displayed on LED.
- In addition to the token, counter and service information, the LED should be able to display scrolling information that hospital may want to convey to their patients.

4. Call Console for Doctor's/Consultant's room

- 4x4 multipurpose keyboard and 3 digit, 1" token number display or as per the requirement. Facility to call next token, to call any specific token number and call token from another queue as per the requirement.
- Full function Call pad for non-PC counters. Counters with Server/PC and counters without Server/PC can be mixed in the same system.

5. Software Application

- Web and client/server based application
- Database – as per the requirements
- Desktop application – Browser based
- Software Application to be integrated with the HMIS application if required or as per the requirement of the hospital.

6. Cabling work

Necessary cabling & conduiting work with all the accessories (VGA adapter, distributor etc.) to be done for the system for data and power supply as per the requirement. All modules are interconnected through a 4-wire 1MM copper bus that carries data and power.

Completeness of the system

Any equipment, hardware, software, accessories, cabling etc. which may not be specifically mentioned, but are necessary for carrying out the contract work shall be in the scope of the System Integrator Technology firm/service provider and the system must be completed in all respect.

Other special Terms and conditions for implementation of Queue Management System for OPD and Consultant's room.

(1) System Integrator Information Technology firm/service provider has to provide the plan, design and site preparation as per requirement and as directed to the satisfaction of the engineer and as per terms of the technical and functional requirements of the hospital. If required, Software application for Queue Management System to be customized as per the requirements of the hospital.

(2) All the latest equipment should be supplied at the time of implementation of the Queue Management System. Technology of all the equipment including LED TV should not be more than six months old.

(3) Above system to be supplied with 3 years on site Comprehensive Maintenance (labor and parts). Minimum one technically qualified engineer having good knowledge of the system will have to be posted at site after completion of the work (commissioning and handing over) during 3 years maintenance period on regular basis. Engineer should be available during OPD time or as per the requirement of the hospital and co-ordinate with the concerned staff of the hospital on regular basis. The cost of this will be deemed to be including in price quoted. Consumable items like stationary (paper roll) etc. shall not be covered in the comprehensive maintenance and to be charged separately.

(4) System Integrator Information Technology firm/service provider should have experience for implementation of the Queue Management System in large hospital which caters at-least 1000-2000 patient per day in OPD and system should use multiple token dispenser units (at least 2 or more) for printing of tokens simultaneously. Service provider also has experience for implementation of the QMS for the consultant's room.

(5) All the license of the software will be provided in the name of the client (KCGMC, Karnal).

Technical Specification for the Queue Management system Kiosk

- It should be Floor Mount with Touch Screen comprising of the following
  - õ Switch , multiple Services and multiple counters support
  - õ Integrated PC with Windows 7/8 OS or latest Windows OS
  - õ Additional VGA port and VGA amplifier to drive Master LED displays
  - õ Thermal Printer with auto-cutter (Token Dispenser Unit)
  - õ AQMS server software
  - õ Required interfaces and power supply
- Support multiple services and multiple counters as per the requirements.
- Paper width – 58mm, Paper Roll size – 50 meter or as per the requirements.
- Dispenser machine minimum capacity holding capacity of 50 meters to generate at least 500 tickets without a refill or as per the requirements.
- Support multiple Dispenser connectivity.
- The system should have the capability of generating alerts to the administrator for events like device fault, printer out of paper, paper jam etc.
- The system should be able to connect to 2 or more separate token display units as per the requirements.

Annexure-A

Building wise Network Point Details

Sr. No.	Building	No. of Network points	No. of Computer	No. of LaserJet Printer (LJ)	No. of Multifunction LaserJet Printer (Print, Scan, Copy)	MS-Office
1.	Hospital	478	147	30	71	24
2.	OPD	226	136	102	30	13
3.	College	291	127	65	12	16
	Total	**995**	**410**	**197**	**113**	**53**

Floor wise details –

HOSPITAL BLOCK					
Floor	**No. of Network points**	**No. Of Computer**	**No. of LaserJet Printer (LJ)**	**No. of Multifunction LaserJet Printer (Print, Scan, Copy)**	**Ms Office**
Ground	61	31	7	14	13
1st	74	22	7	8	5
2nd	76	27	3	11	3
3rd	76	22	6	13	3
4th	69	21	7	10	-
5th	36	8	0	4	-
6th	54	8	0	4	-
Basement	32	8	0	7	-
TOTAL	**478**	**147**	**30**	**71**	**24**

OPD BLOCK					
Floor	**No. of Network points**	**No. of Computer**	**No. of LaserJet Printer (LJ)**	**No. of Multifunction LaserJet Printer (Print, Scan, Copy)**	**Ms Office**
Ground	32	31	18	12	12
1st	34	19	15	3	-
2nd	42	20	17	2	-
3rd	38	18	14	4	-
4th	46	32	27	5	-
5th	16	6	4	2	-
Basement	18	10	7	2	1
Total	**226**	**136**	**102**	**30**	**13**

College Block					
Floor	**No. of Network points**	**No. of Computer**	**No. of LaserJet Printer (LJ)**	**No. of Multifunction LaserJet Printer (Print, Scan, Copy)**	**MS-Office**
Ground Floor	37	19	5	2	02
First Floor	60	26	14	5	04
Second Floor	76	23	12	1	02
Third Floor	65	29	15	4	04
Fourth Floor	53	30	19	2	04
Total	**291**	**127**	**65**	**12**	**16**

HOSPITAL BLOCK						
Sr. No.	**Description**	**No. of Network Point**	**No. of Computer**	**No. of Laserjet Printer**	**No. of Multifunction Printer**	**MS Office**
			Basement			
1	Main store	2	1	-	1	-
2	Main Lab	2	1	-	1	-
3	Office (2)	2	2	-	2	-
4	Store (2)	1	-	-	-	-
5	Central Medical record section (2)	2	1	-	1	-
6	Mammography	1	-	-	-	-
7	X-ray (2)	2	-	-	-	-
8	Demo room	1	-	-	-	-
9	MRI	1	-	-	-	-
10	CT scan	1	-	-	-	-
11	Computer room (2)	2	1	-	-	-
12	Medical store	1	-	-	-	-
13	Laundry	1	-	-	-	-
14	Office	1	1	-	1	-
15	Clean Packaging storage	1	-	-	-	-
16	Room (8)	8	-	-	-	-
17	Linen store	1	-	-	-	-
18	Office area	1	1	-	1	-
19	USG room	1	-	-	-	-
	TOTAL	**32**	**8**	**0**	**7**	**0**
			Ground Floor			
20	Reception and enquiry	4	1	-	-	-
21	Doctor room	1	1	-	1	-
22	Reception and nursing station	4	2	-	-	-
23	Treatment room	1		-	-	-
24	Nurse station (2)	2	2	-	-	-
25	Room (2)	2	-	-	-	-

26	Store room	1	-	-	-	-
27	X ray	1	-	-	-	-
28	Ultrasound room	1	-	-	-	-
29	Pharmacy (2)	2	1	1	-	-
30	Central Lab	1	1	1	-	-
31	OT (2)	4	2	-	-	-
32	IPD reception	1	1	-	-	-
33	Office (12)	12	12	-	12	12
34	Dialysis	1	-	-	-	-
35	Reception at Office area	1	-	-	-	-
36	Record room	1	-	-	-	-
37	Store room (2)	2	-	-	-	-
38	Blood collection room	2	2	2	-	-
39	LAB (2)	2	-	-	-	-
40	Meeting room	1	-	-	-	-
41	MS Office	2	1	-	1	1
42	PS to MS	1	1	1	-	-
43	Lecture hall	1	-	-	-	-
44	Billing desk	5	2	2	-	-
45	CCTV security office	2	1	-	-	-
46	Entry Reception	1	1	-	-	-
47	College Council room	2	-	-	-	-
	TOTAL	**61**	**31**	**7**	**14**	**13**
			First Floor			
48	Doctor room	1	1	1	-	-
49	Demo room (2)	2	-	-	-	-
50	Treatment room (2)	2	-	-	-	-
51	Examination room	1	-	-	-	-
52	Nurse duty room (2)	2	-	-	-	-
53	Staff room	1	-	-	-	-
54	Nurse station (3)	3	3		-	-
55	Room (10)	10	-	-	-	-

56	Preparation room	1	-	-	-	-
57	Delivery OT (2)	2	2		-	-
58	Sterilization	1	-	-	-	-
59	Anaesthesia room	1	-	-	-	-
60	Nurse station (2)	2	2		-	-
61	Clinical demonstration	1	-	-	-	-
62	Doctor duty room (3)	3	-	-	-	-
63	Assistant room (9)	9	-	-	-	-
64	HOD (2)	2	2		2	-
65	PS (3)	3	3	3	-	-
66	ASSO (6)	6	-	-	-	-
67	Meeting room	1	-	-	-	-
68	Additional Director	2	1	-	1	1
69	Joint Director	2	1	-	1	1
70	PS office	2	1	1	-	-
71	Office	2	1	-	1	-
72	Director office	2	1	-	1	1
73	Director Room	2	1	-	1	1
74	Director meeting room	2	-	-	-	-
75	PS to Director	2	1	1	-	-
76	Dean room	2	1	-	1	1
77	PS to dean	2	1	1	-	-
	TOTAL	**74**	**22**	**7**	**8**	**5**
			Second Floor			
78	Nurse station (4)	5	4	-	-	-
79	Equipment room	1	-	-	-	-
80	OT (9)	18	9	-	-	-
81	Doctor room (2)	2	2	-	2	-
82	Doctor duty room (2)	2	-	-		-
83	Office	1	1	-	1	-
84	Nursing room	1	-	-	-	-
85	Demonstration room (2)	1	-	-	-	-

86	HOD (3)	3	3	-	3	-
87	Clinical demonstration room	1	-	-	-	-
88	Treatment room	1	-	-	-	-
89	Laboratory	1	-	-	-	-
90	Nurses duty room	1	-	-	-	-
91	OT complex	1	-	-	-	-
92	OT HOD	2	1	-	1	-
93	TSSU	1		-	-	-
94	Computer room	2	1	-	1	-
95	Room (4)	4	-	-	-	-
96	OT store	1	-	-	-	-
97	Departmental Library	2	1	1	-	-
98	Clean store	1	-	-	-	-
99	Asst. (8)	8	-	-	-	-
100	PS (2)	2	2	2	-	-
101	Meeting room	1	-	-	-	-
102	Account office	2	1	-	1	1
103	Store	1	-	-	-	-
104	Law officer	2	1	-	1	1
105	Administrative office	2	1	-	1	1
106	Admin Section	2	-	-	-	-
107	Legal Section	2	-	-	-	-
108	Account Section	2	-	-	-	-
	TOTAL	**76**	**27**	**3**	**11**	**3**
			Third Floor			
109	Nurse station (3)	3	3	-	-	-
110	Treatment room (3)	3	-	-	-	-
111	Clinical demonstration room(3)	3	-	-	-	-
112	Laboratory (3)	3	-	-	-	-
113	Doctor duty room (3)	3	-	-	-	-
114	Nurses duty room (3)	3	-	-	-	-
115	Central Lab	4	1	-	1	-

116	PS (6)	6	6	6	-	-
117	HOD (9)	9	9	-	9	-
118	Staff room (3)	3	-	-	-	-
119	ASST (13)	13	-	-	-	-
120	ASSO (10)	10	-	-	-	-
133	Academic office	2	1	-	1	1
134	Store	1	-	-	-	-
135	Procurement officer	2	1	-	1	1
136	Administrative office	2	1	-	1	1
137	Admin Section	2	-	-	-	-
138	Procurement Section	2	-	-	-	-
139	Academic Section	2	-	-	-	-
	TOTAL	**76**	**22**	**6**	**13**	**3**
	Fourth Floor					
140	Nurse station (4)	5	4	-	-	-
141	Treatment room (4)	4	-	-	-	-
142	Clinical demonstration room (4)	4	-	-	-	-
143	Laboratory (4)	4	-	-	-	-
144	Doctor duty room (4)	4	-	-	-	-
145	Nurses duty room (4)	4	-	-	-	-
146	Central Lab	2	1	1	-	-
147	PS (6)	6	6	6	-	-
148	HOD (10)	10	10	-	10	-
149	Staff room (3)	3	-	-	-	-
150	ASST (13)	13	-	-	-	-
151	ASSO (10)	10	-	-	-	-
	TOTAL	**69**	**21**	**7**	**10**	**0**
	Fifth Floor					
152	Nurse station (4)	5	4	-	-	-
153	Treatment room (4)	4	-	-	-	-
154	Clinical demonstration room (4)	4	-	-	-	-

155	Laboratory (4)	4	-	-	-	-
156	Doctor duty room (4)	4	-	-	-	-
157	Nurses duty room (4)	4	-	-	-	-
158	Room (2)	2	-	-	-	-
160	HOD (4)	4	4	-	4	-
161	Staff room (4)	3	-	-	-	-
162	Room (2)	2	-	-	-	-
	TOTAL	**36**	**8**	**0**	**4**	**0**
Sixth Floor						
163	Nurse station (4)	5	4	-	-	-
164	Treatment room (4)	4	-	-	-	-
165	Clinical demonstration room (4)	4	-	-	-	-
166	Laboratory (4)	4	-	-	-	-
167	Doctor duty room (4)	4	-	-	-	-
168	Nurses duty room (4)	4	-	-	-	-
169	Room (2)	2	-	-	-	-
170	HOD (4)	4	4	-	4	-
171	Staff room (4)	3	-	-	-	-
172	Room (20)	20	-	-	-	-
	TOTAL	**54**	**8**	**0**	**4**	**0**

OPD BLOCK						
Sr. No.	**Description**	**No. of Network Point**	**No. of Computer**	**No. of Laserjet Printer**	**No. of Multifunction Printer**	**MS Office**
Basement						
1	Reception	2	1	-	-	-
2	Lab (4)	4	4	4	-	-
3	Nurse station	1	1	1	-	-
4	Doctor room	1	1	-	1	-
5	OPD nurse room	1	-	-	-	-

6	Office	1	1	-	1	1
7	staff room	1	-	-	-	-
8	OPD store	1	1	1	-	-
9	store (4)	4	-	-	-	-
10	Sample collection	2	1	1	-	-
	TOTAL	**18**	**10**	**7**	**2**	**1**
Ground Floor						
11	Record room	1	0	-	-	-
12	Medicine store	1	1	1	-	-
13	Office (12)	12	12	-	12	12
14	Free medicine distribution (5)	5	5	5	-	-
15	Enquiry office	1	1	-	-	-
16	Registration (12)	12	12	12	-	-
	TOTAL	**32**	**31**	**18**	**12**	**12**
First Floor						
17	Record room	1	-	-	-	-
18	Treatment room (2)	2	-	-	-	-
19	Teaching room (2)	2	-	-	-	-
20	Doctor room (2)	2	2		2	-
21	Staff room	1	-	-	-	-
22	Consultant room (15)	15	15	15	-	-
23	Room(2)	2	-	-	-	-
24	OPD store (2)	2	-	-	-	-
25	X ray	1	-	-	-	-
26	Counselling room	1	-	-	-	-
27	OPD nurses room	1	-	-	-	-
28	Minor OT	1	1	-	1	-
29	Plaster room	1	-	-	-	-
30	Reception	2	1	-	-	-
	TOTAL	**34**	**19**	**15**	**3**	**0**
Second Floor						
31	Teaching room (2)	2	-	-	-	-
32	Doctor room	1	1	-	1	-
33	Baby feeding room	1	-	-	-	-

34	Staff room	1	-	-	-	-
35	Record room	1	-	-	-	-
36	Child Speech room	1	-	-	-	-
37	Child Guidance Clinic	1	-	-	-	-
38	Treatment room (2)	2	-	-	-	-
39	Consultant room (16)	16	16	16	-	-
40	Doctors room	1	1	-	1	-
41	Child Immunization room	1	-	-	-	-
42	OPD nurses room (2)	2	-	-	-	-
43	OPD store (2)	2	-	-	-	-
44	Family Welfare Clinic	1	-	-	-	-
45	Antenatal Clinic	1	-	-	-	-
46	Cancer detection clinic	1	-	-	-	-
47	Sterility Clinic	1	-	-	-	-
48	Dietician room	1	-	-	-	-
49	Ultrasound room	1	-	-	-	-
50	Reception	2	2	1	-	-
51	Minor OT	1	-	-	-	-
52	Child care room	1	-	-	-	-
	TOTAL	**42**	**20**	**17**	**2**	**0**
Third Floor						
53	Treatment room (3)	3	-	-	-	-
54	Teaching room (3)	3	-	-	-	-
55	Doctor room (3)	3	3	-	3	-
56	Staff room	1	-	-	-	-
57	Speech therapy	1	-	-	-	-
58	Record room	1	-	-	-	-
59	ENG Lab	1	-	-	-	-
60	Sound proof audiometry	1	-	-	-	-
61	Consultant room (14)	14	14	14		-
62	Dental surgery	1	-	-	-	-
63	OPD store (3)	3	-	-	-	-
64	OPD nurses room (3)	3	-	-	-	-
65	Minor OT	1	1		1	-

66	PAC Clinic	1	-	-	-	-
67	Dental prosthetic room	1	-	-	-	-
	TOTAL	**38**	**18**	**14**	**4**	**0**
Fourth Floor						
68	Treatment room (3)	3	-	-	-	-
69	Teaching room (3)	3	-	-	-	-
70	Doctor room (4)	4	4	-	4	
71	Staff room	1	-	-	-	-
72	PFT lab	1	-	-	-	-
73	Record room	1	-	-	-	-
74	ECG room	1	-	-	-	-
75	Echo room	1	-	-	-	-
76	Consultant room (27)	27	27	27	-	-
77	Minor OT	1	1	-	1	-
78	OPD store (2)	2	-	-	-	-
79	OPD nurses room	1	-	-	-	-
	TOTAL	**46**	**32**	**27**	**5**	**0**
Fifth Floor						
80	Consultant room (4)	4	4	4	-	-
81	Room (7)	7	-	-	-	-
82	Doctor room	1	1	-	1	
83	OPD Nurse room	1	-	-	-	-
84	OPD store	1	-	-	-	-
85	Minor OT	1	1	-	1	-
86	Refraction room	1	-	-	-	-
	TOTAL	**16**	**6**	**4**	**2**	**0**

College Building – Details for Network Points, Computer and Printer

COLLEGE BLOCK						
Sr. no.	**Description**	**No. of Network point**	**No. of Computer**	**No. of Printer**	**Type of Printer**	**MS-Office**
Ground floor						
1.	Dissection Hall	3	-	-	-	-
2.	Research	2	1	1	1LJ	-
3.	Histology Lab	3	1	1	1MLJP	-
4.	Cafeteria	3	-	-	-	-
5.	Asst. Prof(3)	3	3	3	3LJ	-
6.	Tutor	1		-	-	-
7.	Deptt. Clc	1		-	-	-
8.	HOD Room	1	1	1	1MLJP	MSO-1
9.	Room(11)	11	11			-
10.	Demo (2)	3		-	-	-
11.	Reception	4	1	-	-	-
12.	Wt.	1	-	-	-	-
13.	PS Room	1	1	1	1LJ	MSO-1
	Total	**37**	**19**	**7**	**LJ5 2MLJP**	**MSO-2**
First Floor						
14.	Practical Lab	3	1	1	1LJ	-
15.	Research (2)	3	2	-	-	-
16.	Demo Room(4)	4		-	-	-
17.	Asst. Prof (3)	3	3	3	3LJ	-
18.	Asso. Prof (4)	4	4	4	4LJ	-
19.	Library (2)	4	2	2	2LJ	-
20.	Amphibian Lab	6	1	1	1LJ	-
21.	Tutor room(2)	2		-	-	-
22.	Non Tech	1		-	-	-
23.	HOD Room (2)	2	2	2	2MLJP	MSO-2
24.	PS Room(2)	2	2	2	2LJ	MSO-2
25.	Office Room	1	1	1	1LJ	-
26.	Clerical	1	1	-	-	-
27.	Physiology Lab	6	1	1	1NP	-
28.	Haematology	6	1	1	1NP	-
29.	Mammalian Lab	6	1	1	1NP	-
30.	Room(3)	4	3			-
31.	CLC. Room	1		-	-	-
32.	Wt.	1	-	-	-	-
	Total	**60**	**26**	**19**	**14 LJ 2 MLJP 3 NP**	**MSO-4**

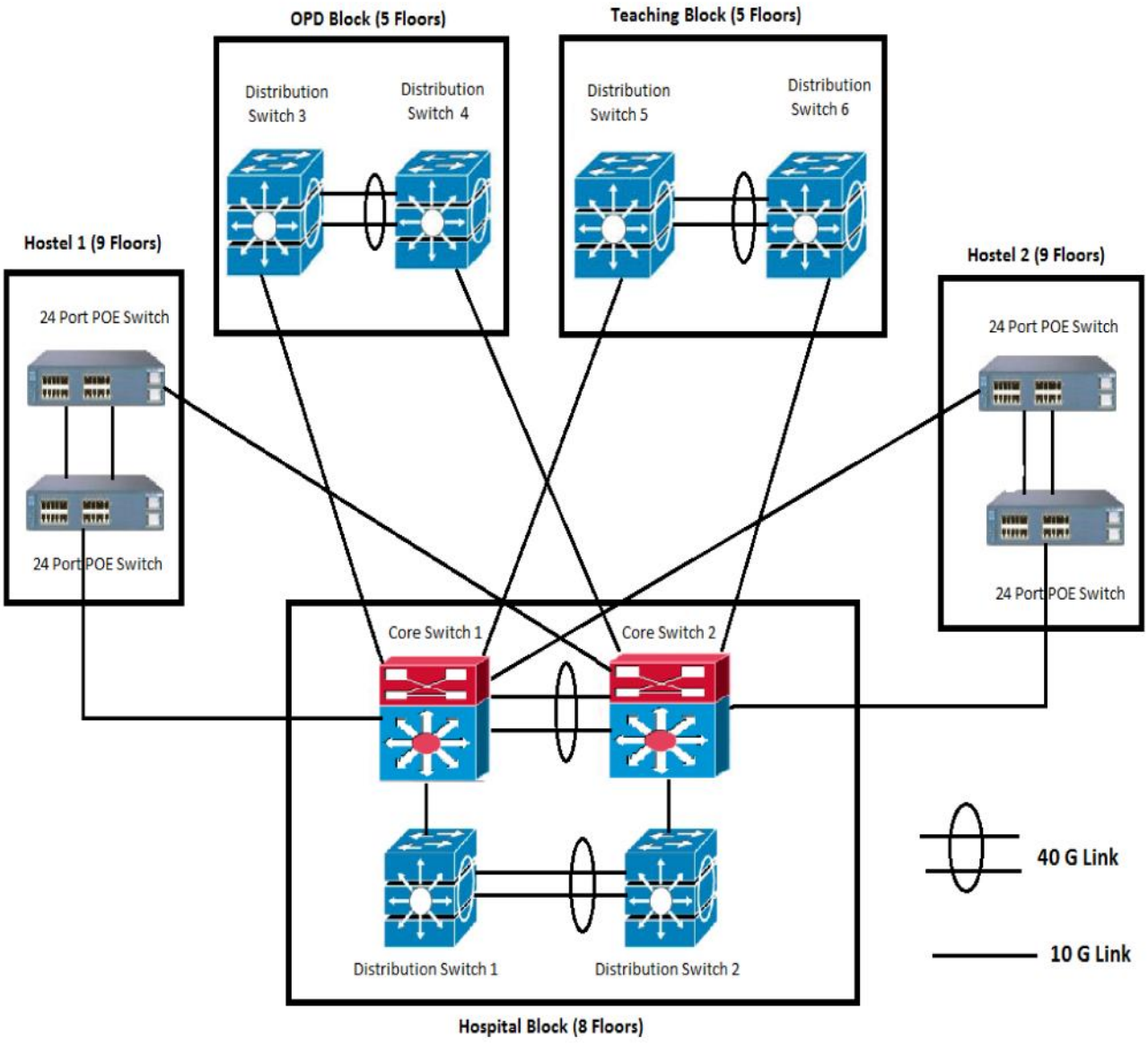
Second Floor						
33.	Asst. Prof(3)	3	3	3	3LJ	-
34.	Asso. Prof.(5)	5	5	5	5LJ	-
35.	Museum	1	-	-	-	-
36.	Cytopathology	2				-
37.	Research	2	1	1	1LJ	-
38.	Blood Bank	4	1	-	-	-
39.	Histopathology	2				-
40.	Demo Room(7)	10		-	-	-
41.	Tutor room	1		-	-	-
42.	CLC. Room	1		-	-	-
43.	HOD Room	1	1	1	1MLJP	MSO-1
44.	Wt.	1	-	-	-	-
45.	PS Room	1	1	1	1LJ	MSO-1
46.	Library	2	1	1	1LJ	-
47.	Clerical	1	1			-
48.	Room(7)	21	7			-
49.	Haematology Lab	2				-
50.	Lab	2	1			-
51.	Pathology/Haematology Lab	6	1	1	1LJ	-
52.	Histology Lab	2				-
53.	Morbid Anatomy	6				-
	Total	**76**	**23**	**13**	**12LJ 1 MLJP**	**MSO-2**
Third Floor						
54.	Museum(3)	5	-	-	-	-
55.	Practical Lab	4	1	1	1LJ	-
56.	Demo room(3)	9		-	-	-
57.	Asst. Prof(6)	6	6	6	6LJ	-
58.	Asso. Prof.(3)	3	3	3	3LJ	-
59.	HOD Room (2)	2	2	2	2MLJP	MSO-2
60.	Research(2)	4	2	2	2MLJP	-
61.	Library(2)	4	2	2	2LJ	-
62.	PS Room(2)	2	2	2	2LJ	MSO-2
63.	WT.	1	-	-	-	-
64.	Parasitology	2	1			-
65.	Virology	2	1			-
66.	Mycology	2	1			-
67.	Tuberculosis	2	1			-
68.	Anaerobic	2	1			-
69.	Serology	2	1			-
70.	Tutor	1		-	-	-
71.	CLEC.	1		-	-	-
72.	Non-teach	1		-	-	-
73.	Clinical	6	1	1	1LJ	-

	Pharmacology					
74.	Experimental Pharmacology	4	4	-	-	-
	Total	**65**	**29**	**19**	**15LJ 4 MLJP**	**MSO-4**
Fourth Floor						
75.	Research	2	1	1	1LJ	-
76.	Demo room(3)	6		-	-	-
77.	Library	2	1	1	1LJ	-
78.	Asst. Prof(6)	6	6	6	6LJ	-
79.	Asso. Prof.(3)	3	3	3	3LJ	-
80.	HOD Room (2)	2	2	2	2MLJP	MSO-2
81.	PS Room(2)	2	2	2	2LJ	MSO-2
82.	Wt.	1	-	-	-	-
83.	Lab(2)	12	6	6	6LJ	-
84.	Room(9)	12	9			-
85.	CLEC.	1		-	-	-
86.	Tutor	1		-	-	-
87.	Non-teach	1		-	-	-
88.	Museum	2	-	-	-	-
	Total	**53**	**30**	**21**	**19LJ 2 MLJP**	**MSO-4**

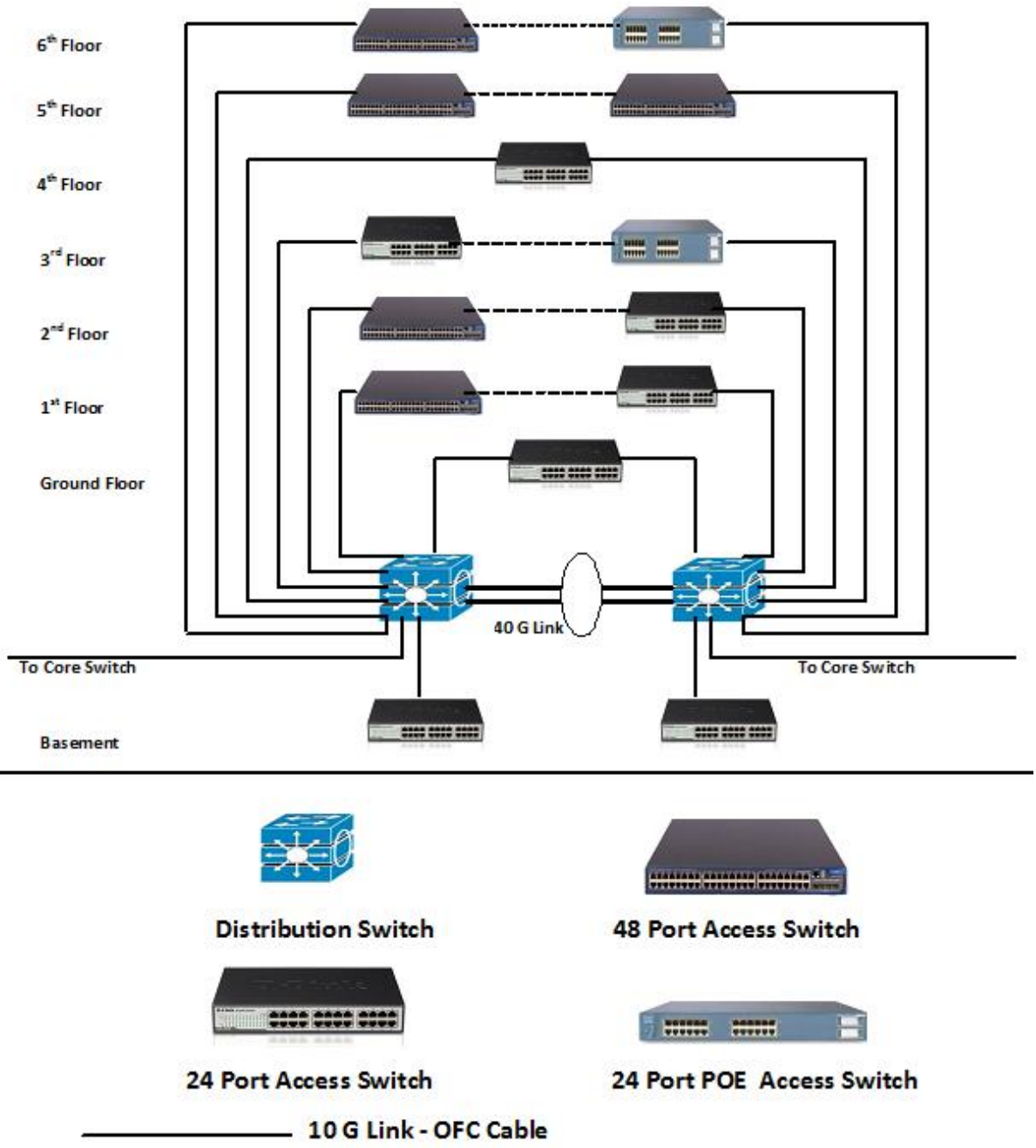
Annexure-B

(Proposed Network diagram for all blocks and LMS diagram for Library)

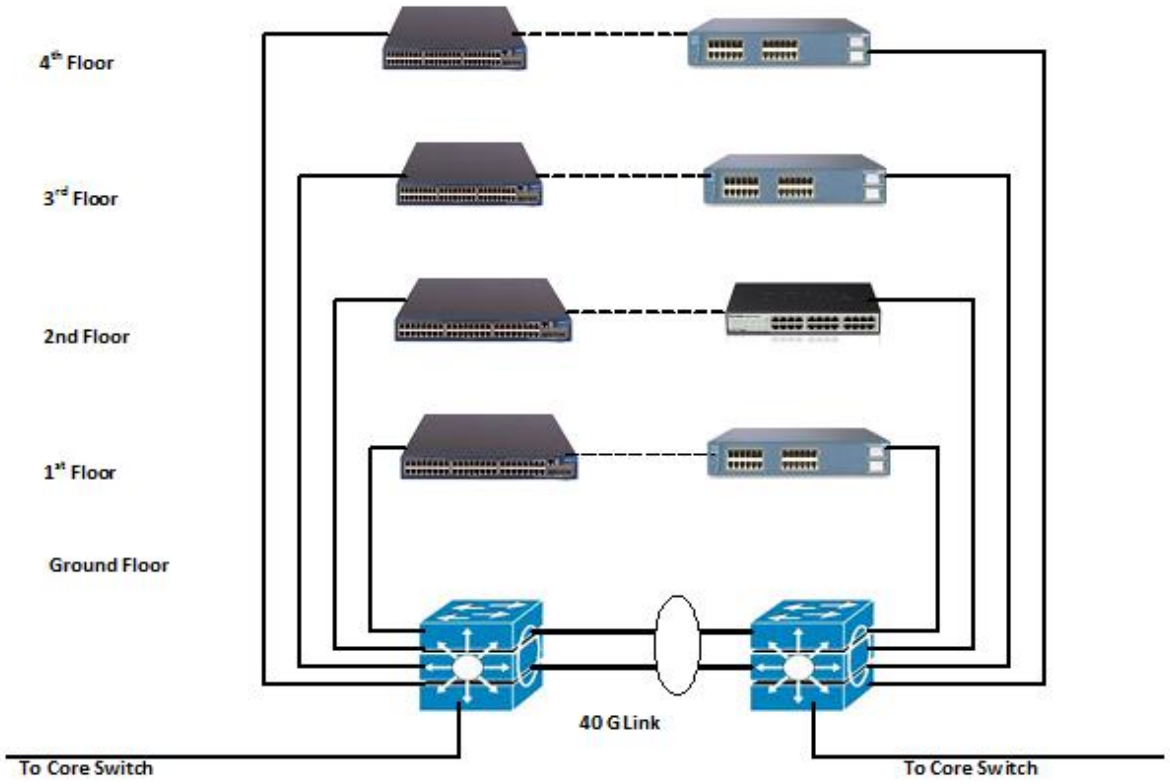
Proposed Network Diagram for Kalpana Chawla Govt. Medical College, Karnal



Proposed Network Diagram For Hospital Block



Proposed Network Diagram for OPD Block



Distribution Switch

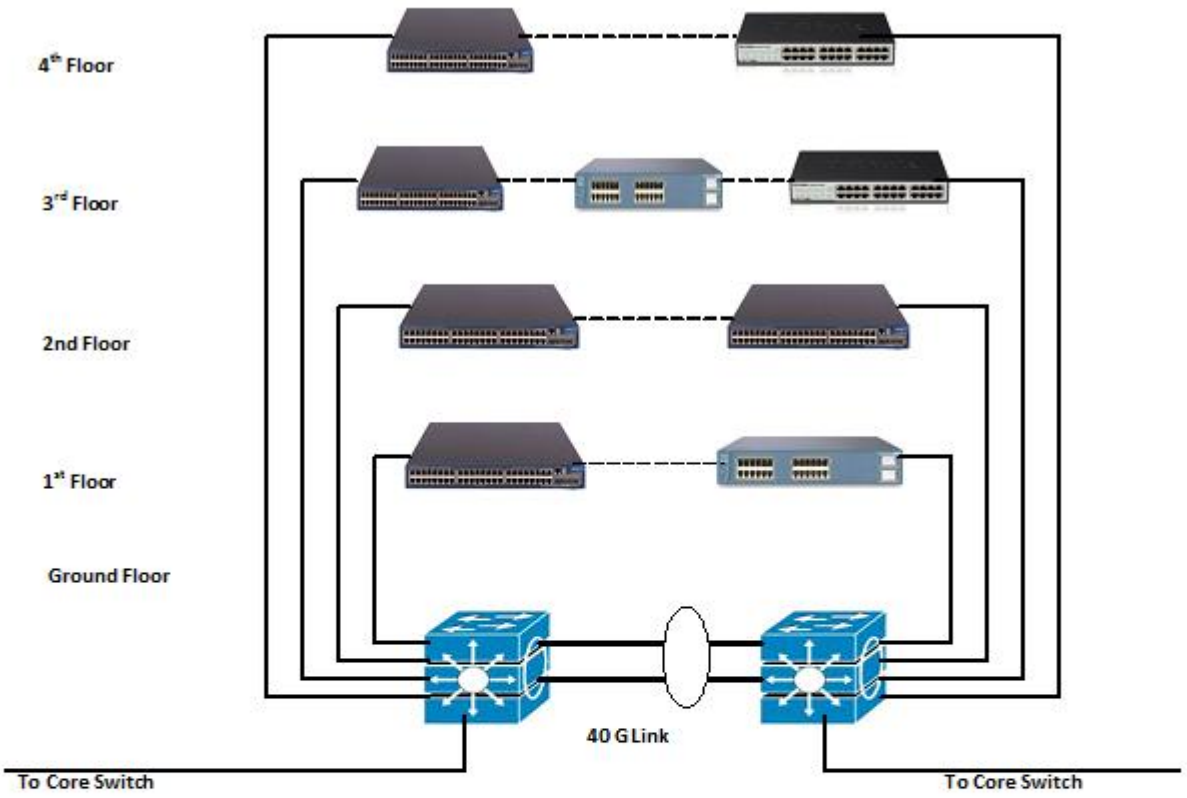
48 Port Access Switch

24 Port Access Switch

24 Port POE Access Switch

10 G Link - OFC Cable

Proposed Network Diagram for College



Distribution Switch

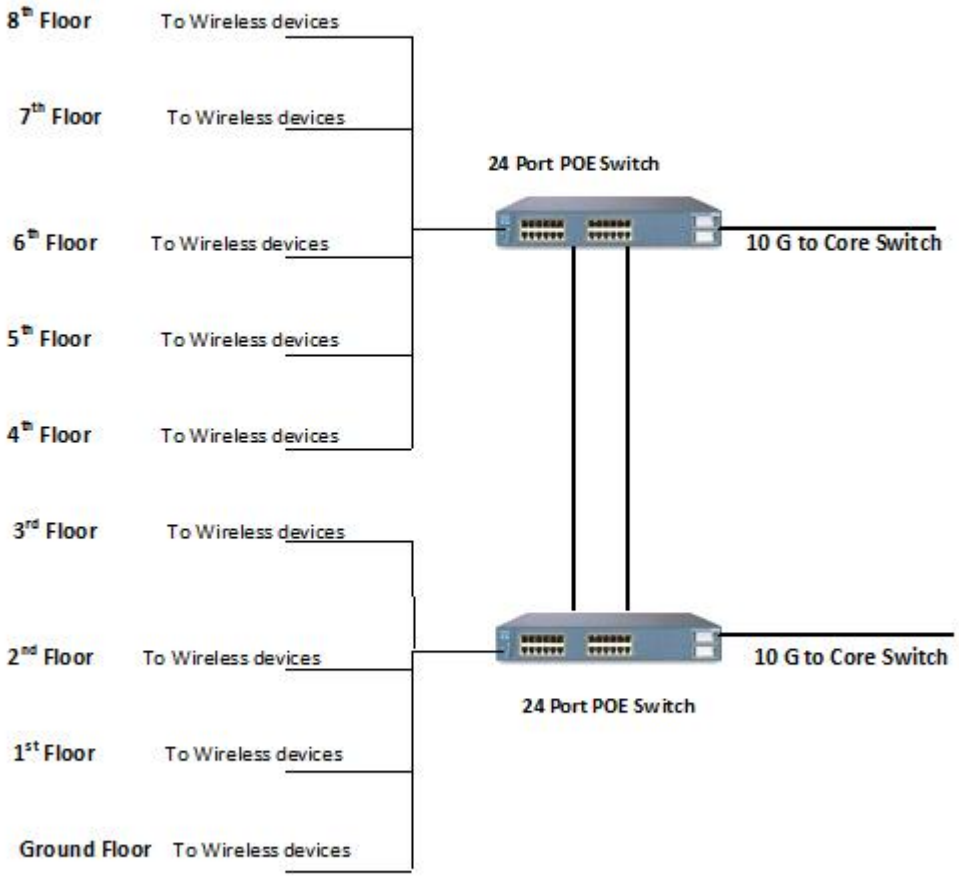
48 Port Access Switch

24 Port Access Switch

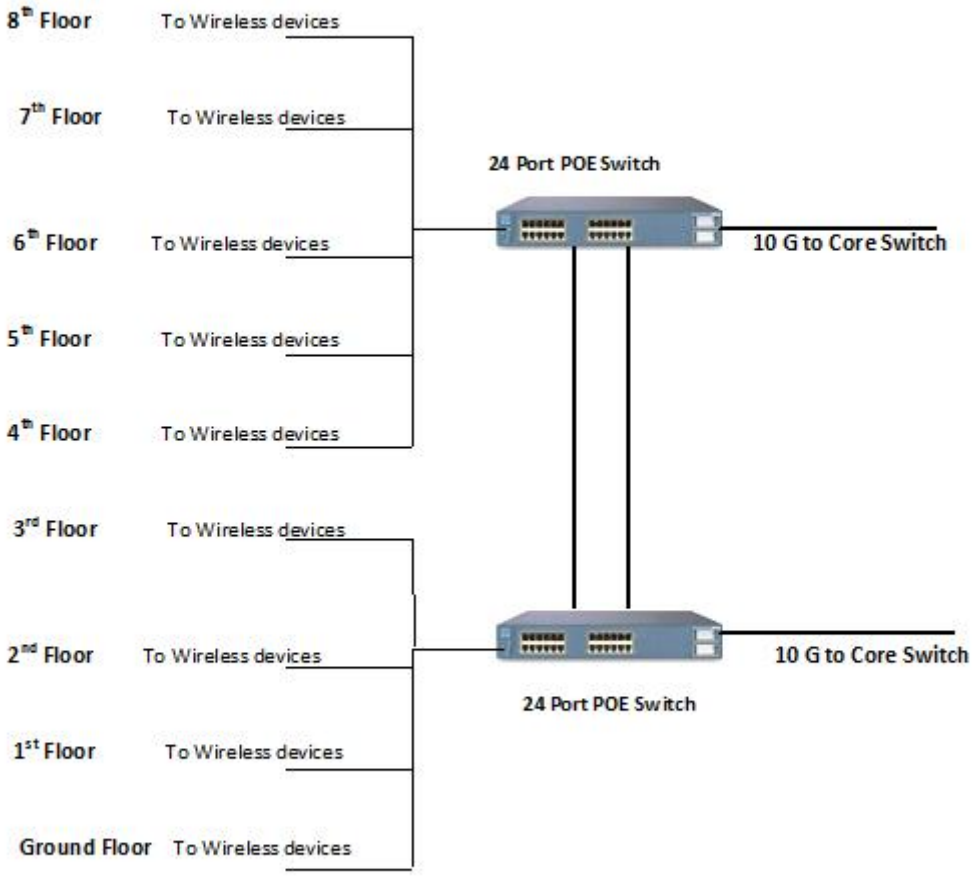
24 Port POE Access Switch

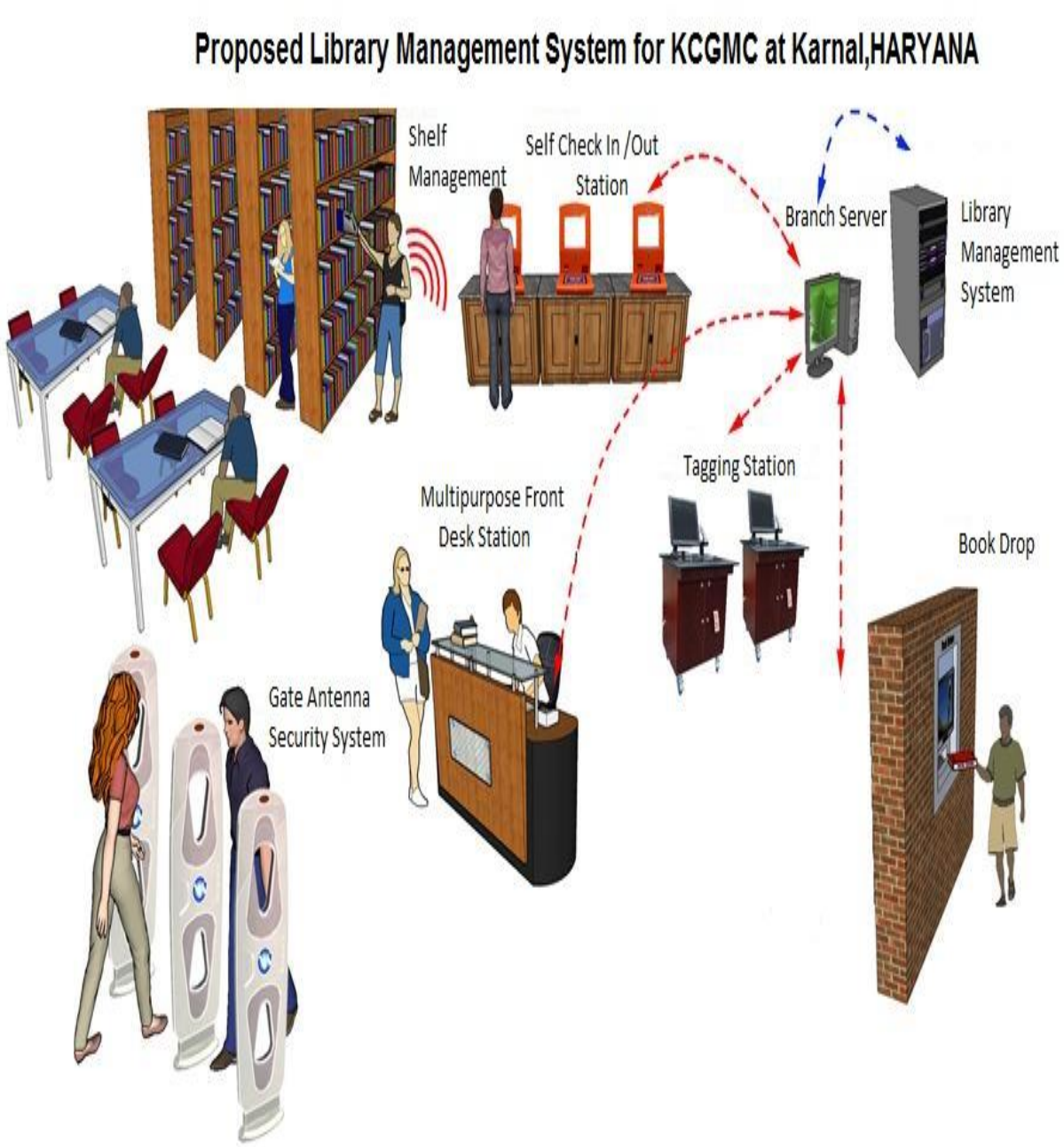
10 G Link - OFC Cable

Proposed Network Diagram For Hostel -1



Proposed Network Diagram For Hostel -2




Proposed Library Management System for KCGMC at Karnal,HARYANA
Shelf Management
Self Check In /Out Station
Branch Server
Library Management System
Tagging Station
Multipurpose Front Desk Station
Book Drop
Gate Antenna Security System

Annexure-C

(Technical Specification for Active and Passive devices of Local Area Network (LAN) for KCGMC, Karnal)

1. Core Switch (Make – as per approved make)

(Sr. no. 1.1 in BOQ of LAN)

Sr. no.	Specifications
1	Core Switch/Chassis configured in an Active-Active mode with support for Virtual Port Channel (VPC) or equivalent for dual homing connections.
2	Core switch should be configured with redundancy in power supplies and fans.
3	Core Switch should be configured to provide Wire-Speed Non-Blocking Switching and Routing Performance at Layer 2 and Layer 3 on all ports.
4	Each Core Switch should have min 48 ports of 10G SFP/SFP+ wire speed for L2 and L3.
5	The ports on each core switch should be capable of supporting 1000Base-TX, 1000Base-SX and 1000Base-LX SFP and 10 Gbps Direct-Attached Copper, 10G SR and 10G LR SFP+ connectivity options.
6	Each Core Switch should have 6 x 40G QSFP ports for Inter-core switch connectivity and should support scalability for additional 6 ports of 40G QSFP for the future expansion with Ethernet fabric or virtual chassis or on same hardware.
7	It should support Unicast, Multicast routing and IPv4 and IPv6 routes.
8	Switch should support IEEE for user authentications, accounting, DHCP snooping, RADIUS and TACACS.
9	Switch should support min 100K IPv4 routes and 50K IPv6 routes.
10	Core Switch should have minimum switching capacity of 1.44 Tbps and minimum forwarding capacity of 1.08 Bpps or more for both IPv4 and IPv6.
11	The Core Switches should support min 200 K MAC addresses and min 4K active VLAN.
12	The Core Switches should support full Layer 2 features like STP, RSTP, MSTP, LAG, LACP, ACL, QoS and IGMPv1/v2 from day 1.
13	The Core Switches should support full Layer 3 features like PIM-DM/SM, RIPv1/v2, OSPF, VRRP and PBR from day 1. It should be upgradable to support BGP feature in future.
14	The Core Switches should support full IPv6 features like RIPng, MLD v1/v2, OSPFv3, VRRPv3 and IPv6 management from day 1.
15	Should support security features like standard / extended ACLs, based on port and or time.
16	Should support MAC address filtering based on source and destination addresses.

17	The switch should have control plane policing feature to filter the unwanted traffic entering the CPU queues.
18	The switch should support Non Stop Routing (NSR) and ISSU.
19	The Core Switch should support SNMP v1, v2 & v3 for management. It should be manageable with any standard EMS/NMS.
20	Core switches should be provided with 3 years warranty including 24 X 7 OEM direct Technical Assistance Centre (TAC) support.

2. L3 Distribution Switch (Make – as per approved make)

(Sr. no. 2.1 in BOQ for LAN)

Sr. No.	Specifications
1	The Layer 3 Switch/Chassis has to be configured with redundancy in power supplies and fans.
2	The Layer 3 Switch should be configured to provide Wire-Speed Non-Blocking Switching and Routing Performance at Layer 2 and Layer 3 on all ports.
3	Each Layer 3 Switch should have min 24 x 10/100/1000 Mbps RJ45 ports and 8 ports of 10G SFP+ fibre in standalone or virtual chassis mode.
4	The Layer 3 Switch should have min 4 ports of 40G QSFP from day 1 for inter-distribution switch connectivity.
5	The Layer 3 Switch should provide Non-Blocking switch fabric capacity of 448 Gbps or more.
6	The Layer 3 Switch should provide wire-speed packet forwarding of 330 Mbps or more.
7	The Layer 3 Switch should support min 30K MAC addresses and min 4000 active VLANs.
8	The Switch should support scalability of upto 30 port of 10G SFP+ in standalone or virtual chassis mode.
9	The Layer 3 Switch should support full Layer 2 features like STP, RSTP, MSTP, LAG, LACP, ACL, QoS and IGMPv1/v2 from day 1.
10	The Layer 3 Switch should support full Layer 3 features like PIM-DM/SM, RIPv1/v2, OSPF, PBR and VRRP from day 1. It should be scalable to support BGP features if required in future with a license.

11	The Layer 3 Switch should support a minimum of 14K IPv4 Routes and 2500 IPv6 Routes in hardware.
12	The Layer 3 Switch should be configured with full IPv6 features like RIPng, MLD v1/v2, OSPFv3, VRRPv3 and IPv6 management from day 1.
13	The Layer 3 Switch should support SNMP v1, v2 & v3 for management. It should be manageable with any standard EMS/NMS.
14	All Switches and Transceivers should be of same OEM make.
15	The Layer 3 Switch should be quoted with 3 years warranty including 24 X 7 OEM direct Technical Assistance Centre (TAC) support.

3. 24 Port Access Switch (Make – as per approved make)

(Sr. no. 3.1 in BOQ for LAN)

Sr. No.	Specifications
1	Access Switch should have 24 ports of 10/100/1000 RJ45 and 4 port of 10G SFP+ fibre based.
2	Access Switches should support non-blocking switching fabric capacity of min 125 Gbps and forwarding capacity of 95 Mpps. IPv4 to IPv6 conversion should not affect the expected throughput.
3	The Access switch should support min 16K MAC addresses and min 1K active VLANs with 4K VLAN IDs.
4	The Access Switch should support stacking of minimum 8 units. All required stacking ports/modules and cables should be included.
5	The Access switch should support up to 8 hardware queues per port
6	The Access Switch should support full Layer 2 features like STP, RSTP, MSTP, LAG, LACP, ACL, QoS, IGMP v1/v2 from day 1.
7	The Access Switch should support basic L3 features like IPv4 & IPv6 static routing, Layer 3/4 ACLs, ECMP, virtual interfaces and routed interfaces from day 1.
8	The Access Switch should support IPv6 management features like IPv6 ping, IPv6 trace route, IPv6 Telnet, IPv6 TACACS, IPv6 DNS, and IPv6 RADIUS.
9	All Switches and Transceivers should be of same OEM make.

10	The Access Switch should have support for internal/external redundant power supply
11	The Access Switches should be quoted with 3 years warranty including 8 X 5 OEM direct Technical Assistance Centre (TAC) support.

4. 48 Port Access Switch (Make – as per approved make)

(Sr. no. 3.2 in BOQ for LAN)

Sr. No.	Specifications
1	Access Switch should have 48 ports of 10/100/1000 RJ45 and 4 port of 10G SFP+ fibre based.
2	Access Switches should support non-blocking switching fabric capacity of min 175 Gbps and forwarding capacity of 130 Mpps. IPv4 to IPv6 conversion should not affect the expected throughput.
3	The Access switch should support min 16K MAC addresses and min 1K active VLANs with 4K VLAN IDs.
4	The Access Switch should support stacking of minimum 8 units. All required stacking ports/modules and cables should be included.
5	The Access switch should support up to 8 hardware queues per port
6	The Access Switch should support full Layer 2 features like STP, RSTP, MSTP, LAG, LACP, ACL, QoS, IGMP v1/v2 from day 1.
7	The Access Switch should support basic L3 features like IPv4 & IPv6 static routing, Layer 3/4 ACLs, ECMP, virtual interfaces and routed interfaces from day 1.
8	The Access Switch should support IPv6 management features like IPv6 ping, IPv6 trace route, IPv6 Telnet, IPv6 TACACS, IPv6 DNS, and IPv6 RADIUS.
9	All Switches and Transceivers should be of same OEM make.
10	The Access Switch should have support for internal/external redundant power supply
11	The Access Switches should be quoted with 3 years warranty including 8 X 5 OEM direct Technical Assistance Centre (TAC) support.

5. 24 Port POE+ Access Switch (Make – as per approved make)

(Sr. no. 4.1 in BOQ for LAN)

Sr. No.	Specifications
1	Access Switch should have 24 ports of 10/100/1000 PoE/PoE+ RJ45 and 4 port of 10G fibre based
2	Access Switches should support non-blocking switching fabric capacity of min 125 Gbps and forwarding capacity of 95 Mpps. IPv4 to IPv6 conversion should not affect the expected throughput.
3	The Access switch should support min 16K MAC addresses and min 1K active VLANs with 4K VLAN IDs.
4	The Access Switch should support stacking of minimum 8 units.
5	The Access switch should support up to 8 hardware queues per port
6	The Access Switch should support full Layer 2 features like STP, RSTP, MSTP, LAG, LACP, ACL, QoS, IGMP v1/v2 from day 1.
7	The Access Switch should support basic L3 features like IPv4 & IPv6 static routing, Layer 3/4 ACLs, ECMP, virtual interfaces and routed interfaces from day 1.
8	The Access Switch should support IPv6 management features like IPv6 ping, IPv6 trace route, IPv6 Telnet, IPv6 TACACS, IPv6 DNS, and IPv6 RADIUS.
9	All Switches and Transceivers should be of same OEM make.
10	The Access Switch should have support for internal/external redundant power supply
11	The Access Switches should be quoted with 3 years warranty including 8 X 5 OEM direct Technical Assistance Centre (TAC) support.

6. Wireless Access Point (Make – as per approved make)

(Serial no. 5.1 in BOQ for LAN)

S.No	Specifications Indoor AP
	Description
1	Access Point radio should be minimum 3x3 MIMO with 3 spatial streams or more. Dual Radio capable .

2	Access Point should be 802.11ac ready from day one.
3	AP should have 1x10/100/1000 Ge LAN port.
4	802.11 a/b/g/n/ac functionality certified by the Wi-Fi alliance.
5	Access Point can have integrated or external Antenna.
6	The Max transit power of the AP + Antenna should be as per WPC norms for indoor Access Points. OEM to give a undertaking letter stating that the AP will configured as per WPC guidelines for indoor AP and also submit the WPC certificate showing approval.
7	Should support 8x BSSID per AP radio.
8	Access point should support 802.11ac beam forming for 802.11ac.
9	The access point should be capable of performing security scanning and serving clients on the same radio. It should be also capable of performing spectrum analysis and security scanning using same radio.
10	Should support BPSK, QPSK, 16-QAM, 64-QAM and 256 QAM modulation types
11	Access point should support 802.3af/at POE standard.
12	Access point should have option of external power adaptor as well.
13	AP should be UL 2043 certified.
14	Must support Proactive Key Caching and/or other methods for Fast Secure Roaming.
15	Must operate as a sensor for wireless IPS
16	AP should have kensington lock slot.
17	AP mounting kit should be with locking mechanism so that AP cannot be removed without using special tools.

7. Wireless Access Controller (Make – as per approved make)

(Serial no. 5.2 in BOQ for LAN)

S. No	Specifications
1	The proposed architecture should be based on centralized controller with thin/thick AP deployment. AP's should download OS and configuration from controller. Switch/Controller for improved security.
2	The Single Hardware controller should be capable of supporting 500 or more AP's in thin AP deployment mode. Controller should have license as per number of AP's being asked in tender.
3	The controller should have minimum of 2x10/100/1000 Mbps Eth ports.

4	Redundancy Features: Controller should support hardware redundancy
5	Controller should have console port and USB port.
6	The controller should support 802.11ac standard.
7	Controller should support management frame protection.
8	Controller should have capacity to handle minimum 10000 or more concurrent devices.
9	Controller should support reliable fast roaming standards 802.11k/r
10	The controller should support advance QOS either as an integrated feature or through add-on components to implement role based access for data, voice and video applications. It should support session prioritization as well like Voice, Video, Data.
11	Rules for access rights should be based on any combination of time, location, user identity and device identity.
12	The controller should provide latest network authentication (WEP, WPA, WPA2) and encryption types like DES/3DES, TKIP and AES.
13	Controller should track the location of interferer objects and Rogue AP. Please quote additional if functionality is available by adding additional component/License.
14	Solution must support per user Rate limiting control.
15	Controller should support UL 60950 , EN 60950 safety standard.
16	Security is major concern so Controller/Add on Solution should provide Advance WIDS/WIPS functionality. Please quote the additional price for the same. Advance WIDS/WIPS should comply below mentioned security points:-
17	Advance WIDS/WIPS should able to detect advance attacks i.e. spoofed MAC address detection, Authentication attack, Valid SSID misuse, EAP handshake Flood attacks etc
18	Advance WIDS/WIPS should detect an invalid AP broadcasting valid SSID and should prevent valid clients from these AP's.
19	The WIPS solution should detect and protect if an attacker attempts to lure a client to a malicious AP using university SSID on fake AP in close proximity of the university premises. It should detect When the Campus Client probes for Campus SSID and these malicious APs respond and invite the client to connect to them.
20	Controller should perform spectrum analysis to detect and classify sources of interferences. System should provide fast Fourier transform displays and spectrograms for real-time troubleshooting and visualization.
21	The WIPS solution should detect and protect if a client probe-request frame will be answered by a probe response containing a null SSID to crash or lock up the firmware of any 802.11 NIC.
22	The WIPS solution should detect and protect if a client/tool try to flood an AP with 802.11 management frames like authenticate/associate frames which are designed to fill up the association table of an AP.
23	The WIPS solution should detect and protect if somebody try to spoof MAC address of client or AP for unauthorized authentication.

24	The WIPS solution should detect and protect if a client/tool try de authentication broadcast attempts to disconnect all clients in range rather than sending a spoofed death to a specific MAC address.

8. Network Monitoring Solution (NMS) (Make – as per approved make)

(Serial no. 6.1 in BOQ for LAN)

NETWORK MONITORING SYSTEM (NMS)	
Sr. no.	**Specifications**
1	The Network Management Software shall provide secured web-based consoles to monitor 50 devices and should have scalability to manage up to 500 devices.
2	The Network Management Software should provide a customizable at-a-glance summary of all discovered devices, including inventory and event summary information used to proactively identify problem areas and help prevent network downtime
3	The Network Management Software should be able to discover, configure, monitor, manage, and deploy configurations to dynamically update groups of devices
4	The Network Management Software should allow flexible definitions of administrator roles and responsibilities with RBAC (Role based Access Control) for different teams.
5	The Network Management Software should provide an interface to configure and deploy Command Line Interface (CLI) based configuration templates across one or more IP devices.
6	The Network Management Software should enable performance management by providing customizable dashboards.
7	The Network Management Software should be able to generate reports designed to summarize utilization of and traffic patterns on network interfaces.
8	The Network Management Software should be able to provide real-time network monitoring and accounting capabilities without impacting network performance.
9	The Network Management Software should allow administrators to track device configuration changes, enabling viewing, retrieval, and restoration of configuration files, and monitoring of configuration for troubleshooting purposes
10	NMS should be quoted with 3 years warranty

9. Firewall (Serial no. 7.1 in BOQ for LAN)

(Make – as per approved make)

Sr. No.	Desired Specification
	The proposed solution should match following criteria:-
1	Total 8 number fixed 10/100/1000 interface
2	Total 2 No of SFP Ports
3	Firewall Throughput should be 15 Gbps or higher
4	VPN Throughput should be 3 Gbps or higher
5	IPS Throughput should be 4.5 Gbps or higher
6	Anti-Virus Throughput should be 1 Gbps or higher
7	Concurrent Connections should be 30,000,00
8	New Connections /Sec should be 50,000
9	Maximum Licensed Users should be unrestricted
10	The device should be leader or challenger in Gartner Magic Qudrant for Unified Threat Management
	General Management
11	Customizable Dashboard and SNMP Support
12	Role Based Administration
13	Software Based UTM Manager to manage multiple UTM devices.
14	Manually Or fully automated backup & restore options
15	Self service user portal for one click vpn setup
16	Reusable System Object Definations for networks,services,hosts,users & groups.
	Firewall
17	The proposed solution should be standalone appliance with hardened OS.
18	The proposed solution should be ICSA certified firewall.
19	Should Support NAT static, masquerade (dynamic).
20	Should Support Full configuration of DNS, DHCP and NTP

21	Should Support Routing: static, multicast (PIM-SM) and dynamic (BGP, OSPF)
22	Should Support WAN link balancing: Internet connections, auto-link health check, automatic failover, automatic and weighted balancing and granular multipath rules
23	Should Support QoS with full control over bandwidth pools and download throttling using Stochastic Fairness Queuing and Random Early Detection on inbound traffic.
24	Should Have IPv6 support
25	Should Support VoIP handling for SIP and H.323 connections
26	Should Have Revrse Proxy & URL Hardening Engine
27	Should Have Deep-linking control,Directory traversal prevention,SQL injection protection ,Cross-site scripting protection.
28	Should Have Dual Anti-Virus
29	HTTPS (SSL) encryption offloading
	IPS
30	Intrusion protection: Deep packet inspection engine, 12,000+ patterns
31	Should Have Selective IPS patterns for maximum performance and protection
32	Should Support IPS pattern aging algorithm for optimal performance
33	Should Have Flood protection: DoS, DDoS and portscan blocking
34	Should Support Country blocking by region or individual country (over 360 countries) with separate inbound/outbound settings and exceptions
	Advanced Threat Protection
35	Should Detect and block network traffic attempting to contact command and control servers using DNS, AFC, HTTP Proxy and firewall
36	Should Identify infected hosts on the network and contain their network activity
37	Should Have Selective sandboxing of suspicious code to determine malicious intent
	Web Protection

38	URL Filter database with 30 million+ sites in 95 categories and 64+ languages
39	Application Control: Accurate signatures and Layer 7 patterns for thousands of applications
40	Dynamic application control based on productivity or risk threshold
41	View traffic in real-time, choose to block or shape
42	Malware scanning: HTTP/S, FTP and web-based email via dual independent antivirus engines block all forms of viruses, web malware, trojans and spyware
43	Fully transparent HTTPS filtering of URLs
44	Advanced web malware protection with JavaScript emulation
45	Live Protection real-time in-the-cloud lookups for the latest threat intelligence
46	Potentially unwanted application (PUA) download blocking
47	Malicious URL reputation filtering backed by Global Labs
48	Reputation threshold: set the reputation threshold a website requires to be accessible from internal network
49	Active content filter: File extension, MIME type, JavaScript, ActiveX, Java and Flash
50	YouTube for Schools enforcement
51	Sould Have SafeSearch enforcement
52	Should Support Authentication: Active Directory, eDirectory, LDAP, RADIUS, TACACS+ and local database
53	Custom categorization to override categories or create custom categories
54	Policy testing tool for URLs, times, users and other parameters
55	Customizable block pages
	Email Protection/ Anti Spam
56	Reputation service with spam outbreak monitoring based on patented Recurrent-Pattern-Detection technology
57	Advanced spam detection techniques: RBL, heuristics, SPF checking, BATV, URL scanning, grey listing, RDNS/HELO checks, expression filter and recipient verification
58	Block spam and malware during the SMTP transaction
59	Detects phishing URLs within e-mails
60	Global & per-user domain and address black/white lists

61	Recipient Verification against Active Directory account
62	E-mail scanning with SMTP and POP3 support
63	Dual antivirus engines
64	Archived and compressed attachment scanning with deep-level support
65	Scan embedded mail formats: Block malicious and unwanted files with MIME type checking
66	Quarantine unscannable or over-sized messages
67	Filter mail for unlimited domains and mailboxes
68	Automatic signature and pattern updates
69	Patent-pending SPX encryption for one-way message encryption
70	Completely transparent, no additional software or client required for Email Encryption.
71	PGP key server support
72	Allows content/virus scanning even for encrypted e-mails
73	DLP engine with automatic scanning of emails and attachments for sensitive data
74	User-quarantine reports mailed out daily at customizable times
75	Customizable User Portal for end-user mail management, in 15 languages
76	PDF and CSV exporting of reports
77	Customizable email footers and disclaimers
	VPN
78	PPTP, L2TP, SSL, IPsec, HTML5-based and Cisco client-based remote user VPNs, as well as IPsec, SSL, Amazon VPC-based site-to-site tunnels
79	Authentication: Pre-Shared Key (PSK), PKI (X.509), Smartcards, Token and XAUTH
80	Encryption: AES (128/192/256), DES, 3DES (112/168), Blowfish, RSA (up to 2048 Bit), DH groups 1/2/5/14, MD5 and SHA-256/384/512
81	Intelligent split-tunneling for optimum traffic routing
82	NAT-traversal support
83	Client-monitor for graphical overview of connection status
84	Multilingual: German, English and French
85	IPsec Tunnel Binding
86	Sould Support Proven SSL-(TLS)-based security

87	Ssl VPN Should have support for iOS and Android
88	Should Have True clientless HTML5 VPN portal for accessing applications securely from a browser on any device
	Logging & Reporting
89	Logging: Remote syslog, nightly rotation, email/ftp/ SMB/SSH archiving and log management service
90	On-box reporting: Packet filter, intrusion protection, bandwidth and day/week/month/year scales
91	Hundreds of on-box reports
92	Per-user tracking and auditing
93	Web log searching parameters per user, URL or action
94	Full transaction log of all activity in human-readable format
95	PDF and CSV exporting of reports
96	Executive report scheduling and archiving
	Endpoint Management
97	Windows endpoint protection with Antivirus and device control within UTM
98	On-access, on-demand or scheduled scanning for malware, viruses, spyware and Trojans
99	Live Protection Antivirus provides real-time, in-the-cloud lookups for the latest threat intelligence
100	HIPS with suspicious behavior detection
101	Download scanning
102	Device control for hundreds of popular device types include removable storage, optical media, modems, Bluetooth, wireless, infrared.
	High Availability
103	Zero-config active/passive high- availability
104	Active/active clustering for up to 10 appliances

10. Server Hardware Configuration (Sr. no. 10.6 in BOQ for LAN)

Sr. No.	Item	Description
1	**Server Model**	Server Model with below specification with redundant enablement kit and all the accessories etc. complete in all respect

2	**Processor type**	Intel Xeon Processor E5-2609 v3 (1.9 GHz/6-core/95W/15MB) or Superior
3	**Number of processors**	2 Processor or superior
4	**Standard memory**	16 GB (8x2) or higher
5	**Internal hard disk drive**	Minimum 3 nos. 300 GB 6G SAS or higher
6	**Hard disk controller**	Smart Array P420 /1GB FBWC Controller or equivalent or higher
7	**Internal drive bays**	hot plug advanced key (RAID Technology or equivalent)
8	**Optical drives**	OEM SATA DVD+/- RW Drive
9	**Power Supply**	Redundant power supply (provide additional power supply kit for power redundancy)
10	**Network interface**	Embedded Dual Port Gigabit Server Adopter
11	**Keyboard & Mouse**	OEM standard keyboard and mouse
12	**Monitor**	OEM standard 18.5”
13	**Compatible operating systems**	Microsoft® Windows® Server 2012 and Linux Operating System (Latest)
14	**Warranty**	Three years onsite comprehensive maintenance including labour & parts shall be provided through Manufacturer Warranty/Care Pack/Support Pack.

Specifications for Passive Items & others

CABLING FOR DATA SYSTEM

1. All Copper and Fiber components shall be from the same OEM
2. The OEM shall be ISO 9001:2000 certified
3. The OEM shall be ISO 14001 accredited
4. The Copper and Fiber cabling system shall be certified by OEM to have application support warranty for 25 years

1.0 COPPER CABLING SYSTEM

1.1 CAT6A U/FTP SHIELDEDTWISTED PAIR CABLE	
Characteristic	**Min. Required Specification**
General Features	Category 6A 4 pair U/FTP LS0H cable shall be compliant with TIA/EIA-568-C.2
	Category 6A U/FTP cables shall extend between the work area location and its associated telecommunications closet and consist of 4 pair, 23 AWG, U/FTP LS0H cable jacket.
	Should be ETL verified to TIA/EIA-568-C.2 Category 6A standard for 500MHz (ETL certificate to be enclosed along with the bid)
	Screen: Each individual pair shall be enclosed in laminated Aluminum foil with drain wire.
	Third party report of Full Cat6A Channel/Performance Test should be enclosed along with the technical bid.
	The Category 6A cables shall meet or exceed the following characteristics:
Mechanical Characteristics	**Construction**: 4 pair U/FTP cable should be constructed of 4 individual screened pairs and drain wire.
	Conductor: Solid Copper
	Conductor Size:23 AWG
	Insulator: Polyolefin
	Jacket/ Sheath Type: LS0H (Low Smoke Zero Halogen)
	NVP:75-77%
	Screen: Each individual pair enclosed in laminated aluminum foil with drain wire.
	Pulling Force: 50 N/mm² max
	Capacitance: 40 pF/m nom. @1 KHz.
	DC Resistance: 72 Ω/Km max**.**
	Propagation Delay:514 + 36f½ nS/100m max @1-500 MHz
	Propagation Delay Skew: 45 nS/100 max @ 1-500 MHz
	Mean Impedance: 100Ω ± 6 @ 1-500 MHz

	Resistance Unbalance: 2% max**.**
	Coupling Attenuation: 45dB min @30-100 MHz 40-20 Log (f/100) @ 100-500 MHz
	Outer Diameter: 7.0±0.4mm
	Short term. bend radius:8 x OD mm
	Long Term bend radius: 4 x OD mm
	Weight LS0H per 500m reel:30kg
	Max. Temperature: Storage: -20˚C to +75˚C Operation: -20˚C to +60˚C

1.2 FACE PLATE	
Characteristic	**Min. Required Specification**
Features	Single Gang square plate, 86mmx86mm
	Write on labels in transparent plastic window – supplied with plate
	Screw hole covers – to be supplied with plate
	Plug in Icons – Icon tree – to be supplied with plate
	Should be able to support variety of jacks – UTP, STP, Fiber, Coax etc.

1.3 CAT6A DATA GATE SHIELDED RJ45 JACK	
Characteristic	**Min. Required Specification**
Features	Category 6A Shielded Jack shall be specifically designed for high-speed data transmission and must be compliant with latest ISO/IEC 11801 A1.1 draft and ratified TIA/EIA 568-B.2-10 for the support of 10G BASE-T.
	All information outlets for 22-24 AWG copper cable shall: Use insulation displacement connectors (IDC)
	Allow for a minimum of 200 re-terminations without signal

	degradation below standards compliance limits.
	Be constructed of high impact, flame-retardant thermoplastic and robust die cast zinc alloy housing with icon options for better visual identification.
	With spring loaded shutter
	IDC posts should be pointed
	568A/B configuration
	Color options in jacks should be available.
	The I/O should be UL certified.
Mechanical Characteristic: Jack Connector	**Plastic Housing:**Robust die cast Zinc Alloy housing plated with Bright Nickel/Cu
	Operating Life: Minimum 750 insertion cycles
	Contact Material: Copper alloy
	Contact Plating: 1.25 micrometers Gold/Ni
	Contact Force:100g minimum
	Plug Retention Force: 6.8kg minimum
Mechanical Characteristic:IDC Connector	**Plastic Housing:** Polycarbonate, UL94V-0 rated or equivalent
	Operating Life: Minimum 200 Re-terminations
	IDC Contact Plating: Tin Matte Finish
	Contact Force: 100g minimum
	Wire Accommodation: 22-24 AWG solid

1.4 CAT6A 24 PORT SHIELDED JACK PANEL UN-LOADED:-	
Characteristic	**Min. Required Specification**
Features	Be made of cold rolled steel, in 24 port configurations. Each jack for the jack panel should have spring loaded shutter inside the jack for 100% dust free environment.
	Have port identification numbers on the front of the panel.

	Should have self-adhesive, clear label holders (transparent plastic window type) and white designation labels with the panel, with optional color labels / icons.
	Each port / jack on the panel should be individually removable on field from the panel.
	Should be certified by third Party like UL. Certificates to be submitted with bid.
	Should be supplied with metallic integrated rear cable management shelf as a part of Jack Panel.
	Jack Panel shall be RoHS Compliant
	Jack Panel shall be of shielded type.

1.5 CAT6ASHIELDED MOUNTING CORDS (1 Mtr and 2 Mtr)	
Characteristic	**Min. Required Specification**
Features	Category 6A Equipment cords (Length – 1mtr and 2mtr.)
	The work area equipment cords shall, be comply with TIA/EIA-568-B.2-10 Commercial Building Cabling Standards Transmission Performance Specifications for 4 pair Category 6A Cabling.
	Category 6A modular equipment cords: Shall be round, and consist of eight insulated 26AWG, stranded bare copper conductors, arranged in four color-coded twisted-pairs with aluminium/polyester shield and tinned copper drain wire
	Equipped with modular 8-position modular shielded plugs on both ends, wired straight through with standards compliant wiring.
	Should have 50 micro inches of gold plating over nickel contacts.
	Modular cords should include a moulded strain relief boot.
	Should be covered by UL certification program.
Mechanical Characteristic: Cable	**Conductor size:** 26 AWG stranded bare copper

Mechanical Characteristic: Plug	**Max O.D.:** 6.5mm
	Jacket: PVC
	Temperature range: -20°C to +60°C
	Operating life: Minimum 750 insertion cycles
	Contact Material: Copper alloy
	Contact plating: 1.25 micrometers Au/Ni
	Plug dimensions & tolerances compliant with FCC Part 68 and IEC 60603-7
ElectricalCharacteristics:- Plug	**Max voltage:** 150 VAC (max)
	Max current: 1.5A @ 25 ˚C
	Operating Temperature range: -40 ˚C to +85 ˚C

2.0 OPTICAL FIBER CABLING:-

2.1.1 6 CORE Single-Mode 9/125 µm OS1 Armoured Multi-Tube Optical Fiber Cable:-

Characteristic	**Min. Required Specification**	
Features	The fiber type should be 9 / 125, OS1Matched Cladding Single Mode optical fiber.	
	Fiber dual coated with acrylate coating	
	The fiber should be optimized for operation at 1310 nm and at 1550 nm.	
	Should fulfill the requirements of ISO.IEC 11801 - 2nd Edition, type OS1, ITU-T REC G 652D spec for Low Water Peak fibre.	
Physical Characteristics:-	No of Cores	06
	Nominal mode field diameter	9 µm
	Mode field diameter tolerance	±0.5µm

	Cladding diameter	125 µm
	Cladding diameter tolerance	±1.0 µm
Optical Characteristics:-	**Attenuation (of cable with fibers):**	
	At 1310 nm	≤ 0.35 dB/km
	At 1550 nm	≤ 0.22 dB/km
	Polarisation Mode Dispersion (PMD)	≤ 0.06(ps/sq km)
	Proof Stress level	> 0.7 (~ 1%) GPa
	Core-Cladding Concentricity error	≤ 0.5µm
	Cladding non-circularity	≤ 0.7 %
	Diameter of outer coating layer	242 ± 5 µm
	Cut-off wavelength	≤ 1260 nm
Construction Details:-	CORE	Germanium doped core with no phosphorus i.e. reduced tendency for hydrogen degradation.
	COATING	UV-curable dual layer acryl ate coating, which ensures excellent micro bending and abrasion resistance.
	Fibre/Tube Identification	Color coded
	Fibre protection(Tubes)	Polybutylene Terephthalate (PBT)
	Armor	Corrugated Steel tape Armor (ECCS Tape)
	Inner Jacket	High density polyethylene
	Outer Jacket	UV Stabilised High density polyethylene (HDPE).
	Outer Jacket Colour	Black
	Central Strength Member	Fibre Reinforced Plastic(FRP)
Dimensions and Mass:-	Cable Diameter	15.1 mm
	Mass (Nominal)	220 kg/km

Mechanical and Environmental Performance:-	Max Bend Radius(full load)	10 X Overall diameter
	Max. Bending Radius (during installation)	20 X Overall diameter
	Max. Tensile Strength-Short Term	3500N
	Max. Crush Resistance-Short Term	6000N/10 cm
	Operating Temperature range	-40°C to +70°C

2.1.26 CORE Multi-Mode 50/125 µm OM3 Armoured Multi-Tube Optical Fiber Cable:-		
Characteristic	**Min. Required Specification**	
Features	The fiber type should be 50 / 125, OM3 Graded Index Fiber cable	
	Fiber dual coated with acrylate coating	
	The fiber should be optimized for operation at 850 nm and at 1300 nm.	
	Should fulfill the requirements of ISO/IEC 11801:2002- 2nd Edition, Type OM3;	
Physical Characteristics:-	No of Cores	6
	Nominal mode field diameter	50 µm
	Mode field diameter tolerance	±2.5µm
	Cladding diameter	125 µm
	Cladding diameter tolerance	±2.0 µm
Optical Characteristics:-	**Attenuation (of cable with fibers):**	
	At 850 nm	<= 2.7dB/km
	At 1300 nm	<= 0.8 dB/km
	Bandwidth:	

	At 850 nm		>= 2000 MHz · km
	At 1300 nm		>= 500 MHz · km
	Numerical aperture		0.200 ± 0.015
	Proof test level		1%
	Core concentricity error		Max.:1.5µm
	Cladding non-circularity		Max. 1 %
	Diameter of outer coating layer		245 µm (without coloring layer)
	Tolerance of coating layer diameter		±10 µm
	Coating concentricity error		Max. 12 µm
Construction Details:-	CORE	Germanium doped core with no phosphorus i.e. reduced tendency for hydrogen degradation.	
	COATING	UV-curable dual layer acryl ate coating, which ensures excellent micro bending and abrasion resistance.	
	Stripping force after conditioning at 23± 5 °C at 40 - 60 % RH for 24 h		
	Min.		1.0 + 0.1 N
	Max.		3.5 + 0.2N
	Stripping force after ageing in water at 70 ± 5 °C for 168 h.		
	Min.		1.0 + 0.1 N
	Max.		3.5 + 0.2 N
	Fibre/Tube Identification		Color coded
	Fibre protection(Tubes)		Polybutylene Terephthalate (PBT)
	Armor		Corrugated Steel tape Armor (ECCS Tape) Thickness.
	Inner Jacket		High density polyethylene
	Outer Jacket		UV Stabilised High density

		polyethylene (HDPE).
	Outer Jacket Colour	Black
	Central Strength Member	Fibre Reinforced Plastic(FRP)
Dimensions and Mass:-	Cable Diameter	15.1 mm
	Mass (Nominal)	220 kg/km
Mechanical and Environmental Performance:-	Max Bend Radius(full load)	10 X Overall diameter
	Max. Bending Radius (during installation)	20 X Overall diameter
	Max. Tensile Strength-Short Term	3500N
	Max. Crush Resistance-Short Term	6000N/10 cm
	Operating Temperature range	-40°C to +70°C

2.1.3Fiber Optic LIU:-

Fiber optic patch panel	Fibre management enclosures that can be used as a wall mount enclosure for isolated applications or rack mount enclosure for integrated applications.
Height	1 U, 1.75 inches
No. of fiber ports	12/24
Dimensions	482mm W x 254mm D x 43mm H(Rackmount)
	305mm W x 254mm D x 43mm H (Wallmount)
Material	Powder coated Mild Steel
	Rugged steel construction in graphite finish
	Rear, side & base access for Incoming / Outgoing fiber cables
Cable Management rings	Management rings within the system to accommodate excess fibre cordage behind the through adapters and maintain fibre bend radius.
Adaptor Slots	Built in Slots for SC Duplex adaptors.
Sliding cover	Panel cover is of slide out for easy maintenance

Splice Tray	24Fiber Splice Tray of Moulded ABS material should be supplied for the LIU.

2.1.4Fiber Optic Adaptors (Singlemode):-	
Fiber optic adaptors	SC Duplex Type Singlemode Adaptors
Type	SC Duplex Type
	Meets TIA/EIA 568-C.3 and IEC 874-109 standards
	Adapters should be snap mount for easy insertion and removal.
	Unique shuttered feature protects from light emissions
Material Ferrule	Zirconia Alignment sleeve
Compliance	RoHS Compliant

2.1.5 Fiber Optic Pigtail 9/125 Singlemode OS1 SC Type:-	
Fiber optic pigtails	**Singlemode OS1 Pigtails with SC connector**
Type	9/125 micron OS1 fibre performance
Cordage Outer Diameter:	2.0mm ±0.1mm x 4.1 ± 0.2mm
Cable	900µmTight Buffered
Retention Strength	100N
Jacket Material	PVC
Operating Temp.	-20ºC to 75ºC
Connector Insertion Loss	0.30dB(Max)

2.1.6 Fiber Optic Patch Cord SC-LC 9/125 OS1Singlemode:-	
Fiber Optic Patch Cords	**SC-LC 9/125 µm, OS1Singlemode Duplex Patch Cord**
Cable	9/125 µm, OS1SM, Duplex Zipcord.
Connectors	The optical fiber patch leads shall comprise of Single-mode 9/125µm OS1 fiber with 2XSC type fiber connectors terminated at one end and 2X LC type fiber connectors at other end of the patch cord.
Cordage O.D	(Duplex): 2.0mm ± 0.1mm x 4.1± 0.2mm
Cable	900µmTight Buffered
Strength Member	Aramid Yarn
Jacket Material	LS0H IEC 61034-1 & 2,IEC-60332-1, IEC-60754-1 & 2
Connector Loss	0.30dB(max)
Operating Temperature	-40°C to +85°C

2.1.7Fiber Optic Adaptors (Multimode):-	
Fiber optic adaptors	SC Duplex Type Multimode Adaptors
Type	SC Duplex Type
	Meets TIA/EIA 568-B.3 and IEC 874-109 standards
	Adapters should be snap mount for easy insertion and removal.
	Unique shuttered feature protects from light emissions
Material Ferrule	Zirconia Alignment sleeve
Insertion Loss	<0.34dB Max
Compliance	RoHS Compliant
Operating Temperature	-10°C to +70°C

2.1.8 Fiber Optic Pigtail 50/125 Multimode OM3 SC Type:-	
Fiber optic pigtails	**Multimode OM3 Pigtails with SC connector**
Type	50/125 micron OM3 fibre performance
Cordage Outer Diameter:	2.0mm ±0.1mm x 4.1 ± 0.2mm
Buffer Diameter:	900µm
Primary Coating :	245µm
Jacket Material:	PVC
Operating Temp.	-10°C to +60°C
Connector Insertion Loss	0.30dB(Max)

2.1.9 Fiber Optic Patch Cord SC-LC 50/125 OM3 Multimode:-	
Fiber Optic Patch Cords	**SC-LC 50/125 µm, OM3 Multimode Duplex Patch Cord**
Cable	50/125 µm, OM3 MM, Duplex Zipcord.
Connectors	The optical fiber patch leads shall comprise of Multi-mode 50/125µm OM3 fiber with 2XSC type fiber connectors terminated at one end and 2X LC type fiber connectors at other end of the patch cord.
Cordage O.D	(Duplex): 2.0mm ± 0.1mm x 4.1± 0.2mm
Buffer Diameter	900µ tight buffer
Strength Member	Aramid Yarn
Jacket Material	LS0H IEC 61034-1 & 2,IEC-60332-1, IEC-60754-1 & 2
Connector Loss	0.30dB(max)
Operating Temperature	-40°C to +85°C

Annexure-D

(Technical Specification of Hardware and Software for Library Management)

1. Library Management Software(LMS) (Sr. no. 34.1 of BOQ for HMIS)

Item Name	Specifications
Library Management Software	**Library Management Software (LMS)** • The LIBRARY SOFTWARE must support all the major library functions including acquisition, cataloguing, authority control, circulation, Web OPAC, serials control, import/export of records and reporting. • Must be an open architecture system and should support various international standards. The system should also support the following internet standards TCP/IP, SMTP, MIME, HTTP, SSL. Interactions with external systems need to support the following standards: a. ANSI/ISO Z39.50 (ISO 23950) on both server and client b. Record syntaxes: MARC21, UNIMARC, USMARC c. NCIP and SIP2 for RFID Integration d. ISO 2709 • The System must be capable of maintaining multiple languages using UNICODE. • The System must have support for NCIP/SIP2 protocol for RFID transactions. • The system must be able to handle barcodes in different formats like EAN-13, SICI/SISAC, Codabar. • The hardware/server should run on UNIX/LINUX/Windows Platforms. • Auto Daily backup should be possible • Verification of users should be done in a secure manner and it should be possible to set different security setting for users. • Live update of the support has to be provided. • Application software must be web-based. The application should not require any proprietary software licenses. • The backend database must be robust using either Microsoft SQL or Oracle or MySQL. • The client operations must be web-based (platform independent). • Librarian interface (client software) must be web-based. • The main OPAC interface for the users outside the library must be a web browser, such as Internet Explorer and Firefox. • The system must support the import and export of records from different type of

	data media such as tape, CD-ROM, hard disk, and diskette. • The system should support online import and conversion of records from Z39.50 compliant databases. • Library system must support exhaustive management statistics and reporting functions allowing the library to be able to create their own reports. • OPEC access: [It must be possible to] allow access to Web-based services both from within the staff client as well as from the Web OPAC using the 856 link tag in a MARC record. • There must be provisions for different search levels (e.g., simple and advanced) in the OPAC. • All indexes and record displays must be updated in real-time. All fields and sub-fields should be available to be keyword and/or string indexed with a flexibility in defining indexes. • It should be possible to search a record as a whole (any field), specify any variable field to be searched and Boolean search. • Searching should be possible by including but not limited to author, title, subject, publisher, call number, standard number (e.g., ISBN, ISSN, etc.) and Barcode number. • Search refinement should be possible by author, series, topics, item type, location/branches, place of publication and availability. • Circulation System must have functions such as check-out (charges), renewals, check-in (discharges), reservations, fines and fees, statistics and reports. • The patron record should be in a MARC-like format and the patron record must include fields for the following information: o Borrower Card Number o Name of the Candidate o Father's Name o Mother's Name o Date of Birth o Class (with subject) o Department o School o Correspondence Address o Permanent Address

	o Contact Number (Mobile / Landline) o Email ID o Challan No with Date • Barcode Generator system must include a utility that can be used to print barcode labels for the library items. • Cataloguing system must be able to import records in the USMARC/MARC21 formats, online through a Z39.50 client which is integrated with the cataloguing (and acquisition) module. The system should have a reservoir for managing imported MARC records so that it can be checked before loading into database. • Authority control must be possible to create and maintain authority control for the following search elements: personal and corporate names, conferences, uniform titles, series titles, subjects, name/title combinations and publishers. • Data Entry system must have full screen data entry and editing ("empty screen" with MARC header) for cataloguing as well as a number of predefined data entry screens (templates). It must support hidden fields which can be seen in MARC editor but not in the OPAC. • Output must be possible to exporting the bibliographic records in standard MARC communications format (ISO2709). • Order initiation for titles indented • Check for duplication of titles from 'on order', received and Web OPAC • All data entered at acquisition section be used throughout system • Placing Order: Firm orders for titles, including for materials received: • Purchase orders printing/ (e)mailing • Title / publisher/ vendor-wise order generation • Incorporation of special delivery statements/ conditions • Standing orders for annual publications • Invoice Processing includes accessioning of items: • Allows changes in units price, variable discount, exchange rate etc. • Maintains exchange rates of various user defined currencies • Accession number can either be generated automatically by the system or it can be a user defined number • Updated funds accounts online • Barcode generation • Order Follow Up: Periodic overdue notices/ reminders; and Online printing of

	follow up notices • Serials Publications (Periodicals): New serials initiated, go through the approval process and ordering, duplicate checking, prints approval lists, updation of 'Approved' or 'Rejected' titles, prints purchase orders for single or package subscription, status mandatory, print purchase order by department/ publisher/ vendor wise and print order for single and package subscription. • Renewal Order printing either by department / publisher/ vendor /Centre or Library, based on subscription expiry date, Separate orders for renewals and additional serials and cancel supply order of single or all titles from particular order • Invoice processing, both for new subscription and subscription renewal must allow more than one invoice for an order, changes in subscription, period, volumes, issue nos., frequencies etc., accepts supplementary invoices for any title and; accept and updates subscriptions details. • Well-designed screens requiring entry of minimum possible data • Recording of issues by volume/issue number or date and barcode • Facility to record receipt of regular issues, various indexes, special issues and additional issues • Claims Monitoring must makes possible timely follow-up of 'not received', (missing issues and supply not started) overdue and damaged journal numbers and provision of claims for each title of package or bundle subscription. • Routing and Circulation: User-defined routing of issues registered along with circulation of bound volumes and loose issues; routing of an issue immediately on arrival may be defined, before it is displayed or circulated; integrated with the circulation module and overdue reminders • Provision of catalogue generation for current journals and serials holdings according to MARC-21 • Online Queries: Serials-related queries are titles in bindery and recent arrivals. • Reports: Reports generated by the Serial System include: order form, list of completed volumes, bindery order, accession register (for bound volume collection), current arrivals, classified and specialized indexes and lists of serials as required, budget & expenditure analysis, missing issues list, list of duplicate issues, notices for 'not received', 'overdue', 'soiled/damaged' issues, subscription renewal order, new subscription order, claim letters for missing and non-supply,

list of current subscription(alphabetical, department wise, publisher wise, vendor wise), and list of new titles added and deleted titles for particular year.

General Specifications of Library Software

- Support unlimited data
- LAN & WAN enabled client/ web server interface
- Multi-user, user friendly and multilingual
- ANSIZ39.50 Compliant
- Full data transfer from present software including Indian language data
- Extraction of record in any MARC-21 format
- Imports/Export facility in ISO/2709 format
- Circulation module with facility to scan member photo on membership card and online reservation, with features to check the status and history of each member online.
- Union Catalogue with multiple access points
- Multi-tasking with online help facility
- Provision for customization of report
- Financial management with different budget heads
- Security of Access control as per categorization.
- Articles indexing and scanning of articles
- Should support image and multimedia files
- Automatic currency conversion
- Duplicate record check
- Binding record management
- Hyper linking of books
- Status of user's account from OPAC
- Metadata (MARC-21/Dublin Core)
- E-resource management (basic)
- Use of preferred RDBMS such as Oracle/SQL Server/ MySQL / Progress SQL for databases and should be open, not locked to further generate any required report
- Report on order/ budget status department wise
- XML / CSV/Excel based interface for reports
- Windows® based, client server application

	• Unicode® standard • Flexibility to move from one language to another in all subsystems • Multiple search options available in OPAC • Multimedia access • Backup/ Restore/recovery of complete database • Comprehensive set of parameters to customize the software to meet the library's operational environment • Completely web/ browser based (works on internet/ intranet) • Supports windows / Windows NT/ Linux/ Unix

2. Staff Station Reader

(Sr. no. 34.2 of BOQ for HMIS)

Item Name	Specifications
Staff station	Library Staff Station Reader • Support 13.56 Mhz. or better • Should be fully ISO/IEC 14443, 15693 and ISO 18000 compliant. • On the staff station library staff can do circulation and conversion (tagging). It physically consists of an RFID-antenna, a RFID-reader, a barcode scanner and a HKID-reader • The RFID antenna shall be fully shielded, i.e. not read items placed under the table and on the side of the antenna pad • The antenna pad shall be fabricated in transparent plexiglass with integrated LED's showing the transaction status • The staff station shall be able to program and verify multiple RFID tags put on the antenna • The staff station shall enable to have the tag security added or removed without interaction with the LMS • The RFID reader connects to the PC supplied by the library via keyboard wedge and accordingly simulate the connection of a barcode scanner • The staff station contains a communication link to an intranet

based monitoring system and will cope with the requirements defined for that system.

- The software delivered with the staff station shall handle both the RFID tagging of items and the circulation
- SIP2/NCIP compliance software interface integrated with integrated library management software for all operations like patron card personalization, check-in. check-out, renew, reserve etc. of library circulation.

Dimensions (h x w x d):

Antenna: 13X9.5X0.4 inches or better
Reader: 5.7X3.3X1.2 (inches) or better

Weight: Antenna : 0.5 Kg Reader: 0.2 Kg or better
Power/ Connectivity: RFID reader connects to PC via USB. The RF output is 1.2 watt or better
RFID Specification: 13.56 Mhz or better
Supported Tags types: ISO 15693, ISO 18000-3-A, (Infineon my-d, NXP I-Code, SLI, SLIx)
Standard Compliance: Reader: CE and FCC regulations (certificate to be submitted)
Circulation Software

- The circulation software shall be able to process tags programmed in more than 30 different data models
- Staff can select a method for writing security; on, off, none, auto, etc.
- Provides complete ISO 28560 compliancy
- It shall be possible to work both with single items and multiple items
- As option the staff station might connect to the library management system using their web based services. This requires an integration with Library Management System.
- It shall work with more than 30 different data models on the labels
- It shall provide support for more than 100 languages
- It shall warn staff if a library item potentially has parts missing
- It shall be designed to work so that in normal operations the staff simply needs to 1) Place item(s) on pad 2). Wait for

	security colour to change 3). When security write colour changes back simply remove stack. **Tagging Software** • The tagging software provides staff with a quick and easy way to tag and convert stock items, taking around five seconds physical time per item to complete. • Does not require any communication with the LMS, staff can carry out the conversion process any location in the library • If a tag cannot be written for whatever reason, then the system will detect this and inform correspondingly • Must support more than 30 different data models and more than 20 extended fields • If the bar code input does not match a particular length or mask (due to scanner or user error) a warning can popup to prevent writing the tag with a potentially bad value **Desktop Computer** • Core i5 Processor or higher • 8GB RAM or higher • 1 TB HDD or higher • 22 Inch Monitor or higher • Windows 8 license OS or latest OS

3. Gate Antenna Security System (Sr. no. 34.3 of BOQ for HMIS)

Item Name	Specifications
RFID GATE security system	**General Specification** • The gates shall be fabricated in solid • It shall detect RFID label on which security is set on • External devices, such as CCTV and/or barriers can be connected • Alarms are generated the entire gate in a red light combined with an adjustable audible alarm.

	• Light alarm can be optionally generated by all the pedestals or just by the 2 pedestals the library item was detected • It shall provide full detection from 0 to 35 inches/900 mm • It shall obtain optimal detection performance at a pedestal distance of 900mm • It shall be built on a master – slave principle with up to 8 pedestals in one single system • All electronic, i.e. readers, multiplexers are built into the pedestals, there are no external devices • The gate supports multiple RFID data encoding models simultaneously • The gate support latest technology i.e. AFI **Gate Software** • The gate software is installed on a PC supplied by the library running with Windows XP or Windows 7 • The said PC is connected to the gates via physical LAN connection • Different clusters of gates can be logically connected to the same PC • Clusters of gates can be given nick names • The screen displays the ID (barcode) and title of items generating an alarm, the exact time and the pedestal ID • The gate software contains a communication link to an intranet based monitoring system and will cope with the requirements defined for that system. **Dimensions** (w X d X h): 80 X 720 X 1590 (+/- 3) mm or better **Weight**: 54 kgs or equivalent **RFID Specification**: 13.56 Mhz or better **Max Transmitting Power**: 4W or better **Supported Tags types**: ISO 15693, ISO 18000-3-A, (Infineon my-d, NXP I-Code, SLI, SLIx) **Standard Compliance**: CE, C-Tick, ARIB, ETSI, FCC, IC, ADA, DDA, UL

4. RFID Handheld Reader

(Sr. no. 34.4 of BOQ for HMIS)

Item Name	Specifications
HF Handheld Inventory System	Handheld Portable Reader • Ergonomically designed Cordless PDA based Wi-Fi Handheld Inventory Reader + external Antenna integrated with chargeable battery (minimum 4 Hours life or better). • The proposed system shall be fully compliant with ISO 15693/ISO • 18000-3 Mode-1 standards & supplied tags. • Software Components: Client software for PDA. Also supply of compatible software for laptop & PC. • Features: Long lightweight handheld; performs stock-checking, re-shelving and also locates specific items, sorting and monitoring of library material on shelf along with locating misplaced documents. To locate items that is misplaced on the shelves. • Reading 15-20 items per second or better • Certification: CE/EN, ETS, FCC, UL, EMC, etc. • Long wand / extended reach for taking stock taking and searching for book above the racks without using any secondary hardware/furniture. • Display lost and misplaced items in the shelves. • If any middleware software is required for integrating with the whole system, it must be supplied along with hand held reader. **Dimensions** (w X d X h): Reader 19X11X6 cms, Antenna : 60 cms **Weight**: Reader: 0.7 Kg Antenna : 0.3 Kg **RFID Specification**: 13.56 Mhz **Battery Life**: 4 hours or more with one backup battery **Power**: DC Power 12 V DC 2,500 mAh **RF Output Power**: 1.2 W Typical **Power Consumption**: 4.5 W **Display PC**: Window 7/8

	Supported Tags types: ISO 15693, ISO 18000-3-A, (Infineon my-d, NXP I-Code, SLI, SLIx) **Standard Compliance**: CE, FCC Part 15, ETSI EN300-330 (EM Emission) EN 50364 (Human Exposure) (certificate to be submitted) **Software for Handheld Reader** • The staff shall use a light-weight, portable, handheld terminal with colour touch-screen, battery and flexible antenna on a rotation axis which provides library staff a quick, effective and reliable mechanism to interrogate the library shelf. • The terminal shall work off-line. Connection to the library management system shall take place via an intermediate PC with which the handheld shall communicate using Bluetooth or USB-cable. • The intermediate PC is supplied by the library and works with Windows XP or Windows 7 or Windows 8 or higher (latest) • The terminal can perform an instantaneous inventory of all on-shelf items by reading the RFID tagged items. Following an inventory, data can be uploaded to the LMS or analyzed manually. • The terminal features a large flexible antenna that is designed to flex around the books as it is moved down the shelf edge. • An all-in-one touchscreen device with full navigation capabilities displays information relating to the current task, with notifications provided optionally, via audible alerts or LED light. • The terminal incorporates an additional barcode scanner for alternative reading of items • The terminal incorporates a full keyboard so that data may also be added manually. • The terminal provides an effective read range of 300mm, combined with a scanning rate of 400-600mm of library shelving per minute of use • The terminal can gather data into a file that may be imported into the library management system that supports inventory import. This allows the portable data gathering device and software to be

	able to output data that the staff can use for inventory reporting within the library management system. • The terminal can import text files from numerous formats to use as 'search' records. The data gathering device and software to find any items such as holds, or items presumed missing if such lists can be exported from the LMS or manually created in a text document. • Can find items significantly out of range if an ordered text file is imported • The stock taking terminal contains a communication link to an intranet based monitoring system and will cope with the requirements defined for that system.

5. RFID Tags (Sr. no. 34.5 of BOQ for HMIS)

Item Name	Specifications
RFID tag	The RFID chip used in the tag should have been designed specifically for library use. It should have: • Standards: ISO 18000–3, ISO 15693, ISO 28560-1, CE • Total memory: 1024 bit / 32 blocks or better • IC Write Endurance: 100,000 Operations or better • Operating Frequency: 13.56 MHz or better • Performance guarantee and capability to provide over 100,000 read/write operations or better • NXP ICODE SLIX processor or better • Aluminium antenna • 32 bit password protection or better • Data Retention: 50 Years or better • Footprint 86mm x 54mm or better • Recommended to use for books, magazine, CD covers etc.

6. RFID Member Card (Sr. no. 34.6 of BOQ for HMIS)

Item Name	Specifications
Member Card	**RFID Member Card** • Memory- 1 KB or more and as per the requirement • ISO Card (Blank - White - Credit Card Size) • NXP S50 Chip • R/W 1K Bytes

7. RFID Middleware Software (centralized Control System / Software for all RFID hardware/device) (Sr. no. 34.7 of BOQ for HMIS)

Item Name	Specifications
RFID Middleware Software (centralized Control System / Software for all RFID hardware)	Centralized control/administrative software for all the RFID hardware must be a web based application. Vendor should be able to provide the support online by monitoring the health / condition of the RFID hardware. • The control system shall connect via the library intranet to all RFID-enabled equipment delivered by the supplier • The control system shall be hosted by the supplier • All network communication shall be secured through https connections (SSL security certificate). • The system shall allow for individual configurable access rights. Login takes place with username and password. Certified library staff users shall be able to manage different security groups and give access rights • There is no limitation on the number of library staff users that can get access rights. • One shall have the possibility to dedicate certain cluster of branches to certain users or certain types of equipment to certain users • The control system typically gives access to a specific library within the library network, a specific device inside that library

	and specific component inside that device • The control system shall be able to receive event- and errors messages from devices, i.e. when a sorting bin is full or not present; a paper roll is almost finished etc. • The control system shall enable users to look at the current status of devices and their main components and make diagnostics. • The control system shall provide statistics of utilization, i.e. transactions per time unit, whereby the time intervals can be set. The statics can be exported into various standard formats. • The control system shall enable the certified user to change the configuration of devices - and set the time for concurrent downloading of updated software to all devices within the library network. • The control system shall enable the certified users to monitor the function of sorting systems with the physical installation modeled on the screen • Data shall be cached on all devices before being uploaded to the control system. This allows data to be held indefinitely in the event of a communication failure and then sent when communication can be re-established. • The control system can email or send SMS text alerts to defined users when a device reports a part in a state the user is interested in. This means that users do not need to be constantly logged in for the system to alert them of a problem. Alerts can be instant repeatable or issued once per day • The control system shall allow device configuration to be changed from a single source and then deployed without needing to visit that device to update configuration locally • The control system shall give the feature of combining statistical information from many devices to provide a holistic view of patron interactions with devices within the library.

8. Self Check out Kiosk

(Sr. no. 34.8 of BOQ for HMIS)

Item Name	Specifications
Self-Check Out System	Desktop based self-checkout system for the issue and return of library resources integrated with library management software via SIP2 protocol. • Non-intrusive look i.e. can be easily blend with library interior. • Capable of issue and return of library books with RFID tags • Can easily be upgraded to provide full range of media case unlocking capabilities and the ability to collect fines and fees • Reduce repetitive strain injuries. • Easy-to-use interface makes self-checkout fast and simple • Can be upgraded to pay their fines and fees right at the kiosk with the swipe of a credit/debit card • Should be integrated with library management software with SIP2 protocol • Should also support barcode based circulation also. • Built in graphic capable thermal receipt printer, provides the users with a complete simple statement of items that are currently on their account. **Hardware Specification** • Dimensions (w X d X h) : 22 X 21 X 23.25 inches or better • Weight : 20 kg (with 17” touchscreen) or better • Power: 110-230 V 50-60Hz, IEC inlet Socket, 5 Amp supply • Data: RJ45 socket for Ethernet network connectivity • Touchscreen: 17” inches or better • Login types: barcode (full range of barcode type), RFID, smartcard and manual screen entry • Standard and Compliance: DDA, ADA, CE, FCC • Reporting: configuration and reporting is made available in real-time via Centralized Control System/Software for all RFID hardware. **Self-service kiosk software**

	• The software shall run under Windows XP and Windows 7 • The software shall enable checking library items in and out based on a SIP2 connection to the library management system • The software shall enable patrons to check their account (items borrowed and expiration per item, fees and fines) and to prolong (if the library choose to allow for it) • When processing library items (checking in-or out) the status of each item shall be displayed ((incl. the setting of the security bit and type of item (i.e. books, CD, DVD's, Blu-ray and games) • The software shall allow to integrate payment functionality at a later stage (cash (coins & notes) and chip & pin cards, without software charges. • The software shall allow the library to choose between several standard theme designs, also children's themes. • The software shall allow the library to optional chose a customized theme • The screen can display more than 10 languages that patrons can chose from for communication • The software allows the patron to switch language whenever he/she wants to – also in the middle of a check-in / check-out session • The software enables a patron to complete all functions (check in, check out, check account, payments) under one login, making the transaction process easy and smooth. • The software shall have the ability to provide access to any external web-based system via a simple configuration. The external system can be accessed via an on-screen buttons which is easily configurable. The software shall also have the possibility to handle PC booking and print management facilities via integration with a 3rd party supplier. • The software can be configured to continue working in offline mode, when the connection to the LMS has failed. The software shall continue to let patrons borrow and return

	items to provide a continuous service; then once the connection to the LMS has been restored, all offline transactions shall be automatically uploaded to the LMS ensuring that all transaction history has been updated. If transactions fail to upload correctly then the staff will be alerted automatically • The software contains a communication link to an intranet based monitoring system and will cope with the requirements defined for that system. **Desktop Computer** • Core i5 Processor or higher • 8GB RAM or higher • 1 TB HDD or higher • 22 Inch Monitor or higher • Windows 8 license OS or latest OS

9. Book Drop Station

(Sr. no. 34.10 of BOQ for HMIS)

Item Name	Specifications
Book Drop System	Desktop based Book Drop system for the issue and return of library resources integrated with library management software via SIP2 protocol. • Non-intrusive look i.e. can be easily blend with library interior. • Capable of return of library books with RFID tags • Can easily be upgraded to provide full range of media case unlocking capabilities and the ability to collect fines and fees • Reduce repetitive strain injuries. • Easy-to-use interface makes self-checkout fast and simple • Can be upgraded to pay their fines and fees right at the kiosk with the swipe of a credit/debit card • Should be integrated with library management software with SIP2 protocol • Should also support barcode based circulation also.

	• Built in graphic capable thermal receipt printer, provides the users with a complete simple statement of items that are currently on their account. **Hardware Specification** • Reader Dimensions (w X d X h) : 22 X 21 X 23.25 inches • Weight : 20 kg (with 17" touchscreen) or equivalent • Power: 110-230 V 50-60Hz, IEC inlet Socket, 5 Amp supply • Data: RJ45 socket for Ethernet network connectivity • Touchscreen: 17" inches or equivalent • Book Drop Enclosure with receiving cart • Login types: barcode (full range of barcode type), RFID, smartcard and manual screen entry • Standard and Compliance: DDA, ADA, CE, FCC • Reporting: configuration and reporting is made available in real-time via Centralized Control System/Software for all RFID hardware. **Desktop Computer** • Core i5 Processor or higher • 8GB RAM or higher • 1 TB HDD or higher • 22 Inch Monitor or higher • Windows 8 license OS or latest OS **Book Drop software** • The software shall run under Windows XP and Windows 7/8 or latest. • The software shall enable checking library items in and out based on a SIP2 connection to the library management system • The software shall enable patrons to check their account (items borrowed and expiration per item, fees and fines) and to prolong (if the library choose to allow for it) • When processing library items (checking in-or out) the status of each item shall be displayed ((incl. the setting of the security bit and type of item (i.e. books, CD, DVD's, Blu-ray and games)

	• The software shall allow to integrate payment functionality at a later stage (cash (coins & notes) and chip & pin cards, without software charges. • The software shall allow the library to choose between several standard theme designs, also children's themes. • The software shall allow the library to optional chose a customized theme • The screen can display more than 10 languages that patrons can chose from for communication • The software allows the patron to switch language whenever he/she wants to – also in the middle of a check-in / check-out session • The software enables a patron to complete all functions (check in, check out, check account, payments) under one login, making the transaction process easy and smooth. • The software shall have the ability to provide access to any external web-based system via a simple configuration. The external system can be accessed via an on-screen buttons which is easily configurable. The software shall also have the possibility to handle PC booking and print management facilities via integration with a 3rd party supplier. • The software can be configured to continue working in offline mode, when the connection to the LMS has failed. The software shall continue to let patrons borrow and return items to provide a continuous service; then once the connection to the LMS has been restored, all offline transactions shall be automatically uploaded to the LMS ensuring that all transaction history has been updated. If transactions fail to upload correctly then the staff will be alerted automatically • The software contains a communication link to an intranet based monitoring system and will cope with the requirements defined for that system.

10. Member Card Printer

(Sr. no. 34.11 of BOQ for HMIS)

Item Name	Specifications
Card Printer	Thermal transfer, 300 dpi, Color double-sided printing at 125 cards/hour, 2.125" card width, USB interface, 16MB RAM. Including Printer, Power cord, USB cable, card Design software.

11. Server Hardware Configuration

(Sr. no. 34.12 & 34.13 of BOQ for HMIS)

	Make	HP/Dell/IBM
1	**Server Model**	Server Model with below specification with redundant enablement kit and all the accessories etc. complete in all respect
2	**Processor type**	Intel Xeon Processor E5-2609 v3 (1.9 GHz/6-core/95W/15MB) or Superior
3	**Number of processors**	2 Processor or superior
4	**Standard memory**	16 GB (8x2) or higher
5	**Internal hard disk drive**	Minimum 3 nos. 300 GB 6G SAS or higher
6	**Hard disk controller**	Smart Array P420/1GB FBWC Controller or higher
7	**Internal drive bays**	hot plug advanced key (RAID Technology)
8	**Optical drives**	OEM SATA DVD+/- RW Drive
9	**Power Supply**	Redundant power supply (provide additional power supply kit for power redundancy)
10	**Network interface**	Embedded Dual Port Gigabit Server Adopter
11	**Keyboard & Mouse**	OEM standard keyboard and mouse
12	**Monitor**	OEM standard 18.5”
13	**Compatible operating systems**	Microsoft® Windows® Server 2012 and Linux Operating System (Latest)
14	**Warranty**	Three years onsite comprehensive maintenance including labour & parts shall be provided through Manufacturer Warranty/Care Pack/Support Pack.

Annexure-E

Appendix-T1

Item wise breakup for HMIS (Item mentioned in Sr. No. 1 in Volume-V-BOQ - (PART A)-I)			
Sr. no.	**Item Description**	**Unit**	**Quantity**
1			
2			
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6			
7			
8			
9			
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11			
12			
13			
14			
15			

(Please insert additional row if required)

If required, Please mention Technical Specification of the above item in the separate sheet and upload in the PDF format on the HSCC e-tender portal along with technical bid. Also mention the make and model of each item.
Bidders are requested to clearly mention the reference of Item-wise Sr. No. of the above appendix in the sheet of Technical Specification

Appendix-T2

Item wise breakup for Server Hardware and System Software including Storage HMIS and PACS (Item mentioned in Sr. No. 2 in Volume-V –BOQ- (PART A)-I)			
Sr. no.	**Item Description**	**Unit**	**Quantity**
1			
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12			
13			
14			
15			

(Please insert additional row if required)
Please mention Technical Specification, Make and Model of the above item in the separate sheet and upload in the PDF format on the HSCC e-tender portal along with technical bid. Also mention the make and model of each item.
Bidders are requested to clearly mention the reference of Item-wise Sr. No. of the above appendix in the sheet of Technical Specification

Appendix-T3

Item wise breakup for Education Management System (Item mentioned in Sr. No. 35 in Volume-V –BOQ - (PART A)-I)			
Sr. no.	**Item Description**	**Unit**	**Quantity**
1			
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12			
13			
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15			

(Please insert additional row if required)

Please mention Technical Specification, Make and Model of the above item in the separate sheet and upload in the PDF format on the HSCC e-tender portal along with technical bid. Also mention the make and model of each item.

Bidders are requested to clearly mention the reference of Item-wise Sr. No. of the above appendix in the sheet of Technical Specification

Appendix-T4

Item wise breakup for Telemedicine (Item mentioned in Sr. No. 36 in Volume-V- BOQ - (PART A)-I)			
Sr. no.	**Item Description**	**Unit**	**Quantity**
1			
2			
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11			
12			
13			
14			
15			

(Please insert additional row if required)

Please mention Technical Specification, Make and Model of the above item in the separate sheet and upload in the PDF format on the HSCC e-tender portal along with technical bid. Also mention the make and model of each item.

Bidders are requested to clearly mention the reference of Item-wise Sr. No. of the above appendix in the sheet of Technical Specification

Appendix-T5

Technical compliance of IT components (HMIS, PACS, EMS,LMIS, LAN & Wi-Fi Telemedicine and QMS)		
Sr. no.	**Technical Specification**	**Comply (Yes/No)**
1		
2		
3		
4		
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Annexure-F

Details submitted by bidder for Make and Model of the following items			
(Make- as per the list of approved makes at Annexure H)			
Sr. no.	**Item Description**	**Make of the item**	**Model of the item**
1	2	3	4
1	**PACS solution** (Item mentioned in Sr. No. 3.0 in Volume-V- BOQ - (PART A-I))		
	PACS SERVERS		
2	**3D Advanced post processing workstation software** offer superior performance, image quality and a wide range of advanced clinical modules suited for various radiology applications(Item mentioned in Sr. No. 5.0 in Volume-V- BOQ - (PART A-I))		
3	**PACS Server**(for Application and Database) (Item mentioned in Sr. No. 4.0 in Volume-V- BOQ - (PART A-I))		
	PACS Workstation		
4	**Radiology workstation (**for CT) (Item mentioned in Sr. No. 6.0 in Volume-V- BOQ - (PART A-I))		
5	**Radiology workstation** (for MRI) (Item mentioned in Sr. No. 7.0 in Volume-V- BOQ - (PART A-I))		
6	**X-Ray workstation for PACS** (Item mentioned in Sr. No. 8.0 in Volume-V- BOQ - (PART A-I))		
7	**Ultrasound Workstations for PACS** (Item mentioned in Sr. No. 9.0 in Volume-V- BOQ - (PART A-I))		
	Software & Accessories for Speech Recognition		
8	**Speech Recognition software** (Item mentioned in Sr. No. 10.0 in Volume-V- BOQ - (PART A-I))		
9	**USB dictation microphone** (Item mentioned in Sr. No. 11.0 in Volume-V- BOQ - (PART A-I))		
10	**Robotic CD/DVD Writers** - Dual-drive disc publisher in a black painted steel cabinet for desktop or rack mount use. Includes two built-in DVD±R/CD-R recorders (Item mentioned in Sr. No. 12 in Volume-V- BOQ - (PART A-I))		

	Desktop, Printer and Other items		
11	**Desktop Computer (**All-in-one desktop or equivalent, **i7** processor or higher, 4 GB RAM or higher, 1 TB Hard Disk Drive or higher, 23" LED screen or higher, DVD RW, Ethernet card and Wireless LAN card, Windows OS 8 or higher) (Item mentioned in Sr. No. 13 in Volume-V- BOQ - (PART A-I))		
12	**Desktop Computer** (All-in-one desktop or equivalent, **i5** processor or higher, 4 GB RAM or higher, 1 TB Hard Disk Drive or higher, 18.5" LED screen or higher, DVD RW, Ethernet card and Wireless LAN card, Windows OS 8 or higher) (Item mentioned in Sr. No. 14 in Volume-V- BOQ - (PART A-I))		
13	**Light weight Notebook PC** (i7 processor or higher, 8 GB RAM or higher, 1 TB Hard Disk Drive or higher,15" LED screen or higher, Windows OS 8 or higher) (Item mentioned in Sr. No. 15 in Volume-V- BOQ - (PART A-I))		
14	**latest Stylish Tablet** (Item mentioned in Sr. No. 16 in Volume-V- BOQ - (PART A-I))		
15	**Antivirus Server (Hardware, OS and Antivirus Software)** (Item mentioned in Sr. No. 17 in Volume-V- BOQ - (PART A-I))		
	Printers		
16	**Heavy Duty Black and White Network LaserJet Printer**-latest Black and White Network LaserJet Printer (Speed up to 52 ppm or higher, USB 2.0 port, 1200 x 1200 dpi or higher, Gigabit Ethernet Network or higher, 512 MB memory or higher(Item mentioned in Sr. No. 19 in Volume-V- BOQ - (PART A-I))		
17	**Black and White LaserJet Printer** (Minimum Speed 22 pages per minute or higher, USB 2.0 port, 1200 dpi effective output or higher) (Item mentioned in Sr. No. 21 in Volume-V- BOQ - (PART A-I))		
18	**LaserJet Multifunction (Print, Scan, Copy, Fax, Wireless) Printer** (Minimum 20 ppm or higher, 1200 dpi or higher, e-print facility, USB 2.0 port, Ethernet network port, 128 MB memory or higher (Item mentioned in Sr. No. 23 in Volume-V- BOQ - (PART A-I))		
19	**latest LaserJet Multifunction (Print, Scan, Copy, Fax, Wireless) Printer (Legal Size)** (Minimum 20 ppm or higher, Up to 600 x 600 dpi (color) or higher, e-print facility, duplex print, USB 2.0 port, Ethernet network port, 600MHz processor with 192 MB memory or higher (Item mentioned in Sr. No. 25 in Volume-V- BOQ - (PART A-I))		
20	**LaserJet Multifunction (Print, Scan, Copy, Wireless) Printer** (20 ppm or higher, Memory 128 MB or higher) (Item mentioned in Sr. No. 27 in Volume-V- BOQ - (PART A-I))		

21	**Colour LaserJet Printer** (Minimum Speed 16 pages per minute or higher, USB 2.0 port, 600 x 600 dpi or higher, Ethernet network port) (Item mentioned in Sr. No. 29 in Volume-V- BOQ - (PART A-I))		
22	**Flatbed Document Management Scanners** (Minimum Speed Up to 15ppm / 6 ipm or higher, up to 2400x2400 dpi resolution, Duplex Scanning; 1 Hi -Speed USB 2.0,1 Ethernet 10/100 Base-T(RJ45), ScanSize:8.5x11 in (21.6 x 27.9 cm),8.5x14 in (21.6x35.5 cm)) (Item mentioned in Sr. No. 31 in Volume-V- BOQ - (PART A-I))		
23	Latest **Bar code printer** (Item mentioned in Sr. No. 32 in Volume-V- BOQ - (PART A-I))		
24	Latest **Bar code reader** (Item mentioned in Sr. No. 33 in Volume-V- BOQ - (PART A-I))		
	Library Management System (LMS)		
25	**Library Management Software** (Item mentioned in Sr. No. 34.1 in Volume-V- BOQ - (PART A-I))		
26	**Staff Station Reader** (Item mentioned in Sr. No. 34.2 in Volume-V- BOQ - (PART A-I))		
27	**Gate Antenna Security System** (Item mentioned in Sr. No. 34.3 in Volume-V- BOQ - (PART A-I))		
28	**RFID Handheld Reader** (Item mentioned in Sr. No. 34.4 in Volume-V- BOQ - (PART A-I))		
29	**RFID Tags** for Books including taging job (Item mentioned in Sr. No. 34.5 in Volume-V- BOQ - (PART A-I))		
30	**RFID 1KB Member Card** (Item mentioned in Sr. No. 34.6 in Volume-V- BOQ - (PART A-I))		
31	**RFID Middleware Software** (centralized Control System / Software for all RFID hardware) (Item mentioned in Sr. No. 34.7 in Volume-V- BOQ - (PART A-I))		
32	**Self Check out Kiosk** (Item mentioned in Sr. No. 34.8 in Volume-V- BOQ - (PART A-I))		

33	**Anti Theft Sticker** (Item mentioned in Sr. No. 34.9 in Volume-V- BOQ - (PART A-I))		
34	**Book Drop Station** (Item mentioned in Sr. No. 34.10 in Volume-V- BOQ - (PART A-I))		
35	**Member Card Printer** with 5 Ribbon And 2 Cleaning Kit (Item mentioned in Sr. No. 34.11 in Volume-V- BOQ - (PART A-I))		
36	**Central Server** (Based On Latest Technology) including all necessary hardware and software, OS, Database etc. (Item mentioned in Sr. No. 34.12 in Volume-V- BOQ - (PART A-I))		
37	**Backup Server** (Based On Latest Technology) including all necessary hardware and software, OS, Database etc.(Item mentioned in Sr. No. 34.13 in Volume-V- BOQ - (PART A-I))		
	LAN & Wi-Fi System		
	Active Devices		
38	**Core Switch** (Item mentioned in Sr. No. 1.1 in Volume-V- BOQ - (PART A-II))		
39	**Layer 3 Distribution Switch** (Item mentioned in Sr. No. 2.1 in Volume-V- BOQ - (PART A-II))		
40	**24-port Access Switch** (Item mentioned in Sr. No. 3.1 in Volume-V- BOQ - (PART A-II))		
41	**48-port Access Switch** (Item mentioned in Sr. No. 3.2 in Volume-V- BOQ - (PART A-II))		
42	**24-port POE switch** (Item mentioned in Sr. No. 4.1 in Volume-V- BOQ - (PART A-II))		
43	**Wireless Access Point** with Power over Ethernet Adapter (Item mentioned in Sr. No. 5.1 in Volume-V- BOQ - (PART A-II))		
44	**Wireless Access Controller** (Item mentioned in Sr. No. 5.2 in Volume-V- BOQ - (PART A-II))		
45	**Network Management Solution (NMS)** (Item mentioned in Sr. No. 6.1 in Volume-V- BOQ - (PART A-II))		
46	**Firewall** (Item mentioned in Sr. No. 7.1 in Volume-V- BOQ - (PART A-II))		
	Passive Devices		

	U/FTP Components		
47	**Cat 6A, U/FTP Cable** (Item mentioned in Sr. No. 8.1 in Volume-V- BOQ - (PART A-II))		
48	**Wall Plate 1 Port** (Item mentioned in Sr. No. 8.2 in Volume-V- BOQ - (PART A-II))		
49	**Wall Plate 2 Port** (Item mentioned in Sr. No. 8.3 in Volume-V- BOQ - (PART A-II))		
50	**Power Cat6A Data Gate Jack, Shuttered BLUE** (Item mentioned in Sr. No. 8.4 in Volume-V- BOQ - (PART A-II))		
51	**Power Cat6A Data Gate Jack, Shuttered Yellow** (Item mentioned in Sr. No. 8.5 in Volume-V- BOQ - (PART A-II))		
52	**Cat6A Patch Cord S/FTP 1 mtrs** (Item mentioned in Sr. No. 8.6 in Volume-V- BOQ - (PART A-II))		
53	**Cat6A Patch Cord S/FTP 2 mtrs** (Item mentioned in Sr. No. 8.7 in Volume-V- BOQ - (PART A-II))		
54	**GANG Box,** 1 Port, White (Item mentioned in Sr. No. 8.8 in Volume-V- BOQ - (PART A-II))		
55	**24 Port Unloaded Patch Panel CAT-6A** (Item mentioned in Sr. No. 8.9 in Volume-V- BOQ - (PART A-II))		
	Optical Fiber Cable Components		
56	**12 port MM/SM SC LIU Fibre Panel**- loaded (Item mentioned in Sr. No. 9.1 in Volume-V- BOQ - (PART A-II))		
57	**SC Pigtail, SM**, 9/125, 900 micron, 2mts (Item mentioned in Sr. No. 9.2 in Volume-V- BOQ - (PART A-II))		
58	**SC Pigtail, MM,** 9/125, 900 micron, 2mts (Item mentioned in Sr. No. 9.3 in Volume-V- BOQ - (PART A-II))		
59	**SC-LC, Multimode**, 3 Mtrs Patchcord (Item mentioned in Sr. No. 9.4 in Volume-V- BOQ - (PART A-II))		
60	**SC-LC, Singlemode**, 3 Meters Patch cord (Item mentioned in Sr. No. 9.5 in Volume-V- BOQ - (PART A-II))		
61	**6 core SM OS1 cable** (Item mentioned in Sr. No. 9.6 in Volume-V- BOQ - (PART A-II))		

62	**6 core MM OM3 cable** (Item mentioned in Sr. No. 9.7 in Volume-V- BOQ - (PART A-II))		
	Racks and other accessories		
63	**19'' Rack 27U** Wall/Floor Mount Rack with standard accessories (Item mentioned in Sr. No. 10.1 in Volume-V- BOQ - (PART A-II))		
64	**19'' Rack 12U** Wall Mount Rack with standard accessories (Item mentioned in Sr. No. 10.2 in Volume-V- BOQ - (PART A-II))		
65	**19'' Rack 15U** Wall Mount Rack with standard accessories (Item mentioned in Sr. No. 10.3 in Volume-V- BOQ - (PART A-II))		
66	**19'' Rack 42U** Wall Mount Rack with standard accessories (Item mentioned in Sr. No. 10.4 in Volume-V- BOQ - (PART A-II))		
67	**Server Hardware** (Item mentioned in Sr. No. 10.6 in Volume-V- BOQ - (PART A-II))		
	Queue Management System (QMS) for OPD Block		
68	**Controller for Queue Management System Kiosk - Floor Mount with Touch Screen as per the technical specification** (Item mentioned in Sr. No. 1 in Volume-V- BOQ - (PART A-III))		
69	**Queue Management System Kiosk - Floor Mount with Touch Screen as per the technical specification** (Item mentioned in Sr. No. 2 in Volume-V- BOQ - (PART A-III))		
70	**Counter Display With Hannging** (Item mentioned in Sr. No. 3 in Volume-V- BOQ - (PART A-III))		
71	**42" LED TV or higher for display** (Item mentioned in Sr. No. 4 in Volume-V- BOQ - (PART A-III))		
72	**55" LED TV or higher for display** (Item mentioned in Sr. No. 5 in Volume-V- BOQ - (PART A-III))		
73	**Token Announcement system** (Item mentioned in Sr. No. 10 in Volume-V- BOQ - (PART A-III))		
74	**Display Unit for outside Consultant's room** (Item mentioned in Sr. No. 12 in Volume-V- BOQ - (PART A-III))		
75	**Calling Pad /Device Unit for individual Consultant's room** (Item mentioned in Sr. No. 13 in Volume-V- BOQ - (PART A-III))		

Annexure-G

(Technical Specification for Desktop, Printer, Tablet & PACS Workstations etc.)

1. PACS Workstation (Sr. No. 6.0 to 9.0 in Volume - V –BOQ(PART –A-I))

1.1 Radiology workstation (for CT) (Sr. No. in 6.0 in BOQ)

S. No.	Description
1	Quad core Intel 64 bit Processor or higher
2	16 GB RAM or higher
3	Windows OS
4	Diagnostic Dual Head Color LED Backlight Display system (Barco or Equivalent)
5	It should have resolution of 2 MP (1600 x 1200) or higher and screen technology TFT AM Color LCD IPS
6	It should have protective, non-reflective glass cover
7	It should fulfil DICOM calibrated luminance of 400cd/m2 and Max Luminance 800cd/m2
8	It should have front consistency sensor and uniform luminance technology and Backlight Output Stabilization (BLOS) (BARCO or equivalent make)
9	It should have 21.3'' Medical Grade Review display- third display.
10	It should have DICOM calibrated luminance of 250cd/m2
11	It should have Luminance of 440cd/m2
12	It should include necessary accessories and front consistency sensor.
13	It should have high end Display controller for three display support
14	It should have Medical QA web software for online QA management
15	It should have Backlight Luminance Warranty @ factory calibrated luminance
16	It should have luminance hours of 20000hrs@400cd/m2- 2MP color diagnostic display

1.2 Radiology workstation (for MRI) (Sr. No. in 7.0 in BOQ)

S. No.	Description
1	Quad core Intel 64 bit Processor or higher
2	16 GB RAM or higher

3	Windows OS
4	It should have Fusion 4 MP Medical Grade Diagnostic Color display system (Barco or Equivalent)
5	It should have resolution native 4MP (2560 x 1600) configurable to 2 x 2MP+ (1280 x 1600)
6	It should have TFT AM Color LCD Dual Domain IPS-Pro and screen size of 29.9"
7	It should have DICOM calibrated at 500cd/m2 and Maximum Luminance of 1000cd/m2
8	It should have Iguard sensor, Uniform Luminance technology and ambient light compensation
9	It should have Protective, non-reflective glass cover configurable to 2 x 2MP (1200 x 1600) (BARCO or equivalent make)
10	It should have 21.3'' Medical Grade Review display
11	It should have DICOM calibrated luminance of 250cd/m2
12	It should have Luminance of 440cd/m2- Clinical review third display
13	It should include necessary accessories and front consistency sensor.
14	It should have High end Display controller for three display support
15	It should have Medical QA web software for online QA management
16	It should have Backlight Luminance Warranty @ factory calibrated luminance
17	It should have luminance (hours) of 20000hrs@400cd/m2.- 4MP Fusion display

1.3 X-Ray workstation for PACS (Sr. No. in 8.0 in BOQ)

S. No.	Description
1	Quad core Intel 64 bit Processor or higher
2	16 GB RAM or higher
3	Windows OS
4	It should have 3MP diagnostic Dual head grayscale display system- (Barco or Equivalent)
5	It should have Screen technology UA-SFT (ultra advanced - super fine technology) with LED backlight

6	It should have 3MP (2048 x 1536) Pixel pitch 0.2115 mm
7	It should have number of grayscales (LUT in/LUT out) 1024 grey levels (10/12)
8	It should have ULT technology, ambient light compensation and I guard for DICOM calibration
9	It should have maximum Luminance 1700cd/m2 and DICOM calibrated at 600cd/m2- 3MP Grey scale diagnostic display.
10	It should have Screen protection Protective, non-reflective glass cover
11	It should have 21.3'' Medical Grade Review display
12	It should have DICOM calibrated luminance of 250cd/m2
13	It should have Luminance of 440cd/m2
14	It should include necessary accessories and front consistency sensor.
15	It should have high end Display controller for three display support
16	It should have medical QA web software for online QA management
17	Display should also mention the backlight warranty hours.
18	It should have backlight Luminance Warranty @ factory calibrated luminance
19	(hours)- 45000 hrs at 600cd/m2- 3MP Grey scale display.

1.4 Ultrasound Workstations for PACS (Sr. No. in 9.0 in BOQ)

S. No.	Description
1	Quad core Intel 64 bit Processor or higher
2	16 GB RAM or higher
3	Windows OS
4	It should have 21" 2MP Medical Grade Review display (Barco or Equivalent)- Dual head clinical displays with necessary graphic card and Medical QA software
5	It should have DICOM calibrated luminance of 250cd/m2, Ambient Light Compensation (ALC) and contrast ratio of 1500:1
6	It should have Luminance of 440cd/m2
7	It should include necessary accessories and front consistency sensor.

2. Desktop Computer (i7 Based) (Sr. No. 13.0 in Volume - V –BOQ(PART –A-I))

Specification Sheet- Desktop Computer (preferably All In One)		
Sr. No.	**Description**	**Specification**
1.	Processor	Intel Core i7 with 3.6 GHz, 3MB cache or Higher
2.	Memory	4 GB RAM or Higher
3.	Hard Disk Drive	1 TB 7200 rpm or higher
4.	DVD Drive	DVD RW Drive
5.	Network Card	Integrated 10/100/1000 Gigabit Ethernet LAN
6.	Monitor	57.5 cm (23 inch)larger LED/ TFT Digital Colour Monitor TCO-05 certified
7.	Keyboard	104 keys with USB interface
8.	Mouse	Optical with USB interface
9.	Interfaces/ Port	6 USB Ports including 2 USB 3.0, audio ports for microphone and headphone.
10.	Operating System	Windows 8 Professional or Higher
11.	Warranty	Onsite 3 year warranty

3. Desktop Computer (i5 Based) (Sr. No. 14.0 in Volume - V –BOQ(PART –A-I))

Specification Sheet- Desktop Computer		
Sr. No.	**Description**	**Specification**
1.	Processor	Intel Core i5 with 3.6 GHz, 3MB cache or Higher
2.	Memory	4 GB RAM or Higher
3.	Hard Disk Drive	1 TB 7200 rpm or higher
4.	DVD Drive	DVD RW Drive
5.	Network Card	Integrated 10/100/1000 Gigabit Ethernet LAN
6.	Monitor	47 cm (18.5 inch)larger LED/ TFT Digital Colour Monitor TCO-05 certified

7.	Keyboard	104 keys with USB interface
8.	Mouse	Optical with USB interface
9.	Interfaces/ Port	6 USB Ports including 2 USB 3.0, audio ports for microphone and headphone.
10.	Operating System	Windows 8 Professional or Higher
11.	Warranty	Onsite 3 year warranty

4. NOTEBOOK PC (Sr. No. 15.0 in Volume - V –BOQ(PART –A-I))

Specification Sheet- Notebook PC		
Sr. No.	**Description**	**Specification**
1.	Processor	Intel Core i7 with 3.6 GHz
2.	Memory	8 GB RAM or Higher
3.	Hard Disk Drive	1 TB 7200 rpm or higher
4.	DVD Drive	DVD RW Drive
5.	Network Card	Integrated 10/100/1000 Gigabit Ethernet LAN
6.	Monitor	38.1 cm (15 inch) LED Screen
7.	Interfaces/ Port	3 or more USB Ports including at least 1 USB 3.0, audio ports for microphone and headphone.
8.	Operating System	Windows 8 Professional or Higher
9.	Warranty	Onsite 3 year warranty

5. Latest Tablet (Sr. No. 16.0 in Volume - V –BOQ(PART –A-I))

Specification Sheet- Latest tablet		
Sr. No.	**Description**	**Specification**
1.	Processor	1.5 GHz Quad Core Processor or higher
2.	Memory	2 GB RAM or Higher
3.	Internal Memory	Expandable Storage Capacity of 64 GB or higher

4.	Primary Camera	5 MP Primary Camera or higher
5.	Secondary Card	1.3 MP Secondary Camera or higher
6.	Screen Size	8-inch TFT Capacitive Touchscreen or higher
7.	Connectivity	Wi-Fi, 3G or 4G Enabled, Bluetooth connectivity
8.	Operating System	Android v5.0.0 or higher (Lolly Pop) OS
9.	Warranty	Onsite 3 year warranty
10.	Battery	Above 4000 mAH

6. Printer (Sr. No. 19.0 to 30.0 in Volume - V –BOQ(PART –A-I))

Specification Sheet- Heavy Duty Black and White Network LaserJet Printer (Sr. No. 19.0 in BOQ)		
S No.	**Description**	**Specification**
1	General Features	Paper (bond, color, letterhead, plain, pre-printed, pre-punched, recycled, rough, light), envelopes, labels, cardstock, transparencies, shelf edge labels, user-defined
2	Print Speed	50 ppm or Higher
3	Print Technology	Laser Printer
4	First Page Out	8 seconds or less
5	Resolution	1200 x 1200 dpi Higher
6	Control Panel	4-line color LCD display
7	Processor	1.2 GHz or higher
8	Memory	512 MB or more
9	Duty Cycle	1,75,000 pages per month or more
10	Paper (Input)	Tray 1: up to 100 sheets, Tray 2: up to 500 sheets
11	Output	Up to 600 sheets or more
12	Two Side Printing	Automatic
13	Interfaces	1 Hi-Speed USB 2.0 Device, 1 Gigabit Ethernet 10/100/1000T network
14	Print Languages	PCL 6, PCL 5 and PS 3 emulation

15	Media Size	letter, legal, 8.5 x 13 in, executive; A4, A5, RA4, B5 (JIS), 16K, executive
16	OS Compatibility	Windows XP SP3 all 32-bit editions (XP Home, XP Pro, etc.), Windows Vista all 32-bit editions (Home Basic, Premium, Professional, etc.), Windows 7 all 32- and 64-bit editions, Windows 8/8.1 all 32- and 64-bit editions

Specification Sheet- Black and White LaserJet Printer (Sr. No. 21.0 in BOQ)		
S No.	**Description**	**Specification**
1	General Features	Paper (laser, plain, photo, rough, vellum), envelopes, labels, cardstock, transparencies, postcards
2	Print Speed	25 ppm or Higher
3	Print Technology	Laser Printer
4	First Page Out	Up to 8 sec or less
5	Resolution	Up to 1200 x 1200 dpi or more
6	Control Panel	2-line LCD
7	Processor	266 MHz or Higher
8	Memory	128 MB or more
9	Duty Cycle	8000 pages or more per month
10	Paper (Input)	250-sheet input tray, 10-sheet priority tray
11	Output	150-sheet output tray or more
12	Two Side Printing	Automatic
13	Interfaces	1 Hi-Speed USB 2.0; 1 Ethernet 10/100, built-in Wi-Fi 802.11b/g/n
14	Print Languages	PCL 6, PCL 5 and PS emulation
15	OS Compatibility	Windows 8.1 (32 & 64-bit), Windows 8 (32 & 64-bit), Windows 7 (32 & 64-bit), Windows Vista (32 & 64-bit),

Specification Sheet- Black and White Multifunction LaserJet Network (Print, Scan, Fax, Copy, Wireless) Printer (Sr. No. 23.0 in BOQ)		
S No.	**Description**	**Specification**
1	General Features	Paper (plain, LaserJet), envelopes, transparencies, labels, postcards, Scanning
2	Print Speed	20ppm or Higher
3	FPO	Upto 10 sec or less
4	Print Technology	Laser Printer
5	Resolution	Up to 600 x 600 dpi or higher
6	Print Language	PCL
7	Scan Resolution	Up to 1200 x 1200 dpi
8	Scan file format	JPG, RAW (BMP), PDF, TIFF, PNG
9	Copy Speed	Up to 20 cpm or Higher
10	Copier reduce and enlarge	25 to 400 %
11	Copier Settings	Number of copies; Lighter/Darker; Reduce/Enlarge; Optimize (draft, text, mixed, picture); Paper Size, ID Copy
12	Connectivity	Hi-Speed USB 2.0 port; built-in Fast Ethernet 10/100Base-TX network port; built-in Wi-Fi 802.11b/g/n
13	Memory	128 MB or more
14	Processor Speed	600 MHz or higher
15	Duty Cycle	Up to 8000 pages or more

Specification Sheet- Color Multifunction LaserJet Printer (Legel size) (Print Scan, Copy, Fax, Wireless, ePrint) (Sr. No. 25.0 in BOQ)		
S No.	**Description**	**Specification**
1	General Features	Paper (bond, brochure, colored, glossy, letterhead, photo, plain, pre-printed, pre-punched, recycled, rough), postcards, transparencies, labels, envelopes Print Scan, Copy, Fax, Wireless, ePrint etc.
2	Print Speed	Up to 30 ppm or more, A4 (Black & Colour)

3	First Page Out/First Copy Out	As fast as 18 sec (Colour) or less, A4
4	Print Resolution	Up to 600 x 600 dpi or more
5	Control Panel	3.5-in intuitive touchscreen
6	Processor	800 MHz or more
7	Memory	256 MB or more
8	Duty Cycle	Up to 75000 pages per month or more
9	Copy Speed	Up to 30 cpm or more
10	Number of copies	Up to 99 copies or more
11	Copier Resize	25 to 400 %
12	Copier Settings	Number of copies; Reduce/Enlarge; Lighter/Darker; Optimize; Paper; Multi-page copy; Collation; Tray select; Two-sided; Draft mode; Image adjustment; Set as new defaults; Restore defaults
13	Scan Type	Flatbed and ADF
14	Scan file formats	PDF, searchable PDF, JPG, RTF, TXT, BMP, PNG, TIFF
15	Color Scanning	Yes
16	Scan Speed	Up to 18 ipm (B&W)
17	Scanner Advance features	Scan-to-E-mail; Scan-to-network folder, Scan to USB
18	Fax memory	Up to 250 pages
19	Fax features	Permanent fax memory backup, auto fax reduction, auto redialing, delayed sending, fax forwarding, TAM interface, polling, junk barrier, distinctive ring detection, cover page wizard, block fax, billing codes, save and load, poll receive, fax activity reports, dial prefix setting, print fax log, PC Interface supported (PC fax send only)
20	Paper Input / Output	Up to 350 sheets / Up to 250 sheets
21	Duplex Printing	Automatic

22	Media Sizes	A4; A5; B5 (JIS); 16K, Legal, Letter
23	Connectivity	1 Hi-Speed USB 2.0; 1 Gigabit 10/100/1000T Ethernet; 1 Wi-Fi 802.11 b/g/n
24	Print Languages	PCL 6, 5, PS 3 emulation
25	Operating Systems	Microsoft® Windows® 8 32-bit and 64-bit, Microsoft® Windows® 7 32-bit and 64-bit, Windows Vista® 32-bit and 64-bit, Windows® XP 32-bit (SP2 or higher), and Windows Server 2012; Mac OS X v 10.6, OS X Lion

Specification Sheet- Black and White Multifunction LaserJet (Print, Scan, Copy, Wireless) Printer (Sr. No. 27.0 in BOQ)		
S No.	**Description**	**Specification**
1	General Features	Paper (plain, LaserJet), envelopes, transparencies, labels, postcards, Scanning
2	Print Speed	20ppm or Higher
3	FPO	Upto 10 sec or less
4	Print Technology	Laser Printer
5	Resolution	Up to 600 x 600 dpi or higher
6	Print Language	PCL
7	Scan Resolution	Up to 1200 x 1200 dpi
8	Scan file format	JPG, RAW (BMP), PDF, TIFF, PNG
9	Copy Speed	Up to 20 cpm or Higher
10	Copier reduce and enlarge	25 to 400 %
11	Copier Settings	Number of copies; Lighter/Darker; Reduce/Enlarge; Optimize (draft, text, mixed, picture); Paper Size, ID Copy
12	Connectivity	Hi-Speed USB 2.0 port; built-in Fast Ethernet 10/100Base-TX network port; built-in Wi-Fi 802.11b/g/n
13	Memory	128 MB or more
14	Processor Speed	600 MHz or higher
15	Duty Cycle	Up to 8000 pages or more

Specification Sheet- Color LaserJet Network Printer (Sr. No. 29.0 in BOQ)		
S No.	**Description**	**Specification**
1	General Features	Paper (plain, LaserJet), envelopes, transparencies, labels, postcards, Scanning
2	Print Speed	16 ppm or Higher
3	FPO	Upto 10 sec or less
4	Print Technology	Laser Printer
5	Resolution	Up to 600 x 600 dpi or higher
6	Print Language	PCL
7	Connectivity	Hi-Speed USB 2.0 port; built-in Fast Ethernet 10/100Base-TX network port; built-in Wi-Fi 802.11b/g/n
8	Memory	128 MB or more
9	Processor Speed	600 MHz or higher
10	Duty Cycle	Up to 8000 pages or more

7. **Scanner** (Sr. No 31.0 in BOQ)

S No	**Description**	**Specification**
1	Scan Speed	15ppm or higher
2	Image Scan Rate	6 ipm or higher
3	Resolution	up to 2400x2400 dpi resolution
4	Duplex Scanning	Automatic
5	Interfaces	1 Hi-Speed USB 2.0 Device, 1 Ethernet 10/100 Base-T(RJ45),
6	Scan Size	8.5x11 in (21.6 x 27.9 cm),8.5x14 in (21.6x35.5 cm)
7	OS Compatibility	Windows XP SP3 all 32-bit editions (XP Home, XP Pro, etc.), Windows Vista all 32-bit editions (Home Basic, Premium, Professional, etc.), Windows 7 all 32- and 64-bit editions, Windows 8/8.1 all 32- and 64-bit editions

Annexure-H

List of approved makes for IT Work

Sr. No.	ITEM	MAKE
1	Common Storage for HMIS & PACS	Cisco/HP/Dell/IBM/EMC[2]
2	Hardware Server for HMIS, PACS & Antivirus	HP/Dell/IBM
3	PACS Workstations	HP/Dell/IBM
4	Software & Accessories for Speech Recognition	Nuance or equivalent
5	USB dictation microphone	Philips or equivalent
6	Robotic CD/DVD Writers	Primera /R-image
7	Desktop computer & Notebook PC	HP/Dell/IBM
8	Antivirus Software	Symantec/Trend Micro/Sophos
9	Core Switch	HP/Cisco/Juniper/Brocade
10	Distribution Switch	HP/Cisco/Juniper/Brocade
11	Access Switch	HP/Cisco/Juniper/Brocade
12	Network Management Solution	HP/Cisco/Juniper/Brocade
13	Wireless Solution (Wireless Access Point and Wireless Controller both)	HP/Cisco/Juniper/Aruba/Ruckus
14	Firewall	Cyberoam/Juniper/Fortinet/Sophos
15	U/FTP Components and Optical Fibre Cable components (Passive devices for LAN)	Molex/Systimax/Panduit
16	Server Hardware	HP/Dell/IBM
17	LED TV	Sony/Samsung/Panasonic/Toshiba
18	Tablet	Samsung/Dell/HP
19	Printers and Scanner	HP/ Canon

Annexure-I

	Tentative phase wise item distribution				
Sr. no.	**Item Description**	**Quantity**	**Unit**	**Phase-I (Hospital and OPD blocks)**	**Phase-II (Teaching and Hostel blocks)**
1	2	3	4	5	6
HMIS (Hospital Management and Information System)					
1.0	Hospital Management and Information System	Lumpsum	-	Phase I	
2.0	Server Hardware and System Software including common storage & NAS for HMIS & PACS	As per the requirement	-	Phase I	
	Picture Archival and Communication System (PACS)				
3.0	PACS solution	As per the requirement	-	Phase I	
PACS Server for Application and Database					
4.0	latest PACS Server(for Application and Database)	2	No	Phase I	
5.0	3D Advanced post processing workstation software	1	No	Phase I	
PACS Workstation					
6.0	Radiology workstation (for CT)	1	No	Phase I	
7.0	Radiology workstation (for MRI)	1	No	Phase I	
8.0	X-Ray workstation for PACS	1	No	Phase I	
9.0	Ultrasound Workstations for PACS	2	No	Phase I	
Software & Accessories for Speech Recognition					
10.0	Speech Recognition software	5	No	Phase I	
11.0	USB dictation microphone	3	No	Phase I	

12.0	Robotic CD/DVD Writers	1	No	Phase I	
Desktop					
13.0	latest i7 Desktop Computer	40	No	30	10
14.0	latest i5 Desktop Computer	360	No	250	110
15.0	latest Light weight Notebook PC	10	No	10	
16.0	latest Stylish Tablet	50	No	50	
	Antivirus Server (Hardware, OS and Antivirus Software)				
17.0	latest Antivirus Server	2	No	Phase I	
18.0	latest Microsoft Office 2013 Professional License	53	No	37	16
Printers					
Heavy Duty Black and White Network LaserJet Printer					
19.0	latest Black and White Network LaserJet Printer	6	No	4	2
20.0	Original OEM Cartridge for the above printer	3	No	3	
Black and White LaserJet Printer					
21.0	latest Black and White LaserJet Printer	197	No	132	65
22.0	Original OEM Cartridge for the above printer	100	No	50	50
Black and White Multifunction LaserJet Network Printer					
23.0	latest LaserJet Multifunction (Print, Scan, Copy, Fax, Wireless) Printer	30	No	20	10
24.0	Original OEM Cartridge for the above printer	10	No	10	
Color Multifunction LaserJet Printer (Legel size)					
25.0	latest LaserJet Multifunction (Print, Scan, Copy, Fax, Wireless) Printer	10	No	5	5
26.0	Original OEM Cartridge for the above printer	5	No	5	
Black and White Multifunction LaserJet Printer					

27.0	latest LaserJet Multifunction (Print, Scan, Copy, Wireless) Printer	70	No	70	
28.0	Original OEM Cartridge for the above printer	10	No	10	
Color LaserJet Network Printer					
29.0	latest Color LaserJet Printer	3	No	2	1
30.0	Original OEM Cartridge for the above printer (Complete set of colours)	3	No	2	1
31.0	Scanner	3	No	2	1
32.0	latest Bar code printer	10	No	10	
33.0	latest Bar code reader	10	No	10	
34.0	**Library Management System (LMS)**				
34.1	Library Management Software	1	No		Phase II
34.2	Staff Station Reader	2	No		Phase II
34.3	Gate Antenna Security System	1 Set	No		Phase II
34.4	RFID Handheld Reader	2	No		Phase II
34.5	RFID Tags	10000	No		Phase II
34.6	RFID 1KB Member Card	1000	No		Phase II
34.7	RFID Middleware Software	1	No		Phase II
34.8	Self Check out Kiosk	2	No		Phase II
34.9	Anti Theft Sticker	10000	No		Phase II
34.10	Book Drop Station	2	No		Phase II
34.11	Member Card Printer	2	No		Phase II
34.12	Central Server	1	No		Phase II
34.13	Backup Server	1	No		Phase II
Education Management System					
35.0	Education Management System	1	Lumpsum		Phase II
Telemedicine					
36.0	Telemedicine	1	Lumpsum		Phase II

Active Devices					
1.0	**Core Switch**				
1.1	Core Switch	2	No	2	
1.2	24X7 support with advance replacement and 3 years OEM warranty for the core switch	2	No	2	
1.3	1000BASE-TX SFP Copper, RJ-45 Connector	16	No	16	
1.4	10G BASE-LR, SFP+ OPTICAL (LC) for upto 10 Km SMF Module for the core switch	10	No	10	
1.5	10 G BASE-SR, SFP+ optic, MMF, (for upto 300mtr.) LC Connector optical monitoring capable for core switch	24	No	24	
1.6	40G QSFP Direct attach cable 1 mtr OEM make for core switch	6	No	6	
2.0	**Distribution Switch**				
2.1	Layer 3 Distribution Switch as per the technical specification mentioned .	6	No	4	2
2.2	3 years OEM warranty and 24X7 support with advance replacement for the distribution switch	6	No	4	2
2.3	10G BASE-LR, SFP+ optic (LC)for upto 10 Km SMF Module for the distribution switch	6	No	4	2
2.4	10G BASE-SR, SFP+ optic (LC), target range 300m over MMF for the distribution switch	40	No	30	10
2.5	40G QSFP Direct attach cable 1 mtr OEM make for distribution switch	6	No	4	2
3.0	**Access Switch**				
3.1	24-port Access Switch with 3 years OEM warranty and support as per the technical specification mentioned .	13	No	7	6
3.2	48-port Access Switch with 3 years OEM warranty and support as per the technical specification mentioned .	14	No	9	5

3.3	10 G Stack cable 1 mtr.	27	No	16	11
3.4	10G BASE-SR, SFP+ optic (LC) Module for the access switch	27	No	16	11
4.0	**24 Port POE Access Switch**				
4.1	24-port POE switch with 3 years OEM warranty and support as per the technical specification mentioned.	8	No	4	4
4.2	10 G Stack cable 1 mtr.	8	No	4	4
4.3	10G BASE-LR, SFP+ optic (LC)for upto 10 Km SMF Module for the distribution switch	4	No	2	2
4.4	10G BASE-SR, SFP+ optic (LC) Module for the access switch	16	No	10	6
5.0	**Wireless Solution**				
5.1	Wireless Access Point with Power over Ethernet Adapter (10/100/1000 Mbps), Wall mounting device, Universal horizontal ceiling etc.	114	No	44	70
5.2	Wireless Access Controller for above mentioned Wireless Access Points with three years subscription etc.	1	No	1	
6.0	**Network Management Solution**				
6.1	**Network Management Solution**	1	No	1	
7.0	**Firewall**				
7.1	Appliance based Firewall with internal/external IPS/IDS	1	No	1	
Passive Devices					
8.0	**U/FTP Components**				
8.1	Cat 6A, U/FTP Cable	57500	Meter	40000	17500
8.2	Wall Plate 1 Port - White	1200	No	800	400
8.3	Power Cat6A DataGate Jack, Shuttered BLUE	1200	No	800	400

8.4	Power Cat6A DataGate Jack, Shuttered Yellow	1200	No	800	400
8.5	Cat 6A Patch Cord S/FTP 1 mtrs	1200	No	800	400
8.6	Cat 6A Patch Cord S/FTP 2 mtrs	1200	No	800	400
8.7	GANG Box, 1 Port, White.	1200	No	800	400
8.8	24 Port Unloaded Patch Panel CAT-6A.	60	No	40	20
8.9	Pentascanning Charges per node.	1200	No	800	400
9.0	**Opitcal Fiber Cable Components**				
9.1	12 port MM/SM SC LIU Fibre Panel-Unloaded .	44	No	30	14
9.2	Supply, laying, testing and Commissioning of SC Pigtail, SM, 9/125, 900 micron, 2 mtrs. .	96	No	60	36
9.3	Supply, laying, testing and Commissioning of SC Pigtail, MM, 50/125, 900 micron, 2 mtrs. .	430	No	300	130
9.4	SC-LC, Multimode, 3 Mtrs Patchcord.	72	No	50	22
9.5	SC-LC, Singlemode, 3 Mtrs Patchcord.	16	No	10	6
9.6	Supply, laying, testing and commissioning of 6 core SM OS1 cable .	3000	Meter	3000	
9.7	Supply, laying, testing and commissioning of 6 core MM OM3 cable.	1700	Meter	1100	600
9.8	OLTS (Optical Loss Test Sets) charges per core.	500	No	350	150
10.0	**Equipment Racks and other accessories**				
10.1	19" Rack 27 U Wall/Floor Mount Rack with all standard accessories that include Cable Manager, Power Bar with sockets etc.	2	No	1	1
10.2	19" Rack 12 U Wall Mount Rack with all standard accessories that include Cable Manager, Power Bar with sockets etc.	7	No	2	5

10.3	19" Rack 15U Wall Mount Rack with all standard accessories that include Cable Manager, Power Bar with sockets etc.	14	No	14	
10.4	19" Rack 42U Floor Mount Rack with all standard accessories that include Cable Manager, Power Bar with sockets etc.	1	No	1	
10.5	Supply, laying, testing and Commissioning of PVC Batten/pipes as per actual 1".	10000	Meter	7000	3000
10.6	latest Server Hardware as per the technical specification mentioned	2	No	2	
10.7	latest Server Operating System - Microsoft Windows 2012 Server or higher with media etc. as standard for the above Server .	2	No	2	
10.8	HDPE Pipe	6000	Meter	6000	
	Queue Management System			It is part of Phase I	

Annexure-J

(Technical Specification for Server Hardware and other items for HMIS and PACS)

This is the minimum configuration, however, latest and higher configuration of servers and other items to be supplied as per the requirements of HMIS solution for meeting functional and technical requirements as per the tender document.

1. CHASSIS

S. No.	Description with Specification
1	Rack Mountable Chassis to accommodate Support for minimum 7 full height, minimum 14 half height blades in the same enclosure holding Minimum 14 half /full Height blades per enclosure
2	Same enclosure should support Intel Xeon and AMD Opteron based blades.
3	Should support Hot Pluggable & fully Redundant Management Modules.
4	The blade chassis should be configured with Hot swap IP based KVM Switch for Management or KVM Management should be integrated in Remote Management Controller.
5	Should have passive mid-plane/back-plane architecture.
6	Hot swap and redundant cooling fans and all fans should be fully populated
7	Dual end-to-end redundant Network connectivity for each blade
8	The blade chassis should have at least 6 I/O Modules
9	The enclosure should be populated fully with power supplies of the highest capacity available with the vendor. Power supplies should support N+N as well as N+1 redundancy configuration, where N is greater than 1
10	Bus slots should support for Dual/Quad Gigabit, Dual 10Gbps and Dual port 4x QDR Infini band options for increased bandwidth and additional network port requirements.
11	Microsoft Windows Server 2012 Std. Edition, Windows Server Hyper-V, Redhat Enterprise Linux, SuSE Linux Enterprise Server
12	Power Management Features like i. To cap the power of individual server or a group. ii. Intelligently assign power to the appropriate server in the pool based on policy settings. iii. To show the actual power usage and thermal measurements data of servers iv. To generate comprehensive power reports.
13s4	The blade chassis should be configured with cables, connectors and accessories required to connect the Power distribution units to the power supplies
14	The Chassis should have redundant 10GbE network switches/module with at least 14Nos x 10GbE downlink ports and at least 2 x 10GbE & 2 x 1GbE uplink ports per switch for connecting to the Core Switch with end to end support for FCOE and redundant 20 or more ports fiber channel SAN switch/module with at least 14Nos x 8Gbps auto negotiating FC downlink ports and 4Nos x 8Gbps uplink ports per SAN switch with necessary required cables

15	The chassis should have minimum 1 DVD ROM which can be used by all the blade servers or should support virtual media to mount DVD/CD from remote system.
16	Should support combination housing of Ethernet, FC, iSCSI, FCOE,IB interconnect fabrics offering Hot Pluggable & Redundancy as a feature.
17	System Management and deployment tools to aid configuring the Blade Servers and OS Deployment should be provided.
18	The chassis should be equipped for providing MAC & WWN address across the slots or chassis instead of individual Host Bus Adapter/NIC of the Blade. The solution provided must not have any single point of failure and must be configured in failover
19	The Power and cooling requirements of the configuration should be submitted along with technical document

2. SERVER

S.No.	Item	Description with Specification
1	Processor	Two Intel E5-2680 V3 2.5 Ghz 12 cores or above
2	Chipset	Intel C600
3	Memory	256GB DDR3 Memory / 16 Slots , scalability upto 768GB
4	Memory Protection	Advanced ECC with multi-bit error protection
5	Hard Drives	2 x 300GB 15K RPM SAS HDD or more hot swappable system disk with mirroring using integrated RAID 0,1 on internal disks, It should be possible to hot swap the drives without shutting down the server
6	Ethernet , HBA	2 * 10GbE multifunctional network ports with support for iSCSI, FCoE protocols based on future datacenter needs. Each 10 GbE should be able to partitioned as minimum 4 partitions.
7		1No of FC HBA card with Dual Port 8Gbps Fiber Channel
8		In addition to the above dedicated Remote Management should be done/ All the blades in the chassis should be remotely managed through Chassis
9	Bus Slots	Minimum of 2 PCI expansions/Mezzanine expansions.
10		Bus slots should support for Dual/Quad Gigabit, Dual 10Gbps and Dual port 4x QDR Infini band options for increased bandwidth and additional network port requirements.

11	OS Support	Microsoft Windows Server 2012 Std. Edition, Windows Server Hyper-V, Redhat Enterprise Linux, SuSE Linux Enterprise Server
12	Virtualization Support	VMWARE ESX/ESXi, Microsoft Hyper-V
13	Alerts	Pre Failure alerts for all active and important components and automatic calls logging.
14	Systems Management	Smart Embedded Systems Management should be able to automate task like discovery deploy monitor and update.
15		Should not be dependent on agents to for life cycle management.
16		Should be able to provide Single console to manage Servers.
17		Power management tool – Single interface to optimize ad control every usage
18		Should be able to integrate to 3rd party management tools.
19	Remote Management	Vendor should provide embedded features that helps to manage Servers in physical, local and remote environments, operating in-band or out-of-band, with or without a systems management software agent.
20		Should include Power Management, necessary licenses should be included.
21		Power Management should give historical data for atleast 72 hours.
22		Should also support IPv6
23		Should support remote scripted reconfiguration tools
24		Should be able to monitor all systems components (BIOS, HBA's, NICs, CNA's)
25	Security	Power-on password, administrator password.
26	Systems Management Software	The server should come with systems management software to provide update management, configuration management, patch management and virtualization management. The software should be able to Cap data based on the report.
27	Benchmarks	Server family should have published benchmark (Spec_int _rate2006)
28	Delivery	All the necessary tools & tackles licenses, cables/ connectors for Ethernet/ Fibre/ USB/ Power etc. required for making the system operational shall be

		provided by the bidder.
29	Industrial Standard Compliance	ACPI 2.0 Compliant, PCI 2.0 or higher Compliant, WOL Support, MS Logo Certification, USB 2.0 Support.
All the server Hardware and storage shall be provided **from day 1** as per the specification mentioned.		

3. ENTERPRISE STORAGE

S.No.	Item	Description with Specification
1	Make	The OEM shall be listed in Challenger or Leader' s Quadrant in the "Magic Quadrant for General- Purpose Disk Arrays" published in Mar 2013 or latest . BIDDER shall at tach the copy of above mentioned Gartner Report in support of their claim.
2	Storage Controller	The Storage system must have at least two controllers running in an active-active mode with automatic failover to each other in case of one controller failure.222
3	Cache required	Dual controllers on Active Active mode ; controllers should support mirroring each other's cache; Minimum 32GB Cache across controller.
4	Protocols Supported	The storage shall support FCP protocols for use with different applications . Any hardware/software required for this functionality shall be supplied along with it in NSPOF (No Single Point Of Failure) .
5	Storage Capacity	The storage shall support both SAS, SATA/NL-SAS, SSD based disks simultaneously in the same enclosure. The storage should be supplied with minimum 50 TB usable capcity with 900 GB 10K RPM SAS drives configured in RAID-5 . Minimum of 3 global hot-spare disk drive should be configured for SAS Disks
6	Front-End connectivity	The storage should support minimum of 8*8 Gbps FC or higher SAS Storage front end ports as well as an additional 2 *1/10 Gbps ISCSI/IP ports for Replication.
7	Back End Connectivity	The storage should be provided with 16* SAS lanes of 6 Gbps across controllers for backend disk connectivity.
8	RAID configuration	The system should support RAID 0, 5, 6. 1+0
9	Storage Scalability	The storage should be scalable to at least 120 drives.

10	Storage built-in functionality	Feature of Dynamic volume expansion to expand the volumes.
		Thin provisioning should be provided & capable from day one for the entire storage capacity
		Feature of Dynamic capacity expansion
		Feature of Dynamic RAID level migration
		Local protection snapshots, volume copy & Remote replication software should be provided from day ONE. The remote replication software provided should be able to establish replication in synchronous as well as asynchronous mode. Presently Asynchronous replication will be required between DC & DR. Necessary hardware & Software to be provided with the storage.
		The storage should support Automatic tiering mechanism through SSD, SAS and NL-SAS within storage.License should be provided for full capacity at DC site.
		Feature Dynamic mode switching from one replication mode to another mode based on future requirement.
		Non-Distruptive controller firmware upgrade should be supported
11	Multipathing	Multipathing and load balacing and fail over either native OS feature or storage software with license for minimum 20 windows/linux servers.
12	Licensing	All the licenses on the storage system must be provided for an entire capacity supported by the system from day one.
13	Upgradeability/ Investment Protection	In the event of unforeseen growth, the proposed system should be field upgradeable to a higher model in the family through data-in-place upgrades without requiring forklift upgrade and without requiring replacement of the disk shelves .
14	Management	Easy to use GUI based and web enabled administration interface for configuration, storage management. Storage management alerting and reporting tools also should be bundled with the storage
15	OS support	Support for industry-leading Operating System platforms including: LINUX/UNIX , Microsoft Windows.
16	Remote Diagnostics	The proposed system should support Web based, Email facility for remote service & also support dial-in / dial-out to report errors and warnings
17	Warranty	05 years warranty (24 x 7 x365) with 04 hours on site responce should be offered with call home facility from OEM.

18	Firmware Upgrade	Array shall have no single point of failure (NSPOF); it should support Online firmware upgrades and Remote diagnostic support.
19	Replication	• The storage array should be able to do Synchronous and Asynchronous Replication using native ssytem functionality. • There should not be any additional appliance reqruied for Replication.Storage Array should have iSCSI/IP ports for replication to DRs site. • Replication license for Synchronous and Asynchronous for full offered capacity should be provided on day one at both sites. • The replication solution offered and should be capable of optimizing the WAN bandwidth usage by having feature like compression or de-duplication or zero page deduction.
20	Software Features	Array shall be supplied with license feature to Point-in Time Copy, Clone; Online Volume Migration, Array based LUN masking, Multipath, Thin Provisioning, from day one for entire proposed capacity. Any license if applicable to restore production volume from snap/ clone shall be supplied for entire proposed capacity. Array shall be also supplied with feature license if applicable to show detailed key performance characteristics like, Read and Write IOPs, Throughput.response time, controller utilization, disk utilization, capacity utilization etc. Management GUI shall support scheduling of reports for above performance metrics.
21	Integration	Storage must be complied to Vmware API for Array Integration and Microsoft ODX standards.
22	Rack and Accessories	Compatible Rack should be supplied with SAN Storage,Required rack accessories e.g rack mount kit, cables to be provided .
23	Redudancy	Array shall be Rack Mountable with Hot Swap Redundant Power Supply and cooling fans. All necessary cables and accessories to connect Storage system to SAN switch shall be provided.
All the server Hardware and storage shall be provided **from day 1** as per the specification mentioned.		

4. SAN SWITCH

S. NO.	Description
1	The SAN switch should be quoted with minimum 16 FC ports of 8Gbps The switch should be scalable to 24 ports or more.

2	Should protect existing device investments with auto-sensing 2, 4,8 and 16 Gbit/sec capabilities.
3	The switch should have auto sensing, Zoning, Integrated Ethernet and Serial Port for communication.
4	The switch should be equipped with redundant hot swap power supply and Fan and allow hot swap ability without resetting the switch, or affecting the operations of the switch.
5	The switch should have feature for Non-disruptive firmware upgrade
6	The switch should be capable of End to end performance monitoring
7	Switch should be rack mountable and should be supplied with mounting kit.
8	The switch should have security features like zoning, policy based security
9	The switch should have features like port binding, masking etc
10	The switch should have support for secure access and SSH, SNMP etc.
11	The switch should have support for Inter Switch linking / trunking
All the server Hardware and storage shall be provided **from day 1** as per the specification mentioned.	

5. TAPE LIBRARY

S. No.	Description
1	Shall support Native data capacity of 100 TB (uncompressed)
2	Shall be offered with Minimum of Two LTO6 FC tape drive. Drive shall support encryption
3	Shall be offered with minimum 40 Cartridge slots.
4	Tape Library shall be further scalable 4 LTO-6 drives
5	Offered LTO6 drive in the Library shall conform to the Continuous and Data rate matching technique for higher reliability.
6	Offered LTO4 drive shall support 160MB/sec in Native mode and 400MB/sec in 2.5:1 Compressed mode.
7	Offered Tape Library shall provide 8Gbps native FC connectivity to SAN switches.
8	Offered Tape Library shall have partitioning support so that each drive can be configured in a separate partition.

9	Offered Library should support key management or hardware base encryption key management solution.
10	Tape Library shall provide web based remote management.
11	Tape library shall support Barcode reader and mail slot.
12	Tape Library shall have GUI Panel
13	Shall have option for redundant power supply
16	All the server Hardware and storage shall be provided **from day 1** as per the specification mentioned.