

## INVITATION FOR QUOTATION

HSCC/PUR/KCGMC/Low Value/Medical College Items/2017/MC-Aug (7)

7<sup>th</sup> Aug, 2017

To,

**All Bidders**

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**Subject:** Invitation for Quotations for supply of Low Value Items for below mentioned dept.  
*1. Dept. of Community Medicine,*  
*2. Dept. of Microbiology*  
*3. Dept. of Forensic Medicine*  
*4. Dept. of Pathology*  
*5. Dept. of Dentistry*  
*6. Dept. of Biochemistry for Kalpana Chawla Medical College, Karnal, Haryana.*

Dear Sirs,

1. Director General, Medical Education & Research, Panchkula, Govt. of Haryana through its Consultant HSCC (India) Ltd. invites most competitive quotation for the following goods of the respective Departments as detailed below:

**Annexure - (Including name of items, Specification and Quantity)**

- (I) Dept. of Community Medicine,
  - (II) Dept. of Microbiology
  - (III) Dept. of Forensic Medicine
  - (IV) Dept. of Pathology
  - (V) Dept. of Dentistry
  - (VI) Dept. of Biochemistry
2. Quotation:
    - 2.1 The contract shall be for the full quantity as described above.
    - 2.2 Corrections, if any, shall be made by crossing out, initialling, dating and rewriting.
    - 2.3 The prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
    - 2.4 The unit price/ rate of the item should be clearly indicated in the tender. Rates /Prices quoted shall be Inclusive of all taxes, duties, forwarding, and insurance & transportation up to the destination, Kalpana Chawla Medical College – Karnal. Annexure-A is enclosed for price bid quotation format.
  3. Each bidder shall submit only one quotation.
  4. Evaluation of Quotations:

The Purchaser shall evaluate and compare the quotations determined to be substantially responsive i.e. which;

- 4.1 are properly signed; and
- 4.2 confirm to the terms and conditions, and specifications.
- 4.3 final considerations of equipments shall be based on the quality of equipments during demonstration / inspection.
5. The Quotations would be evaluated item wise.
6. Award of contract:
- 6.1 The Purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive and who has offered the lowest rate for the item subject to quality of the items during demonstration / inspection.
- 6.2 Notwithstanding the above, the Purchaser reserves the right to accept or reject any quotations and cancel the bidding process and reject all quotations at any time prior to the issue of Purchase Order, without assigning any reason.
7. Delivery period shall be within **07** days from date of placement of order.
8. Payment shall be made only in Indian Rupees as follows:

**Satisfactory Acceptance and delivery - 100% of total cost**

100% Payment on submission of following documents (Duly signed & stamped at your end):-

- Copy of Purchase order.
- Consignee Acceptance Certificate in original issued by KCGMC/HSCC
- Invoice in favour of consignee/Director, KCGMC, Karnal through HSCC (I) Ltd
- Warranty Certificate in original.

9. All supplied items shall be under warranty of **12** months from the date of delivery/successful acceptance.

10. You are requested to provide your offer as follows:

Sr. No.	DESCRIPTION	ITEM No.	Closing date & time for submission & receipt of tender	Date and time of Opening of Techno – Commercial Tenders
I.	Department of Community Medicine Equipment	1 to 18	16th August 2017at 14:00	16th August 2017at 14:30
II.	Department of Microbiology List of Charts, Models & Museum Articles	As Indicated	16th August 2017at 14:00	16th August 2017at 14:30
III.	Equipments for Department of <b>Forensic Medicine:</b>			
	Annexure - I: List of Weapons	64	16th August 2017at 14:00	16th August 2017at 14:30
	Annexure - II: List of Photographs	30	16th August 2017at 14:00	16th August 2017at 14:30
	Annexure - III: List of Models	69	16th August 2017at 14:00	16th August 2017at 14:30
	Annexure - IV: List of Bones	3	16th August 2017at 14:00	16th August 2017at 14:30
	Annexure - V: List of Poisons	156	16th August 2017at 14:00	16th August 2017at 14:30
	Annexure - VI: List of Charts	94	16th August 2017at 14:00	16th August 2017at 14:30
IV.	Department of Pathology		16th August 2017at 14:00	16th August 2017at 14:30
V.	Department of Dentistry		16th August 2017at 14:00	16th August 2017at 14:30

**NOTE:** (Under any unforeseen circumstances if the due date for submission of Tender is declared as holiday then the tender shall be submitted & opened on the next working day at the scheduled time).

The quotations will be opened in HSCC office, NOIDA as mentioned above in the presence of tenderer or their authorised representative as they may choose to attend.

11. Information brochures/ Product catalogue, if any, must be accompanied with the quotation clearly indicating the model quoted for.
12. Sealed quotation to be submitted/ delivered at the address mentioned below:

**General Manager (Procurement)**  
**HSCC (India) Ltd.**  
**E- 6 (A), Sector -1.**  
**NOIDA – 201 301.**

**THE COVER SHOULD BE SUPERSCRIBED WITH THE FOLLOWING:**

Reference to letter of enquiry.  
Due date of opening.  
Serial No of the Items with Department.

13. Quoted amount should be in Indian Rupees only.
14. For all items, the Technical Evaluation Committee may opt for Demonstration of the items. The Committee may also ask for Demonstration / Inspection before supply / delivery of the items for quality assurance.
15. Insurance shall be arranged/borne by supplier.

**Note:** Please indicate the quotation reference no. (Given at the top of page 1 of this letter) and Serial No of the Items on the top of the envelope.

The details of various medical equipment shall be also made available at [www.hsccltd.co.in](http://www.hsccltd.co.in), and modification/amendments etc, if any, shall only be notified on website only.

We look forward to receiving your quotation and thank you for your interest in this project.

**General Manager (Procurement)**

**Price bid**

<b>Sl No.</b>	<b>Name of Item</b>	<b>Qty(Nos)</b>	<b>Unit Price (Rs.) (Incl. Of forwarding, packing, insurance, transportation up to destination)</b>	<b>Tax (if any)</b>	<b>Unit Price (Incl. Tax)</b>	<b>Total Price(Incl. Tax) Rs.</b>

We accept all terms and conditions of the above Invitation of Quotation

Authorized signatory  
*Name , designation and sealed*

**DEPARTMENT OF COMMUNITY MEDICINE**

## D. DEPARTMENT OF COMMUNITY MEDICINE

### **1. Barometer - Precision, Fortin (Manual) - 1 No.**

1. Made of metal, mounted on wood structure
2. The instrument should consist of a scale, mercury-filled glass tube and Cistern.
3. Scale should be graduated in hPa (mb) and mmHg on a brass tube marking, apex of ivory pointer as cardinal point and is read by the vernier in 0.1 mm graduation.
4. Measuring method –mercury column.
5. Measuring range – 870 to 1090 hPa / 650 to 820 mmHg Min graduation – 1 hPa/1mmHg.
6. Vernier readings – 0.1hPa/0.1mmHg Accuracy - +/- 0.5hPa.
7. Mounted Thermometer – Mercury filled glass thermometer, measuring range - -20° C to 50°C, Minimum graduation – 0.5°C

### **2. Extraction Apparatus Fat Complete with accessories - 1 No.**

1. Extraction Apparatus, fat, complete
2. Fat Extractor used to determine fat and oil content in samples.
3. Frame is constructed of metal
4. Spring-loaded heater elements operated by control knobs / Key pads with variable heat input from 20-100% capacity;
5. Red pilot light
6. Metal condensers with Type 304 stainless steel heads with automatic pressure-release valves
7. On/Off switch
8. Control valve for connection to cold water supply
9. Water outlet for connection to an open drain

### **3. Filter, Pasteur Chamber Land, Complete Set - 1 No.**

The essential part of a filter is the candle, which is made of unglazed porcelain in Pasteur Chamber land type. Made of porcelain tube that contains a ring of enameled porcelain through which inflow pipe fits the core of a porcelain pipe. Outflow made up of metal pipe with holes through which water flows out and is collected.

### **4. Filter Berke Field - 1 No**

The essential part of a filter is the candle, which is made of Kieselgurh in Berkefield type. Container capacity: 8 lit. Typical output per day: 80 lit. Candle two in no. 2.75"x5" (Approx.) Imperial Supersterasyl ATC ceramic candle, empty weight: 2.7 kg.

5. BP Apparatus – 6 Nos. (4 Digital & 2 Mercury)

### **6. Centrifuge Clinical - 1 Nos**

Centrifuges are required in the Laboratory to separate various components of Blood and any other liquid sample for analysis

#### **Specifications:**

Aerodynamic compact construction for vibration free performance

Table top version, complete with power lead

Tube Capacity: No. 8: Size 5 – 15 ml

Should have a digital timer

Body should be made of strong fabricated & corrosion resistant steel

Control panel – for start/stop switch, dynamic brakes, step less speed regulator with zero start switch &

speed indicator with timer and protective

fuses. Door interlock

Maintenance-free brushless drive motor with exact speed pre-selection and display. Speed range 100 to 6000 rpm and above, accuracy 1 rpm. RPM :

Up to 6500-7000 power consumption 500 watt, power requirement 220 V & 50 to 60 Hz,

7. **Salter's Baby weighing machine** **-04 Nos**  
Capacity 25 Kg. x 100 gm, material: metal and cloth.
8. **Aqua Guard - standard available** **- 1 No.**
9. **Digital Haemoglobinometer** **-02 Nos**
- Measuring Method : Cyanmethemoglobin
  - Measuring Range : 0 – 30 gm/dl of Hb.
  - Dilution Ratio : 1:25 I Sample Volume : 1 ml Display : 3 Digit 7-Segment Red LED
  - Display Wavelength : 546 nm
  - Keyboard : 3 Keys, Soft Touch Membrane Type Zero Setting : Automatic
  - Calibration : Automatic
  - Detector : Highly sensitive silicon photodiode Power : 230 V  $\pm$  10% AC, 50 Hz
  - Dimensions (L x B x H) : 195 x 235 x 105 mm (Approx.) Weight : 2.5 Kg.  
(Approx.) Accessories: Matched Test Tube: (A set of 5), Spare Lamp,
  - Operation Manual and Dust Cover
10. **Sling Psychrometer** **-02 Nos**  
Approx. 7.5" long x 1" diameter.  
Duel range (high & low temperature) scales for better resolution.  
Slide rule construction should quickly convert temperature to relative humidity, with either red spirit- filled thermometers or mercury-filled thermometers.  
Thermometers telescope into handle for protection when not in use.  
Built-in water reservoir to hold sufficient water for several hours of testing.
11. **SPRING BALANCE ( To Measure misc. weight )** **-02 Nos**  
A **spring balance** apparatus is simply a spring fixed at one end with a hook to attach an object at the other to weigh upto 5 Kg.
12. **Digital clinical THERMOMETER & Mercury Thermometer** **-04 Nos**  
Should be able to measure body temperature. It should consist of a glass bulb attached to a fine tube of glass. Accuracy  $\pm 0.1^\circ\text{C}$  &  $\pm 0.2^\circ\text{F}$ . It should be supplied in individual plastic case.  
Manufacturer should have ISO certification for quality standards
- For measuring temperatures and displaying it with LCD/LED
  - Portable battery operated system is required.
  - Temperature measurement range: - 40 deg C to 210 deg C
  - LCD readout
  - Temperature measurement accuracy :  $\pm 0.1^\circ\text{C}$
  - System as specified-
  - Temperature probe-(quote prices for both surface and internal probes)
  - Battery operated.
13. **Horrock's Apparatus –complete set** **-02 Nos**  
To detect chlorine demand of water with all the chemicals along with the Manual
14. **Chlorine Testing Kit** **-01 Nos**
- Field & Lab Use: An optional AC adapter
  - Large Display: RS-232 Interface: An RS-232 port to interface with a data logger on computer.  
Optional cable
  - 0-4 ppm Chlorine: No need to select a low or high range. The 1200 covers the entire critical chlorine range of 0-4 ppm with a 0.05 sensitivity.
  - 1200 Chlorine Colorimeter Kit with enough tablets for 100 tests or liquid reagents for 140 tests, six sample vials with screw caps, instruction manual, and sturdy carrying case. Water Resistant Design:
  - Auto-Zero: facility
  - Hinged Light Cover: Flip-top lid over sample chamber
15. **Fluride Testing Kit** **-01 Nos**
- Range: 0.00 to 2.00 mg/L
  - Resolution: 0.01 mg/L
  - Accuracy (@  $20^\circ\text{C}/68^\circ\text{F}$ )  $\pm 5\%$  of reading or  $\pm 3\%$  of reading Typical EMC

- Deviation:  $\pm 0.01$  mg/L Light Source, Light Emitting Diode @ 585 nm
- Light Life of the instrument Light Detector Silicon Photocell Battery Type/Life 1 x 9V /

Approximately

40 hours of continuous use Dimensions / Weight 180 x 83 x 46mm (7.1 x 3.3 x 1.8") / 290g (10 oz.) method. Adaptation of the SPADNS method. Reaction between fluoride and reagent causes a red tint in the sample.

#### 16. Slides –

Qty-01 each

##### 1. COMMUNICABLE DISEASE SLIDES

Full set e.g. Mycobacterium TB, Mycobacterium Leprae, Microfilaria, Staph. Aureus , streptococcus Pyogenes, clostridium tetani, Malaria parasite ( vivax, falciparum- various stages), Corynebacterium diphtheria, Pertussis etc.

##### 2. VECTOR SLIDES ( Full Set)

Mosquitoes – male and females (anopheles, aedes, culex, mansonias- adult females, mouth parts, eggs, larvae, pupa), Housefly, Ticks (hard and soft), Mites (trombiculid, scabies), sandfly, flea, louse, Cyclops etc.

#### 17. Weighing Machine – 6 Nos.

#### 18. Shakir's Tape – 3 Nos.

#### 19. Day Carrier with Ice Packs – 1 No.

#### 20. Models, Charts, Diagrams [LIST GIVEN BELOW]

- 01 each

##### Environmental Models – A

##### Structured models – B

1. Nutritional disorders– marasmus, kwashiorkor, xerophthalmia, bitot-spots, rickets, scurvy, dental caries
2. Communicable diseases- measles, chicken-pox, small-pox
3. Parasitological – E. histolytica, L. donovani, G. lamblia, Roundworm, Tapeworm, Hookworm, Filaria
4. Virus – HIV, Hepatitis-B

**Charts** - List given – Wall Mounted on PVC Board and laminated

##### A. ENVIROMENTAL MODELS:

Sr. No.	NAME OF ITEMS	QTY (Nos)
1	Sanitary Well	1
2	Insanitary Well	1
3	Slow Sand Filter	1
4	Rapid Sand Filter	1
6	Biogas Plant	1
7	Incinerator	1
8	Model of Sanitary House	1
9	Septic Tank	1
	Flow Diagram Showing Large Scale treatment of	
10	Water for Community Supply	1
11	Community Sewage	1
12	Smokeless Burner	1
13	Rain water harvesting	1
14	Gobar gas plant	1



**B. STRUCTURAL MODELS:**

VIRUS MODELS		
1	STRUCTURE OF HEPATITIS B VIRUS	1
2	HIV VIRUS	1
TESTING KITS		
1	MBI testing kit for testing iodine in salt	1
2	Water pollution testing kit	1
CHART		
Nutritional Disorder		
1	Marasmus ( PEM)	1
2	Kwashiorkar (PEM)	1
3	Xerophthalmia	1
4	Bitot spot	1
5	Rickets	1
6	Scurvy	1
7	Dental caries	1
Communicable Diseases		
1	Measles	1
2	Spread of Tuberculosis	1
3	Control of Tuberculosis	1
4	Spread of Typhoid	1
5	Prevention of Typhoid Fever	1
6	Spread of Diarrhea and Dysentery	1
7	Spread and Prevention of Cholera	1
8	Life cycle of plasmodium vivax	1
9	Prevention and control of malaria	1
10	Different characteristic of Anopheles, Aedes and Culex	1
11	Manifestation of Dengue	1
12	Life cycle of Housefly	1
13	Scabies	1
14	Skin Leprosy with minimum Nodulation	1
15	Life Cycle of Sandfly	1
16	Life Cycle of itchmite	1
Biomedical Waste		
1	Colour coding of biomedical waste	1
2	Categories of Biomedical Waste	1
FAMOUS SCIENTISTS		
1	Louis Pasteur	1
2	Edward Jenner	1
3	Ronald Ross	1
4.	Other Public Health Sciences – On Available Basis	
PARASITOLOGICAL CHARTS		
1	LIFE CYCLE OF ENTAMOEBIA HISTOLYTICA	1
2	LIFE CYCLE OF GIARDIA LAMBLIA	1
3	LIFE CYCLE LEISHMANIA DONOVANI	1
4	LIFE CYCLE OF ROUND WORM	1
5	LIFE CYCLE OF HOOKWORM	1
6	LIFE CYCLE OF GUINEA WORM	1
7	LIFE CYCLE OF PIN WORM	1
8	LIFE CYCLE OF FILARIA	1

MISCELLANEOUS		
1	SUMMARY OF HEPATITIS A , B, AND C	1
2	STRUCTURE OF HIV VIRUS	1
3	COMMON MODES OF TRANSMISSION OF HIV	1
4	VECTORS OF HUMAN DISEASES	1
5	METHODS OF STERILISATION	1
6	IMMUNE RESPONSE TO INFECTION	1
7	HUMORAL AND CELL MEDIATED IMMUNITY	1
LIFE STYLE DISORDERS		
1	RISK OF OBESITY	1
2	DANGERS OF SMOKING	1
3	WEIGHT CONTROL	1
4	CARDIOVASCULAR DISEASES	1
5	BALANCED DIET (NUTRITION)	1
FIRST AID CHARTS		
1	BANDAGING	1
2	FRACTURES	1
3	TRANSPORT OF INJURED	1
4	ARTIFICIAL RESPIRATION	1
5	ELECTRIC SHOCK MANAGEMENT	1
6	BURNS AND SCALDS	1
7	SNAKES AND SNAKE BITES	1
8	POISONS AND THEIR ANTIDOTES	1
SPECIMENS		
PARASITOLOGICAL SPECIMENS		
1	TAPE WORM	1
2	ROUND WORM	1
3	HOOK WORM	1
4	PIN WORM	1
5	Echinococcus	1
6	Tape Worm	1
7	AscarisLumbricoides	1
8	TaenisSolium	1
9	TaeniaSaginata	1
ANTHROPOD SPECIMENS		
1	FLEA	1
2	MOSQUITO AEDES	1
3	MOSQUITO ANOPHELES	1
4	MOSQUITO CULES	1
5	LOUSE	1
6	MITE	1
7	HOUSE FLY	1
8	SAND FLY	1
9	TICK	1
10	BUG	1
11	Anopheles Female	1
12	Culex	1
13	AedesMosquito	1

**Note: All the Charts should be Laminated & PVC Mounted & must be quoted separately for each Items**

# **MICROBIOLOGY**

## I. DEPARTMENT OF MICROBIOLOGY

### LIST OF LOW VALUE EQUIPMENTS IN MICROBIOLOGY DEPARTMENT

1.	Microbiology	Autoclave Horizontal	2
2.	Microbiology	Autoclave Vertical	1
3.	Microbiology	Hot air sterilizer	2
4.	Microbiology	Flasks flat bottom 50 cc	6
5.	Microbiology	Refrigerators 300 Ltr.	3
6.	Microbiology	Overhead Projector	1
7.	Microbiology - Culture	Material for preparation of media	
8.	Microbiology - Culture	2000cc	24
9.	Microbiology - Culture	1000cc	72
10.	Microbiology - Culture	500cc	48
11.	Microbiology - Culture	250 cc	48
12.	Microbiology - Culture	125 cc	120
13.	Microbiology - Culture	60 cc	120
14.	Microbiology - Culture	Test tubes hard glass150mm x 18mm	100
15.	Microbiology - Culture	Test tubes hard glass100mm x 12 mm	100
16.	Microbiology - Culture	Test tubes hard glass75mm x 12 mm	100

**LIST OF MODELS, CHARTS, MUSEUM ARTICLES etc  
DEPARTMENT OF MICROBIOLOGY**

**A. LIST OF MODELS**

Sr. No.	NAME OF MODELS
1.	HERPES SIMPLEX VIRUS
2.	RHABDO VIRUS
3.	CULTIVATION OF VIRUS IN EGG
4.	HIV VIRUS
5.	HEPATITIS 'B' VIRUS
6.	HELICAL STRUCTURE
7.	POLIO VIRUS
8.	SIMPLE ICOSAHEDROL STRUCTURE VIRUS
9.	BACTERIOPHAGE
10.	CYTOMEGALO VIRUS
11.	HUMAN ADENO VIRUS
12.	INFLUENZA VIRUS
13.	BACTERIAL STRUCTURE
14.	ROTA VIRUS
15.	ADENOVIRUS

**NOTE:** One each of all the above items

**B. LIST OF BACTERIOLOGY CHARTS**

Sr. No.	NAME OF CHARTS
1.	Gram Positive cell wall
2.	Gram negative cell wall
3.	Comparison of prokaryotic and eukaryotic cells
4.	Bacteriology flagella
5.	Comparison of gram-positive and gram-negative bacterial cell.
6.	Normal flora of human body
7.	Endospore formation
8.	Binocular light microscope
9.	Bacterial colony morphology
10.	Classification of medically important bacterial families.
11.	Drug resistance
12.	Classification of medically important virus families.
13.	Types of viral pathogenesis, Dissemination of virus to secondary sites in the body, Mother-to-infant.
14.	Laboratory techniques in diagnosis of microbial diseases.
15.	Gram stain- streptococcus
16.	Gram stain – clostridium perfringens
17.	Gram stain – Escherichia coli
18.	Escherichia coli – pathogenesis
19.	Gram stain – streptococcus viridans
20.	Gram stain – clostridium tetani
21.	Gram stain – straphylococcus aureus
22.	Z-N stain – mycobacterium tuberculosis
23.	Fontana stain – treponemapallidum
24.	Tuberculosis-ZN stain and culture
25.	Typhoid- pathogenesis
26.	Leprosy- ZN stain
27.	Cholerae- Gram stain and culture
28.	Bacterial cell & Bacterial cell walls.
29.	Synthesis of a bacterial cell wall.

30.	Bacterial growth.
31.	Bacterial genome & Bacterial replication
32.	Gene Transfer - A. Conjugation, B. Transduction, C. Transformation.
33.	Gene Regulation - A. Negative control (repression) B. Positive control (catabolite activation)
34.	Staphylococci - Staphylococcus Aureus, Infections & Causes of Diseases
35.	Pseudomonas species & infection of ear.
36.	Streptococcus species (Summary of streptococcal disease)
37.	Corynebacteria species (Summary of Corynebacterium diphtheriae disease).
38.	Bacillus species (Summary of anthrax disease)
39.	Listeria species & Life cycle
40.	Neisseria species (Summary of neisseria diseases).
41.	Campylobacter species (Summary of campylobacter disease).
42.	Negative stain- procedure
43.	AFB stain- procedure
44.	Gram stain- procedure
45.	Preparation of thick & thin smear- procedure
46.	Skin scrapings- sites and procedure
47.	Preparation of smear
48.	Helicobacter disease & Infection.
49.	G.P.C. anaerobic
50.	Hand washing procedure
51.	Hospital waste disposal protocol- 4 nos
52.	Colour coding of dustbins- 4 nos
53.	Flowchart of Mechanism of action- tetanus toxin
54.	Flowchart of Mechanism of action- cholera toxin
55.	Flowchart of Mechanism of action- botulinum toxin
56.	Flowchart of Mechanism of action- E.coli, ETEC toxin
57.	Flowchart of Mechanism of action- diphtheria toxin
58.	Flowchart of Mechanism of action- clostridium defficle
59.	Flowchart of Mechanism of action- bacillus anthrax
60.	Pathogenesis of intestinal ulcer by salmonella and entamoeba histolytica

**NOTE:**

One each of all the above items

All the charts should be provided on a laminated, wall mountable board of size 20"x24". Each should also be accompanied with the following details above the photograph:

**"DEPARTMENT OF MICROBIOLOGY, KCGMC KARNAL"**

**. SCIENTISTS:**

<b>Sr. No.</b>	<b>NAME OF SCIENTIST CHARTS</b>
1.	Louis Pasteur
2.	Laennec renetteopole
3.	Sir Frederic
4.	Von euler
5.	Withelmwaldeyer – harts
6.	Anatomy van leqvenhoek
7.	Paw langerhans
8.	Gregarmenal
9.	Paul ehrlich
10.	Jenner Edward
11.	Robert Koch
12.	Ronald Ross
13.	Emil A von Behring

14.	Alexander Flemming
15.	Selman A Waksman
16.	John F Enders, Thomas H Weller and Federick C Robbins
17.	Peyton Rous
18.	Paul Berg
19.	Susumu Tonegawa
20.	Michael Bishop and Harold E Varmus
21.	Kary B Mullis
22.	Stanley B Prusiner
23.	Barry Marshall and Robin Warren

**NOTE:**

One each of all the above items

The portraits of all the scientists should preferably be provided on a laminated, wall mountable board. Each portrait also be accompanied with the following details above the photograph:

**"DEPARTMENT OF MICROBIOLOGY, KCGMC KARNAL"**

Below the photograph:

1. Name of scientist
2. Birth year – Death year (if applicable)
3. A brief mention of their most significant contribution in the field of Human Microbiology. (upto 30 words or less)

**D. LIST OF IMMUNOLOGY CHARTS**

<b>Sr. No.</b>	<b>NAME OF CHARTS – IMMUNOLOGY</b>
1.	BRANCHES OF IMMUNITY
2.	DIFFERENT PHAGOCYTES OF HUMAN BODY
3.	MENOCLONAL ANTIBODY PRODUCTION BY HYDRIDOMA
4.	UNDESIRABLE CONSEQUENCES OF IMMUNITY
5.	ANTIGEN AND ANTIBODY AFFINITY
6.	INNATE AND ACQUIRED MECHANISMS OF KILLING
7.	ANTIGEN PRESESNTING CELLS
8.	GOOD FIT AND POOR FIT BETWEEN ANTIGEN AND ANTIBODY
9.	COMPLEMENT SYSTEM
10.	IMMUNOGLOBULIN CLASSES
11.	PHAGOCYTOSIS
12.	THE RETICULOENDOTHELIAL SYSTEM
13.	MAJOR LYMPHOID ORGANSAND TISSUES
14.	THE INTERMOLECULAR ATTRACTIVE FORCE BINDING Ag &Ab
15.	COMPLEMENT & ITS ROLE IN ACUTE INFLAMATORY REACTIONS
16.	LYMPHOCYTIC TRAFFIC
17.	ANTIBODY – A FLEXIBLE ADAPTOR
18.	HEMATOPITIC STEM CELLS
19.	OPSONIZATION
20.	IMMUNE SYSTEM IN ACCUTE INFLAMATION

**NOTE:**

One each of all the above items

All the charts should be provided on a laminated, wall mountable board of size 20”x24”. Each should also be accompanied with the following details above the photograph:

**"DEPARTMENT OF MICROBIOLOGY, KCGMC KARNAL"**

**. LIST OF MYCOLOGY CHARTS**

**F. LIST OF VIROLOGY CHARTS**

<b>Sr. No.</b>	<b>NAME OF CHARTS – VIROLOGY</b>
1.	REPRODUCTION OF VIRUSES PENETRATION AND UNCOATING
2.	"AIDS" TRANSMISSION
3.	"AIDS" – GENERAL AWARENESS
4.	"HIV" – LIFE CYCLE

**NOTE:**

One each of all the above items

All the charts should be provided on a laminated, wall mountable board of size 20"x24". Each should also be accompanied with the following details above the photograph:

**"DEPARTMENT OF MICROBIOLOGY, KCGMC KARNAL"**

**G. LIST OF PARASITOLOGY CHARTS**

<b>SR. NO.</b>	<b>NAME OF CHART</b>
1.	Life Cycle of Giardia (Lambia)
2.	Life Cycle of Wacherlria Bancrofti
3.	Adult worm of diphyllabothrium latum
4.	Life Cycle of Echinococcus Gramulosus
5.	Life Cycle of Entorbius vermicularis
6.	eggs in the stool of Man
7.	Life Cycle of Fasiola Heapatica
8.	Life Cycle of Taenia solium
9.	Life Cycle of Entamoeba Histolytica
10.	Evolution of Metastatic Amoebiasis
11.	Life Cycle of trichuris Trichiura
12.	Evolutionary Cycle of Dracunculus Medinesis
13.	Life Cycle of Strongyloides Stercoralis
14.	Life Cycle of Malaria Parasite
15.	Life Cycle of Ascaris Lambricoides
16.	Life Cycle of Ancylostoma Duodemale
17.	Life Cycle of taenia Saginata
18.	Life Cycle of Leishmania Donovanani
19.	Malarial Parasite in Peripheral smear- trophozoite and gametocyte (comparative between P.Vivax, P.Malariae, P. Falciparum, P.Ovale)
20.	Cysts in stool
21.	Life Cycle of G. Lamblia
22.	Examination of stool- procedure

**NOTE:**

One each of all the above items

All the charts should be provided on a laminated, wall mountable board of size 20"x24". Each should also be accompanied with the following details above the photograph:



**"DEPARTMENT OF MICROBIOLOGY, KCGMC KARNAL"**

**H. LIST OF PARASITE SPECIMENS**

<b>SR. NO.</b>	<b>NAME OF PARASITE SPECIMENS</b>
1.	LIVER FLUKE
2.	TAPE WORM HEAD
3.	CYSTICERCUS
4.	ASCARIS MALE
5.	ANCYLOSTOMA
6.	MICROFILARIA – MALE
7.	MICROFILARIA – FEMALE
8.	WUCHERIA BANCROFTI – FEMALE
9.	ASCARIS – FEMALE
10.	MITE
11.	WUCHERIA BANCROFTI – MALE
12.	ECHINOCOCCUS
13.	HYDATID CYST
14.	TENIA SOLIUM
15.	ENTROBIOUS VERMICULARIS
16.	STERCORALIS STRONGELARIS
17.	AEDES EGYPTI
18.	MITE
19.	BED BUG
20.	TAPE WORM – ABDOMINAL PORTION
21.	TRICCHINELLA SPIRALIS
22.	MOSQUITO CULEX
23.	TICK
24.	MOSQUITO ANAPHAELUS
25.	TENIA SAGINATA

**I. LIST OF ADDITIONAL MUSEUM ARTICLES**

<b>Sr. No.</b>	<b>ARTICLE</b>
1.	Membrane Filter
2.	Seitz Filter
3.	Candle Jar
4.	Gaspack Jar
5.	Mcintosh Filter Jar
6.	Mac. Agar
7.	Nutrient Agar
8.	Blood Agar
9.	CLED Media
10.	TSI (KA+H2S)
11.	TSI A/A
12.	TSI K/A
13.	Swab stick
14.	Citrate Positive
15.	TSI Normal
16.	Readymade Swab
17.	LJ Media
18.	Blood culture Bottle
19.	Lofflers Serum Slope
20.	LJ Media
21.	MR test
22.	Oxidase test

23.	PPA test
24.	Semi-solid agar
25.	Latex test Positive

All culture media and biochemical tests should be dummy for museum display. They should have a long shelf life.

# **DEPARTMENT OF DENTISTRY**

### III. DEPARTMENT OF FORENSIC MEDICINE

#### LIST OF LOW VALUE LABORATORY EQUIPMENTS IN FORENSIC MEDICINE DEPARTMENT

#### ANNEXURE I (LIST OF WEAPONS)

Sr. No.	Item Required
1.	AXE
2.	BASOLI
3.	BELAN
4.	BELCHA
5.	BHALA
6.	BLADE
7.	BLADE HACKSAW
8.	BROKEN BOTTLE
9.	CHAINI
10.	CHIMTA
11.	CHISEL
12.	CHOPPER
13.	CRICKET BAT
14.	CUTTER
15.	DAO
16.	DATI /DRANTI
17.	PROTOTYPE FIREARM WEAPONS (One No each of Revolver, Pistol, Rifle and Shotgun with ammunitions - cartridge case and 2 rounds of bullets & pallets)
18.	FARSA
19.	FLASK HOLDER
20.	FORK
21.	GAINTI
22.	GOKHRU
23.	HAMMER
24.	HOCKEY
25.	ICE PICK
26.	IRON CHAINS
27.	IRON ROD
28.	JUMPING ROPE
29.	KASSI
30.	KARNI
31.	KHAUNCHA
32.	KHUKHRI
33.	KHURPI
34.	KNIVES
35.	KUDALI
36.	LATHI
37.	MADHANI
38.	MEAT CHOPPER
39.	NIRANI
40.	PLIER (PALAS)
41.	PUNCH
42.	PARKHI
43.	PETHA PINNER
44.	PHAWADA
45.	POINTED IRON ROD
46.	RAMPURI CHAKU

47.	ROPE (One No each of Jute and plastic)
48.	SAW
49.	SAW (METAL)
50.	SCISSORS (BIG)
51.	SCISSORS (CURVED)
52.	SCISSORS (GRASS CUTTING)
53.	SCISSORS (STRAIGHT)
54.	SCREW DRIVER
55.	SICKLE
56.	STONE
57.	SWORD
58.	TEER
59.	TENTWA
60.	THAPPI
61.	TRISHUL
62.	TYRE
63.	WEAVER'S INSTRUMENT
64.	WICKET

**NOTE:** One each of all the above items

#### **ANNEXURE II (LIST OF PHOTOGRAPHS)**

<b>Sr. No.</b>	<b>Item Required</b>
1	Advanced Decomposition
2	Autoerotic / Sexual Asphyxia
3	Degree of burns
4	Contusion / Bruises
5	Defence Wounds
6	Dribbling of Saliva in a case of Hanging
7	Entry wound of Firearm Over Skull
8	Fabricated Wounds
9	Garroting
10	Graze or Grinding Abrasion
11	Postmortem burns
12	Homicidal Stab Injuries over Chest
13	Imprint or Patterned Abrasion
14	Incomplete or Partial Hanging
15	Laceration of Liver
16	Defence wound
17	Linear Abrasion or Scratches
18	Pressure Abrasion
19	Homicidal cut throat
20	Postmortem Artefacts due to Maggots
21	Rifled Firearm Entry Wound
22	Shotgun Entry Wound
23	Smothering
24	Stab injury Liver
25	Comminuted fracture of skull
26	Throttling
27	Stab Injury of Pericardium and Heart
28	Lynching
29	Transverse Ligature Mark of Strangulation
30	Traumatic Asphyxia

**NOTE:**

One each of all the above items

**Note:1.** All the Photographs should preferably be provided on a laminated, wall mountable board.

Following details should be mentioned above each of the Photograph:

**"DEPARTMENT OF FORENSIC MEDICINE, KCGMC, KARNAL"** in single line.

**All Photographs should be thick Laminated & PVC Mounted & must be quoted separately for each photo.**

**ANNEXURE III (LIST OF MODELS)**

<b>Sr. No.</b>	<b>Item Required</b>
1	Acetic Acid Poisoning: Stains on the Lip and tongue caused by Glacial acetic acid.
2	Action of maggots.
3	Adipocere.
4	Ante-mortem Burns
5	Arsenic Skin Complications. (Front View).
6	Asphyxia Hanging.
7	Automobile injuries.
8	Blast injury
9	Bruises: showing parallel linear hemorrhages due to lathi
10	Burns (Degree of burns).
11	Cadaveric Spasm: - The electric wire firmly grasped in the hand. A Case of accidental death from electricity.
12	Cadaveric spasm (Grass weeds)
13	Choking.
14	Copper Sulfate Poisoning (Suicidal) presence in mouth.
15	Crescentic Abrasions
16	Death due to starvation.
17	Decomposed Body
18	Defensive wounds.
19	Drowning.
20	Effects of poisoning
21	Electric injury
22	Entrance wound shooting with gun
23	Exhumed Body
24	Exit wound of firearm
25	Firearms wounds.
26	Grazed abrasion
27	Healing of wounds.
28	Homicidal wounds.
29	Incised Wound
30	Injuries - nose cut
31.	Kerosene Burning
32.	Lacerated wound and Incised wound
33.	Ligature mark of neck
34.	Manual strangulation i.e throttling
35.	Mouth & tongue in poisoning by Cocaine.
36.	Mummification.
37.	Nitric acid Vitriolage on the body.
38.	Poisoning of a mixture of Sulphuric and nitric acid. Stains on Lip, right angles of mouth, chin due to corrosive action of these acid.
39.	Poisons.
40.	Post Mortem Staining.

41.	Post Mortem Changes
42.	Protrusion of eye balls
43.	Putrefaction
44.	Sexual assault and murder
45.	Sexual offences.
46.	Snake bite (nontoxic)
47.	Snake bite VIPER (toxic)
48.	Stab wound
49.	Stomach in poisoning by Oxalic acid.
50.	Stomach in acute poisoning by Arsenic.
51.	Stomach in Poisoning by Carbolic acid.
52.	Stomach in Poisoning by Caustic potash.
53.	Stomach in poisoning by Hydrochloric acid.
54.	Stomach in poisoning by Nitric acid.
55.	Stomach in poisoning by Potassium Cyanide.
56.	Stomach in poisoning of Sulphuric Acid.
57.	Stomach Poisoning by Alcohol.
58.	Stomach poisoning by Opium
59.	Stomach Poisoning by Phosphorus - red & white.
60.	Strangulation by ligature
61.	Sulphuric acid Vitriolage on the face and chest
62.	Suicidal cut throat
63.	Suicidal Hanging
64.	Sulphuric Acid Poisoning. Stains on angles of mouth and chin due to corrosive action of sulphuric acid.
65.	Tattoo mark over forearm
66.	Traumatic Asphyxia
67.	Tuft of Hair.
68.	Types of hymen.
69.	Types of wounds.

**NOTE:** One each of all the above items

#### **ANNEXURE IV (LIST OF BONES)**

<b>Sr. No.</b>	<b>Item Required</b>	<b>Quantity</b>
1.	Human Male Skeleton - Articulated (along with proper stand and support)	03
2.	Human Female Skeleton - Articulated (along with proper stand and support)	03
3.	Disarticulated Human skeletons (Bone sets)	03

**ANNEXURE V (LIST OF POISONS)**

<b>Sr. No.</b>	<b>Item Required</b>
1.	Acetic acid glacial
2.	Acetone.
3.	Aconite
4.	Ajwain
5.	Alcohol (Methyl and Ethyl)
6.	Aluminium sulphate
7.	Aluminium sulphide
8.	Aluminum nitrate.
9.	Ammonia solution.
10.	Ammonium carbonate.
11.	Ammonium chloride.
12.	Ammonium ferrous sulphate
13.	Ammonium nitrate
14.	Ammonium oxalate
15.	Ammonium sulphate
16.	Antimony sulphate
17.	Alum or phitkari
18.	Arandi oil (Castor oil)
19.	Arandi seeds
20.	Argemone prickly poppy
21.	Arsenic oxide or trioxide
22.	Atom-Imidacloprid 17.8% SL.
23.	Barium
24.	Barium carbonate.
25.	Barium chloride.
26.	Barium chromate
27.	Barium hydroxide
28.	Barium nitrate
29.	Barium phosphate
30.	Benzene.
31.	Bismuth
32.	Bleaching powder.
33.	Borax.
34.	Boric acid.
35.	Boron
36.	Bromine
37.	Cadmium acetate.
38.	Calcium carbonate.
39.	Calcium chloride
40.	Calcium hydroxide
41.	Calcium hydrogen orthophosphate.
42.	Calcium oxalate
43.	Calcium sulphate dihydrate.
44.	Calotropis
45.	Camphor.
46.	Canabis sativa
47.	Centipede
48.	Cerberathevatia ( Yellow Kaner)
49.	Chloral hydrate
50.	Chlorine
51.	Chromic Acid
52.	Colocynth (Bitter Apple)
53.	Copper sulphate
54.	Cupric sulphate.
55.	Cypermethrin 10%



56.	D.D.V.P
57.	Daalcheeni.
58.	DDT
59.	Dhatura seeds
60.	Endrin
61.	Ferric oxide red.
62.	Ferrous ammonium sulphate
63.	Ferrous chloride anhydrous.
64.	Formaldehyde solution.
65.	Formalin.
66.	Gramoson
67.	Heera (2,4-D ethyl ester)
68.	Hot shot-Imida cloprid a.i 17.80% SL.
69.	Hydrochloric acid
70.	Hydrofluoric acid
71.	Imidacloprid
72.	Insecticidal marshal
73.	Iodine
74.	Iron phosphate
75.	Iron Sulphate
76.	Jaiphal
77.	Jamalgota (Croton Tiglium)
78.	Kalmi-shora
79.	Kaner
80.	Lal mirch (Capsicum)
81.	Lastraw
82.	Lead borate
83.	Lead carbonate
84.	Lead chloride.
85.	Lead nitrate.
86.	Lime water.
87.	Magnesium bicarbonate
88.	Magnesium chloride.
89.	Magnesium nitrate.
90.	Magnesium oxalate
91.	Magnesium sulphate.
92.	Magnesium sulphide
93.	Manganese dioxide
94.	Marshal 25 E
95.	Mercury
96.	Malathion
97.	Methyl parathion 2% DP.
98.	Naphthalene powder.
99.	Neelathotha
100.	Neem baan (azadirachtin)
101.	Nerium Odorum (White Kaner)
102.	Nitric oxide
103.	Oleander
104.	Opium
105.	Oxalic Acid
106.	Paraffin wax.
107.	Pest seal.
108.	Phosphorus (white or yellow and Red)
109.	Picric Acid
110.	Plaster of paris
111.	Plumbago rosea
112.	Potassium bicarbonate.

113.	Potassium carbonate anhydrous.
114.	Potassium chloride.
115.	Potassium Hydroxide
116.	Potassium nitrate
117.	Potassium permanganate
118.	Potassium sulphate.
119.	Profax
120.	Rakshak (disinfectant phenyl 2)
121.	Rattan jot.
122.	Rati (Abrus precatorius)
123.	Roban-rat killer.
124.	Rogan dhatoora.
125.	Rogan khashkhash.
126.	Salicylic Acid
127.	Sankhia
128.	Sapindastrifoliatus
129.	Scorpion sting
130.	Semecarpus anacardium
131.	Sindoor
132.	Silver Nitrate
133.	Sodium carbonate anhydrous.
134.	Sodium chloride
135.	Sodium hydroxide.
136.	Sodium nitrate
137.	Spray.
138.	Strychnos (Nux Vomica)
139.	Sulban chlorpyriphos
140.	Sulphous.
141.	Sulphur powder.
142.	Sulphuric acid.
143.	Supari
144.	Tannic acid.
145.	Tartaric Acid
146.	Temiseal (chloropyriphos)
147.	Terpentine oil
148.	Thallium
149.	Tobacco
150.	Washing soda
151.	White disinfectant fluid
152.	Yellow ammonium sulphide solution
153.	Zinc chloride
154.	Zinc Oxide
155.	Zinc Phosphide
156.	Zinc sulphate

**NOTE:** One each of 500 ml (in good quality Glass Bottle) for all the above items

#### ANNEXURE VI (LIST OF CHARTS)

Sr. No.	Item Required
1.	Ages of appearance and fusion of different ossification of bones : - 1. Whole Skeleton. 2. Hip bone. 3. Body, manubrium and xiphoid process of Sternum. 4. Humerus, Radius and Ulna. 5. Femur, Tibia and Fibula. 6. Clavicle and Scapula.
2.	Advantages and disadvantages of comparisons of teeth and finger prints.

3.	Blood factors of Fisher & Race & Wiener R. H. Agglutinogens & blood factors.
4.	Mode of Death – Syncope
5.	Mode of Death—Asphyxia
6.	Mode of Death—Coma.
7.	Causes of Impotence & Sterility in Males.
8.	Causes of sudden death.
9.	Cephalic Index.
10.	Classification of Wound.
11.	Details of examination of Mutilated Bodies / Decomposed Bodies and bony remains.
12.	Determination of ABO Groups.
13.	Determination of Identity.
14.	Determination of race in Hindu & Mohammadan Female.
15.	Determination of race in Hindu & Mohammadan Male.
16.	Determination of sex.
17.	Difference between arsenic poisoning & cholera.
18.	Difference between cobra & viper (Fatal dose & amount injected in one bite)
19.	Difference between Hanging & Strangulation.
20.	Difference between oxalic acid, magnesium sulfate.
21.	Difference between Respired and un-respired Lungs.
22.	Difference between temporary & permanent teeth.
23.	Difference in lungs before, after Respiration.
24.	Differences between Ante-mortem and Postmortem Abrasions.
25.	Differences between Bruise & Congestion.
26.	Differences between Bruise and Postmortem Staining.
27.	Differences between Bruises and lesions Produced by Chemicals or Plant Juices.
28.	Differences between Civil and Criminal Negligence.
29.	Differences between professional negligence and infamous conduct.
30.	Differences between dhatura and capsicum seeds.
31.	Differences between male and female sex characters.
32.	Differences between Coroner's Court and Judicial Magistrate's Court.
33.	Differences between Police Inquest (Investigation) and Magistrate/ Coroner's Inquest
34.	Differences between professional Negligence & Professional Misconduct
35.	Differences between Suicidal and Homicidal Cut Throat.
36.	Differences between true Insanity and Feigned Insanity.
37.	Differences between mandible in infancy, adult and old age.
38.	Differences between Postmortem hypostasis and congestion.
39.	Differences between rigor mortis and cadaveric spasm.
40.	Differences between drunkenness and concussion.
41.	Differences between extra-dural hematoma due to burns and due to blunt force.
42.	Differences between Ante-mortem and Postmortem wounds.
43.	Differences between wounds of entrance and exit of a bullet wound.
44.	Differences between human and animal hair.
45.	Differences between true bruise and artificial bruise.
46.	Differences between Ante-mortem and Postmortem burns.
47.	Differences between fresh water and sea water drowning.
48.	Differences in the uterus of parous and nulliparous women.
49.	Differences between virginity and defloration.
50.	Differences between drug addiction and drug habituation.
51.	Differences between white phosphorus and red phosphorus.
52.	Different Measurements of Uterus after delivery.
53.	Difficulties in detection of crime in India.
54.	Distinction between natural & criminal abortion.
55.	Effects of Cocaine.
56.	Effects of Dhatura.
57.	ESTIMATION OF AGE – Ages of Eruption of Teeth.
58.	External Morphological Features in Male and Female
59.	Gordon's Classification of Death.

60.	Height of fundus of the Uterus at Different Periods of Pregnancy.
61.	Impact of car from behind with person falling.
62.	International System of Numbering Teeth.
63.	Interpretation of 114 Drugs Concentrations in Blood.
64.	Interpretation of Chemical Concentrations in Blood.
65.	Material to be preserved in case of suspected poisoning.
66.	Medico legal Aspect of Age.
67.	Methods for determining the extent of a burn.
68.	Methods of inducing Criminal Abortion.
69.	MN System. The genotype of parents & Phenotypes of children's.
70.	Multiplication factor for different bones for calculation of persons of different parts of India
71.	Postmortem changes and the process of decomposition.
72.	Postmortem changes in myocardial infarction.
73.	Pressure in Chamber, Muzzle Velocity, Spinning Revolution of Projectile, Striking Range and Effective Range of Projectiles, Features of Fire Arm Injuries, Extent of Effects of Partly Burnt Gun Powder, Smoke, Heat and Fire, Wound of Entrance at Different Parts of the Body at Different Distances in Case of Shot Gun.
74.	Putrefactive changes occurring at different periods of time in a body submerged in water.
75.	Racial Difference in Skull.
76.	Sex Differentiating Features in Hip Bone Differentiating.
77.	Sex Differentiating Features in Articulated Pelvis in addition to those present in Hip Bone & Sacrum.
78.	Sex Differentiating Features in Femur.
79..	Sex Differentiating Features in Mandible.
80.	Sex Differentiating Features in Sacrum
81.	Sex Differentiating Features in Skull
82.	Side effects of antipsychotic & depressants drugs.
83.	Sign & symptoms of pregnancy in woman.
84.	Sign of Death
85.	Skeletal maturation and growth
86.	Structure of firearm weapons and their components properties of different explosives.
87.	Symptoms & signs of Acute Alcohol Poisoning.
88.	The postmortem fate of Human remains Summer Decay rates (Bodies on Surface) and Winter.
89.	The various ABO mattings & the children which can arise from them.
90.	Treatment of some common Poisons.
91.	Types of guns and mechanism of breech loading.
92.	Types of Intersex.
93.	Types of medical evidence.
94.	Wound entrance at different parts of the body at different distance in case of short barrellled rifled guns.

**NOTE:**

One each of all the above items

**Note:1.** All the Charts should preferably be provided on a laminated, wall mountable board.

Following details should be mentioned above each of the Charts:

"DEPARTMENT OF FORENSIC MEDICINE, KCGMC, KARNAL" in single line.

**All Charts should be thick Laminated & PVC Mounted & must be quoted separately for each Chart.**

# **PATHOLOGY DEPARTMENT**

## PATHOLOGY DEPARTMENT

### Requirement of Models and charts for Department of Pathology, KCGMC Karnal

#### 2 D models:-

Sr. No.	Name of 2 D Models	Quantity
<b>I. Cardiovascular disorders</b>		
1	Myocardial infarction	1
2	Rheumatic heart disease	1
<b>II. Respiratory disorders</b>		
1	Lung cancer	1
2	Pneumonia	1
3	Sarcoidosis	1
4	Tuberculosis	1
<b>III. Gastrointestinal disorders</b>		
1	Appendicitis	1
2	Colorectal cancer	1
3	Esophageal cancer	1
4	Gastric cancer	1
5	Liver cancer	1
6	Pancreatic cancer	1
7	Ulcers	1
<b>IV. Musculoskeletal disorders</b>		
1	Bone tumors	1
2	Osteoarthritis	1
3	Osteomyelitis	1
<b>V. Endocrine disorders</b>		
1	Thyroid cancer	1
<b>VI. Reproductive disorders</b>		
1	Benign breast conditions	1
2	Breast cancer	1
3	Ectopic pregnancy	1
4	Endometrial cancer	1
5	Erectile dysfunction	1
6	Fibroid disease of uterus	1
7	Ovarian cancer	1
8	Ovarian cysts	1
9	Prostate cancer	1
10	Sexually transmitted infections	1
11	Testicular cancer	1
12	Vaginitis	1
13	Vulvar cancer	1
14	Acute renal failure	1
15	Bladder cancer	1
16	Renal calculi	1
17	Renal cancer	1
<b>VII. Skin disorders</b>		
1	Atopic dermatitis	1

### VIII. Sensory disorders

1	Hearing loss	1
2	Conjunctivitis	1
3	Glaucoma	1
4	Meniere's disease	1

### B. 3 D models:

Sr. No.	Name of 3D models:	Quantity
<b>I Cardiovascular disorders</b>		
1	Heart disease (congestive, myocardial infarction)	1
2	Artery	1
3	Artery (normal, fatty streak, atheroma & fibrous plaque and blockage)	1
<b>II Respiratory disorders</b>		
1	Lung pathology (cancer)	1
2	Lung (COPD, normal)	1
3	Bronchus (normal, swelling, hypersecretion & muscle spasm)	1
<b>III Gastrointestinal disorders</b>		
1	Liver with pathologies	1
2	Stomach (gastric, duodenal ulcer)	1
3	Colon pathologies (4 stages)	1
4	Colon (common pathology)	1
5	Rectum	1
<b>IV Musculoskeletal disorders</b>		
1	Lumber vertebrae degeneration (normal, herniated disc, bone/disc degeneration & advanced osteoporosis)	1
2	Stages of osteoarthritis (degenerative joint disease) 3 stages.	1
<b>V. Immunologic disorders</b>		
1	Thyroid diseases (lymphocytic thyroiditis, graves disease & papillary carcinoma)	1
<b>VI. Reproductive disorders</b>		
1	Breast (common pathology)	1
2	Uterus – ovary (common pathology)	1
3	Prostate (enlarge with hard, irregular surface & seminal vesicle involvement. Indicating cancer)	
4	Staging of testis tumours (3 stages)	1
5	Diseased kidney	1
6	Kidney stone	1
<b>VII. Skin disorders</b>		
1	Skin pathology	1

2	Common skin acne	1
3	Skin burns	1
4	Skin cancer	1

#### VIII. Miscellaneous

1	Hypertension	1
2	Diabetes type II	1

#### List of Charts

- 1) Gastrointestinal tuberculosis
- 2) Ulcerative colitis
- 3) Thyroid disorder
- 4) Peptic ulcers
- 5) Osteosarcoma
- 6) Chronic osteomyelitis
- 7) Hereditary anaemia
- 8) Atherosclerosis, thrombosis & embolism
- 9) Rickets & osteomalacia
- 10) Basal cell carcinoma
- 11) Squamous cell carcinoma
- 12) Malignant melanoma
- 13) Herpes simplex encephalitis & Rabies
- 14) Infective endocarditis-postate of enlry& predisposing factors
- 15) Teratoma-dermoid cyst & solid teratoma
- 16) Granulomatous inflammation
- 17) Benign soft tissue tumour
- 18) Cervical cancer-stages & types
- 19) Malaborption syndrome
- 20) Crohn's disease
- 21) Testicular tumours-seminoma & embryonal carcinoma
- 22) Chronic pancreatitis
- 23) Colon cancer
- 24) Cancer of small intestine-adenocarcinoma
- 25) Infiltrating carcinoma-breast
- 26) Leiomyoma (fibroid)
- 27) Lung cancer
- 28) Pathologic changes in coronary artery disease
- 29) Anemias of deficient hematopoeisis
- 30) Diabetic nephropathy Renal pathology
- 31) Acute myelogenous leukemia
- 32) Hodgkin's disease
- 33) Chronic myelogenous leukemia
- 34) Non Hodgkin's lymphoma microscopy view
- 35) Insulin dependent diabetes mellitus
- 36) Nephrotic syndrome-patho physiology



- 37) Non insulin dependent diabetes mellitus
- 38) Hepatocellular carcinoma
- 39) Cirrhosis of Liver
- 40) Renovascular hypertension
- 41) Atherosclerosis
- 42) Asthma
- 43) Idiopathic hypertrophic subaortic stenosis : Hypertrophic cardiomyopathy
- 44) Pathophysiology of heart failure.
- 45) Causes of hypertension
- 46) Pulmonary tuberculosis
- 47) Acute & subacute myocardial infarcts
- 48) Chronic obstructive pulmonary disease
- 49) Malignant soft tissue tumour
- 50) Giant cell tumour

**Name of Scientists, Portraits of following famous pathologists with brief history written on them is required for the museum and practical lab of the Deptt. of Pathology.**

1. Antonie van Leeuwenhoek.
2. Rudolf Virchow (Father of modern pathology)
3. Carl Von Rokitansky
4. Giovanni Battista Morgagni
5. Ludwig Aschoff
6. William Boog Leishman
7. Camillo Golgi
8. Juan Rosai
9. Santiago Ramon y Cajal
10. Louis Pasteur
11. Robin Warren
12. Aldred Scott Warthin
13. Friedrich Wegener
14. Carl Weigert
15. Javier Arias Stella
16. Gustav Giemsa
17. Stanley Robbins
18. Maxwell M. Winterbe
19. William J. Williams
20. Thomas Hodgkin
21. Robert Koch
22. Max Askanazy
23. Hippocrates
24. Theodor Langhans
25. James Anderson
26. Aulus Cornelius Celsus
27. William Boyd
28. Fritz Brenner
29. Benjamin Castleman
30. David C. Dahlin
31. Paul Ehrlich
32. Hakaru Hashimoto
33. Friedrich Albin Hoffmann
34. Karl Hurthle
35. Julius Von Kossa
36. Paul Langerhans
37. William Osler
38. George Nicolas Papanicolaou
39. Charles Scott Sherrington
40. Cuthbert Dukes
41. Lauren V. Ackerman
42. Vasant Ramji Khanolkar

## **LIST OF TEACHING SLIDES – PATHOLOGY DEPARTMENT**

Technical Specifications:-

1. Hematoxylin & Eosin stained slides of Pathological lesions including both general & systemic Pathology.
2. Sets having classical & well preserved histomorphological features will be preferred.
3. Quality of slides & variety of lesions available will be subjected to scrutiny.

List of Slides:-

### **General Pathology**

1. Acute inflammation – Appendix, Fallopian tube.
2. Chronic cholecystitis.
3. Foreign Body Granuloma.
4. Coagulative necrosis.
5. Caseous Necrosis – TB lymph Node.
6. Liquefactive Necrosis – Amoebic Abscess.
7. Fatty liver.
8. Medial Calcification.
9. Granulation Tissue.
10. CVC – Liver, Spleen, Lung.
11. Hemangioma – Capillary, Cavernous.
12. Thrombosis.
13. Kidney Amyloidosis.
14. Actinomycosis.
15. Rhinosporidiosis.
16. Benign Tumors – Fibroadenoma, BPH, Leiomyoma.
17. Malignant Tumors – Infiltrating Ductal Carcinoma, Squamous Cell Carcinoma, Adenocarcinoma.

### **SYSTEMIC PATHOLOGY**

1. Atherosclerosis.
2. Hodgkins Lymphoma.
3. TB – Lung.
4. Lobar Pneumonia.
5. Bronchopneumonia.
6. Lung Tumors.
7. Benign Gastric Ulcer.
8. Intestinal Tuberculosis.

9. Gastric Carcinoma.
10. Colonic Carcinoma.
11. Rectal Carcinoma.
12. Cirrhosis Liver.
13. Hepatocellular Carcinoma.
14. Secondaries in Liver.
15. Acute Glomerulonephritis.
16. Chronic Glomerulonephritis.
17. Chronic Pyelonephritis.
18. Wilms Tumor.
19. Renal Cell Carcinoma.
20. Seminoma Testis.
21. Squamous Cell Carcinoma.
22. Leiomyoma Uterus.
23. Carcinoma Cervix.
24. Dermoid Cyst Ovary.
25. Serous Cystadenoma Ovary.
26. Mucinous Cystadenoma Ovary.
27. Fibroadenoma.
28. Colloid Goitre.
29. Multinodular Goitre.
30. Hashimoto's Thyroiditis.
31. Follicular Adenoma.
32. Papillary Carcinoma Thyroid.
33. Follicular Carcinoma.
34. Chronic Osteomyelitis.
35. TB Osteomyelitis.
36. Osteosarcoma.
37. Osteoclastoma.
38. Ewings sarcoma.
39. Pleomorphic Adenoma.
40. Meningioma.
41. Glioblastoma Multiforme.
42. Medulloblastoma.
43. Papilloma.
44. Basal cell Carcinoma.
45. Metastatic carcinoma in Lymph node

# **DEPARTMENT OF DENTISTRY**

## DEPARTMENT OF DENTISTRY

Sr No.	Name of Equipment with Specification	Specifications	Requirement
1.	<b>Mouth Mirror</b>	Stainless steel rust resistant ISI, ISO Certified, FDA, CE, UL or BIS Approved	100
2.	<b>Explorer</b>	Stainless steel, ISI, ISO certified	50
3.	<b>Probe</b>	Stainless steel rust free, ISI, ISO Certified	50
4.	<b>Tweezer</b>	Stainless steel rust free, ISI, ISO Certified	100
5.	<b>Kidney trays</b>	Stainless steel rust free, ISI, ISO Certified	25
6.	<b>Toffelmire</b>	Stainless steel rust resistant ISI, ISO Certified FDA, CE, UL or BIS Approved	10
7.	<b>Warwick James straight elevator</b>	Stainless steel rust resistant ISI, ISO Certified, FDA, CE, UL or BIS Approved	7
8.	<b>Air Rotor</b>	Contra angle, ISI, ISO Certified, CE, 380000 rpm	5
9.	<b>Cheatles Forcep</b>	Stainless steel, ISI, ISO Certified	5
10.	<b>Glass slab</b>	Rounded margins, thickness minimum 8mm	3
11.	<b>Mortar pestle</b>	Made of Bone China	3
12.	<b>Cotton holder</b>	Stainless steel, ISI, ISO Certified	3
13.	<b>Stainless steel tray big</b>	Stainless steel, ISI, ISO Certified	3
14.	<b>Stainless steel tray small</b>	Stainless steel, ISI, ISO Certified	3
15.	<b>Stainless steel autoclavable drum- large</b>	Capacity 20 litres	5
16.	<b>Stainless steel drum for cotton</b>	Small size	5
17.	<b>Filling Instruments</b>	<b>6 sets</b>	
	Spoon excavator	Stainless steel 0.5mm ISI, ISO Certified	6
	Spoon excavator	Stainless steel 1mm, ISI, ISO Certified	6
	Spoon excavator	Stainless steel 1.5mm, ISI, ISO Certified	6
	Burnisher	Stainless steel, ISI, ISO Certified	6
	Condenser	Stainless steel, ISI, ISO Certified	6
	Hollen back carver	Stainless steel, ISI, ISO Certified	6
	Diamond shape carver	Stainless steel, ISI, ISO Certified	6
	Amalgam carrier	Stainless steel, ISI, ISO Certified	6
	Gingival Marginal Trimmer (Mesial & Distal)	Stainless steel, ISI, ISO Certified	6
	Plastic Spatula	ISI, ISO Certified	6
	Teflon Coated Burnisher	ISI, ISO Certified	3
	Teflon Coated Condenser	ISI, ISO Certified	3
	Teflon Coated plastic Filling Instrument	ISI, ISO Certified	3
18.	<b>Extraction Forceps</b>		
	Maxillary Anterior forceps	Stainless steel rust free, ISI, ISO Certified	6
	Maxillary Premolar Forceps	Stainless steel rust free, ISI, ISO Certified	6
	Maxillary Molar Forceps (Right & Left)	Stainless steel rust free, ISI, ISO Certified	6
	Maxillary root forceps	Stainless steel rust free, ISI, ISO Certified	6
	Maxillary Third Molar Forceps	Stainless steel rust free, ISI, ISO Certified	6
	Mandibular Anterior forceps	Stainless steel rust free, ISI, ISO Certified	6
	Mandibular Premolar Forceps	Stainless steel rust free, ISI, ISO Certified	6
	Mandibular Molar Forceps	Stainless steel rust free, ISI, ISO Certified	6
	Mandibular root forceps	Stainless steel rust free, ISI, ISO Certified	6
	Mandibular Third Molar Forcep	Stainless steel rust free, ISI, ISO Certified	6
	Bayonet Forceps	Stainless steel rust free, ISI, ISO Certified	3
	Maxillary Cowhorn	Stainless steel rust free, ISI, ISO Certified	3
	Mandibular Cow horn	Stainless steel rust free, ISI, ISO Certified	3
	Chisel	Stainless steel rust free 2mm, ISI, ISO Certified	2
	Chisel	Stainless steel rust free 3mm, ISI, ISO Certified	2
	Periosteal Elevator	Stainless steel rust free, ISI, ISO Certified	15
	Moon's Probe	Stainless steel rust free	2
	Cryer (right and left)	Stainless steel rust free, ISI, ISO Certified	4
	Couplands elevator No. 1	Stainless steel rust free, ISI, ISO Certified	7
	Upper root forceps	Stainless steel rust free, ISI, ISO Certified	4
	Lower root forceps	Stainless steel rust free, ISI, ISO Certified	2
	Needle holder	Stainless steel rust free, ISI, ISO Certified	5
	Artery forceps	Stainless steel rust free, curved, 6 inches, ISI, ISO Certified	4
	Bone File	Stainless steel rust free, ISI, ISO Certified	3
	Scissor	Stainless steel rust free tissue dissecting surface, blunt tip, length 5", ISI, ISO Certified	5

	Bone currete	Stainless steel rust free, ISI, ISO Certified	3
	Tissue forcep	Stainless steel rust free toothed tissue forceps, ISI, ISO Certified	3
	Bone ronger	Stainless steel rust free, ISI, ISO Certified	3
	Mallet	Stainless steel rust free, ISI, ISO Certified	3
	BP handle	Autoclavable Bard Parker Handle size 3	5
	Tongue depressor L shape	Stainless steel tongue depressor L shape	3
	Cheek retractors	Extraoral plastic cheek retractors made of clear plastic used for intraoral photography. Autoclavable. Hands free single piece design`	5
	<b>19. Prosthetic Instruments</b>		6 sets
	Stainless steel stock tray Perforated Maxillary	Stainless steel 0-4	6 sets
	Stainless steel stock tray Perforated Mandibular	Stainless steel 0-4	6 sets
	Stainless steel stock tray Non- Perforated Maxillary	Stainless steel 0-4	3 sets
	Stainless steel stock tray Non- Perforated Mandibular	Stainless steel 0-4	3 sets
	Flexible rubber bowl small		6
	Flexible rubber bowl large		6
	Lacrons carver		5
	Wax spatula		5
	Mixing spatula straight	Width approx 1"	3
	Mixing spatula curved		3
	Cement spatula		6
	Wax knife	Stainless steel	1
	Mean value articulator	Stainless steel, with remounting plates and with vertical pin. Aniodised metal	2
	<b>20. Scaling instruments</b>		
	Curette 4R-4L	Stainless steel rust free, ISI, ISO Certified	6
	Gracy 1-14	Stainless steel rust free, ISI, ISO Certified	2
	<b>21. Hygienic Rubber dam kit (Adult)</b>	Kit should Contains: -Plastic Dental Dam Frame 6" -Wedjets Stabilizing Cord Pack(S) -Hygenic Template 6" -Punch -Forcep -Rubber Dam Sheets 6x6"(36) -Set of 9 Clamps-Adult	2

## Equipment big size

1.	Endomotor	<ol style="list-style-type: none"> <li>1. RPM range should be 250 to 1200</li> <li>2. Torque range should be from 0.6 to 4.0Ncm</li> <li>3. Should be preset for popular rotary systems</li> <li>4. Should run on battery and direct AC</li> <li>5. Should be able to run for at least two hour continously</li> <li>6. Programs should be customizable by the doctor</li> <li>7. Inbuilt auto reverse mechanism that prevents file Separation during continuous motion</li> </ol>	1
2.	Apex locator	<ol style="list-style-type: none"> <li>1. Should have more than 95% accuracy</li> <li>2. Should be able to work in both moist and dry canals and in presence of pus, blood, GP solvent</li> <li>3. No preadjustment should be required before use.</li> <li>4. Automatic calibration</li> <li>5. Compact and light weight</li> <li>6. Color display to indicate apex, short of apex and crossing of apex</li> <li>7. With audible beep to indicate crossing of apex</li> </ol>	2

		8. Supplied with at least three file holders, five contrary electrodes, one probe cord, one canal length tester.	
3.	Implant kit with 25 implants	Implant kit with standard no. of drills and supplementary drills for different diameters, drill extender, depth gauge, screw driver, autoclavable box, implant kit for all single stage and two stage implants.  Dental implants compatible with the system used: Assorted size range (2.5-6 mm diameter approx., length range 6-14 mm approx.)	1
4.	Physiodispenser with handpiece	Surgical micromotor for implant placement, meeting sterility and safety standard, speed and torque control, LCD Display with programmable setting, gear reduction.	1
5.	DigitestPulp tester	ISI, ISO Certified	2
6.	Amalgamator	<ul style="list-style-type: none"> <li>• Individual adjustment of paste consistency</li> <li>• Non Capsule type</li> <li>• Electronically controlled</li> <li>• Digital display</li> <li>• FDA, CE, UL or BIS Approved</li> </ul>	1
7.	Lab type micromotor	Heavy duty Micro Motor Must be DC supply with control Unit .	1
8.	Acrylizer	With stainless steel heavy gauge chamber, fully leak proof with Argon welding, with tap for pouring of wax, inbuilt heater with auto off option at set temperatures,	1
9.	Dewaxing units	Outside & Inside body made of Stainless steel 304 grade body.inner size 300x250x350mm with digital display and controller cum digital timer.	1
11.	Hydraulic press	Heavy Duty Hydraulic Press with Pressure Gauge and In Built Oil tank	1



**DEPARTMENT OF BIOCHEMISTRY**

## DEPARTMENT OF BIOCHEMISTRY

### LIST OF LOW VALUE LABORATORY EQUIPMENTS IN BIOCHEMISTRY DEPARTMENT

#### 1. Fume Cupboard (Bio Safety Cabinet Class IIA): - 2 Nos.

- Biosafety cabinet of class II, Type B2 (Total Exhaust) with vertical laminar airflow
- complying to EN12469:2000 with microprocessor based monitoring system.
- Automatic control of all functions and all safety alarm systems with double centrifugal fan to provide complete operator, product and environmental protection. Suitable for handling pathogens namely *Mycobacterium paratuberculosis*.
- Internal dimension (WxDxH) should be approximately 850X 700X 550 mm or more
- The cabinet should be fitted with 1 automatic safety service connection for gas, 1 for vacuum and 1 electrical socket
- Dual, long life ULPA/HEPA (H-14 grade, according to EN1822) filters for supply and exhaust airflow. The cabinet should consist of ducting facility on the top of the cabinet for direct ducting to facility exhaust system.
- The Cabinet should be supplied with a UV sterilizing lamp
- Frameless, shatter-proof sash with automatic UV shut-off on sash opening
- Machine should have low noise level ( below < 53 dB)
- The cabinet should have user friendly practical keyboard and display to inform
- laminar airflow and frontal air barrier velocity , residual lifetime of HEPA filter , UV lamp , total number of hours of operation, saturation level of HEPA filter, inside and outside Temperature
- Audio and visual alarms required for power failure, out of range or incorrect
- laminar airflow velocity and frontal air barrier velocity, end of life-cycle of UV lamp , fan-motor malfunction ,saturation of HEPA filters , un-correct position of front sash-window, blockage in the exhaust duct.
- Interior work area of a single piece of stainless steel and single piece HIGH GRADE stainless steel. Work surface should be consisted of sections easily removable for carrying out routine cleaning and/or require autoclaving sterilization procedures if so desired.
- Cabinet should be preferably coated with anti bacterial treatment/ solution to prevent microbial contamination.
- Cabinet should also be supplied with modular stand with castors.
- Air flow velocity should be at least 90 fpm; efficiency should be > 99.99% at 0.1 micron to 0.3 micron to provide 100% exhaust.
- Safety device: (i) Dual-wall construction surrounds the work zone with negative pressure plenums for maximum safety. (ii) Fail-safe system ensures that in case of exhaust failure
- Must meet American (NSF/ANSI) or European standard EN 12469 (type tested) or both. Must submit a copy of EN 12469 or NSF/ANSI certification along with the quote (it is mandatory and without the valid certificate the quote will be considered as non-responsive).

## **2. Refrigerator (300 Litres or more)**

**- 1 No**

For storing blood plasma and other blood products, vaccines, other medical or pharmaceutical supplies. Also to cool samples or specimens for preservation. For faster pull-down and recovery times, it should have bypass refrigeration and microprocessor-based controls

### Technical Specifications

1. Laboratory refrigerator should have 330 ltr capacities.
2. Temperature range from 2 deg C to 10 deg C.
3. It should have galvanized sheet steel construction, white powder coated and adjustable feet.
4. No welded joint to be exposed for rusting.
5. Insulation of high-grade pressure – foam material.
6. Lockable door with plastic magnetic sealing surround.
7. Automatic defrosting and condensed melt water evaporation.
8. Re-circulating air-cooling system.
9. Control panel with thermometer, main switch and temperature selection.
10. Hermetically enclosed, low noise, vibration proof compressor.
11. Visual and a caustic signal alarm system.
12. Epoxy coated outside finish and S/S interior.
13. Low noise, automatic defrosting, Freon free.
14. Should be CFC free.
15. Temperature indicators to be provided.
16. Power input to be 220-240VAC, 50Hz.
17. Should be CE or FDA or BIS approved product

## **3. Boiling Water Baths with lids having 8 – 12 holes**

**- 6 Nos.**

1. Useful for dual purpose. It is a routine rectangular water bath with stainless steel lids having 8 to 12 holes and concentric rings.
2. Standard double wall construction. Inner chamber made out of highly polished stainless steel sheet and exterior made out of thick mild steel duly finished power coated paint.
3. Glass wool insulation between sheets
4. Immersion heaters are provided for heating to attain temperature range from 5° C above ambient to 95° C  $\pm 1$  °C.
5. Digital temp. Indicator-cum-Controller. The equipment to work on 220v AC 50 Hz single phase.
6. Chamber size in mm & inches L x W x H 300 x 225 x 175 mm Approx Capacity approx 15 ltrs. Approx.
7. Should be CE or FDA or BIS approved product

## **4. Autoclave Electric (Horizontal)**

**- 2 Nos.**

1. The water reservoir shall have a capacity that is sufficient for minimum 10 cycles.
2. The reservoir shall have a float that reads the level of the water that indicates on the display when the reservoir needs to be refilled.
3. The sterilization chamber shall have a capacity of at least 5 litres, constructed of stainless steel.
4. The sterilizer shall function with a micro - processor which controls a defined volume of distilled water that is pumped into a boiler, converted into steam, and then injected into the sterilizing chamber.
5. The micro processor shall accurately control and monitor the sterilizing temperature and pressure.
6. The sterilizer shall have a keypad, which controls the pre-set programs and the start control with a single touch.
7. Unwrapped Cycle - To sterilize unwrapped instruments the sterilizing cycle shall be constant at 134°C for 3.5 minutes. The total cycle time including warm up, pressurization and de-pressurization shall not be more than 11 minutes.
8. Wrapped Cycle - To sterilize wrapped instruments the sterilizing cycle shall be constant at 134°C for 6 minutes. The total cycle time including warm up, pressurization and de-pressurization shall not be more than 15 minutes.
9. Cycle for Delicate Items - To sterilize certain rubber, plastic and delicate items the sterilizing cycle shall be constant at 121 degrees C for 15 minutes. The total cycle time including warm up pressurization and de-pressurization shall not be more than 24 minutes.
10. Digital Display for monitoring the systems throughout the processing cycle including the temperature, pressure and time elapsed.
11. Power supply - 220V, 50 Hz.

12. The product should be CE or FDA Certified

## **5. Balance – Micro**

**- 1 No.**

### **1 Description of Function**

1.1 Electronic Balance is required for precision weighing of Lab samples.

### **2 Operational Requirements**

2.1 Microprocessor based single pan Analytical Balance with High accuracy & precision is required.

2.2 Reading of the weight by digital display.

2.3 Electronic top loading balances with transparent case

2.4 The balance should have functions of piece counting, percent weighing, formulation, Dynamic weighing with automatic and manual start and' provision for data interface

### **3 Technical Specifications**

3.1 Weigh accurately up to 4th decimal place of one gm.

3.2 Auto self-calibration facility

3.3 Auto zero Setting

3.4 One touch calibration

3.5 Weighing capacity upto 200 gms.

3.6 Repeatability and resolution: 0.1 mg

3.7 Linearity: + 0.2m

3.8 Stabilization time < 5 second

3.9 Adjustment weight (Int. wt.) 200g

3.10 Adjustment weight (Ex. Wt.): 500 mg, 1 gm, 10gm, 50gm, 100 gm, 200gm

3.11 Balance should have the following features:-

- \* Touch Screen/LCD Display.
- \* Stainless Steel Large Square/round weighing Pan
- \* IR Sensor for Hands-free operation for personnel security and automatic draft shield opening and Closing.
- \* Warns if the Balance is not correctly leveled to ensure accuracy of the result.
- \* Automatic & detachable draft shield.
- \* Toolbox, including user administration and password protection.
- \* Integrated Automatic Safety Functions for external routine operations.
- \* Alphanumeric data entry of 4 ID's.

### **4 System Configuration Accessories, spares and consumables**

4.1 System as specified

4.2 Should be supplied with standard external and internal weights as specified.

### **5 Environmental factors**

5.1 Shall meet IEC-60601-1-2 :2001(Or Equivalent BIS) General Requirements of Safety for Electromagnetic Compatibility,or should comply with 89/366/EEC; EMC-directive.

5.2 The unit shall be capable of being stored continuously in ambient temperature of 0 -50 deg C and relative humidity of 15-90%

5.3 Thu unit shall be capable of operating in ambient temperature of 20-30 deg C and relative humidity of less than 70%

### **6 Power Supply**

6.1 Power input to be 220-240VAC, 50Hz fitted with Indian plug

6.2 UPS of suitable rating with voltage regulation and spike protection for 60 minutes backup.

6.3 Resettable overcurrent breaker shall be fitted for protection

### **7 Standards, Safety and Training**

7.1 should comply with ISO/GLP with auto validation with ink jet printer

7.2 Should be FDA or CE or UL or BIS approved product

7.3 Electrical safety conforms to standards for electrical safety IEC-60601 / IS-13450

7.4 Manufacturer/Supplier should have ISO certification for quality standards

## **6. Colorimeter**

**- 6 Nos.**

1. Photoelectric colorimeter with 8 filter digital (490, 520,540,570,600, 700 nm)
2. Digital colorimeter should be highly stable and accurate ideal clinical instruments for blood and chemical analysis.

3. Should have 5 / 8 filters with battery option.
4. Range: 400mm to 700mm filters 5 high standard filters, Accuracy: +/-0.010.Abs
5. Output Optional, Density 0 to 1.99, display 2.5 digit LED display, detector selenium photo cell light.
6. Source 6.2V 0.3 Amp. Tungsten filament Lamp,
7. Min volume 1 ml
8. Power 230V+I- 10 50Hz Ac.
9. Size (LxBxH) 225 x 230 x 150mm (Approx),
10. Weight: 4 kg. (Approx)
11. ISI certified
12. 2 year warranty

**Accessories:**

Test Tubes 5 Nos.  
 Light Source Bulb  
 Dust Cover  
 Instruction Manual

**7. Stop Watch**

**- 4 Nos.**

Stop watch of good quality reading at 1/5 second with LED/LCD display reading at 1/5 display

**8. All Glass Distillation Plant**

**- 3 Nos.**

**Technical specifications:**

1. The glassware should be made of high quality borosilicate glass to withstand high heat.
2. Apparatus capacity should be of 4 litres/Hr.
3. Should be double stage.
4. Should have metallic stand and other accessories.
5. Stand should be made of rust free material.
6. Standards heating elements of 2.5-3KW to be used.
7. An automatic cut off device should be attached.
8. Heater should be of quartz for immediate output of distilled water. Apparatus should consist of high quality Borosilicate Boiler with built in water leveler.
9. Output water should be pyrogen-free with conductivity less than 1 micro siemen, ph 6.9-7, distillate temp 65-75 deg C.
10. Automatic cut off device or safety control module.
11. Power input to be 220-240 VAC, 50 Hz.
12. Manufacturer should have ISO or CE certification for quality standards

**9. Desiccators Large Size**

**- 6 Nos.**

Desiccators large size used to protect chemicals which are hygroscopic or which react with water from humidity. It should be circular and made up of boro silicate glass. Both Vacuum & plan Desiccators are provided with a thick perforated Polypropylene disc with a big hole in the center for easy lifting. The tiny holes in the disc provide air troughs & support to the dishes. However porcelain discs are advisable in case of incandescent crucibles

**10. Desiccators Small Size**

**- 6Nos.**

Desiccators small size used to protect chemicals which are hygroscopic or which react with water from humidity. It should be circular and made up of boro silicate glass. Both Vacuum & plan Desiccators are provided with a thick perforated Polypropylene disc with a big hole in the center for easy lifting. The tiny holes in the disc provide air troughs & support to the dishes. However porcelain discs are advisable in case of incandescent crucibles.

**11. Centrifuge Clinical for 12 Tubes**

**- 6+2 Nos.**

**1 Description of Function**

1.1 Centrifuges are required in the Laboratory to separate various components of Blood and any other liquid sample for analysis

## **2 Operational Requirements**

2.1 Aerodynamic compact construction for vibration free performance

2.2 Table top version

## **3 Technical Specifications**

3.1 Tube Capacity: No. 24 – 36: Size 5 – 15 ml

3.2 Should have a digital timer

3.3 Body should be made of strong fabricated & corrosion resistant steel

3.4 Control panel – for start/stop switch, dynamic brakes, step less speed regulator with zero start switch & speed indicator with timer and protective fuses.

3.5 Door interlock

3.6 Maintenance-free brushless drive motor with exact speed preselection and display. Speed range 100 to 6000 rpm and above, accuracy 1 rpm.

## **4 System Configuration Accessories, spares and consumables**

4.1 Centrifuge complete with fixed angle rotors.

4.2 Tube Holders as appropriate

## **5 Environmental factors**

5.1 The unit shall be capable of operating continuously in ambient temperature of 10 -40deg C and relative humidity of 15-90%

5.2 The unit shall be capable of being stored continuously in ambient temperature of 0 -50deg C and relative humidity of 15-90%

## **6 Power Supply**

6.1 Power input to be 220-240VAC, 50Hz as appropriate fitted with Indian plug

6.2 Voltage corrector/stabilizer of appropriate ratings meeting ISI Specifications.( Input 160- 260 V and output 220-240 V and 50 Hz)

## **7 Standards, Safety and Training**

7.1 The supplier should be ISO certified for quality standards

7.2 Should be FDA or CE or UL or BIS approved product

2 year warranty with 5 year AMC/CMC

## **12. Digital pH Meter**

**- 3 Nos.**

1. Description of function: will be able to measure precisely the pH of any solution.

2. Operational requirement: combined electrode with digital display of pH.

3. Technical specification

\* pH: (1) range: 1-14, (2) Resolution: 0.1, (3) accuracy:  $\pm$ , (4) calibration: at least 2 point.

\* ORD: (1) RANGE:  $\pm$  199 mv (2) Resolution: 0.1 mv / 1 mv.

\* Temperature: (1) range: 0-100<sup>0</sup> C, (2) Resolution: 1<sup>0</sup> C (3) Accuracy:  $\pm$ 1<sup>0</sup> C (4) calibration: offset range  $\pm$ 1<sup>0</sup> C.

## **4. System Configuration Accessories, spares and consumables**

4.1 Should be supplied with two level standard pH solution / pH tablets.

## **5. Environmental factors**

5.1 Shall meet (BIS) General Requirements of Safety for Electromagnetic Compatibility. or comply with 89/366/EEC; EMC-directive.

5.2 The unit shall be capable of being stored continuously in ambient temperature of 0-5deg C and relative humidity of 15-90%

5.3 The unit shall be capable of operating in ambient temperature of 20-40 deg C and relative humidity less than 70%

## **6. Power Supply**

6.1 Power input to be 220-240VAC, 50Hz fitted with Indian plug

## **7. Standards, Safety and Training**

7.1 Should be FDA or CE or BIS approved product

7.2 Electrical safety conforms to standards for electrical safety IEC-60601 / IS-13450

7.3 Manufacturer / Supplier should have ISO certification for quality standards.

### **13. Ultra Violet UV Lamp**

**- 1 No.**

Features: high turbulence; non wetting surface; high reliability low maintenance

### **14. Bottles Dispenser**

**- 09 Nos.**

Bottle dispenser It should be designed for performance handling of liquids from a large variety of bottles and flasks, the dispensers combine the latest in dosing technology, high tech materials and ergonomic design. As a result, users benefit from universal chemical compatibility, ease of operation, superior safety and low maintenance.

Volumes range 0.25 to 100 mL.

Superior chemical resistance.

Long lasting performance stability.

Comfortable and convenient in use.

Solid, yet simple construction.

Instant volume setting.

In-lab calibration.

Autoclavable at 121°C fully assembled.

Supplied with bottle adapters

Calibration certificate

### **15. Electrophoresis Apparatus with Power Supply for Paper/ PAGE/ AGAROSE.**

**- 6 Nos.**

#### **Chambers – total 6**

#### **1. For Paper electrophoresis, horizontal – 2 Nos.**

Paper electrophoresis system, cellulose acetate system suited for standard and wet cellulose paper electrophoresis, support adjustable for different strip lengths, can adjust strip dimensions of upto 24X20 cm, Acrylic made, with lid, platinum electrodes, red and black connecting cords,

Suitable for standard and wet cellulose acetate electrophoresis of haemoglobin, serum proteins, isoenzymes, urine proteins, lipoproteins and glycoproteins, can adjust multiple gel sizes available commercially

#### **2. For gel (agarose) electrophoresis – 2 Nos.**

##### **a. Small system - One**

Acrylic made, Inner tank 215 x 141 x 55 mm, with lid

Trays:

130 x 130 mm - 1 No.

130 x 65 mm - 2 Nos.

65 x 60 mm - 4 Nos

No. of combs:

13 Well Analytical Acrylic Comb 1.5 mm thick x 1 No.

8 Well Analytical Acrylic Comb 1.5 mm thick x 4 Nos.

3 Well Preparative Acrylic Comb 3 mm thick x 1 No

Universal gel casting tray, Platinum electrodes, Red and black connecting cables

##### **b. Large system – One**

Acrylic made, Inner tank 39.5 X 23 X 9 cm, with lid

Trays:

200 x 100 mm - 1 No.

200 x 200 mm - 1 Nos.

200 x 250 mm - 1Nos

Combs: 20 well (1 mm thick) X 2 Nos.

2 gel casting dams, Platinum electrodes, Red and black connecting cables

### 3. Vertical electrophoresis (PAGE)

#### a. Mini system - One No.

Vertical dual mini Gel, Acrylic made, with lid, Gel Size : 8 x 7 cms x 2,  
Upper buffer tank dimension : 70 x 70 x 43 mm,  
Lower buffer tank dimension : 150 x 130 x 115 mm,

Combs :

7 Well Teflon Comb 0.5 mm-2 Nos.

7 Well Teflon Comb 1 mm-2 Nos.

Teflon Spacers :

0.5 mm Teflon Spacers - 4 Nos.

1 mm Teflon Spacers - 2 Nos.

Glass plate : Notched and Rectangular 2 sets of glass plates, 2 sets of Clamp and screws, Water circulation, Gel casting unit, red and black connecting cables, Platinum electrodes.

#### b. Large system – One No.

Acrylic made, with lid, Dual gel system, Gel Size : 16 x 20 cms x 2 gels,

Upper Buffer Tank Dimension : 200 x 75 x 20 mm

Lower Buffer Tank Dimension : 270 x 100 x 115 mm

Combs : 20 Well Teflon Comb 1 mm-2 Nos.

Teflon Spacers : 1 mm Teflon Spacers 6 Nos.

Red and black connecting cables, Platinum Electrodes, Water Circulation,

Glass Plate : Notched and Rectangular 2 sets.

Clamp and Screws : 4 sets.

Gel Casting Unit

#### Power supplies – One

Output range upto 500 V, adjustable in 1 V steps, 0.01–2.5 A, adjustable in 0.001 A steps, Upto 500 W, fully adjustable in 1 W steps.

Modes- programmable, constant voltage, constant current, or constant power with facility for auto crossover

Terminals- 4 pair of recessed banana jacks in parallel

Timer control of 1-99 hr 59 min, fully adjustable

Pause/resume function,

Programmable- memory for methods storage and real time clock.

Automatic recovery after power failure

LCD Display

Proper safety and electrical compliance,

Safety: No-load detection, sudden load change detection, ground leak detection, overload/short circuit protection, overvoltage detection, input line protection, auto power-up after power failure.

Input power suited to Indian power supply of 110–240 V AC, 50/60 Hz

Operating conditions 0–40°C, 0–90% humidity

Appropriate CE/ ISI etc certification

### 16. Spectrophotometer

- 1 No.

1. Wavelength range: 190 to 1100 nm.
2. Spectral bandwidth: 0.5 to 4 nm.
3. Light Source(s) 20-W halogen/Xenon lamp and deuterium lamp built-in light source auto position adjustable.
4. Detector Type: Silicone photodiode.
5. Wavelength Accuracy:  $\pm 0.5$  nm for entire range.
6. Spectral Resolution: 0.1 nm increment.
7. Absorbance Precision: Absorbance: -4 to 4 Abs, Transmittance: 0% to 400%, accuracy:  $\pm 0.01$  Abs at 0.5 Abs,  $\pm 0.008$  Abs at 1.0 Abs.
8. Photometric System: Double beam optic.
9. Wavelength Scanning speed: 3600 nm / min.
10. Power requirement: 220 to 240 V, AC 50Hz.
11. Environmental requirement: Temp 15 to 40°C. Humidity: 30-70%.
12. Output device: UV PC format.



13. PC Compatibility: provided with software. External control possible via USB.
14. Should provide Quartz cuvette: 1ml and 3ml Capacity.
15. Should provide glass cuvette 1ml and 3ml capacity.
16. Facility for small sample volumes (of 50 $\mu$ L, 25 $\mu$ L and 5 $\mu$ L micro-volume cells) measurement with required accessory should be included
17. Sample detection for RNA and Protein.
18. Maximum sample concentration: 750-1000 ng / microlitre of dsDNA.
19. Measurement Time < 5 seconds.
20. PC with software Windows XP / 2007 or inbuilt LCD Screen.
21. System should be US FDA or European CE or BIS approved

### **17. Sprit Lamp**

**- 50 Nos.**

Spirit lamp should be of top quality made up of premium raw material with a excellent functioning and durability

### **18. Charts**

**- Qty as per list.**

List Enclosed at Annexure "A" - given below:

## 19. Charts

- Qty as per list.

### List of charts & models required for the Department of Biochemistry

Sr. No.	Title	Quantity
1	Isomerism- Cis-trans-isomers, Conformers, Optical isomers, The aconitase reaction	01
2	Biomolecules I - Important classes of compounds	01
3	Biomolecules II- Acetyl CoA	01
4	Reaction Kinetics- Activation energy, Reaction rate, Reaction Order	01
5	Acids and bases-Acids and bases, pH values in the body, Buffers	01
6	Redox Processes-Redox Reactions, Reducing equivalents, Biological redox system.	01
7	Chemistry of sugar - Reaction of the monosaccharides, Polarimetry, Mutarotation	01
8	Glycosaminoglycans and Glycoproteins- Hyaluronic acid, Oligosaccharide in immunoglobulin (IgG), Glycoproteins	01
9	Steroid structure – Steroid building blocks, 3D structure, Thin-layer Chromatography	01
10	Steroid overview – sterols, Bile acids, Steroid hormones	01
11	Chemistry and properties – Amino acids: functions, Optical activity, Dissociation curve of histidine B27	01
12	Peptide bonds – Peptide bonds, Resonance, Peptide nomenclature, Conformation space of the peptide chain	01
13	Secondary structure – Helix, Collagen Helix Pleated-sheet structure, B- Turns	01
14	Molecule models : Insulin – Structure of insulin, Insulin ( Monomer)	01
15	Isolation and analysis of proteins – Salt precipitation, Dialysis, Gel filtration, SDS gel electrophoresis	01
16	Base and nucleotides – Nucleic acid bases, Nucleosides, Nucleotides, Oligonucleotides, Polynucleotide	01
17	RNA- Ribonucleic acids (RNAs), Transfer RNA (tRNA)	01
18	Molecular model: DNA and RNA – DNA: Conformation, RNA	01
19	Enzyme Kinetics 1 – Michaelis Menten kinetics, Isosteric and allosteric enzymes	01
20	Inhibitors – Types of inhibitor, Kinetics of inhibition	01
21	Enzymatic analysis – Principle of spectrophotometry, Assay of lactate Dehydrogenase activity, Enzymatic determination of glucose	01
22	Allosteric regulation – Aspartate carbamoyltransferase : reaction, Kinetics, R and T conformation, Structure of a dimer,	01
23	Transcription Control – Functions of regulatory proteins, lactose operon	01
24	Hormonal Control – Principles of hormone action, Hormonal regulation of glucose metabolism in the liver	01
25	ATP – ATP: structure, Hydrolysis energies, Types of ATP formation	01
26	Energetic Coupling – Energetic coupling, Substrate level phosphorylation	01
27	Tricarboxylic acid cycle: reactions- Tricarboxylic chain, Organization	01
28	Respiratory Chain- Components of the respiratory chain, ATP synthase	01
29	ATP synthesis – Redox systems of the respiratory chain, ATP synthase	01
30	Regulation- respiratory control, Uncouplers	01
31	Glycolysis – Glycolysis: balance, Reactions, Energy profile	01
32	Pentose Phosphate Pathway – Pentose phosphate pathway : oxidative part, Reactions,	01
33	Gluconeogenesis - Gluconeogenesis -	01
34	Glycogen metabolism - Glycogen metabolism, Glycogen balance.	01
35	Regulation- Regulation of carbohydrate metabolism, Fructose 2, 6-bisphosphate,	01
36	Diabetes mellitus – Insulin Biosynthesis, Effects of insulin deficiency	01
37	Over view – Fat metabolism.	01
38	Fatty acid degradation – Fatty acid degradation : B- Oxidation, Fatty acid	01
39	Fatty acid synthesis – Fatty acid synthesis	01
40	Biosynthesis of Cholesterol – Cholesterol biosynthesis	01
41	Protein Metabolism : over view – Protein metabolism overview	01
42	Transamination and Deamination – transamination and Deamination	01
43	Amino acid degradation - Amino acid degradation : overview, Deamination,	01
44	Urea Cycle – Urea cycle	01
45	Nucleotide degradation - Nucleotide degradation Hyperruricemia(gout)	01
45	Purine and pyrimidine biosynthesis – Components of nucleobases, Pyrimidine and purine synthesis	01
46	Heme biosynthesis – Heme biosynthesis,	01
47	Heme degradation – Degradation of heme groups,	01
48	Structure of cell – Comparison of prokaryotes and eukaryotes, Structure of an animal cell	01

49	Structure and Components – Structure of the plasma membrane	01
50	Transport Processes – Permeability of membranes, passive and active transport, Transport processes	01
51	Transport proteins - Transport mechanisms, Glucose transporter Glut – 1, Aqyaporin-1, Sarcoplasmic Ca <sup>2+</sup> pump.	01
52	Iron channels – Voltage-gated Na <sup>+</sup> channel in Streptomycin lividans	01
53	Membrane receptors – Principle of receptor action, Insulin receptor, 7-Helix receptors, T- cell receptor.	01
54	Protein sorting – protein sorting , Translocation signals, Exocytosis	01
55	Protein synthesis and maturation –Protein in the rough endoplasmic reticulum, protein glycosylation	01
55	Protein maturation – Protein folding in the rER, Chaperones and chaperonins, protein import in mitochondria	01
56	Replication – Mechanism of DNA polymerases, Replication in E coli,	01
57	Transcription – Transcription and maturation of RNA: overview, Organization of the PEP- CK gene, Process of transcription	01
58	Transcriptional Control – Initiation of transcription, Regulation of PEP-CK transcription	01
59	RNA Maturation – 5' and 3' modification of m RNA: Splicing of h nRNA Spliceosome	01
60	Amino acid activation – The genetic code, Amino acid activation Asp-tRNA- Ligase ( Dimer)	01
61	Translation I : initiation – Structure of eukaryotic ribosomes, Polysome Initiation of translation in E Coli	01
62	Translation II: elongation and termination – Elongation of protein biosynthesis in E Coli	01
63	Antibiotics – Antibiotic: overview, Intercalators, C Penicillin as suicide substrate	01
64	Mutation and Repair- Mutagenic agents, Effects, Repair mechanisms	01
65	DNA cloning - Restriction endonucleases, DNA cloning	01
66	DNA sequencing – Gene libraries, Sequencing of DNA,	01
67	PCR and protein expression – Polymerase chain reaction ( PCR), DNA electrophoresis, Over expression of proteins	01
68	Genetic engineering in medicine – DNA fingerprinting, Diagnosis of vira DNA using RT-PCR, Gene therapy.	01
69	Hemoglobin - Hemoglobin structure, Hemoglobin allosteric effects	01
70	Iron metabolism – Distribution of iron, Iron metabolism	01
71	Acid-base balance – Hydrogen ion concentration in the blood plasma Acid-base balance, Buffers system in the plasma	01
72	Immune response – Simplified scheme of the immune response	01
73	T-cell activation – Antigen receptors, T cell activation,	01
74	Complement system- Complement activation	01
75	Antibodies – domain structure of Immunoglobulin G, Classes of immunoglobulins	01
76	Monoclonal antibodies – immunoassay – Monoclonal antibodies Immunoassay	01
77	Carbohydrate metabolism – Gluconeogenesis : overview, Fructose and Galactose metabolism	01
78	Lipid metabolism – lipid metabolism Biosynthesis of ketone bodies	01
79	Bile acids – Bile acids and bile salts, Metabolism of bile salts,	01
80	Cytochrome P450 systems – Cytochrome P450 – Dependent monooxygenases : reactions	01
81	Urine-Urine, Organic constituents , inorganic constituents,	01
82	Function in the acid-base balance – Proton secretion Ammonia excretion	01
83	Renal hormones – renal hormones, Renin angiotensin system,	01
84	Muscle contraction – Organization of striated muscle, Mechanism of muscle contraction	01
85	Muscle metabolism I Cori and alanine cycle, Protein and amino acid metabolism	01
86	Muscle metabolism II – Cori and alanine cycle , Protein and amino acid metabolism.	01
87	Calcium metabolism. – Function of Calcium, Bone remodelling, Calcium Homeostasis	01
88	Collagens – Structure of collagens , Biosynthesis,	01
89	Extracellular matrix – Extracellular matrix, Fibronectins, Proteoglycans	01
90	Lipid – soluble vitamins – Vitamin supply, Lipid-soluble vitamins	01
91	Water- soluble vitamins I – Water- soluble vitamins I	01
92	Water- soluble vitamins II – Water- soluble vitamins II	01
93	Basics – A. Hormones: overview, A. Hormonal regulation system	01
94	Metabolism of steroid hormones – Biosynthesis of steroid hormones Inactivation of steroid hormones	01
95	Metabolism of Peptide Hormones – Biosynthesis, degradation and inactivation,	01
96	Mechanisms of action – Mechanisms of action, Signal transduction	01
97	Second messengers – Cyclic AMP, Inositol 1,4,5-trisphosphate and diacylglycerol, Calcium ions	01
98	Signal cascades – Insulin: signal transduction, Nitrogen monoxide (NO) as a mediator,	01
99	Apoptosis – Cell proliferation and apoptosis, Regulation of apoptosis	01
100	Oncogenes – Proto-oncogenes: biological role, Oncogene products: biochemical functions.	01
101	Sanger Fredrick	01
102	Krebs, Sir Hans Adolf	01
103	J.D. Watson & H.F.C. Crick	01
104	Jacob & Monod	01

105	Lehninger	01
106	Carl Neuberg, Father of Biochemistry	01
107	B.C. Guha Father of Biochemistry in India	01
108	Carl Ferdinand Cori	01
109	Arthur Kornberg	01
110	Thomas B.Kornberg.	01
111	Maude Menten.	01
112	Leonor Michaelis	01
113	Linus Pauling.	01
114	Raj Shankar.	01

## NOTE:

**Note:1.** The portraits of all the scientists (*Sr. No. 101 to 114*) should preferably be provided on a laminated, wall mountable board. Each portrait should also be accompanied with the following details below each of the Photograph:

- Name of scientist
- Birth year – Death year (if applicable)
- A brief mention of their most significant contribution in the field of Human Physiology (upto 30 words or less).
- All charts must be quoted separate for each charts

Following details should be mentioned above each of the Photograph:

**"DEPARTMENT OF BIOCHEMISTRY, KCGMC, KARNAL"** in single line.

**All portrait Charts should be thick Laminated & PVC Mounted & must be quoted separately for each charts.**