

SPECIFICATIONS FOR HUMAN PATIENT SIMULATOR :

Human Patient Simulator for Training & Education of undergraduates, Post graduate students & Health professionals in routine and special clinical situations.

It Should offer sophisticated mathematical models of human physiology and pharmacology and capable of determining automatically the patients response to user actions and interventions:

Human Patient Simulation system should comprise the following

A) MANNEQUIN :

- It Should be supplied with two mannequins
 - i). Adult Mannequin should represent the physical characteristic of an adult male / female patient with interchangeable genitalia
 - ii). Pediatric mannequin to represent physical characteristic of pediatric patient.
- It should be fully operational in supine, sitting, lateral & prone position and can be placed on O. T. Table, ICU Beds on ground & in a Ambulance.
- It should react to intravenous drugs, CPR, defibrillation, intubations ventilation, catheterizations & other procedures.
- Should physically demonstrate of various clinical signs (i.e. heart / breath sounds, palpable pulses , chest excursion , airway patency etc.) which should be dynamically coupled with the mathematical models of human physiology and pharmacology.

B) COMPUTERISED SYSTEM CONTROLLER

Simulation system should be supplied complete with PC console and a hand held Laptop for instructor to control all aspects of simulator from Bedside of the Patient

C) UTILITY SOFTWARE

- Simulation system should be supplied complete with software for:
- Modification of preconfigured scenarios & patient profiles or creating new scenarios & profiles
- Recording of patients physiology and intervention by student ,instructor or central software
- modification of pharmacokinetics & pharmacodynamic parameters of selected drugs :

D) PATIENT MONITOR


- Should have facility to be connected to a real patient monitor for monitoring following parameters :
 - 1) 5 Lead ECG
 - 2) NIBP
 - 3) IBP (at least 2 ch)
 - 4) SPO2
 - 5) Cardiac Output
 - 6) ST. Segment & Arrhythmia Analysis
 - 7) ETCO2
 - 8) Anesthetic agents (enflurane, sevoflurane, desflurane, Halothane, Isoflurane)

E) ANAESTHESIA MACHINE

- Should be supplied complete with flow meters for Air, Oxygen, Nitrous Oxide with low flow range and hypoxia guard.
- Electronic anesthesia ventilator for Paed. & Adult usage.
- Breathing circuit (02 nos. each) for adult & paed. patient.
- Vaporizer
- Circle Absorber.

F) DEFIBRILLATOR with ECG Monitoring, integrated adult & paed. paddles.

G) ICU Ventilator for adult & paed. applications.


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HUMAN PATIENT SIMULATOR SHOULD HAVE FOLLOWING FEATURES :-**1. AIRWAY SYSTEM**

- Mannequins should provide automatically realistic oropharynx , naso -pharynx and larynx representing adult and paediatric patient
- Should allow direct laryngoscope , oral and nasal tracheal intubation.
- Should support right / left mainstream endobronchial intubation , esophageal intubation.
- Should allow for activation of laryngospasm activator & airway occluder to create "cannot ventilate, cannot intubate" crisis scenario.
- Should allow instructor to activate tongue swelling of varying degrees.
- Should support the use of Combitubes, lighted stylets and fiber optic intubation tubes.

2. PULMONARY SYSTEM :-

- Should have facility for adjustment of breath rate & tidal volume by the instructor to maintain target CO₂ pressure.
- Should be capable of simulating events such as atelectasis , pneumothorax , asthma , COPD etc.
- The mannequin's lungs should physically consume O₂ ,produce Co₂ and uptake or excrete N₂O, sevfluorane, isofluorane, enflurane, and halothane
- Should have independent control of left & right lung to model airway resistance, lung compliance & chest wall compliance.
- The lungs should be realistically modeled with respect to the range of tidal volumes & functional residual capacity.
- Should have facility to superimpose modes of ventilation (spontaneous, assisted & mechanical) one on another and respiratory system should be capable of triggering a ventilator.
- Ventilation should result in appropriate production of expired CO₂ which registers correctly on external capnograph.
- Should give appropriate & dose dependent pulmonary response to intravenously injected drugs.
- Should have facility to continuously Calculate patients arterial blood gas & PH

3. CARDIO VASCULAR SYSTEM:


- Should simulate heart sound synchronized to QRS complex of ECG, generate 5 lead ECG from appropriate positions on the patients chest and Should be able to simulate associated abnormalities such as myocardial ischemia, sinus tachycardia & bradycardia, ventricular fibrillation & asystole.
- Should have palpable carotid, radial, brachial, femoral pedal pulses synchronous to ECG.
- Should have independent control of left & right radial, brachial, femoral & pedal pulses.
- Should simulate hypovolemia & hypervolemia and right and / or left heart failure.
- Should be able to simulate patients blood pressure that can be measured with cuff of NIBP Monitor, and provide monitoring of haemodynamic parameters.

4. METABOLIC SYSTEM


Should physiologically model Actual blood gases including pH, Pco₂, Po₂ accurately corresponding to alveolar concentration of CO₂ & O₂.
Should allow instructor to adjust ABG pH level to simulate Metabolic Acidosis and alkalosis

5. GENITO URINARY SYSTEM.

Mannequin should allow insertion of urinary catheters, & offer instructor controlled or automatic scenario controlled excretion of urine and its flow rate.


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6. **NEUROLOGIC SYSTEM:**
- Should model cardio vascular & respiratory responses to sympathetic & para sympathetic activities.
 - Should have electrode attachment for peripheral nerve stimulator.
 - Should automatically detect PNS stimulus pattern and generate appropriate thumb twitch response.
7. **ADVANCED CARDIAC LIFE SUPPORT SYSTEM.**
- Should display alveolar & arterial gas concentrations appropriately reflecting efficacy of ventilatory technique employed.
 - Should display artificial circulation, cardiac O/P, Central & peripheral blood pressure palpable pulses & CO₂ return as a result of effective chest compression.
 - Should have facility to select & maintain desired cardiac Arrhythmia and central patients response to clinical intervention.
 - Should have facility to apply conventional & automatic external defibrillators to the patient and should trigger appropriate patient response.
 - Should have provision to apply transcutaneous pacemakers.
 - Should support all drug required by ACLS algorithm.
8. **TRAUMA FEATURES:**
- Should simulate constriction & dilation of pupils of each eye in response to changing light stimuli.
 - Should have provision to perform needle decompression of Tension Pneumothorax, & chest tube placement and management.
 - Should have facility to perform subxyphoid needle peri-cardiocentesis to resolve acute cardiac tamponade.
9. **PHARMACOLOGY & DRUG RECOGNITION SYSTEM:**
- Should have preprogrammed pharmacokinetic and pharmacodynamic parameter for over 50 (fifty) intravenous medication.
 - Should incorporate various intravenous access points such as antecubital, right internal jugular and femoral veins in the mannequin.
 - Should have facility to administer injection & intravenous infusions from main PC console or instructors hand held remote control.
 - Mannequin should appropriately & automatically respond to incorrect medications.
 - Should have drug recognition system to identify drug, its concentration & quantity of dosage given.
 - Should have facility to modify pharmacodynamic & pharmacokinetic models of existing drugs & to add new drugs.
10. **PATIENT PROFILES & SCENARIOS**
- Should have at least 25 pre-configured profiles of patients of various ages, medical history, gender & physiological parameter
 - Should have facility to change existing patient profiles and to create new patient profiles.
 - It should be possible to capture the current state of patient at any part of simulation session & to use it as new patient.
 - Simulator should have at least 60 pre-configured scenarios of events & crises.
 - Should have facility to change existing scenarios and to create new scenarios of events & crises.



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SPECIFICATION OF FINE MICROTOME

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- Motorized drive.
- Compatible embedding material paraffin, plastic.
- The Cutting and trimming function can be finished by the control system.
- The hand wheel can be locked at any position, so as to ensure the safety of the operation.
- The large waste tray can be exchanged arbitrarily.
- Two kinds of the specimen clamp can be changed conveniently, and it has the alarm system.
- Two model for section: manual and automatic, the user can switch arbitrarily.
- Four speed of section: 25 circle/minute, 35 cricle/minute, 45 cricle/minute, 55 cricle/minute.
- Switch arbitrarily between section and trimming.
- Alarm system for horizontal and vertical stock limit, protection system for motor surcharge.
- Range of the thickness of slice: 0~100 μ m.
- Range of the thickness of trimming: 0~100 μ m.
- Setting thickness of slice range:
 - 0~10 μ m increment 0,5 μ m.
 - 10~20 μ m increment 2 μ m.
 - 20~100 μ m increment 5 μ m.
- Horizontal specimen stroke: 26mm.
- Vertical specimen stroke: 60mm.
- The retraction of the specimen clamp: 20 μ m.
- Orientation of the specimen head: 360°.
- Minimum setting thickness of slice: 0,5 μ m.
- Maximum section of slice: 50x50mm.
- Slice precision: \pm 10%.


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Specification as under

Models:

1. Size of each model should be 2¹/₂ft.x2ft.x5inch.
2. The frame of each model should be made by iron and the gauge should be 20.
3. The model should be with multicolored properly illuminated from three sides.
4. The weight should not exceed 10kg.
5. The details of the name of each model given in enclosure-1.

Laminated Charts/Graphs:

1. Should cover all systems in human physiology.
2. The size of each laminated chart should be 15"x10".
3. The laminated chart/graphs should be made by wood & should be laminated.
4. The Charts/Graphs should be multicolor drawn on photographic paper.

Racks:

1. The racks should be made by iron with gauge 20.
2. Weight of the rack should not exceed 10kg.
3. The size of the rack should be 5ft.x3ft.
4. The each rack should be painted and should have facility to attach laminated boards.

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List of Models for Physiology

Sr.n.	Description
1	Autonomic nervous system.
2	Sensory Pathways.
3	Motor Path ways.
4	Coronary Circulation.
5	Fetal Circulation.
6	Connection of cerebellum.
7	Connection of Hypothalamus.
8	Connection of Thalamus.
9	Anterior Spinothalamic Tract.
10	Asscending and descending reticular fiber system.
11	Auditory Pathways.
12	Visual Pathways.
13	Sinoaortic Mechanism.
14	Sympathetic Nervous Systems.
15	Parasympathetic Nervous Systems.
16	Autonomic Innervation of Heart.
17	Gastric Secretion.
18	Salivary Secretion.
19	Pancreatic Secretion.
20	Vagus Nerve Distribution.
21	Mechanism of Mastication.
22	Mechanism of Vomiting.
23	Defecation reflex pathwaus.
24	Neural Regulation of Cardiovascular System.
25	Neural Regulation of Respiratory System.
26	Reflex arc.
27	Hemisection of Spinal Cord.
28	Swallowing Mechanism.
29	Specialized conducting tissues of the heart.
30	Urinogenital System with blood supply of nephron.
31	Physiology of Lactation.
32	Endocrine glands of human body.
33	Cranial Nerves-1 origin, distribution and termination.
34	Cranial Nerves-2 origin, distribution and termination.
35	Cranial Nerves-3 origin, distribution and termination.
36	Cranial Nerves-4 origin, distribution and termination.
37	Cranial Nerves-5 origin, distribution and termination.
38	Cranial Nerves-6 origin, distribution and termination.
39	Cranial Nerves-7 origin, distribution and termination.
40	Cranial Nerves-8 origin, distribution and termination.
41	Cranial Nerves-9 origin, distribution and termination.
42	Cranial Nerves-11 origin, distribution and termination.
43	Cranial Nerves-12 origin, distribution and termination.
44	Contraceptives

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45	Peripheral Circulation.
46	Pyramidal System.
47	Extrapyramidal System.
48	Mechanism of heat regulation.
49	Heat loss Mechanism.
50	Brain

T.N. Rimal / mm-Phyto/07/11-12

SPECIFICATION FOR VACCUM PUMP

- 1. Vacuum : Rating of 28" Hg (48.8 Torr) or better.
- 2. Flow Rate : > 25 Lit/Min.
- 3. Fluid Capacity :
 - Minimum : 03 Liter
 - Maximum : 05 Liter
- 4. Function Modes : Continuous or timed operation.
- 5. Timer Control : 0-5 Hours, fully adjustable.
- 6. Operating Conditions :
 - Temp. : 04 -40°C
 - Humidity : 10-90% relative humidity.
- 7. Power Requirement : 220-240 V AC, 50/60 Hz.



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T. NO- Rims 2 R/mm / Dentistry / 09/11-12

SPECIFICATION FOR GINGIVECTOMY & PERIOECTOMY SURGERYKIT

- Curettes - universal and gracey assorted
- Needle holder & rongeurs
- Scissors -
 - Goldman fox
 - Stich cutting
 - straight
 - curved
- chisel - assorted and oehsenbem
- knives - (a) Kirkland - assorted
 - o (b) Ordan's - assorted
 - o check retractor
- handle - NO-05 , periosteal elevator , Spanula , Tissue forceps
- Check retractor , Mallet
- Sharpening stones (a) conventional arkansa (b) Rotatory

- Scalers - Assorted i.e Sickle , chisel , hoe , file.
- Periodontal probes (a) Nabers (b) W.H.O (c) Pocket marking
- Gingivectomy marker

- Tray

- I.C burs assorted for contra and straight hand pieces.

W/W
25/05/11

T.NO. RIMS 2A/MM/obs & gynae/10/11-12

Specification for Cryocautery Apparatus with Probe

1. Hand Piece:-

- Finger control trigger should be in the release position to be switched on & should be pressed for switching off the coolant.
- It should have a wide range of interchangeable probes, which allow versatile procedure applications.
- Probe & shaft should be autoclavable or sterilisable.
- Shaft should be insulated to lessen chances of freezing adjacent tissue.
- Should be possible to place oblique/hang it to the cart in between uses there by increasing ease of use.

2. Control Console:-

- It should be high impact molded console to protect internal component.
- It should have an accurate pressure gauge.
- It should have a remote instant on/off switch to ensure automatic gas line cleaning.
- It should have probe tipped temperature indicator which enable precise, optimum & reproducible freeze performance.
- It should be non electrical.
- It should be portable.
- It should adapt to various cylinder configurations.
- It should have gas scavenger systems for exhaust gases.

3. Gas Line & Connectors etc:-

- It should have high strength gas lines pretested at the rate 2000 PSI for maximum safety.
- It should have variety of as cylinder connectors.
- It should have gas purifier for reliable & efficient freezing.

4. Design:-

- It should be designed for safety & portability.
- Cart should be easy to maneuver.
- Accustom carrying should be available to protect the system during travel and storage.
- All pressure seals should be removable from possible patient and physician exposure to ensure safe venting.

5. Probes:-

- Different kinds of Exo Cervical probe set. **(AT LEAST 6)**
- Different kinds of Endo Cervical probe set. **(AT LEAST 6)**

