

## A close-up photograph of a hand holding a blue stethoscope over a tablet. The tablet screen displays handwritten medical notes in cursive, including 'Examination', 'Other (of patients)', 'Sounding new', 'Shape of', 'Shape of', 'Site', and 'Date'. The notes are written on a grid background. The stethoscope has a silver chest piece and blue tubing. The hand is dark-skinned. The background is a light-colored, textured surface.



**A state University established by the Govt of H.P**

# Atal Medical & Research University, H.P.

(A State Govt. University)

(SLBS Govt. Medical College & Hospital Campus, Ner Chowk, Mandi, H.P.)

## Minutes of meeting of PG Board of Studies (Anesthesia) held on 4<sup>th</sup> May, 2023 in

### Conference Hall, AMRU at 12:30 PM

A meeting of PG Board of Studies (Anaesthesia) was held on 4<sup>th</sup> May, 2023 at 12:30 PM at Conference Hall, AMRU under the Chairmanship of Dr. Surender Singh, Professor & HOD Anaesthesia, IGMC, Shimla.

Following members attended the meeting:

1. Dr. Surender Singh, Professor & HOD Anaesthesia, IGMC, Shimla -cum-Chairperson.
2. Dr. Ajay Sood, Professor, Dept. of Anaesthesia, IGMC, Shimla -cum-Member.
3. Dr. Ramesh Kumar, Associate Professor (Regular), and Professor (Designated), Dept. of Anaesthesia, IGMC, Shimla-cum-Member.
4. Dr. Sonali Kaushal, Assistant Professor (Regular), and Associate Professor (Designated), Dept. of Anaesthesia, YSPGMC, Nahan-cum-Member (through video conference).

The meeting started with the Chairperson welcoming the members.

The following decisions were taken:

1. Syllabus of MD Anaesthesiology prescribed by NMC was discussed, few suggestions of members were added and final draft was approved.
2. Examination pattern of MD Anaesthesiology prescribed by NMC was discussed and accepted with few additions.
3. Logbook was discussed & finalised.

**The meeting ended with a vote of thanks to the chair.**



Dr. Surender Singh,  
Professor & HOD Anaesthesia,  
IGMC, Shimla.



Dr. Ajay Sood,  
Professor Dept. of Anaesthesia,  
IGMC, Shimla.



Dr. Ramesh Kumar,  
Assistant Professor (Regular)  
And Professor (Designated)  
Dept. of Anaesthesia, IGMC, Shimla

Dr. Sonali Kaushal,  
Assistant Professor (Regular)  
And Associate Professor (Designated)  
Dept. of Anaesthesia, YSPGMC, Nahan.

# DEPARTMENT OF ANAESTHESIA IGMC SHIMLA

No: HFW (MC)Anaesth(B) .....365

Dated:- 15.05.2023.

To

The Controller of Examinations  
Atal Medical and research University  
Mandi at Ner Chowk.

**Subject: - Submission of Curriculum, Assessment and Examination pattern, sample Logbook and Model question paper for MD Anaesthesia in accordance with NMC PG Regulations 2000.**

Sir,

Please find attached herewith the final draft of Curriculum, Assessment and Examination pattern, sample Logbook and Model Question paper for MD Anaesthesia in accordance with NMC PG Regulations 2000 as approved in its meeting at AMRU Ner Chowk on 04.05.2023 by the PG Board of Studies, constituted by the Hon'ble Vice Chancellor of Atal Medical and Research University Mandi at Ner Chowk Himachal Pradesh vide notification No. AMRU/Acad/BOS/Faculty/2022/-62-181 dated 05.01.2023.

This submission is for your kind information and necessary action please.

Yours faithfully



**Dr. Surinder Singh**  
**Professor & Head Anaesthesia,**  
**IGMC Shimla-cum-Chairman,**  
**PG Board of Studies (Anaesthesiology)**  
**Atal Medical and Research University,**  
**Mandi at Ner Chowk.**



# ATAL MEDICAL AND RESEARCH UNIVERSITY

MANDI AT NER CHOWK HIMACHAL PRADESH

MD ANAESTHESIOLOGY

## PROPOSED SYLLABUS, EXAMINATION AND PATTERN OF QUESTION PAPERS FOR COMPETENCY BASED MEDICAL EDUCATION IN ACCORDANCE WITH NMC GUIDELINES

### GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN ANAESTHESIOLOGY

#### Preamble

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

A post graduate specialist having undergone the required training in anaesthesiology should be able to recognize the health needs of the community. He or she should be competent to handle effectively medical problems and should be aware of the recent advances pertaining to his/her specialty. She/he should be highly competent anesthesiologist with broad range of skills that will enable him/her to practice anaesthesiology independently. The PG student should also acquire the basic skills in teaching of medical/para-medical students. She/he is also expected to know the principles of research methodology and modes of consulting library. She/he should attend conferences, workshops and CMEs regularly to upgrade his/her knowledge.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of "domains of learning" under the heading "competencies".

#### **SUBJECT SPECIFIC LEARNING OBJECTIVES**

The training should have clear objective, is competency based, is well planned & evaluated, is supervised and delivered by well trained teachers. It will have special emphasis on attitude and behavior, safety, communication, presentation, audit, teaching, ethics and law and management.

No limit can be fixed and on the number of topics that can be prescribed as course contents. The student is expected to know his/her subject in depth from various text books and





journals; however more emphasis should be on the diseases/health problems most prevalent in that area. Knowledge of recent advances and basic sciences as applicable to his/her specialty should get high priority. Competency in anaesthesia skills commensurate with the specialty (actual hand on training) must be ensured.

#### **Specific learning objectives:**

- 1. Theoretical knowledge:** The student should have fair knowledge of basic sciences (Anatomy, Physiology, Biochemistry, Microbiology, Pathology, Pharmacology, Statistics and Physics) as applied to Anaesthesia. The student should acquire in-depth knowledge including recent advances. He/she should be fully conversant with the bedside procedures (diagnostic and therapeutic) and have knowledge of latest diagnostics and therapeutics procedures available including radiological methods.
- 2. Teaching:** The student should learn the basic methodology of teaching and develop competence in teaching medical/paramedical students. The student should be familiar with the latest teaching (computer and power point presentation) modes including simulators training and evidence based medical education.
- 3. Attitude development:** The student should develop attitude that leads to appropriate communication with colleagues to function in a group in Operating Room /Intensive Care Unit, and develop the ability to function as a leader in the operating room.

#### **SUBJECT SPECIFIC COMPETENCIES**

**The student during the training programme, should acquire the following competencies:**

##### **A. Cognitive domain**

- Demonstrate knowledge of Anatomy related to;
  - Diaphragm, upper and lower airway, heart and coronary circulation ,
  - Regional anaesthesia - field block, central neuraxial, blockade, block for acute pain states
  - Procedures like -Intramuscular injections, arterial and venous cannulations
  - Patient Positioning under anaesthesia
  - Demonstrate knowledge of Physiology of various systems (respiratory, cardiovascular, hepatobiliary, renal, endocrine, pregnancy, haematological, neuromuscular, regulation of temperature and metabolism, stress response, cerebral blood flow and ICP, central, autonomic and peripheral nervous systems, metabolic response to stress and trauma) in detail and translate its application in a problem solving manner.
  - Demonstrate knowledge of Biochemistry relevant to fluid balance and blood transfusion, perioperative fluid therapy, acid base homeostasis in health and diseases.
  - Demonstrate knowledge of commonly used drugs in anaesthesia practice (premedication, induction agents - intra-venous and inhalational, neuromuscular blocking agents and reversal of muscle relaxants) - general principles, concepts of pharmacokinetics and pharmacodynamics, drug interactions with the other drugs taken concomitantly by the patient and anaphylactoid reactions.
  - Demonstrate knowledge of gas laws, medical gas supply system, fluidics, electricity, diathermy and oxygen therapy.

- Demonstrate knowledge of 'principles of physics' that govern functions of basic anaesthesia delivery equipment, airway devices – (laryngoscopes, airways etc), breathing systems and monitors, fiber optics, Lasers, Pacemakers and defibrillators, monitoring equipments (used for assessment of cardiac functions, temperature, respiratory functions, blood gases, intracranial pressure, depth of anaesthesia and neuromuscular block), Sterilization of equipments, manufacture, filling and transport of gases and liquid oxygen. etc.
- Demonstrate knowledge of importance of pre-anaesthetic assessment and optimization of a patient; consisting of evaluation, interpretation of laboratory investigation as applied to the care of the patients in planning and conduct of general anaesthesia.
- Demonstrate knowledge of basic life support, advanced cardiac, trauma life support, and neonatal resuscitation according to latest guidelines.
- Demonstrate knowledge of principles of sterilization and universal precautions, selection, maintenance and sterilization of anaesthesia and related equipment, Infection control, cross contamination in OT and ICU.
- Immune response and anaesthesia.
- Describe the development and history of anaesthesia as a specialty with knowledge of important personalities who have contributed towards it.
- Demonstrate knowledge of principles of artificial ventilation, management of unconscious patients, oxygen therapy, shock - (pathophysiology and management) and various protocols related to Intensive Care Unit.
- Demonstrate knowledge of post-operative care in the post-anaesthesia recovery room, in terms of management of Post-operative pain: various modalities:
  - Nausea and vomiting
  - Identify emergencies and postoperative complications.
  - Special precautions to be taken in specific surgical patients.
  - Demonstrate knowledge of acute pain management, chronic pain therapy & therapeutic nerve blocks, acupuncture, acupressure and other non-conventional methods of treatment.
- Describe documentation, medico-legal aspects of anaesthesia and concept of informed consent.
- Demonstrate knowledge of research methodology and basics of biostatistics relevant to data collection, analysis, record keeping in anaesthesia, comparison and estimation of significance.
- Demonstrate ability to interpret blood gas analysis and other relevant biochemical values, various function tests and basics of measurement techniques, ECG.
- Explain blood coagulation mechanism, and their disturbances, rational use of blood and blood components.
- Demonstrate knowledge pertaining to special anaesthetic techniques as relevant to:
  - Outpatient anaesthesia, hypotensive anaesthesia, anaesthesia in abnormal environments including rural area and calamitous situations
  - Associated medical disorders in surgical patients
  - Geriatric and pediatric anaesthesia, Emergency, ENT, orthopedic, ophthalmology, obstetrics, dental, radio-diagnosis and radiotherapy.





- Induced hypothermia, incidental, environmental safety of patient.
- Malignant hyperthermia, myasthenia gravis, GB syndrome and other neuromuscular diseases, obesity, COPD, Diabetes mellitus, bronchial asthma and hypertensive crises..
- Principles of anaesthetic management of neuro/cardiac/thoracic/vascular/transplantation/burns and plastic surgery.
- Anaesthesia for patients with severe cardiac, respiratory, renal and hepatobiliary disorder posted for unrelated surgery
- Shock, types, pathogenesis and management of patients in shock, renal failure, critically ill and/or on ventilator, Multiple organ failure
- Demonstrate knowledge pertaining to care of terminally ill, Hospices management,
- Do not resuscitate orders.
- Demonstrate knowledge of general principles of medical audit and Critical incident reporting.
- Demonstrate knowledge of Ethics and clinical trial.
- Demonstrate knowledge of Hospital, ICU and OT design and planning.
- Demonstrate knowledge of Medical education including evidence based medical education.
- Demonstrate knowledge of principles of human resources and material management.

#### **B. Affective Domain:**

- Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
- Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
- Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

#### **C. Psychomotor domain**

**At the end of the course, the student should acquire skills in the following broad areas and be able to demonstrate ability as a perioperative physician, in terms of:**

- Acquiring mastery in careful and relevant history taking, physical examination in clinical evaluation of the patient preoperatively.
- Collecting and synthesizing preoperative data from parent hospital and other sources and to develop a rational strategy for the peri-operative care of the patient.
- Thorough and systematic approach to preoperative evaluation of patients with and without systemic diseases, undergoing different types of operations.
- Prioritizing problems, present cases clearly and systematically to attending consultants.
- Developing working relationships with consultants in other specialties to assist in preoperative evaluation and get a good consultation.
- Interacting with preoperative patients and developing effective counseling techniques for different anaesthetic techniques and peri-operative procedures.



- Assessing and explaining risk of procedure and taking informed consent.
- Managing information in preoperative evaluation and outcome enhancement and communication skill to patients and relatives.
- Ability to choose and order the required investigations to be done in a particular patient peri operatively
- Demonstrate ability in performing
  - Pre-operative equipment check
  - Selection of drugs
  - Preparation of work table etc.
  - Identify conditions like difficult airway by following difficult airway algorithms.
  - Demonstrate ability to establish topical airway anaesthesia for awake intubation
  - Demonstrate management of a Failed intubation drill on a Mannequin according to latest guidelines
  - Demonstrate ability to monitor and assess depth of anaesthesia
  - Demonstrate abilities to manage body fluid composition; volume status; replacement of fluid and blood loss; use of whole blood and blood components.
  - Demonstrate abilities to manage Electrolyte and acid base derangements; osmolality and osmolality.
  - Demonstrate acquisition of skills to initiate mechanical ventilation; select appropriate type and mode of ventilator; and monitor proper functioning of ventilator.
  - Identify the need to perform intra-operative laboratory tests, blood gases, coagulation profile and interpret the results with clinical co relation
  - Demonstrate ability to manage co-morbid conditions and anaesthesia
  - Demonstrate ability to perform cannulation of arteries, central and peripheral veins.
- Demonstrate ability in using and interpreting the following routine non-invasive and invasive monitors intra-operatively:
  - Electrocardiogram with ST-segment analysis
  - Noninvasive blood pressure
  - Capnograph: values and changes in values and waveform.
  - Pulse oximetry: values and changes in values
  - Neuromuscular blockade monitor
  - Invasive arterial pressure: waveform and changes in the waveform
  - Central venous pressure: values and waveform
  - Pulmonary artery pressure alues and waveforms
  - Pulmonary capillary wedge tracing.
  - Cardiac output
  - Mixed venous oxygen saturation
  - Evoked potential
- Transesophageal echocardiography: basic understanding
- Demonstrate skills in providing basic life support, advanced cardiac life support, trauma life support and paediatric-neonatal life support, train medical and paramedical staff in BLS and ALS.



- Demonstrate mastery in common procedures like vascular access, use of latest invasive and non-invasive monitoring equipment, lumbar puncture, management of appropriate mechanical ventilation and total care of Intensive Care Patient.
- Demonstrate ability to administer general anaesthesia and regional anaesthesia for ASA I to V, under supervision.
- Demonstrate ability to give extradural block (EDB) lumbar and thoracic, Spinal Block, and Peripheral Nerve Blocks under supervision.
- Demonstrate ability to use ultrasound machine for giving blocks and venous cannulation.
- Demonstrate ability to plan and administer anaesthesia to all emergency patients under supervision including patients for Cardiac, Neurosurgery, Pediatric surgery, and for all major surgeries, able to manage critically ill patients and treat
- intractable pain.

**Demonstrate following abilities in Emergency Anaesthesia, Trauma and Resuscitation:**

- Organize resources in case of mass casualty.
- Perform triage.
- Assess, transport and manage mass casualties / disaster management and camp anaesthesia.
- Manage massive haemorrhage and massive blood transfusion.
- Transport critically ill patient.
- Perform anaesthetic management of geriatric patients with fracture neck of femur
- Manage severe burns patients, rapidly progressing spinal compression, massive haemoptysis and lobectomy, peritonitis from various suspected causes, preparation and management of bowel obstruction, septicæmic shock, acute upper airway obstruction such as foreign body, epiglottitis, infections, cardiac tamponade from examples post cardiac surgery, malignant pericardial effusion, peri-operative management of rupture aneurysm of abdominal aorta
- Basic Cardiac Life Support and Advanced Cardiac Life Support, Basic Trauma Life Support, Advanced Trauma Life Support, and Cerebral preservation.
- Management of intra-operative cardiac arrest
- Management of intra-operative bronchospasm
- Demonstrate ability to document a Medico-legal aspect.
- Demonstrate ability to provide special sedation / **anaesthesia requirements outside operating Room**, eg **Radiology**: for CT, MRI (especially in relation to dye allergy and embolization, **Onco radiotherapy**, **Electroconvulsive shock therapy** (modified ECT. **Non-invasive cardio-radiologic procedures** including balloon angioplasty and cardiac catheterization, **Non-invasive neuro-radiologic procedures**, lithotripsy etc .
- Demonstrate ability to analyze data and write a thesis, present scientific data participate in anaesthesia audit.
- Demonstrate ability to critically review and acquire relevant knowledge from the journals about the new development in the specialty
- Demonstrate following abilities in the **Post Anaesthesia Care Unit (PACU)**
  - Assess the patient's recovery and condition for a safe discharge or transfer.



- Observe, recognize and treat the commonly occurring problems likely to arise in the Post-anaesthesia Care Unit (PACU) especially those in relation to cardio-respiratory systems:
- Airway integrity and compromise.
- Arrhythmia, Hypertension, Hypotension, Pain prevention and pain relief, Nausea and vomiting, Decreased urine output, Emergence delirium, Delayed emergence from anaesthesia, Shivering, Post-obstructive pulmonary edema.
- Assess patient recovery and the parameters for transfer from the PACU to the ward, ICU, home.
- Score the patient's condition according to the Aldrete system, including fast tracking after out-patient surgery.

#### **Demonstration of following abilities in Intensive Care Unit**

- Understanding the spectrum of critical illnesses requiring admission to ICU.
- Recognizing the critically ill patient who needs intensive care -Trauma, burns, all types of shock, Sepsis, SIRS and ARDS, Poisoning, infectious patient (HIV, Hepatitis) and patients with metabolic disturbances.
- Monitoring progress of patients by physiological scoring systems
- Practicing infection control practices and control of nosocomial infections.
- Inserting central venous lines, arterial lines using ultrasound and interpreting the data.
- Managing cardiovascular instability, respiratory failure and postoperative pulmonary complications
- Understanding of the operation of mechanical ventilators including different ventilatory modalities non-invasive ventilation, complications and modes of weaning.
- Principles and application of Oxygen Therapy
- Glycemic control in the critically ill patient
- Practice of Hypothermia and prevention of cerebral injury after cardiac arrest
- Delivering appropriate nutritional support - enteral and parenteral.
- Proper use of sedative/hypnotic drugs in the ICU.
- Practicing ethical and legal aspects of critical care
- Good communication skills with patient and relatives.
- Proper Sterilization of ICU equipment.

#### **Demonstration of following abilities in Acute and Chronic Pain Management**

- Assessment of patients with pain including: history taking, physical examination, and interpretation of investigations.
- Classify types of pain - acute chronic, traumatic, cancer pain, etc. with the knowledge of Pain pathways in detail.
- Practice the different modalities of physical therapy that may relieve both acute and chronic pain
- Practice the acute pain, cancer pain guidelines and WHO treatment ladder.
- Practice routes of administration and risk/benefits of drugs used for acute and chronic pain relief, patient controlled analgesia and treat the common pain syndromes.





- Demonstrate practice of pain management in patients with problem drug use, drug dependency and addiction and identify the parameters for referral to a pain medicine specialist.

**Demonstrate Organization of acute pain service and role of acute pain nurse for:**

- Pain assessment in various groups of patients,
- Physiological changes secondary to pain
- Practice different modalities of pain control. Pharmacology and side effects of opioid analgesia and non-opioid analgesia, principle of patient-controlled analgesia and assessment of its efficacy, Pharmacology and side effects of epidural/intra-thecal opioid. Neurological assessment of epidural blockade and management of failed block. Management of regional blockade – brachial plexus, para-vertebral and intra-pleural block. Management of epidural abscess.
- Substance abuse and acute pain control. Pain control in concurrent medical diseases – COAD, IHD, bleeding tendency, geriatric. Pain control in burns patients. Pain control in trauma patients included multiple rib fracture

**Demonstration of abilities to manage Chronic Pain**

- Practice different modalities of chronic pain management - physical therapy, psychotherapy, (including cognitive behavioural approaches), neuroablation, neuro-augmentation, spinal opioid, interventional neuro-blockade, non-opioid analgesia.
- Anatomy, indication, technique and complication of chemical sympathectomy (lumbar sympathectomy, stellate ganglion block, celiac plexus block).
- Practice principles of management of cancer pain, principle of management of non-cancer neuropathic pain - phantom limb pain, post-herpetic neuralgia, complex regional pain syndrome, trigeminal neuralgia.
- Principle of management of non-cancer nociceptive pain - myofascial pain, lower back pain, intractable angina, burns, chronic pancreatitis, PVD.
- Practice Epidural steroid injection (all levels) and long-term epidural catheterization.
- Observe and practice following blocks: Infra-orbital nerve, Intercostal nerve
- Recognize complications associated with each blocks and know appropriate treatment of each
- Know the indications for stimulation techniques such as transcutaneous electrical nerve stimulation (TENS), dorsal column stimulation, and deep brain stimulation.
- Mechanisms and side effects of other therapies used for treating pain.
- The principles of pain management in special patient groups including the elderly, children, disabled, intellectually handicapped and those unable to communicate.
- Awareness of the principles for insertion and management of implantable drug delivery pumps.
- Awareness of the basic principles of palliative care.

**Demonstrate practice of Regional Anaesthesia:**

- Applying general principles of pharmacology of local anaesthetics and various adjuvants.
- Familiarizing with the relevant anatomy for regional techniques.
- Application of indications and contraindications to regional anesthetic technique including central neuraxial blocks, peripheral nerve blocks and sympathetic nerve blocks.

- Assessing adequacy of regional anaesthesia, and learn techniques of supplementation of inadequate blocks.
- Providing effective anxiolytics and sedation of patients by both pharmacologic and interpersonal technique.
- **Performing the following regional anaesthesia techniques:**
  - Brachial plexus, cervical plexus, stellate ganglion block, lumbar plexus, lumbar sympathetic, Sciatic nerve block, Femoral nerve block, 3 in 1 block, Wrist block, Popliteal Nerve block, Trigeminal nerve block, Retro bulbar blocks, Paravertebral blocks, Intercostal blocks, Caudal block – adult and pediatric, Ankle block, Epidural block/Catheter, Subarachnoid block, Bier's block, All peripheral nerves of the upper and lower limbs.

#### **Demonstrate practice of Thoracic Anaesthesia**

- Pre-operative assessment of patients undergoing Thoracotomy (lung resection), thoracoscopy, video assisted thoracoscopy and mediastinoscopy
- Various approaches and their relevant equipments for lung isolation.
- Various double lumen tubes and their placement.
- Application of Principle of chest drain.
- Respiratory Physiology and management of one lung ventilation (OLV).
- Indications, contraindications and hazards of OLV.
- Application of the knowledge of Anatomy of lung and broncho-pulmonary segments.
- Anatomy and techniques for intercostals nerve block and thoracic epidural.
- Management of thoracic epidural anaesthesia and analgesia
- Anatomy, techniques and placement of paravertebral block/catheter.
- Post-operative care of patients after lung surgery.
- Peri-operative management of patients with myasthenia gravis.
- Peri-operative management of patients with mediastinal mass.
- Anaesthetic management of mediastinoscopy, major airway stenting.
- Lung volume reduction surgery and problems.

#### **Demonstrate practice of Cardiovascular Anaesthesia:**

- Application of the knowledge of Anatomy and physiology of valvular disease, coronary arteries and their territories. Pulmonary circulation, coronary circulation, cerebral circulation, visceral circulation.
- Application of the knowledge of Distribution of blood volume to different organs and systems and their control. Microcirculation. Venous system, venous pressure, its influence on various functions.
- Regulation of blood pressure, hypotensive anaesthesia.
- Anatomy and physiology of all operable congenital heart disease like ASD, VSD, PDA, TOF, transposition of great vessels.
- Application of the knowledge of anatomy and physiology of vascular heart disease like co-arctation of aorta.
- Assessment of cardiac patient with ischaemic heart, valvular heart disease and other diseases listed above. Understanding of cardiac catheterization, echocardiography, stress testing, and radio-nucleide imaging.
- Application of Principle and complication of cardiopulmonary bypass



- Application of Principle of trans-esophageal echocardiography
- Application of Principle of circulatory support: inotropes, IABP, pacing
- Coagulation and management of coagulopathy.
- Off pump bypass
- Intra-operative management of aortic surgery and major peripheral vascular surgery, aneurysm grafts, recanalisation procedures.
- Understanding of the adult patient with congenital heart disease and their management during anaesthesia.
- Postoperative cardiac critical care, including cardiovascular problems, analgesia. Insertion of invasive monitoring for arterial monitoring, central venous pressure monitoring, pulmonary artery catheter insertion and interpretation.
- Robotic cardiac surgery.

#### **Demonstrate practice of Paediatric Anaesthesia**

- Application of knowledge of Anatomical changes in paediatric patient and neonates.
- Application of knowledge of Physiology and pharmacology in paediatric patient.
- Guideline for pre-operative fasting in children and pre-medication.
- Anaesthetic equipment: laryngoscopes, airways, endotracheal tubes, LMAs,
- PLMA and breathing circuit for children.
- Anaesthesia management for premature and newborn.
- Emotional problems for parent and child and principles of premedication.
- Consent by parents and their presence during induction. To become skilled
- in communicating with children, parents and other relatives.
- Problems of transporting a sick pediatric patient from the ward to the operating room and back with regard to temperature maintenance, cardiovascular stability, ventilation and oxygenation.
- Estimate preoperatively blood volume, hourly fluid requirements, fluid deficit, third space loss, acceptable blood loss and apply principles of fluid and blood replacement in the perioperative period.
- Induce and maintain anaesthesia by inhalation, intravenous, intramuscular and rectal routes and monitor pediatric patients.
- Understand the benefits, risks and techniques of regional anaesthesia in children.
- Anatomy and techniques of caudal, dorsal penile and inguinal regional block, spinal and epidural block
- Learn to recognize and treat post anaesthesia complications like apnea, laryngospasm, acid-base and electrolyte disturbances, febrile and convulsing child and bleeding child.
- Common problems related to common congenital syndromes presenting for surgery. Anaesthetic management of a child with concurrent disease – Down's, Pierre Robin syndrome, von Willebrand's disease, Goldenhar's, Sturge-Weber, Tracher-Colin, Prune-Belly, and cyanotic and non-cyanotic congenital heart disease.
- Paediatric resuscitation: drugs, doses and defibrillation of children of all ages, from the very premature neonates to those children with complex coexisting disease.
- Management of patients requiring paediatric intensive care, ventilator management, and support of circulation.



- Resuscitation of neonates and children of all ages. A period of one to two months in a PICU is recommended for all post graduate students undergoing advanced training in paediatric anaesthesia.
- Paediatric pain management
- Assessment of a child with URTI, with a heart murmur.
- Management of fluid and electrolytes in children.
- Anaesthetic management of a malignant hyperthermia susceptible child.
- Anaesthetic management of FB bronchus, oesophagus, Wilm's tumour, congenital diaphragmatic hernia, tracheo-oesophagus fistula, thoracotomy.
- Anaesthesia for Fetal Surgery.
- Sedation techniques including the selection, management and monitoring of children for diagnostic and therapeutic procedures, with particular attention to working in areas outside the theatre suite.

#### **Demonstrate practice of Transplant anaesthesia**

- Application of knowledge of basic pathophysiology of renal and liver failure. Principles of anesthetizing an immuno-compromised patient.
- Principles of anesthetizing patient with end stage renal/liver disease and patient with organ transplantation. Perioperative management.

#### **Demonstrate practice of Neuroanaesthesia**

- Application of basic knowledge of cerebral circulation and intra cranial pressure and its implications
- Anaesthesia to patients with neurologic disease, head injury undergoing neurologic or non-neurologic surgery and for diagnostic procedures requiring anaesthesia.
- Anesthetic implications of the most common neurosurgical procedures, transnasal, trans-sphenoidal pituitary surgery. Posterior fossa surgery.
- Surgery for supratentorial pathology.
- Application of basic concepts behind electrophysiologic monitoring of the brain and spinal cord.
- Application of knowledge of general principles of positioning the patient for surgery and the advantages and disadvantages of each position.
- Effects of anaesthesia on the electroencephalogram (EEG) and evoked potentials.
- Differential diagnoses and treatment alternatives of intraoperative intracranial hypertension ("tight brain")
- Management of Head Trauma, and its anesthetic management and various protocols regarding their management and associated trauma.
- Intracranial surgery and spinal surgery, both routine and emergency.
- Monitoring: techniques for detection and management of air embolism.
- Lumbar puncture and CSF drainage.
- Non-surgical management of the head trauma patient, Systemic complications of severe brain injury.
- Management of subarachnoid haemorrhage and vasospasm.
- Diagnosis and management of patients with brainstem death; and dealing with patient's relatives

The following are special procedures which the post graduate student must be able to perform

**Sr. No. Name of procedure**

1. Blind Nasal intubation
2. Failed intubation drill (includes Fiberoptic Laryngo/ Bronchoscope)
3. Double Lumen Tube
4. Bronchial Blocker placement
5. Jet Ventilation
6. Suctioning and physiotherapy of wet lung
7. Intubation in Neonates
8. Initiation and management of ventilation
9. Combined Spinal Epidural
10. Brachial Plexus Block
11. Intravenous Regional Anaesthesia
12. Elbow, Wrist, Digital, Sciatic, Femoral, Lateral Cutaneous Nerve
13. of thigh, Ankle - each
14. Cervical-Superficial and Deep, Stellate, Splanchnic - each
15. Central Venous Line by Brachial, Jugular and Subclavian veins
16. Radial and Femoral Artery cannulation
17. CVP monitoring
18. Pulmonary Capillary Wedge Pressure
19. Neuro-muscular transmission Monitoring
20. Anaesthetic Depth eg. BIS monitoring
21. Demonstration of anesthetic abilities in the intraoperative period keeping into consideration the specific requirement of the surgical procedure – ENT, Orthopaedic, Gynaecology – Obstetrics, General surgery, Onchosurgery, replacement surgeries, urosurgery, vascular, plastic, Thoracic, Dental etc

**Suggested Time Frame for Training the PG Students:**

The student should be taught as per the following schedule to acquire the skills:

**First 6 months:**

- During the first 6 months, the student should be taught expertise in the management of uncomplicated cases not belonging to any super specialty (ASA I and II cases).
- To start with, the student will observe and slowly become independent in giving general anaesthesia and spinal anaesthesia to ASA I and II cases for minor and major surgery, under graded supervision.
- The postgraduate student should learn the basic principles of safe and effective anaesthesia, resuscitation, and both the prevention and treatment of pain, perioperative care of the surgical patient, care of handling equipments, basic techniques in anaesthesia, and anaesthetic pharmacology, and electrical safety.
- He/she should select the thesis topic and submit the protocol for his thesis.



### **Next 18 months**

- The student should widen his experience and should be able to undertake anaesthetic care of all routine cases, assist in the anaesthetic care for routine obstetric practice, understand basic principles of critical care, pain management, and participate in audit.
- The student should be trained in administration of general anaesthesia and regional anaesthesia for ASA I to V under supervision. The student should be able to give extradural block (EDB) lumbar and thoracic, Spinal Block, and Peripheral Nerve Blocks under supervision, and use of Ultrasound machine for giving blocks and venous cannulation. The student should learn paediatric and trauma life supports and maintain skills for basic and advanced cardiac life support.

### **It is advised that they should be posted in the following specialties:**

- General surgery including gastrointestinal surgery, transplant, ENT, Urology, Obstetrics, Dental Surgery, Eye, ICU, Pain Clinic and peripheral theatres like ECT, radiodiagnostic and therapeutic procedures (CT scan, MRI scan, angiography).
- The student should be able to analyze data and write a thesis. He/she should be able to present scientific data.

### **Last 12 months**

- Thesis should be submitted minimum of 6 months before the final MD examination.
- The post graduate student should be given experience of various super-specialties like cardiothoracic and vascular surgery, neurosurgery and transplantation, and paediatric surgery. The student should be able to plan and administer anaesthesia to all emergency patients under supervision including patients for Cardiac, Neurosurgery, Pediatric surgery, and for all major surgeries. The aim at the end is to be competent and independent soon after the third year of junior residency in providing anaesthesia to elective and emergency cases.
- The post graduate student should be able to manage critically ill patients and treat intractable pain.
- They should also know how to organize resources in case of mass casualty. The curriculum should be able to provide 04 months of elective Intensive Care Unit posting (2 months during initial years under supervision and 2 months independently in the last six months).
- **At the end of 3 years, the post graduate student should have the skills to:**
- Plan and conduct anaesthesia and provide post-operative care including pain relief for elective and emergency surgical procedures related to all surgical specialties.
- Carry out basic life support (BLS) and advanced life support (ALS) and train medical and paramedical staff in BLS and ALS.
- Manage patients admitted to an intensive care unit with the help of latest equipment.
- Manage patients suffering from acute and chronic intractable pain.
- Organize the hospital environment to manage mass casualty situation and camp anaesthesia.
- Critically review and acquire relevant knowledge from the journals about the new development in the specialty.
- Should be able to participate in anaesthesia audit.

### **Overall the student should acquire skills in the following practical competencies:**





- Information management in preoperative evaluation and outcome enhancement and skills to communicate with patient and relatives.

## 1st Year Theory

### *Should cover the following:*

**a) Anatomy** – Diaphragm, larynx and upper and lower airway, learn relevant, anatomy for regional anaesthesia and venous cannulations. Some Anatomical areas of interest to the anaesthetist are Orbit of the Eye, Base of skull, Vertebral Column, spinal cord, and meninges, axilla, 1st rib, Intercostal space.

### **b) Principles of physics and use of equipment in anaesthesia**

- i) Anaesthesia machine - checking the machine and assembly of necessary items.
- ii) Airway equipment including Tracheostomy./ Equipments for airway management - mask, LMA, fiberoptic laryngoscopes; other devices like Combitube etc.
- iii) Breathing systems continuous flow systems, draw over system - Assembly and checking.
- iv) Monitoring in Anaesthesia with concepts of minimal monitoring.
- v) Safety in Anaesthesia Equipments.
- vi) Medical gases - storage and central pipeline system.

### **c) Physiology**

- i) Theories of mechanism of production of Anaesthesia.

Respiratory, cardiovascular, hepatobiliary, renal and endocrine system. Pregnancy, Blood Groups, Muscle & N M Junction, ECG, Regulation of temperature & Metabolism, Stress response, cerebral blood flow and ICP.

### **d) Pharmacology**

- i) General pharmacological principles.
- ii) Concepts of pharmacokinetics and pharmacodynamics.

Uptake and distribution of inhaled anaesthesia agents.

Drug interaction in Anaesthesiology.

Drugs used in Anaesthesia, Drugs used for treatment of diseases and interaction of these.

### **Anaesthetic Techniques:**

Pre-anaesthetic assessment and patient risk assessment

Consent and informed consent

Pre-operative patient preparation

Airway assessment

Premedication

**h) Anaesthesia:** Theoretical background of the commonly used anaesthetic techniques of general and regional anaesthesia viz.

**i) General Anaesthesia** – Intravenous, Inhalational, Endotracheal etc. using spontaneous and controlled mode of ventilation, reversal and recovery.

**ii) Regional Anaesthesia** – Spinal, epidural and local.

**f) Biochemistry:** Biochemistry relevant to fluid balance & Blood Transfusions, Artificial Blood. & Perioperative fluid therapy.

Acid base homeostasis in health and diseases.

BLS and ACLS

**g) biostatistics and documentation in anaesthesia:**

Introduction to Research methodology, Random clinical trials etc.

Basics of biostatistics and importance of accurate documentation.

## **2<sup>nd</sup> Year Theory**

**a) Relevant anatomy and Physiology of each system**

**b) Physics of equipment used in anaesthesia**

Medical gases – gas plant, central pipeline Scavenging system.

Reducing valves

Anaesthesia machine, Humidifiers

Flow meters

Vaporizers – Characteristics and functional specifications.

Breathing systems – Assembly, functional analysis, flow, Minimum monitoring standards requirements,

APL and flow directional valves.

**c) Techniques of Sterilization of equipment.**

**d) Computers:** Computers, Utility, computer assisted learning and data storage. Computerised anaesthesia records.

**e) Pharmacology:** Pharmacology of drugs used in cardiovascular, respiratory endocrine, renal diseases and CNS disorders.

**f) Acid-base Regulation:**

Acid-base and electrolyte balance and.

Interpretation of blood gases and other relevant biochemical values

Basics of ABG and other biochemical measurement techniques

Various function tests

**h) Monitoring Equipment:**

Principles of monitoring equipment used in Operation Theatres, ICU and PACU for:

1. Cardiac function viz. ECG, venous and arterial pressures, cardiac output ,

ii) Pulse Oxymetry

iii) NIBP

iv) Temperature

v) ETCO<sub>2</sub>

The bottom of the page features several handwritten signatures and marks in blue ink. On the left, there is a signature that appears to be 'A. K.' followed by a large, stylized 'A' with a checkmark. To the right of this are two more signatures, one of which is 'M. S.', and a large, simple arrow pointing upwards and to the right.



v) Respiratory function viz., Rate volumes, compliance, resistance, blood gases.

vi) Intracranial pressure

vii) Neuromuscular block.

viii) Working principles of anaesthesia ventilators.

**j) Special anaesthetic techniques** : Special anaesthetic techniques as relevant to outpatient anaesthesia, hypotensive anaesthesia

**k) Anaesthesia in abnormal environments and calamitous situations.**

**l) Anaesthetic management in special situations** – Emergency, ENT, Ophthalmology, Obstetrics,

Obstetric analgesia, Plastic, Dental, Radio-diagnosis and Radiotherapeutic procedures and patients with systemic diseases.

**m) Medical statistics:** Medical statistics relevant to data collection, analysis, comparison and estimation of significance.

**Paediatric Anaesthesia** – Prematurity, Physiology, anatomy of neonate vs adult

1. Neonatal resuscitation.

2. Principles of paediatric anaesthesia. management of neonatal surgical emergencies

Regional Anaesthesia in infants. Anaesthesia and developing brain.

Associated medical disorders in surgical patients – anaesthesia implications and management.

Basics of orthopaedic anaesthesia.

Day care anaesthesia.

Anaesthesia in rural settings – anaesthesia for camp surgery.

Anaesthesia for otorhinolaryngology with special emphasis on difficult airway management.

Blood and blood component therapy. Anaesthetic implications in coagulation disorders.

Monitored anaesthesia care.

Anaesthetic implication in Diabetic mellitus, thyroid and parathyroid disorders, phaeochromocytoma, Cushing's disease etc.

Principles of geriatric anaesthesia

Principles of management of acute and postoperative pain

Anaesthesia outside the OR and in special situations

Principles of management in Trauma, disorders and mass casualties

ACLS and Defibrillation

Management of acid-base disorders

Medical statistics relevant to data collection, analysis, comparison and estimation of significance.

## MD 3<sup>rd</sup> Year

Anaesthesia for patients with severe cardiac, respiratory, renal and hepatobiliary disorders and renal failure posted for unrelated surgery.

### Sub-speciality Anaesthesia

1. Principles of anaesthetic management of neurosurgical patients and monitoring of depth of anaesthesia and cognitive dysfunction
2. Principles of anaesthetic management of patients for cardiac surgery
3. Principles of anaesthetic management of patients for vascular surgery Principles of anaesthetic management of patients for thoracic surgery and one lung anaesthesia
4. Principles of anaesthetic management of patients for Organ Transplantation
5. Principles of anaesthetic management of burns and plastic surgery.
6. Principles of anaesthetic management for Robotic Surgery
7. Advanced drug delivery systems and Closed loop anaesthesia

### Pain Medicine

1. Introduction to anatomical, physiological, pharmacological and biochemical aspects of pain and pain management.
2. Chronic pain therapy and therapeutic nerve blocks.
3. Implantable devices for pain management

### Critical Care:

Basic principles of adult, pediatric and neonatal critical care

Working Principles of ventilators used in critically sick patients

Modes of lung ventilation in adult and pediatric patients

Oxygen therapy : Principles and devices

Physical principles and uses of syringe infusion pumps

Resuscitation of a patient with poisoning and drug overdose

Management of unconscious patients

ATLS and Resuscitation of a severely injured patient

Shock – pathophysiology, clinical diagnosis and management

Management of patients in shock, renal failure, critically ill and/or on ventilator.

### Management of Operation Theatre and ICUs

Introduction to the operation theatre, recovery rooms (concepts of PACU), ICU.

Environment control in Ors and ICU

Fire and electricity hazards in OtS and ICU

Selection, purchase, maintenance and sterilization of anaesthesia and related equipment

Indenting, Inventory maintenance, condemnation and writing off of equipment and materials

Principles of human resources and material management.

General principles of medical audit

Medical education including evidence based medical education.





## TEACHING AND LEARNING METHODS

### Postgraduate Training : Teaching methodology

- Didactic lectures are of least importance.
- Teaching should include seminars, journal clubs, symposia, tutorials, case discussions, and research presentations.
- Reviews and guest lectures should get priority for theoretical knowledge.
- Bedside teaching, grand rounds, interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning.
- Student should have hands-on training in performing various procedures (medical/surgical concerning his specialty) and ability to interpret various tests/investigations.
- Exposure to newer specialized diagnostic/therapeutic procedures concerning his/her subject should be given.
- A postgraduate student of a postgraduate degree course in broad specialties/super specialties would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
- Log books shall be maintained regularly and should be checked and assessed periodically by the faculty members imparting the training.
- The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- Department should encourage e-learning activities.

### Thesis: Supervision

- The postgraduate is responsible to a Faculty member and the latter should be available to advise and assist the student in his clinical assignments
- Departmental teaching committee will be responsible for the educational activities of the department and the teaching schedule.
- This involves providing services for emergencies and it makes different demands upon the anaesthesiologist. It should be learned through experience, with reduced staff. The clinical work during emergency should have a close supervision. The standards should be maintained of the agreed competence on schedule. The emergency duties should be properly arranged with duty off. The postgraduates may have to do emergency duty as per schedule


**During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of skills laboratories in medical colleges is mandatory.**

### Simulators:

Simulators should be used for the events of high importance but infrequent occurrence and where there may be high risks to the patients. The simulators can also be used for assessment purposes.

### Rotation: Schedule for three years of MD Anaesthesia postings:

The post graduate student should be exposed to the following areas of clinical anaesthesia



practice:

1. Pre-anaesthesia clinic
2. Pain clinic
3. Recovery and Post anaesthesia Care Unit ( PACU )
4. Intensive Care Units
5. Dialysis and transplant
6. All specialty theatres
7. Peripheral areas: Radiology, MRI, ECT and other interventional laboratories

**The suggested schedule of the Operating Theatre can be as follows:** This may change as per availability of specialty


Operation theatre	Duration in Months
General Surgery*	05
Pre Anaesthesia Clinic	02
Orthopedics/Trauma/casualty	03
Ophthalmology	01
Otorhinology	02
Obstetrics & Gynecology*	05
Pediatrics surgery	02
District Residency Programme	03
Burns/Plastic	01
Urology	01
Neurosurgery*	6 weeks
CTVS *	6 weeks
ICU	04
Recovery 1	01
Other Areas: Organ Transplant (Radiology,Radiotherapy) ECT, Cardiac Cath)	01
Pain	01
Dental	01
Total	36
<b>Note: The above rotations are subject to change with National Disaster conditions, availability of OTs and future instructions of NMC</b>	

## ASSESSMENT

**Formative Assessment** during the training programme should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

### General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination. The thesis is assessed separately.





**Quarterly assessment during the MD training should be based on:**

1. Journal based / recent advances learning
2. Patient based  
/Laboratory or Skill based learning
3. Self directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I)

**Summative Assessment ie., assessment at the end of training**

The summative examination would be carried out as per the Rules given in **Postgraduate Medical Education Regulations, 2000.**

**Post graduate Examination**

The examination for M.D./ MS shall be held at the end of 3rd academic year (35<sup>TH</sup> - 36<sup>TH</sup> month)  
An academic term shall mean six month's training period.

The examinations shall be organised on the basis of 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training.

Obtaining a minimum of 40% marks in each theory paper and not less than 50% cumulatively in all the four papers for degree examinations and three papers in diploma examination. Obtaining of 50% marks in Practical examination shall be mandatory for passing the examination as a whole in the said degree/diploma examination as the case may be. In accordance with Gazette Notification of NMC/ MCI published on 05.04.2018.

Supplementary examinations will be held not earlier than Four months and later than Six months after the Annual Examination.

"All the candidates joining the Post Graduate training programme shall work as 'Full Time Residents' during the period of training and shall attend not less than 80% (Eighty percent) of the imparted training including assignments, assessed full time responsibilities and participation in all facets of the educational process during each academic term in accordance with "Academic Term of 6 months" in terms of Gazette Notification dated 05.04.2018.

**1. Examiners**

All the Post Graduate Examiners shall be recognised Post Graduate Teachers holding recognised Post Graduate qualifications in the subject concerned.

'No person shall be appointed as an internal examiner in any subject unless he/she has three years experience as recognized PG teacher in the concerned subject. For external examiners, he/she should have minimum six years of experience as recognized PG teacher in the concerned subject.

In terms of Gazette Notification dated 20.10.2008 and the same is as under:

"An examiner shall ordinarily be appointed for not more than two consecutive terms".

There shall be a Chairman of the Board of paper – setters shall moderate the question papers.

  
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For all Post Graduate Examinations, the minimum number of Examiners shall be four, out of which at least two (50%) shall be External Examiners, who shall be **invited from other recognised universities preferably from outside the State.**

Under exceptional circumstances, examinations may be held with 3 (three) examiners provided two of them are external and Medical Council of India is intimated the justification of such action prior to publication of result for approval. The principal of the institution will intimate the controller of examinations, who will further intimate the NMC. Under no circumstances, result shall be published in such cases without the approval of Medical Council of India.

Where there is more than one centre of examination in one city, the University shall appoint a Supervisor as co-ordinator to coordinate the examination on its behalf.

## **2. Number of candidates**

The maximum number of candidates to be examined in Clinical / practical and Oral on any day shall not exceed eight for M.D./M.S. degree, eight for diploma and three for D.M./M/Ch examinations.

## **3. Number of examinations**

The university shall conduct not more than two examinations in a year, for any subject, with an interval of not less than 4 and not more than 6 months between the two examinations.

### **Doctor of Medicine (M.D.)/Master of Surgery (M.S.)**

M.D./M.S. examinations, in any subject shall consist of Thesis, Theory Papers, and clinical/Practical and Oral examinations.

The final examination consists of three parts:

- 1) Thesis
- 2) Theory evaluation
- 3) Practical/Clinical and Oral evaluation

### **1. Thesis**

Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis.

Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination.

The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination.

A post graduate student shall be allowed to appear for the Theory and Practical/ Clinical examination only after the acceptance of the Thesis by the examiners.

(IN case any thesis is rejected by the examiner or there is any disagreement on incorporation of rectifications, the thesis should be sent to another external examiner appointed by the COE. If





still the issue remains unresolved, acceptance the thesis will be subject to majority vote out of three examiners.

**2. Theory** consists of four papers of 3 hours each having 10 short structured questions with 10 marks each:

**Paper I:** Basic Sciences as applied to Anaesthesiology

**Paper II:** Practice of Anaesthesia: Anaesthesia in relation to associated systemic and medical diseases.

**Paper III:** Anaesthesia in relation to subspecialties/superspecialties

**Paper IV:** Intensive Care Medicine, Pain Medicine and Recent advances.

#### **4. Practical/Clinical Examination:**

**The practical and viva voce examination should be conducted within two weeks of the last theory paper.**

**Practical/Clinical Examination** will consist of: 3 clinical cases,

Long case: One, duration 30 min (history, examination, Diagnosis and Management, Discussion) 100 Marks.

Short cases: Two, 15 minutes each for short case. In short cases only relevant history important to anaesthesia to be taken (history, clinical examination and diagnosis, discussion) 50 Marks each.

Internal assessment of .....marks.

**Oral/Viva-voce** should be conducted on four tables with one examiner on each table: (..... marks on each table)

**Table one:** ECG, X-rays, ABG Cards, Pulmonary function tests, Capnographs, communication skills exercise.

**Table two:** Anaesthetic Drugs, Emergency Drugs, IV Fluids, Nerve Blocks (skeleton).

**Table three:** Anaesthesia machine including circuits and Vaporizers, ETT, Supraglottic Airway devices, ICU Ventilator and oxygen therapy equipment.

**Table four:** Resuscitation equipments, resuscitation demonstration, Difficult Airway Equipment, monitoring equipments.

#### **Recommended Reading**

##### **Books (latest edition)**

1. Lee's Synopsis of Anaesthesia
2. Clinical Anesthesiology by Morgan
3. Cardiac Anaesthesia By Joel Kaplan
4. Clinical Anaesthesia by Barash, Cullen and Stoelting
5. Textbook of Anaesthesia by Aitkenhead Rowbotham and Smith
6. Anaesthesia for neonates and infants by Smith
7. Pharmacology and Physiology for Anaesthetists by Stoelting
8. Principles of Obstetric Anaesthesia by Craford
9. Miller's Anesthesia
10. Stoelting RK, Miller RD Basics of Anaesthesia
11. ICU Book, Paul Marino
12. Text Book of Critical Care, by Fink et al

13. Regional Anaesthesia, P Prithviraj
14. Practical Management of Pain, Raj
15. Stoelting and Dierdorf: Anaesthesia and Co-existing Disease
16. Dorsch and Dorsch: Understanding Anaesthesia Equipments
17. ECG by Shamroth/Goldman
18. Anatomy for Anaesthetists by Harold Ellis
19. Clinical Anesthesia by P.G.Barash
20. Longnecker's Anaesthesiology- McGraw Hill
21. Clinical application of mechanical ventilation by David W. Chang
22. Ward's Anaesthetic equipment by Andrew J Davey & Ali Diba
23. Understanding anaesthetic equipment and procedures: A practical approach  
By Dwarkadas K Baheti and Vandana K Laheri

**Recent Advances:**

Journals, Last two editions of Year books of Anaesthesia by Indian College of Anaesthesiologists.

**Must refer:**

1. Cucchiara and Michenfelder: Clinical Neuroanaesthesia
2. Cottrell and Smith: Anaesthesia and Neurosurgery
3. Complications in Anaesthesiology by Orkin
4. Complications in Anaesthesia by Raven
5. Airway management by JL Benumof
6. Obstetric Anaesthesia by Chestnut

**Journals**

03-05 international Journals and 02 national (all indexed) journals







**Annexure I**  
**Postgraduate Students Appraisal Form**  
**Pre / Para /Clinical Disciplines**

Name of the Department/Unit : \_\_\_\_\_

Name of institution: \_\_\_\_\_

Name of the PG Student : \_\_\_\_\_

Period of Training : FROM \_\_\_\_\_ To \_\_\_\_\_

Sr.No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
1.	Journal based / recent advances learning	1 2 3	4 5 6	7 8 9	
2.	2. Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications Yes/ No: \_\_\_\_\_

Remarks\* \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**\*REMARKS:**

Any significant positive or negative attributes of a postgraduate student to be mentioned.

For score less than 4 in any category, remediation must be suggested.

Individual feedback to postgraduate student is strongly recommended.

SIGNATURE OF ASSESSEE:

SIGNATURE OF ASSESSEE:

SIGNATURES OF ASSESSEE:

SIGNATURES OF HoD:

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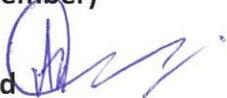


**Signatures of the Members of Board of PG Studies – Anaesthesiology**

**Dr JR Thakur**  
**(External Member)**

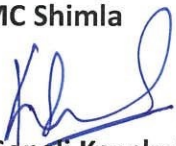


**Dr Ajay Sood**  
**Member**  
**Professor of Anaesthesia**  
**IGMC Shimla**

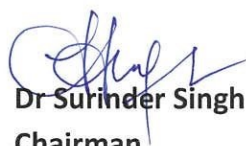


**Dr Ramesh Kumar**  
**Member**  
**Professor of Anaesthesia**  
**IGMC Shimla**

**Dr Sonali Kaushal**  
**Member**  
**Associate Professor of Anaesthesia**  
**Dr YSPGMC Nahan**



**Dr Surinder Singh**  
**Chairman**  
**Professor & Head Anaesthesia**  
**IGMC Shimla**



Dated: 4<sup>th</sup> May 2023.



# LOG BOOK PERFORMA

## PERFORMA

RECORD OF WORK DONE DURING POSTING IN VARIOUS SPECIALTIES, PERIPHERAL POSTING AND EMERGENCY DUTIES, EMERGENCY OT

[illegible]

Remarks and signature of faculty:-





## PERFORMA

## RECORD OF WORK DONE DURING POSTING IN ICU

[illegible]

Remarks and signature of faculty:-

Handwritten signatures of three individuals.

# MODEL QUESTION PAPER



## SAMPLE QUESTION PAPER FOR MD ANAESTHESIA EXAMINATION

Serial No. Use Roman Notation eg. I, II, III, IV	<p>NB: Note regarding the number of questions to be attempted and mode of selection of questions, and/or about any special material the candidates may ask for must be written below.</p> <ol style="list-style-type: none"> <li>1. <i>Attempt all questions.</i></li> <li>2. <i>Illustrate with diagrams where necessary.</i></li> </ol>	Marks: Use Arabic Notation Eg. 1, 2, 3, 4
I	Discuss evaluation, preparation and anaesthetic management of 46 Years old patient posted for surgical repair of aneurism of abdominal aorta.	10
II	Briefly discuss the general considerations and methods for lumbosacral neurxial regional anaesthesia in pediatric patients.	10
III	Discuss anaesthetic management of a 50 years old patient posted for surgery of a posterior cranial fossa tumor.	10
IV	Discuss assessment and anaesthetic considerations for a 68 years old patient admitted for total hip replacement due to fracture neck femur.	10
V	Discuss management of monitoring of a patient of cardio-pulmonary bypass during open heart surgery.	10
VI	Discuss anaesthesia consideration for radical nephrectomy using robotic surgery in an adult patient.	10
VII	How do you assess acute postoperative pain in adults and pediatric patients? Discuss importance of comprehensive post-operative pain management.	10
VIII	Describe assessment and anaesthetic management of a 35 years old female patient posted for the release of post burn contracture of neck.	10
IX	Discuss assessment, preparation and anaesthetic management of a patient with empyema lung with bronchopleural fistula posted for definitive surgery.	10
X	<p>Write short notes on:</p> <ol style="list-style-type: none"> <li>a. Anaesthesia and developing brain</li> <li>b. Latex allergy</li> </ol>	5+5

