MAHATMA GANDHI UNIVERSITY
of
MEDICAL SCIENCES & TECHNOLOGY
JAIPUR

Super Specialty Courses

SYLLABUS

DM CRITICAL CARE MEDICINE (DM09)

Edition 2021-22

Notice

1. Amendment made by the National Medical Commission in Rules/Regulations of Post Graduate Medical Courses shall automatically apply to the Rules/Regulations of the Mahatma Gandhi University of Medical Sciences & Technology (MGUMST), Jaipur.

2. The University reserves the right to make changes in the syllabus/books/guidelines, fees-structure or any other information at any time without prior notice. The decision of the University shall be binding on all.

3. The Jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.

Syllabus of DM / M.Ch. Courses
DM - CRITICAL CARE MEDICINE (DM09)

SELECTION OF CANDIDATES:

There shall be a uniform entrance examination to all medical educational institutions at the Postgraduate level namely 'National Eligibility-cum-Entrance Test' for admission to postgraduate courses in each academic year and shall be conducted under the overall supervision of the Ministry of Health & Family Welfare, Government of India.

In order to be eligible for admission to Postgraduate Course for an academic year, it shall be necessary for a candidate to obtain minimum of marks at 50th percentile in the 'National Eligibility-Cum-Entrance Test for Postgraduate courses' held for the said academic year. However, in respect of candidates belonging to Scheduled Castes, Scheduled Tribes, and Other Backward Classes, the minimum marks shall be at 40th percentile. In respect of candidates with benchmark disabilities specified under the Rights of Persons with Disabilities Act, 2016, the minimum marks shall be at 45th percentile for General Category and 40th percentile for SC/ST/OBC.

The percentile shall be determined on the basis of highest marks secured in the All India Common merit list in National Eligibility-cum-Entrance Test for Postgraduate courses.

Provided when sufficient number of candidates in the respective categories fail to secure minimum marks as prescribed in National Eligibility-cum-Entrance Test held for any academic year for admission to Postgraduate Courses, the Central Government in consultation with Medical council of India may at its discretion lower the minimum marks required for admission to Post Graduate Course for candidates belonging to respective categories and marks so lowered by the Central Government shall be applicable for the academic year only.

The reservation of seats in Medical Colleges/institutions for respective categories shall be as per applicable laws prevailing in States/Union Territories. An all India merit list as well as State-wise merit list of the eligible candidates shall be prepared on the basis of the marks obtained in National Eligibility-cum-Entrance Test and candidates shall be admitted to Postgraduate Courses from the said merit lists only.

There shall be no admission of students in respect of any academic session beyond 31st August under any circumstances. The Universities shall not register any student admitted beyond the said date.

ELIGIBILITY:

Candidates must meet the eligibility criteria required to get admission to DM courses through NEET-SS.

Common Counseling:

There shall be a common counseling for admission to all Postgraduate Super specialty Courses (DM/ M.Ch.) in all Medical Educational Institutions on the basis of merit list of the National Eligibility-cum-Entrance Test.

Period of Training:

The period of training for obtaining DM/M.Ch Degrees shall be three completed years including the examination period.

Migration:
Under no circumstance, Migration/transfer of student undergoing any Super Specialty course shall be permitted by any University/ Authority.

Staff - Faculty:
Only those teachers who possess 6 years teaching experience out of which at least 2 years teaching experience as Assistant Professor gained after obtaining the higher specialty degree shall be recognized post graduate teacher.

No teacher shall be considered as a postgraduate teacher in any other institution during the period till the postgraduate course at the institute which has been granted permission considering him as a postgraduate teacher is recognized u/s 11(2) of the Indian Medical Council Act, 1956.

Minimum staff required (Super-speciality):
1- Professor
1- Associate Professor
1- Assistant Professor
1- Senior Resident
2- Junior Resident

Training Programme:
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 during each academic year (Academic Term of 6 months) including assignments, assessed full time responsibilities and participation in all facets of the educational process.

No candidate shall be permitted to run a clinic/work in clinic/laboratory/nursing home while studying postgraduate super specialty course. No candidate shall join any other course or appear for any other examination conducted by this university or any other university in India or abroad during the period of registration.

Every institution undertaking Post Graduate training programme shall set up an Academic cell or a curriculum committee, under the chairmanship of a senior faculty member, which shall work out the details of the training programme in each speciality in consultation with other department faculty staff and also coordinate and monitor the implementation of these training Programmes.

The training programmes shall be updated as and when required. The structured training programme shall be written up and strictly followed, to enable the examiners to determine the training undergone by the candidates and the Medical Council of India inspectors to assess the same at the time of inspection.

Post Graduate students shall maintain a record (log) book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently by M.Ch. candidates.

The Record (Log) Books shall be checked and assessed periodically by the faculty members imparting the training.

During the training for award of Degree / Superspecialty in clinical disciplines, there shall be proper training in Basic medical sciences related to the disciplines concerned; so also in the applied aspects of the subject; and allied subjects related to the disciplines concerned. In the Post Graduate training programmes including both Clinical and Basic medical sciences, emphasis has to be laid on Preventive and Social aspects. Emergency care, facilities for Autopsies, Biopsies, Cytopsies, Endoscopy and Imaging etc. shall also be made available for training purposes.

The Post Graduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.

Training in Medical Audit, Management, Health Economics, Health Information System, basics of statistics, exposure to human behaviour studies, knowledge of pharmaco – economics and introduction to nonlinear mathematics shall be imparted to the Post Graduate students.

The teaching and training of the students shall include graded responsibility in the management and treatment of patients entrusted to their care; participation in Seminars, Journal Clubs, Group Discussions, Clinical Meetings, Grand Rounds, and Clinico-Pathological Conferences; practical training in Diagnosis and Medical and Surgical treatment; training in the Basic Medical Sciences, as well as in allied clinical specialitites.

The training programme shall be on the same pattern as for M.D. / M.S. in clinical disciplines; with practical training including advanced Diagnostic, Therapeutic and Laboratory techniques, relevant to the subject of specialization. Postgraduate Superspecialty Residents in Surgical Specialties shall participate in Surgical operations as well.

A postgraduate student of a postgraduate degree course in super specialities 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.

ENROLMENT AND REGISTRATION:

Every candidate who is admitted to DM/MCh. course in Mahatma Gandhi Medical College & Hospital shall be required to get himself/herself enrolled and registered with the Mahatma Gandhi University of Medical Sciences & Technology (**MGUMST**) after paying the prescribed eligibility and enrolment fees.

The candidate shall have to submit an application to the MGUMST through Principal of College for the enrolment/eligibility along with the following original documents and the prescribed fees within two months of his/her admission or up to November 30 of the year of admission whichever is later without late fees. Then after, students will have to pay applicable late fees as per prevailing University Rules.

(a) MD/MS pass Marks sheet/Degree certificate issued by the University.
(b) Migration certificate issued by the concerned University (in case the University is other than the MGUMST).
(c) Date of Birth Certificate
(d) Certificate regarding registration with Rajasthan Medical Council / Medical Council of India / Other State Medical Council.

No candidate shall be allowed to appear in University examination without his/her enrolment with the University

SCHEME OF EXAMINATIONS:

The examination shall be held at the end of three academic years (six academic terms). The academic term shall mean six months training period. The examination shall consist of: Theory and Clinical/Practical and Oral.

The examinations shall be organised on the basis of 'Marking system' to evaluate and to certify candidate's level of knowledge, skill and competence.

For passing DM/M.Ch. examination as a whole, a candidate shall secure not less than 50% marks

in each head of passing which shall include (1) Theory (2) Clinical / Practical and Oral examination.

(1) **Theory:**

There shall be four theory papers of 3 hours duration and 100 marks each. The theory examination shall be held in advance before the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/Practical and Oral examination.

Paper I and II will be set by one external examiner from outside of the state and paper III and IV by another external examiner from outside of the state. The external examiner, who is paper setter for paper I & II shall evaluate the answer books of paper II. The external examiner, who is paper setter for paper III & IV shall evaluate the answer books of paper III. The answer books of paper I & IV shall be evaluated by internal examiners. The answer books of paper IV shall be evaluated by the Head of the Department and the answer books of paper I shall be evaluated by the second Internal Examiner.

Candidates will be required to attempt all the questions in every question paper. In Paper I, Paper II and Paper III there will be 10 questions. Each question shall carry 10 marks. In Paper IV there will be 5 questions of 20 marks each.

Obtaining a minimum of 40% marks in each theory paper and not less than 50% cumulatively in all the four papers shall be compulsory to pass the examination.

The paper wise distribution of the Theory Examination shall be as follows:

Paper I: Basic Medical Sciences related to Critical Care Medicine
Paper II: Clinical - Etiology, diagnosis and treatment of acute life-threatening Medical and surgical diseases related to Critical Care Medicine
Paper III: Clinical - Procedures, interventions, professionalism, ethics and research Methods related to Critical Care Medicine
Paper IV: Recent Advances in the field of Critical Care Medicine

(2) **Clinical / Practical and Oral:**

Clinical/Practical examination shall be conducted to test / aimed at assessing the knowledge and competence of the candidate for undertaking independent work as a specialist / teacher. Practical examination shall consist of carrying out special investigative techniques for Diagnosis and Therapy. Candidates shall also be examined in surgical procedures. Oral examination may be comprehensive enough to test the candidate's overall knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the specialty, which shall form a part of the examination.

Obtaining of 50% marks in Clinical / Practical and Oral examination shall be mandatory for passing the Clinical / Practical and Oral examination.

Maximum Marks: 400.

Result:

For passing DM/M.Ch. Examination, a candidate will be required to obtain at least 40% marks in each theory paper, 50% marks in the aggregate of all the four theory papers and 50% marks in the aggregate of Clinical / Practical and Oral examination separately. A candidate failing in any theory paper or in the aggregate of all four theory papers or Clinical / Practical and Oral examination shall have to repeat the whole DM/M.Ch. examination.

Grace Marks:
No grace marks will be provided in DM/M.Ch. examinations.

Revaluation / Scrutiny:
No Revaluation shall be permitted in the DM/M.Ch. examinations. However, the student can apply for scrutiny of the answer books as per University Rules

Examiners:
As per the Amendment Notification of the MCI dated June 5, 2017, 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.

For all Post Graduate Super specialties 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 from outside the State.

Number of Candidates:
The maximum number of candidates to be examined in Clinical / Practical and Oral on any day shall not exceed three for D.M./M.Ch. Examinations.

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.

COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR DM IN CRITICAL CARE MEDICINE

Preamble

Competency based postgraduate training programme for DM in Critical Care Medicine aims to produce a postgraduate student who after undergoing the required training should be able to deal effectively with the needs of the community and should be competent to handle all basic problems. The postgraduate students must gain ample of knowledge and experience in the diagnosis and treatment of patients with acute, serious, and life-threatening medical and surgical diseases. He / She should also acquire skills in supervision of paramedical staff and be able to work as a team member of the health care providers. He / She should be aware of his/her limitations and should be able to decide the point of referral.

The core components of clinical services of the specialty of Critical Care Medicine (CCM) or Intensive Care Medicine, as is known in many countries, revolves around life-support therapies under one roof to critically sick patients (medical, surgical and trauma etc.) who are admitted in the hospital area commonly named as General Adult Intensive Care Unit (ICU) (also known as General Adult Critical Care Unit -CCU) but specialists in Critical Care Medicine are responsible to take care of any of the critically sick patient admitted in any of the wards of the hospital.

Need Based Assessment of Course

DM in Critical Care Medicine (CCM) is a newly instituted postgraduate training programme inIndia and requires strategic planning for successful inception and growth. and the course isknown as In the specialty of CCM, due to the convergence of knowledge and skills with theinvolvement of various primary specialties, there has been flexibility in the models of training,access, duration of training, regulation and certification systems across the globe. Trauma is anincreasingly important problem affecting young individuals. Critical Care will be required to intensively monitor patients in trauma and to manage serious infections with multi-organdysfunction.

At the end of training in CCM, the post graduate student should have acquired the following knowledge and skills:

1. General and specialist aspects of critical care, including management of the service,
2. Supervision of long-term collaborative management plans for larger number of patients,
3. Leadership for ICU team,
4. Teaching and supervision of junior colleagues,

5. Integration of information,
6. Effective functioning of critical care service within wider environments of case-mix,
7. Ability to plan professional development as a contribution to the holistic growth of specialtyincluding patient care, teaching/training and research.

The trainee must gain experience in the diagnosis and treatment of patients with acute, serious, and life-threatening medical and surgical diseases. The curriculum of three-year training in Critical Care Medicine deals with the cognitive, psychomotor and affective domains covering following learning objectives:

SUBJECT SPECIFIC OBJECTIVES

The specific objectives of the course are:

1. Perform resuscitation and management of the acutely ill adult and pediatric patients,
2. Plan and organize therapeutic interventions/organ system support in single or multiple organ failure in conditions associated with trauma, burns, infections, metabolic derangements etc.
3. Plan end of life care,
4. Organize peri-operative care of surgical / trauma patients,
5. Plan and execute infection control procedures, system management and standardoperative procedures in the Intensive (critical) Care Units,
6. Operate the monitoring gadgets and to detect and manage alterations in their functioning,
7. Communicate effectively and empathetically to patients and attendants, about the criticalnature of illnesses, end of life care and breaking bad news in contingencies,
8. Lead and be a member of the team involved in critical care,
9. Analyze the quality and implications of medical literature and apply new knowledge inthe delivery of health care,
10. Identify and participate in future areas of inquiry in medical research,
11. Express enthusiasm and positive attitude in the educational process and participate fullyin educational and research activities.

SUBJECT SPECIFICCOMPETENCIES

By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain) as per details given below:

(A) Cognitive Domain

At the end of the course, the student should be able to:

1. Use the aspects of applied Anatomy, Physiology, Biochemistry and Pharmacologyfor daily practice,
2. Plan and implement resuscitation and initial management of the acutely ill patients,
3. Perform diagnosis, assessment, investigation, monitoring and data interpretation ofthe actively ill patients,
4. Manage critical care in secondary and advanced care facilities,
5. Implement therapeutic interventions/organ system support in single or multiple organ failure,
6. Organise peri-operative care,
7. Supervise critical care of children,
8. Offer support for care in transfer of critically ill patients,
9. Organise Clinical Measurement,
10. Plan and execute Research in related fields,
11. Organise infection control in ICU,
12. Discuss safety for patients & staff in ICU,
13. Exhibit good understanding of critical incidents, adverse events, complicationsrelated to ICU care,
14. Organise multi-disciplinary case conference and counseling sessions with family,
15. Discuss and explain critical appraisal and application of guidelines, protocols andcare bundles
16. Demonstrate understanding of scoring systems for assessment of severity of illnessand case mix,
17. Demonstrate good understanding of the managerial & administrativeresponsibilities of the critical care specialist.

(B) Affective Domain

1. **Comfort, Pain-Relief and Recovery**
   - 1.1 Understanding of the physical and psychosocial consequences of critical illness for patients and families and methods of prevention and management
   - 1.2 Communication of the continuing care requirements of patients at ICU discharge to health care professionals, patients and relatives

2. **End of Life Care**
   - 2.1. Management of the process of withholding or withdrawing treatment with themultidisciplinary team
   - 2.2. Discussion of the end of life care with patients and their families/surrogates

3. **Health Systems Management**
   - 3.1. Leadership in daily multidisciplinary ward round

4. **Ethics, Attitudes and ProfessionalismCommunication skills**

4.1. Communication with patients and relatives
4.2. Communication with members of the health care team

Professional relationships with patients and relatives

4.3. Involvement with patients (or their surrogates) in decision making
4.4. Understanding of cultural and religious beliefs and an awareness of theirimpact on decision making
4.5. Understanding of privacy, dignity, confidentiality and legal constraints onthe use of patient data

Professional relationships with members of the health care team

4.6. Collaboration, consultation, team work
4.7. Supervision and delegation of duties and responsibilities to others

(C) Psychomotor Domain

At the end of the course, the student should have acquired skills in the following:

1. **Respiratory system**

1.1. Oxygen therapy - Fundamental principles and ICU specific issues
1.2. Fibreoptic laryngoscopy
1.3. Emergency airway management
1.4. Difficult and failed airway management
1.5. Endotracheal suction
1.6. Fibreoptic bronchoscopy and BAL in the intubated patient
1.7. Percutaneous tracheostomy and mini-tracheostomy
1.8. Thoracocentesis via a chest drain

2. **Cardiovascular system**
2.1. Peripheral venous catheterization
2.2. Arterial catheterization
2.3. Surgical isolation of vein/artery
2.4. Ultrasound techniques for vascular localization
2.5. Central venous catheterization
2.6. Defibrillation and cardioversion
2.7. Cardiac pacing (transvenous or transthoracic)
2.8. Fundamentals of pericardiocentesis
2.9. Measurement of cardiac output and derived haemodynamic variable

3. **Central Nervous System**
3.1. Lumbar puncture (intradural/spinal)
3.2. Basic understanding of neuraxial pain medication like epidural analgesia

4. **Gastrointestinal System**
4.1. Nasogastric tube placement
4.2. Abdominal paracentesis
4.3. Sengstaken tube (or equivalent) placement
4.4. Fundamentals of upper GI endoscopy
4.5. Measurement and interpretation of intra-abdominal pressure

5. **Genitourinary System**
   5.1. Urinary catheterization

Course contents:

SYLLABUS

1. Resuscitation and Initial Management of the Acutely Ill Patients

1.1 Timely approach to the recognition, assessment and stabilization of the acutely illpatients with disordered physiology
1.2 Cardiopulmonary resuscitation
1.3 Post-resuscitation management
1.4 Triage and prioritization of patients for ICU admission
1.5 Assessment and initial management of the trauma patient
1.6 Assessment and initial management of the patient with burns
1.7 Fundamentals of the management of mass casualties

2. Diagnosis: Assessment, Investigation, Monitoring and Data: Interpretation of theacutely ill patients

2.1 History taking and clinical examination
2.2 Timely and appropriate investigations
2.3 Understanding of echocardiography (trans-thoracic/trans-oesophageal), Indicationsand interpretation of results
2.4 Understanding of Electrocardiography (ECG/EKG), Indications and interpretation ofthe results
2.5 Appropriate microbiological sampling and interpretation of results
2.6 Interpretation of results from blood gas samples
2.7 Organization and interpretation of wide range of clinical imaging including bed-sidechest x- rays, ultrasound, CT scan, MRI and nuclear imaging relevant for the diagnosis and management of critically ill and injured patients.
2.8 Understanding and interpretation of physiological variables
2.9 Integration of clinical findings with laboratory, radiology, microbiology and otherinvestigations to form appropriate differential diagnosis and management strategy

3. Disease Management
Acute disease

3.1 Management of the care of the critically ill patient with following specific acute medical conditions

- Acute Myocardial Infarction
- Pulmonary Embolism
- Cardiogenic Shock
- Life Threatening Arrhythmias
- Pericardial Tamponade
- Acute Ischemic Stroke
- Intracranial Hemorrhage

- Status Epilepticus
- Head & Spine Trauma
- Acute neuromuscular failure (OPP/GBS/MG/Snakebite, etc)
- Acute severe Asthma
- Acute Exacerbation of COPD
- Severe Community acquired pneumonia
- Chest Trauma
- Acute hypoxemia Respiratory Failure including ARDS
- Acute GI Bleed
- Acute Liver Failure
- Acute Pancreatitis
- Acute Abdomen
- Acute coagulation disorders
- Sepsis and Septicemic Shock
- Meningitis
- Acute Hemorrhagic Fevers
- Severe forms of tropical infections like Malaria, Typhoid etc.
- Acute Renal Failure
- Eclampsia
- Bone marrow suppression
- Critical care of mother and child including pre-eclampsia, eclampsia, acute fatty liver of pregnancy, HELLP syndrome, meconium aspiration syndrome, respiratory distress syndrome, transient tachypnoea of the newborn etc.
- Acute poisoning

Chronic Disease

3.2 Identifications of the implications of chronic and co morbid disease in the acutely ill patients

Organ System Failure

3.3 Management of patients with or at risk of circulatory failure
3.4 Management of patients with or at risk of acute renal failure
3.5 Management of patients with or at risk of acute liver failure
3.6 Management of patients with or at risk of neurological impairment
3.7 Management of patients with or at risk of acute gastrointestinal failure
3.8 Management of patients with or at risk of acute lung injury syndromes (ALI/ARDS)
3.9 Management of patients with or at risk of septic shock
3.10 Management of patients with or at risk of severe sepsis/septic shock with multi-organdysfunction/failure
3.11 Management of patients following intoxication with drugs or environmental toxins
3.12 Early recognition and treatment of life-threatening complications, in mother and child, including but not limited to like eclampsia, preeclampsia, acute fatty liver ofpregnancy, HELLP in mother and respiratory distress in child.

4. Therapeutic Interventions/Organ System Support in Single or Multiple OrganFailure

4.1 Principles of safe prescription
4.2 Principles of safe delivery of life-support therapies
4.3 Antimicrobial drug therapy – Fundamental principles and ICU specific issues

4.4 Transfusion therapy - Fundamental principles and ICU specific issues
4.5 Circulatory therapies - Fundamental principles and ICU specific issues pertaining to Fluid therapy including dynamic variables of fluid responsiveness and vasoactive/inotropic drugs
4.6 Mechanical circulatory assist devices
4.7 Initiation, management and weaning of the patients from invasive and non-invasiveventilatory support
4.8 Initiation, management and weaning of the patients from renal replacement therapy
4.9 Management of electrolyte, glucose and acid-base disturbances
4.10 Nutritional assessment and support

5. Peri-operative Care

5.1 Management of the pre-& post-operative care of the high risk surgical patients
5.2 Fundamentals of the management of the care of patients following cardiac surgery
5.3 Fundamentals of the management of the patients following craniotomy
5.4 Fundamentals of the management of the patients following solid organ transplantation
5.5 Fundamentals of the management of the pre and post-operative trauma care of thetrauma patients

6. Critical Care of Children

6.1 Understanding of the critical care of children including but not limited to early diagnosis, initial management and life support therapies related to pediatric and neonatal emergencies

7. Transportation

7.1 Transportation of the mechanically ventilated critically ill patient outside the ICU
7.2 Understanding of the special considerations required during patient transport by air

8. Physical& Clinical MeasurementMathematical Concepts:

8.1 Relationships and graphs
8.2 Concepts of exponential functions and logarithms: wash-in and washout
8.3 Basic measurement concepts: linearity, drift, hysteresis, signal: noise ratio, static anddynamic response
8.4 SI units: fundamental and derived units
8.5 Other systems of units where relevant to ICM (e.g. mmHg, bar, atmospheres)
8.6 Simple mechanics: Mass, Force, Work and Power

Gases &Vapours:

8.7 Absolute and relative pressure.
8.8 The gas laws; triple point; critical temperature and pressure
8.9 Density and viscosity of gases.
8.10 Laminar and turbulent flow; Poiseuille's equation, the Bernoulli principle
8.11 Vapour pressure: saturated vapour pressure
8.12 Measurement of volume and flow in gases and liquids.
8.13 The pneumotachograph and other respirometers.
8.14 Principles of surface tension

Electricity & Magnetism:

8.15 Basic concepts of electricity, magnetism and Bridge circuits
8.16 Capacitance, inductance and impedance
8.17 Amplifiers: bandwidth, filters
8.18 Amplification of biological potentials: ECG, EMG, EEG.
8.19 Sources of electrical interference
8.20 Processing, storage and display of physiological measurements

Electrical Safety:

8.21 Principles of cardiac pacemakers and defibrillators
8.22 Electrical hazards: causes and prevention.
8.23 Electrocution, fires and explosions.
8.24 Diathermy and its safe use
8.25 Basic principles and safety of lasers
8.26 Basic principles of ultrasound and the Doppler effect

Pressure & Flow Monitoring:

8.27 Principles of pressure transducers
8.28 Resonance and damping, frequency response
8.29 Measurement and units of pressure.
8.30 Direct and indirect methods of blood pressure measurement; arterial curve analysis
8.31 Principles of pulmonary artery and wedge pressure measurement
8.32 Cardiac output: Fick principle, thermodilution

Clinical Measurement:

8.33 Measurement of gas and vapour concentrations, (oxygen, carbon dioxide, nitrous oxide, and volatile anaesthetic agents) using infrared, paramagnetic, fuel cell, oxygenelectrode and mass spectrometry methods
8.34 Measurement of H+, pH, pCO2, pO2
8.35 Measurement CO2 production/ oxygen consumption/ respiratory quotient
8.36 Colligative properties: osmometry
8.37 Simple tests of pulmonary function e.g. peak flow measurement, spirometry.
8.38 Capnography
8.39 Pulse oximetry
8.40 Measurement of neuromuscular blockade
8.41 Measurement of pain

9. Research Methods

Data Collection:

9.1 Simple aspects of study design (research question, selection of the method of investigation, population, intervention, outcome measures)
9.2 Power analysis
9.3 Defining the outcome measures and the uncertainty of measuring them
9.4 The basic concept of meta-analysis and evidence-based medicine

Descriptive Statistics:

9.5 Types of data and their representation
9.6 The normal distribution as an example of parametric distribution
9.7 Indices of central tendency and variability

Deductive & Inferential Statistics:

9.8 Simple probability theory and the relation to confidence intervals
9.9 The null hypothesis.
9.10 Choice of simple statistical tests for different data types
9.11 Type I and type II errors
9.12 Inappropriate use of statistics

10. Applied Anatomy
Respiratory System:

10.1 Mouth, nose, pharynx, larynx, trachea, main bronchi, segmental bronchi, structure ofbronchial tree and differences in the children's airway
10.2 Airway and respiratory tract, blood supply, innervation and lymphatic drainage
10.3 Pleura, mediastinum and its contents
10.4 Lungs, lobes, microstructure of lungs
10.5 Diaphragm, other muscles of respiration, innervation
10.6 The thoracic inlet and 1st rib
10.7 Interpretation of a chest x-ray

Cardiovascular System:

10.8 Heart, chambers, conducting system, blood and nerve supply
10.9 Congenital deviations from normal anatomy
10.10 Pericardium
10.11 Great vessels, main peripheral arteries and veins
10.12 Foetal and maternal-foetal circulation

Nervous System:

10.13 Brain and its subdivisions
10.14 Spinal cord, structure of spinal cord, major ascending & descending pathways
10.15 Spinal meninges, subarachnoid & extradural space, extradural space-contents
10.16 Cerebral blood supply
10.17 CSF and its circulation
10.18 Spinal nerves, dermatomes
10.19 Brachial plexus, nerves of arm
10.20 Intercostal nerves
10.21 Nerves of abdominal wall
10.22 Nerves of leg and foot
10.23 Autonomic nervous system

10.24 Sympathetic innervation, sympathetic chain, ganglia and plexuses
10.25 Parasympathetic innervation.
10.26 Stellate ganglion
10.27 Cranial nerves: base of skull: trigeminal ganglion
10.28 Innervation of the larynx
10.29 Eye and orbit

Vertebral Column:

10.30 Cervical, thoracic, and lumbar vertebrae
10.31 Interpretation of cervical spinal imaging in trauma
10.32 Sacrum, sacral hiatus
10.33 Ligaments of vertebral column
10.34 Surface anatomy of vertebral spaces, length of cord in child and adult

Surface Anatomy:

10.35 Structures in antecubital fossa
10.36 Structures in axilla: identifying the brachial plexus
10.37 Large veins and anterior triangle of neck
10.38 Large veins of leg and femoral triangle
10.39 Arteries of arm and leg
10.40 Landmarks for tracheostomy, cricothyrotomy
10.41 Abdominal wall (including the inguinal region): landmarks for suprapubicurinary and peritoneal lavage catheters
10.42 Landmarks for intrapleural drains and emergency pleurocentesis
10.43 Landmarks for pericardiocentesis

Abdomen:

10.44 Gross anatomy of intra-abdominal organs
10.45 Blood supply to abdominal organs and lower body

11. Physiology & BiochemistryGeneral:

11.1 Organisation of the human body and homeostasis
11.2 Variations with age
11.3 Function of cells; genes and their expression
11.4 Mechanisms of cellular and humoral defense
11.5 Cell membrane characteristics; receptors
11.6 Protective mechanisms of the body
11.7 Genetics & disease processes

Biochemistry:

11.8 Acid base balance and buffers, Ions e.g. Na, K, Ca, Cl, HCO3, Mg, PO4,
11.9 Enzymes and Cellular and intermediary metabolism

Body Fluids:

11.10 Capillary dynamics and interstitial fluid
11.11 Oncotic pressure
11.12 Osmolarity: osmolality, partition of fluids across membranes
11.13 Lymphatic system
11.14 Special fluids: cerebrospinal, pleural, pericardial and peritoneal fluids

Haematology & Immunology:

11.15 Red blood cells: haemoglobin and its variants
11.16 Blood groups
11.17 Haemostasis and coagulation; pathological variations
11.18 White blood cells
11.19 Inflammation and its disorders
11.20 Immunity and allergy

Muscle:

11.21 Action potential generation and its transmission
11.22 Neuromuscular junction and transmission
11.23 Muscle types
11.24 Skeletal muscle contraction
11.25 Motor unit
11.26 Muscle wasting
11.27 Smooth muscle contraction: sphincters

Heart & Circulation:

11.28 Cardiac muscle contraction
11.29 The cardiac cycle: pressure and volume relationships
11.30 Rhythmicity of the heart
11.31 Regulation of cardiac function; general and cellular
11.32 Control of cardiac output (including the Starling relationship)
11.33 Fluid challenge and heart failure
11.34 Electrocardiogram and arrhythmias
11.35 Neurological and humoral control of systemic blood pressures, blood volume and blood flow (at rest and during physiological disturbances e.g. exercise, haemorrhageand Valsalva manoeuvre)
11.36 Peripheral circulation: capillaries, vascular endothelium and arteriolar smooth muscle, autoregulation and the effects of sepsis and the inflammatory response onthe peripheral vasculature
11.37 Characteristics of special circulations including: pulmonary, coronary, cerebral, renal, portal and foetal

Renal Tract:

11.38 Blood flow, glomerular filtration and plasma clearance
11.39 Tubular function and urine formation
11.40 Endocrine functions of kidney
11.41 Assessment of renal function
11.42 Regulation of fluid and electrolyte balance
11.43 Regulation of acid-base balance
11.44 Micturition
11.45 Pathophysiology of acute renal failure

Respiration:

11.46 Gaseous exchange: O2 and CO2 transport, hypoxia and hyper- and hypocapnia,hyperandhypobaric pressures
11.47 Functions of haemoglobin in oxygen carriage and acid-baseequilibrium
11.48 Pulmonary ventilation: volumes, flows, dead space.
11.49 Effect of IPPV and PEEP on lungs and circulation
11.50 Mechanics of ventilation: ventilation/perfusion abnormalities
11.51 Control of breathing, acute and chronic ventilatory failure, effect of oxygen therapy
11.52 Non-respiratory functions of the lungs
11.53 Cardio-respiratory interactions in health & disease

Nervous System:

11.54 Functions of nerve cells: action potentials, conduction, synaptic mechanisms andtransmitters
11.55 The brain: functional divisions
11.56 Intracranial pressure: cerebrospinal fluid, blood flow
11.57 Maintenance of posture
11.58 Autonomic nervous system: functions
11.59 Neurological reflexes Motor function: spinal and peripheral
11.60 Senses: receptors, nociception, special senses
11.61 Pain: afferent nociceptive pathways, dorsal horn, peripheral and central mechanisms, neuromodulatory systems, supraspinal mechanisms, visceral pain, neuropathic pain, influence of therapy on nociceptive mechanisms
11.62 Spinal cord: anatomy and blood supply, effects of spinal cord section

Liver:

11.63 Functional anatomy and blood supply
11.64 Metabolic functions
11.65 Tests of function

Gastrointestinal:

11.66 Gastric function; secretions, nausea and vomiting
11.67 Gut motility, sphincters and reflex control
11.68 Digestive functions and enzymes
11.69 Nutrition: calories, nutritional fuels and sources, trace elements, growth factors

Metabolism and Nutrition:

11.70 Nutrients: carbohydrates, fats, proteins, vitamins, minerals and trace elements
11.71 Metabolic pathways, energy production and enzymes; metabolic rate
11.72 Hormonal control of metabolism: regulation of plasma glucose, response to trauma
11.73 Physiological alterations in starvation, obesity, exercise and the stress response
11.74 Body temperature and its regulation

Endocrinology:

11.75 Mechanisms of hormonal control: feedback mechanisms, effect on membrane andintracellular receptors
11.76 Central neuro-endocrine interactions
11.77 Adrenocortical hormones
11.78 Adrenal medulla: adrenaline (epinephrine) and noradrenaline (norepinephrine)
11.79 Pancreas: insulin, glucagon and exocrine function
11.80 Thyroid and parathyroid hormones and calcium homeostasis

Physiology and Metabolism Unique to Pregnancy, Child Birth and Neonates:

11.81 Physiological changes associated with a normal pregnancy and delivery
11.82 Materno-foetal, foetal and neonatal circulation
11.83 Functions of the placenta: placental transfer
11.84 Foetus: changes at birth
11.85 Metabolism unique to pregnant mother and neonates

12. Pharmacology

Principles of Pharmacology:

12.1 Dynamics of drug-receptor interaction
12.2 Agonists, antagonists, partial agonists, inverse agonists
12.3 Efficacy and potency
12.4 Tolerance
12.5 Receptor function and regulation
12.6 Metabolic pathways; enzymes; drug: enzyme interactions; Michaelis-Menten equation
12.7 Enzyme inducers and inhibitors.
12.8 Mechanisms of drug action Ion channels: types: relation to receptors.
12.9 Gating mechanisms.
12.10 Signal transduction: cell membrane/receptors/ion channels to intracellular moleculartargets, second messengers
12.11 Action of gases and vapours

12.12 Osmotic effects
12.13 pH effects
12.14 Adsorption and chelation
12.15 Mechanisms of drug interactions:
12.16 Inhibition and promotion of drug uptake.
12.17 Competitive protein binding.
12.18 Receptor inter-actions.
12.19 Effects of metabolites and other degradation products.

Pharmacokinetics & Pharmacodynamics

12.20 Drug uptake from: gastrointestinal tract, lungs, nasal, transdermal, subcutaneous, IM,IV, epidural and intrathecal routes
12.21 Bioavailability
12.22 Factors determining the distribution of drugs: perfusion, molecular size, solubility,protein binding.
12.23 The influence of drug formulation on disposition
12.24 Distribution of drugs to organs and tissues:
12.25 Body compartments Influence of specialised membranes: tissue binding andsolubility
12.26 Materno-foetal distribution
12.27 Distribution in CSF and extradural space
12.28 Modes of drug elimination:
12.29 Direct excretion
12.30 Metabolism in organs of excretion: phase I & II mechanisms
12.31 Renal excretion and urinary H
12.32 Non-organ breakdown of Drugs
12.33 Pharmacokinetic analysis:
12.34 Concept of a pharmacokinetic compartment
12.35 Apparent volume of distribution
12.36 Orders of kinetics
12.37 Clearance concepts applied to whole body and individual organs
12.38 Simple 1 and 2 compartmental models:
12.39 Concepts of wash-in and washout curves
12.40 Physiological models based on perfusion and partition coefficients
12.41 Effect of organ blood flow: Fick principle
12.42 Pharmacokinetic variation: influence of body size, sex, age, disease, pregnancy, anaesthesia, trauma, surgery, smoking, alcohol and other drugs
12.43 Effects of acute organ failure (liver, kidney) on drug elimination Influence of renalreplacement therapies on clearance of commonly used drugs
12.44 Pharmacodynamics: concentration-effect relationships: hysteresis
12.45 Pharmacogenetics: familial variation in drug response
12.46 Adverse reactions to drugs: hypersensitivity, allergy, anaphylaxis, anaphylactoidreactions

Systemic Pharmacology
12.47 Hypnotics, sedatives and intravenous anaesthetic agents
12.48 Simple analgesics

12.49 Opioids and other analgesics; Opioid antagonists
12.50 Non-steroidal anti-inflammatory drugs
12.51 Neuromuscular blocking agents (depolarising and non-depolarising) and anticholinesterases
12.52 Drugs acting on the autonomic nervous system (including inotropes, vasodilatorsvasoconstrictors, antiarrhythmics, diuretics)
12.53 Drugs acting on the respiratory system (including respiratory stimulants and bronchodilators)
12.54 Antihypertensives
12.55 Anticonvulsants
12.56 Anti-diabetic agents
12.57 Diuretics
12.58 Antibiotics
12.59 Corticosteroids and other hormone preparations
12.60 Antacids. Drugs influencing gastric secretion and motility
12.61 Antiemetic agents
12.62 Local anaesthetic agents
12.63 Immunosuppressants
12.64 Principles of therapy based on modulation of inflammatory mediators, indications,actions and limitations
12.65 Plasma volume expanders
12.66 Antihistamines
12.67 Antidepressants
12.68 Anticoagulants
12.69 Vitamins and trace elements

TEACHING AND LEARNING METHODS

Teaching and learning methodology given below includes but not limited to Lecture, discussion, student directed learning and Case Based Learning.

1. Clinical Case Discussion
2. Morbidity-Mortality Discussion
3. Audit presentation
4. Lectures, Seminars and Journal Clubs
5. Presentation of progress report on the research projects
6. Simulation Laboratory
7. Joint inter-departmental academic meets with radiology, microbiology etc.
8. Departmental Clinical Meetings, Grand Rounds and Clinico-Pathological Meetings
9. Multi-departmental Combined Grand Rounds / Joint Academic Activities of the Institution

Formal Teaching:

a) **Journal Club:** 1 hour duration - Paper presentation/discussion - once per week.

b) **Seminar:** One seminar every week of one hour duration.

c) **Lecture/discussion:** Lectures on newer topics by faculty, in place of seminar as

perneed.

d) **Case presentation** in the ward. Post graduate students will present a clinical casefor discussion before a faculty and discussion made pertaining to its management and decision to be recorded in case files.

e) **Case conference:** Post graduate students are expected to work up one long case ortwo short cases and present the same to a faculty member and discuss the management.

h) **Combined Round/Grand Round:** These exercises are to be done for the hospital once a week or twice a month involving presentation of unusual or difficult cases. Presentation of cases in clinical combined/grand rounds and clinical series/research

data for the benefit of all clinicians and other related disciplines once in week or fortnightly.

i) **Emergency situation**: Casualty duty to be arranged by rotation among the students with a faculty cover daily by rotation.

j). Bedside clinical training for patient care management. Daily for half to one hour during ward round with faculty and 1-2 hours in the evening by post graduate students /faculty on emergency duty, bed side patient care discussions are to be made.

k). Clinical teaching: In OPD, ward rounds, emergency, ICU and the operation theatres.

l) PG students shall be required to participate in the teaching and training programmeof Undergraduate students and interns.

m) Should have attended two conferences/CMEs/Workshops during tenure.

n) A postgraduate student of a postgraduate degree course in broad specialities/super specialities 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.

o) LOG BOOK

Postgraduate students shall maintain a log book of the work carried out by them and thetraining programme undergone during the period of training including details of surgical operations assisted or done independently by M.Ch. trainees. Log book

shall be checked and assessed periodically by the faculty members imparting the training.

p) The Department should encourage e-learning activities.

q) Clinical and Practical Training/posting:

Teaching and training of students shall include graded all round patient care responsibilities including resuscitation, clinical diagnosis, invasive diagnostic and therapeutic procedures and advanced decision making in the management of critically sick medical and surgical patients.

To achieve these objectives, the postgraduate students would be asked to spend theirtime in the following manner:

A. Twenty-four months in core discipline i.e. Intensive Care Units of the Departmentof Critical Care Medicine

Maximum of 12 months of need-based rotation in other disciplines like Internal Medicine, Cardiology, Nephrology, Neurology, Medical Gastroenterology, Endocrinology, Medical Oncology, Immunology, Anesthesiology, Trauma and Emergency Care and Intensive Care Units of other disciplines/hospitals to cover up any deficiency in the required case-mix for the purpose of DM in CCM.

B. Wherever the case-mix is deficient either in surgical and medical patients, the deficiency must be fulfilled by intra-hospital or inter-hospital ICU rotation of the trainees in such units/departments which are running NMC recognized MD/MS or DM/MCh courses.

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially and later to be performed under supervision followed by performing independently. Provision of skills laboratories for cardiopulmonary resuscitation in the medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT

Formative assessment 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.

Periodic Evaluation:

Trainees will be evaluated continuously for their performance in all areas such as clinical and investigative work, case presentations, seminars, journal clubs,

procedures etc. Additional periodic assessment will include theory and practical assessment mimicking the final examination should be conducted every 6 months. Such an evaluation will help assessing the progress of the trainees and the quality of the training programme. Evaluation will be communicated to trainees and their feedback would be taken into considerationfor modifications in training programme.

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.

Quarterly assessment during the DM 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

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The summative assessment examination shall include two heads:

A. Theory examination.

B. Practical, Clinical examination and Viva-voce.

Theory examination and Practical/Clinical, Viva-voce shall be separate heads of passing.

Theory examination shall comprise of four papers. Passing percentage shall be cumulatively 50% with minimum of 40% marks in each theory paper.

Practical /Clinical examination consisting of at least one long case, three short cases and viva-voce. Passing percentage shall be 50%.

Passing shall be separate for each head and failing shall be common, meaning thereby that clearance at theory and failure at practical / clinical shall amount to failure at Summative examination and vice versa.

1. **Theory**: There shall be four theory papers:

   Paper I: Basic Medical Sciences related to Critical Care Medicine
   Paper II: Clinical - Etiology, diagnosis and treatment of acute life-threatening Medical and surgical diseases related to Critical Care Medicine
   Paper III: Clinical - Procedures, interventions, professionalism, ethics and research Methods related to Critical Care Medicine
   Paper IV: Recent Advances in the field of Critical Care Medicine

2. **Practical**:

   The practical examination should consist of the following and should be spread over two days. One long case: History taking, physical examination, interpretation of clinical findings, differential diagnosis, investigations, prognosis and management. Three short cases from various sections of the specialty.

   - Stations for clinical, procedural and communication skills
   - Log Book Records and day-to-day observation during the training

3. **Viva-voce Examination:** covering affective and cognitive domain. This may include a pedagogic session as well.

Feedback:

- Feedback should be given to the trainees on regular basis.
- The feedback should be about the overall integrated, coherent and longitudinal assessment ofthe trainee.
- The feedback should be in the form of constructive suggestions for improvement in theirperformance.

Assessment shall be carried by supervising teachers with focus on:

1 Acquisition and application of knowledge and skills
2 Clinical reasoning and judgment in uncertain situations
3 Problem solving skills - Situation/Problem Based Learning
4 Skill development for diagnostic and therapeutic procedures
5 All above through departmental and extra department rotation

Recommended reading:

Text Books (latest edition)

1. Textbook of Critical Care (Elsevier)
2. Oxford Textbook of Critical Care (Oxford University Press)
3. Critical Care Medicine: Principles of Diagnosis and Management in the Adult (Mosby)
4. Irwin and Rippe's Intensive Care Medicine (LWW)
5. Oh's Intensive Care Manual (Butterworth-Heinemann)
6. Textbook of Critical Care: Common Problems in the ICU Access Code (Saunders)
7. Evidence-Based Practice of Critical Care (Elsevier)

8. Principles and Practice of Mechanical Ventilation (Tobin, Principles and Practice ofMechanical Ventilation) (McGraw-Hill Education / Medical)
9. West's Respiratory Physiology: The Essentials (LWW)
10. Manual of ICU Procedures (Jaypee Hights Medical Pub Inc)
11. Harrison's Principles of Internal Medicine (McGraw-Hill Education/Medical)

- **Journals:**
  3-5 international and two national journals (all indexed)

Annexure I

Postgraduate Student Appraisal

FormClinical Disciplines

Name of the Department/Unit :
Name of the PG Student :
Period of Training : FROM……TO……

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
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				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications Yes/ No

Remarks* _____

_____

_____

_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student tobe 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 CONSULTANT SIGNATURE OF HOD

MODEL PAPER

DM09301 **Basic.Sc.-I**

DM Examination Month, Year

CRITICAL CARE MEDICINE

Paper-I

Basic Medical Sciences related to Critical Care Medicine

Time: Three Hours
Maximum Marks: 100

Attempt all questions

Each question carries 10 marks

Draw diagrams wherever necessary

Q1. What is cardiac output, Describe factor affecting cardiac output, preload, Afterload, stroke volume and cardiac contractility?

Q2 Principles of Renal Replacement Therapy. Describe CRRT.

Q3 Describe in Details: Acid - Base Analysis.

Q4 Describe in Details: Shock - Definition, clarification and Investigation.

Q5 Oxygen dissociation curve with oxygen delivery to tissues.

Q6 Describe Brain Death - (Inclusion, Exclusion & Assessment).

Q7 Describe Sedation & Analgesia in ICU.

Q8 Describe Cerebral Autoregulation & management of raised intracranial pressure.

Q9 Describe Comfort of respiration & Respiratory failure.

Q10 Describe Lung Volume & Capacities & Role of PFT in diagnosis of Pulmonary diseases.

MODEL PAPER

DM09302 **Clinical.-II**

DM Examination Month, Year

CRITICAL CARE MEDICINE

Paper-II

Clinical - Etiology, diagnosis and treatment of acute life-threatening
Medical and surgical diseases related to Critical Care Medicine

Time: Three Hours
Maximum Marks: 100

Attempt all questions
Each question carries 10 marks
Draw diagrams wherever necessary

Q1. Describe Acute Pancreatitis. Outline the causes, diagnosis, scoring criteria, classification, management of acute pancreatitis in Critical care settings Also, discuss the fluid and nutrition therapy in detail in acute pancreatitis

Q2 Describe Subarachnoid Hemorrhage & Discuss the causes, diagnosis, scoring criteria, severity classification and management of Subarachnoid hemorrhage. Also, discuss the Glasgow Coma Scale and FOUR score.

Q3 Discuss Rapid Sequence Intubation, Use of intubation checklist B@EASE during intubation. Also, discuss in detail Drugs used for Rapid Sequence Intubation.

Q4 Surviving Sepsis Guidelines 2020. Discuss in detail the important recommendations of the guidelines.

Q5 What is Pneumothorax - causes and management?

Q6 Mechanical Ventilation strategies in ARDS patients.

Q7 AKI - KDIGO classification of severity and types of AKI.

Q8 RHABDOMYOLYSIS - definition, causes, diagnosis and management.

Q9 BURNS: how to calculate the burnt body surface area, severity classification - grades of burns. Management of burns patients in ICU. Also mention indications of INTUBATION in a burns patient.

Q10 Transpulmonary pressure monitoring in ARDS.

MODEL PAPER

DM09303 **Clinical.-III**

DM Examination Month, Year

CRITICAL CARE MEDICINE

Paper-III

Clinical - Procedures, interventions, professionalism, ethics and research Methods related to Critical Care Medicine

Time: Three Hours
Maximum Marks: 100

Attempt all questions
Each question carries 10 marks
Draw diagrams wherever necessary

Q1. Non Invasive Ventilation: Indication, Contraindication Complication and its application.

Q2 Infection control policies in ICU. CLABSI, CAUTI & VAP Bundles.

Q3 Describe in Details: Role of Hypothermia in Raised ICP.

Q4 Describe in Details: Current role of pulmonary artery catheter versus Transpulmonary thermo dilution method in assessing fluid responsiveness.

Q5 Volume capnography role in cardiac output monitoring.

Q6 Discuss Inhalational drug therapy in critically ill patients.

Q7 Evidenced based role of IABP in cardiogenic shock.

Q8 Describe abdominal compartment syndrome & its management.

Q9 How to do Critical appraisal of research paper?

Q10 Surviving sepsis guidelines.

MODEL PAPER

DM09304 **Recent-IV**

DM Examination Month, Year

CRITICAL CARE MEDICINE

Paper-IV

Recent Advances in the field of Critical Care Medicine

Time: Three Hours
Maximum Marks: 100

Attempt all questions
Each question carries 20 marks
Draw diagrams wherever necessary

Q1. ECMO: Type, Indication & Contraindication, Complication & Weaning.

Q2 Describe in Details: Extracorporeal therapy in Sepsis.

Q3 Describe in Details: Role of immuno modulator & Anti Inflammatory therapy in COVID-19.

Q4 Describe optimum fluid therapy in Critical ill patients.

Q5 Advanced hemodynamic monitoring.