

निजामती कर्मचारी अस्पताल
प्राविधिक सेवा, मेडिसिन समूह, क्रिटिकल केयर मेडिसिन उपसमूह, सिनीयर रजिष्ट्रार (स्पेशलिष्ट) पद, नवौं तहको खुला
तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :- लिखित परीक्षा (Written Examination)

पूर्णाङ्क :- २००

द्वितीय चरण :- अन्तर्वार्ता (Interview)

पूर्णाङ्क :- ३०

१. प्रथम चरण (First Phase): परीक्षा योजना (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
- अस्पतालको प्राविधिक सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरूको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरूप फरक फरक हुनेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।
- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर (Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।
- बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- विषयगत प्रश्नहरूको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिने छ ।
- विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन् । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरू परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- पाठ्यक्रम लागू मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. Management

- 1.1. Health care management system in Nepal and other parts of the world
- 1.2. Fundamental principles of healthcare institution and hospital management.
- 1.3. Effective hospital management principles
- 1.4. Purpose of medical and non-medical data and records
- 1.5. Ethics and responsibility of management
- 1.6. Concept of management and its application in health care including hospital
 - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
 - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
 - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
 - 1.7.4 Coordination: Concept, types, techniques of effective coordination
 - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
 - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
 - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
 - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
 - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
 - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
 - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
 - 1.7.12 Appreciative inquiry: Concept, basic principle and management
 - 1.7.13 Human resource management: Concept, functions and different aspects
 - 1.7.14 Health manpower recruitment and development
 - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. General Health Issues

- 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
- 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
- 2.3. Professional council and related regulations
- 2.4. National Health Policy
- 2.5. Health Service Act and Regulation
- 2.6. Second Long term health plan
- 2.7. Health Management Information System, forms, indicators, annual reports
- 2.8. Human Development Indices, Sustainable Development Goals
- 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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- 2.10. Local governance and community participation in health service delivery
- 2.11. Health Insurance and financing in health care
- 2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
- 2.13. Indigenous and traditional faith health and health practices
- 2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
- 2.15. Supervision, types and its usage in health sector
- 2.16. Monitoring and evaluation system in health sector
- 2.17. National Health Training Centre
- 2.18. National and International Disaster Plan, Coordination
- 2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject
Section (A) – 50 Marks

1. Applied anatomy

1.1 Nervous System

- 1.1.1 Brain and its subdivisions
- 1.1.2 Spinal cord, structure of spinal cord, major ascending & descending pathways
- 1.1.3 Spinal meninges, subarachnoid & extradural space, extradural space-contents
- 1.1.4 Cerebral blood supply
- 1.1.5 CSF and its circulation
- 1.1.6 Spinal nerves, dermatomes
- 1.1.7 Brachial plexus, nerves of arm
- 1.1.8 Intercostal nerves
- 1.1.9 Nerves of abdominal wall
- 1.1.10 Nerves of leg and foot
- 1.1.11 Autonomic nervous system
- 1.1.12 Sympathetic innervation, sympathetic chain, ganglia and plexuses
- 1.1.13 Parasympathetic innervation.
- 1.1.14 Stellate ganglion
- 1.1.15 Cranial nerves, base of skull, trigeminal ganglion
- 1.1.16 Innervation of the larynx
- 1.1.17 Eye and orbit
- 1.1.18 Blood brain barrier

1.2 Respiratory System

- 1.2.1 Mouth, nose, pharynx, larynx, trachea, main bronchi, segmental bronchi, structure of bronchial tree and differences in the children's airway
- 1.2.2 Airway and respiratory tract, blood supply, innervation and lymphatic drainage
- 1.2.3 Pleura, mediastinum and its contents
- 1.2.4 Lungs, lobes, microstructure of lungs
- 1.2.5 Diaphragm, other muscles of respiration, innervation
- 1.2.6 Thoracic cage and primary and secondary muscles of respiration
- 1.2.7 Thoracic receptors
- 1.2.8 Interpretation of a chest X-ray

1.3 Cardiovascular System

- 1.3.1 Heart, chambers, conducting system, blood and nerve supply
- 1.3.2 Congenital deviations from normal anatomy
- 1.3.3 Pericardium
- 1.3.4 Great vessels, main peripheral arteries and veins
- 1.3.5 Foetal and maternal-foetal circulation
- 1.3.6 Coronary and pulmonary circulation

1.4 Vertebral Column

- 1.4.1 Cervical, thoracic, and lumbar vertebrae
- 1.4.2 Interpretation of cervical spinal imaging in trauma
- 1.4.3 Sacrum, sacral hiatus
- 1.4.4 Ligaments of vertebral column
- 1.4.5 Surface anatomy of vertebral spaces, length of cord in child and adult

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- 1.5 **Surface Anatomy:**
 - 1.5.1 Structures in antecubital fossa
 - 1.5.2 Structures in axilla, identifying the brachial plexus
 - 1.5.3 Large veins and anterior triangle of neck
 - 1.5.4 Large veins of leg and femoral triangle
 - 1.5.5 Arteries of arm and leg
 - 1.5.6 Landmarks for tracheostomy, cricothyrotomy
 - 1.5.7 Abdominal wall (including the inguinal region): landmarks for suprapubic urinary and peritoneal lavage catheters
 - 1.5.8 Landmarks for intrapleural drains and emergency pleurocentesis
 - 1.5.9 Landmarks for pericardiocentesis
- 1.6 **Abdomen**
 - 1.6.1 Gross anatomy of intra-abdominal organs
 - 1.6.2 Blood supply to abdominal organs and lower body
- 1.7 **Endocrinal organs**
 - 1.7.1 Gross anatomy of different endocrinal organs and their development
 - 1.7.2 Histology of different endocrinal organs
2. **Applied Physiology & Biochemistry**
 - 2.1 Organisation of the human body and homeostasis
 - 2.2 Functions of micro/macro molecular, organelles and other structures of the cell
 - 2.3 Nutritional requirements of normal people (different ages, male, female) and ill patients of all categories with their modality of supplement
 - 2.4 Mechanisms of metabolic response to trauma and infection
 - 2.5 Function of hemopoietic /R.E.system
 - 2.6 Blood groups, methods of transfusion of blood & blood products & their hazards
 - 2.7 Mechanism of haemostasis, fibrinolysis & methods to control haemorrhage
 - 2.8 Types of excitable tissues and methods of recording their activity
 - 2.9 Cellular communication, chemical/neuronal/ electrical/synaptic transmission
 - 2.10 Autonomic nervous system
 - 2.11 Neuro transmitters, their synthesis and metabolism
 - 2.12 Drugs affecting neurotransmitter activity
 - 2.13 Cardiac and smooth muscles
 - 2.14 Calcium metabolism
 - 2.15 Pain and the mechanism of pain
 - 2.16 Physiology of consciousness and sleep mechanism
 - 2.17 Effect of injury to neurons
 - 2.18 Different methods of monitoring of the heart functions
 - 2.19 Drugs used for inotropic & chronotropic effects
 - 2.20 Mechanism of blood pressure regulation
 - 2.21 Physiology of circulation of different organ in the body
 - 2.22 Pathophysiology of shock and principle of their management
 - 2.23 Capillary exchange
 - 2.24 Assess vascular functions
 - 2.25 Respiration & cause of breathlessness
 - 2.26 Measure blood flow
 - 2.27 Measure/ assess blood gas

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- 2.28 Mechanism of respiratory control
 - 2.29 Mechanism of transport
 - 2.30 Use of oxygen as therapy
 - 2.31 Mechanism of absorption from gut and physiology of gastrointestinal motility
 - 2.32 Composition of GI and hepatobiliary secretions and methods for their assessment
 - 2.33 Normal functions of the liver
 - 2.34 Formation of urine
 - 2.35 Mechanism of osmoregulation
 - 2.36 Normal thermoregulation
 - 2.37 Mechanism of hormone synthesis, secretion, metabolism
- 3. General Pathology**
- 3.1 Concept of cell injury, different types of degeneration & trauma
 - 3.2 Principles of inflammation and the results of various types of inflammation
 - 3.3 Acute and chronic inflammation
 - 3.4 Tissue regeneration, wound healing and healing process
 - 3.5 Various types of disorder of growth
 - 3.6 Principles of neoplasia
 - 3.7 Benign and malignant tumor
 - 3.8 Mechanism of thrombosis, and embolism and their effects
 - 3.9 Ischemia & infarction
 - 3.10 Mechanism of blood clotting and different types of bleeding disorders
 - 3.11 Principle of blood grouping system & complications of blood transfusion
 - 3.12 Principle of shock
 - 3.13 Principle of genetics and apply its concept in hereditary diseases
 - 3.14 Principle of immune response
 - 3.15 Humoral and cell mediated immunity
 - 3.16 Principle of organ transplantation and causes of its rejection
 - 3.17 Principle of Host Parasite relationship
 - 3.18 Different types of micro-organism (Bacteria, Fungus, Parasite, and Virus)
 - 3.19 Pathogenic and non-pathogenic micro-organisms
 - 3.20 Principle of asepsis & antiseptics, sterilization and disinfection
 - 3.21 Principle of antibiotic and chemotherapy
 - 3.22 Microbes that cause wound infection
 - 3.23 Principle of Hospital infection (Nosocomial infection)
 - 3.24 Immunity disorders
 - 3.25 Environmental and nutritional disorders
- 4. Pharmacology and Critical Care Medicine**
- 4.1 Principles of Pharmacology, Pharmacokinetics, pharmacodynamics, adverse drug reactions, drug interactions, drug use, rational drug use
 - 4.2 Principles of pharmacology therapy
 - 4.3 Pharmacology of different medicines
 - 4.4 Principles of critical care medicine
 - 4.5 Oxygen delivery
 - 4.6 Major manifestations, monitoring and management of critical illness
 - 4.7 Acute and chronic poisoning and their management
 - 4.8 Nutritional factors in health and disease
 - 4.9 Hypnotics, sedatives and intravenous anaesthetic agents

Section (B) – 50 Marks

5. Disease Management

5.1 **Acute disease:** Management of the care of the critically ill patient with following specific acute medical conditions:

- 5.1.1 Cardiogenic Shock
- 5.1.2 Acute Myocardial Infarction
- 5.1.3 Pulmonary oedema
- 5.1.4 Pulmonary hypertension
- 5.1.5 Pulmonary embolism
- 5.1.6 Ischemic heart disease
- 5.1.7 Life Threatening Arrhythmias
- 5.1.8 Pericardial Tamponade
- 5.1.9 Acute Ischemic Stroke
- 5.1.10 Intracranial Hemorrhage
- 5.1.11 Status Epilepticus
- 5.1.12 Head & Spine Trauma
- 5.1.13 Coma, Delirium, Brain Death
- 5.1.14 Acute neuromuscular failure (OPP/GBS/MG/Snakebite, etc)
- 5.1.15 Acute severe Asthma
- 5.1.16 Acute Exacerbation of COPD
- 5.1.17 Severe Community acquired pneumonia
- 5.1.18 Chest Trauma
- 5.1.19 Acute hypoxemia Respiratory Failure including ARDS
- 5.1.20 Acute GI Bleed
- 5.1.21 Acute Liver Failure
- 5.1.22 Acute Pancreatitis
- 5.1.23 Acute Abdomen
- 5.1.24 Acute coagulation disorders
- 5.1.25 Sepsis and Septicemic Shock
- 5.1.26 Meningitis
- 5.1.27 Acute Hemorrhagic Fevers
- 5.1.28 Severe forms of tropical infections like Malaria, Typhoid etc.
- 5.1.29 Acute Renal Failure
- 5.1.30 Eclampsia
- 5.1.31 Hypoglycemia & Hyperglycemia
- 5.1.32 Bone marrow suppression
- 5.1.33 Haematological Malignancies, Neutropenia & Coagulopathy
- 5.1.34 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.
- 5.1.35 Acute poisoning

5.2 **Chronic Disease:** Identifications of the implications of chronic and co-morbid disease in the acutely ill patients Organ System Failure

- 5.2.1 Management of patients with or at risk of circulatory failure
- 5.2.2 Management of patients with or at risk of acute renal failure
- 5.2.3 Management of patients with or at risk of acute liver failure
- 5.2.4 Management of patients with or at risk of neurological impairment

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- 5.2.5 Management of patients with or at risk of acute gastrointestinal failure
 - 5.2.6 Management of patients with or at risk of acute lung injury syndromes
 - 5.2.7 Management of patients with or at risk of septic shock
 - 5.2.8 Management of patients with or at risk of severe sepsis/septic shock with multi-organ dysfunction/failure
 - 5.2.9 Management of patients following intoxication with drugs or environmental toxins
 - 5.2.10 Early recognition and treatment of life-threatening complications, in mother and child, including but not limited to like eclampsia, preeclampsia, acute fatty liver of pregnancy, HELLP in mother and respiratory distress in child.
- 6. Resuscitation and Initial Management of the Acutely Ill Patients**
- 6.1 Timely approach to the recognition, assessment and stabilization of the acutely ill patients with disordered physiology
 - 6.2 Cardiopulmonary resuscitation
 - 6.3 Post-resuscitation management
 - 6.4 Triage and prioritization of patients for ICU admission
 - 6.5 Assessment and initial management of the trauma patient
 - 6.6 Assessment and initial management of the patient with burns
 - 6.7 Fundamentals of the management of mass casualties
- 7. Diagnosis of the acutely ill patients**
- 7.1 History taking and clinical examination
 - 7.2 Timely and appropriate investigations
 - 7.3 Understanding of echocardiography (trans-thoracic/trans-oesophageal), Indications and interpretation of results
 - 7.4 Understanding of Electrocardiography (ECG/EKG), Indications and interpretation of the results
 - 7.5 Appropriate microbiological sampling and interpretation of results
 - 7.6 Interpretation of results from blood gas samples
 - 7.7 Organization and interpretation of wide range of clinical imaging including bed-side chest x- rays, ultrasound, CT scan, MRI and nuclear imaging relevant for the diagnosis and management of critically ill and injured patients.
 - 7.8 Understanding and interpretation of physiological variables
 - 7.9 Integration of clinical findings with laboratory, radiology, microbiology and other investigations to form appropriate differential diagnosis and management strategy
 - 7.10 Cardiopulmonary resuscitation (basic and advanced cardiac life support)
 - 7.11 Post-operative recovery and monitoring
 - 7.12 Pain management Intravenous fluid management (Pre and post-surgery)
 - 7.13 Airway management using facemask, oral airway and intubation
- 8. Therapeutic Interventions/Organ System Support in Single or Multiple Organ Failure**
- 8.1 Principles of safe prescription
 - 8.2 Principles of safe delivery of life-support therapies
 - 8.3 Antimicrobial drug therapy – Fundamental principles and ICU specific issues
 - 8.4 Transfusion therapy - Fundamental principles and ICU specific issues
 - 8.5 Circulatory therapies - Fundamental principles and ICU specific issues pertaining to Fluid therapy including dynamic variables of fluid responsiveness and vasoactive/inotropic drugs
 - 8.6 Mechanical circulatory assist devices

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- 8.7 Initiation, management and weaning of the patients from invasive and non-invasive ventilatory support
 - 8.8 Initiation, management and weaning of the patients from renal replacement therapy
 - 8.9 Management of electrolyte, glucose and acid-base disturbances
 - 8.10 Nutritional assessment and support
 - 8.11 Oxygen therapy - Fundamental principles and ICU specific issues
 - 8.12 Fibreoptic laryngoscopy
 - 8.13 Emergency airway management
 - 8.14 Difficult and failed airway management
 - 8.15 Endotracheal suction
 - 8.16 Fibreoptic bronchoscopy and BAL in the intubated patient
 - 8.17 Percutaneous tracheostomy and mini-tracheostomy
 - 8.18 Thoracocentesis via a chest drain
 - 8.19 Peripheral venous catheterization
 - 8.20 Arterial catheterization
 - 8.21 Surgical isolation of vein/artery
 - 8.22 Ultrasound techniques for vascular localization
 - 8.23 Central venous catheterization
 - 8.24 Defibrillation and cardioversion
 - 8.25 Cardiac pacing (transvenous or transthoracic)
 - 8.26 Fundamentals of pericardiocentesis
 - 8.27 Measurement of cardiac output and derived haemodynamic variable
 - 8.28 Lumbar puncture (intradural/spinal)
 - 8.29 Basic understanding of neuraxial pain medication like epidural analgesia
 - 8.30 Nasogastric tube placement
 - 8.31 Abdominal paracentesis
 - 8.32 Sengstaken tube (or equivalent) placement
 - 8.33 Fundamentals of upper GI endoscopy
 - 8.34 Measurement and interpretation of intra-abdominal pressure
 - 8.35 Urinary catheterization
9. **Pre - & Post - Operative Care**
- 9.1 Management of the pre-& post-operative care of the high risk surgical patients
 - 9.2 Fundamentals of the management of the care of patients following cardiac surgery
 - 9.3 Fundamentals of the management of the patients following craniotomy
 - 9.4 Fundamentals of the management of the patients following solid organ transplantation
 - 9.5 Fundamentals of the management of the pre and post-operative trauma care of the trauma patients
10. **Critical Care of Children**
- 10.1 Understanding of the critical care of children including early diagnosis, initial management and life support therapies related to pediatric and neonatal emergencies
11. **Transportation**
- 11.1 Transportation of the mechanically ventilated critically ill patient outside the ICU
 - 11.2 Understanding of the special considerations required during patient transport by air