

निजामती कर्मचारी अस्पताल
प्राविधिक सेवा, प्याथोलोजी समूह, ट्रान्सप्युजन मेडिसिन उपसमूह, रजिष्ट्रार पद, आठौं 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 : आ.व. २०७९/०८०

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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. **Anatomy and Physiology**
 - 1.1 General introduction of various systems of human body.
 - 1.2 Basic physiology of Haemopoetic system
2. **Erythrocyte**
 - 2.1 Clinical manifestations & classification of erythrocyte disorders
 - 2.2 Aplastic Anaemia
 - 2.3 Pure red cell aplasia
 - 2.4 Anemia of chronic disease
 - 2.5 Paroxysmal Nocturnal hemoglobinuria (PNH)
 - 2.6 Iron deficiency anemia and iron overload
 - 2.7 Disorders of iron metabolism
 - 2.8 Thalassemias
 - 2.9 Sickle cell anemia
 - 2.10 Anemia of chronic disease, renal disease, endocrine disease,
 - 2.11 Megaloblastic anemias
 - 2.12 Haemolytic anemias
 - 2.12.1 Hereditary spherocytosis
 - 2.12.2 Hereditary elliptocytosis and related disorders
 - 2.12.3 Hereditary stomatocytosis
 - 2.12.4 Paroxysmal nocturnal hemoglobinuria
 - 2.12.5 Enzymatic defects
 - 2.12.6 Hemolytic anemias resulting from extracellular factors- immune haemolytic anemias, resulting from physical injury to RBCs, resulting from chemical & physical agents, resulting from infections & microorganisms etc
 - 2.13 Haemoglobinopathies
 - 2.13.1 Sickle cell disease/Sickle cell trait
 - 2.13.2 Hereditary methemoglobinemia
 - 2.13.3 Thalassemia syndromes
 - 2.14 Porphyria: Hematological aspects
 - 2.15 Polycythaemia (erythrocytosis)
3. **Pancytopenias**
 - 3.1 Inherited Bone marrow failure syndromes with pancytopenia
 - 3.2 Acquired pancytopenias
 - 3.3 Marrow infiltration disorders
4. **Disorders of different components of white blood cells**
 - 4.1 Neutrophil: Classification & clinical manifestations of neutrophil disorders, Neutropenia, Neutrophilia, Leukemoid reaction, Disorders of neutrophil function
 - 4.2 Eosinophil: Eosinophilia, Hypereosinophilic syndrome, Eosinophilic granulomatosis and polyangiitis, Other disorders of eosinophils
 - 4.3 Basophil: Basophilia, Other disorders of basophils and mast cells
 - 4.4 Lymphocyte: Classification & manifestations of lymphocyte & monocyte disorders, Lymphopenias, Lymphocytosis, Immunodeficiency disorders, Hematological aspects of HIV infection, Mononucleosis syndromes

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- 4.5 Monocyte: Classification & clinical manifestations of disorders of monocytes and macrophages, Monocytosis & monocytopenia, Inflammatory & malignant histiocytosis
5. **Splenomegaly, Hyposplenism, Hypersplenism, Splenic trauma and Splenectomy**
6. **Hematopoietic Cell Transplantation**
- 6.1 Autologous Stem cell transplant
- 6.2 Allogeneic Stem cell transplant
7. **Immunophenotyping**
- 6.3 Principle and practice of flow cytometry
- 6.4 Interpretation and clinical significance of flow cytometry data in leukemias, lymphomas and other hematological disorders

Section (B) – 50 Marks

8. **Transfusion Medicine**
- 8.1 History of Transfusion Medicine
- 8.2 Indications for blood and component transfusion
- 8.3 Donor registration, donor selection, blood collection from donors, adverse donor reaction, predonation counselling, bleeding of the donor, post donation care, post donation counseling
- 8.4 Blood collection room equipment, their principles, and use, emergency medicines,
- 8.5 Details of Anticoagulants used to store blood, their mechanism of action and composition, preservation of donated blood, types of blood bag, mechanism of action and composition of blood preservation solution & additive solutions, changes occurring in the stored blood
- 8.6 Blood components –Indications, preparation of blood components, Selection of blood bags for component preparation, preparation of red Cell concentrate, Fresh Frozen plasma, platelet concentrate, cryoprecipitate, washed red cells, frozen red cells. Component Testing, Labeling, Transportation and storage of blood components, Metabolic changes in blood components during storage
- 8.7 Blood groups and genetics, Principles of immune system central to transfusion medicine, Immunology of red blood cells, Different major and minor blood groups and their importance
- 8.8 Red cell allo-and autoantibody formation and function
- 8.9 Platelets and leucocytes antigen and antibodies, their importance
- 8.10 Blood grouping and Compatibility testing –Major, minor, Coomb's cross match, Factors influencing the results of blood grouping
- 8.11 Coomb's test –application–DCT, ICT, Rh antibody titre
- 8.12 Gel testing for antibody screening and identification
- 8.13 Hazards of blood transfusion, Strategies to prevent transfusion reactions
- 8.14 Pathophysiology, clinical signs and symptoms, and Laboratory Investigation for hemolytic transfusion reactions
- 8.15 Investigation of ABO, Rh and other immunohaemolytic diseases of the newborn
- 8.16 Practical aspects in the selection of blood for neonatal exchange transfusion, Hemolytic disease of the new born and exchange transfusion
- 8.17 Management of Blood Bank Issue Counter, Criteria for acceptance of requisition form, inspection of blood component prior to issue

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- 8.18 Screening of blood units for TTI, ELISA, rapid and other tests for diagnosis of transfusion transmitted infections
- 8.19 Nucleic acid testing
- 8.20 Hemapheresis-definition, types of pheresis, machines and techniques
- 8.21 Basics of Tissue banking & Cord blood banking
- 8.22 Disposal of wastes and biologically hazardous substance in the blood bank
- 8.23 Medico legal aspects of blood transfusion
- 8.24 Quality control of blood grouping reagents, QC of anti-human globulin reagent, bovine albumin, Normal saline
- 8.25 Quality control in blood banking, Quality control of bags and different blood bank components, sterility test on component
- 8.26 Calibration, validation and maintenance of blood bank equipment, QC of blood bank techniques, external and internal quality assessment
- 8.27 Hemovigilance in blood banking
- 8.28 Automation in Blood Banking
- 9. Bone marrow Transplant:**
 - 9.1 Donor selection, HLA typing and, screening of Donor
 - 9.2 Conditioning regimens, principles of their use in different disorders and complications
 - 9.3 Harvesting and manipulation of the bone marrow. Bone marrow collection, red cell or plasma reduction, peripheral blood stem cell, mobilization and collection, cryopreservation, Transfusion of marrow. Purging of marrow –T cell depletion
 - 9.4 Stem cell processing and storage for transplantation
 - 9.5 Classes of MHC, different methods of HLA typing, Procedure of HLA matching for bone marrow transplant
 - 9.6 Procedure of chimerism testing/engraftment analysis after bone marrow transplant
 - 9.7 Transplantation immunology, Histocompatibility, graft versus host disease –diagnosis and management, Immune reconstitution following transplantation
 - 9.8 Management of post-transplant patient
- 10. General Pathology**
 - 10.1 Cellular adaptation, injury and death: cellular response to injury, growth and differentiation, Morphology of cell injury and necrosis, apoptosis, intracellular accumulations, calcification
 - 10.2 Acute and chronic inflammation: general features, cells and chemical mediators involved, events, outcome
 - 10.3 Tissue repair and renewal: Normal cell proliferation and tissue growth, their control, mechanism of tissue regeneration, repair by healing, scar and fibrosis, healing by first and second intention, factors effecting wound healing,
 - 10.4 Hemodynamic disorders: Normal hemostasis, thrombosis and embolism, Infarction, Shock, Disseminated intravascular coagulation
 - 10.5 Genetic diseases: Mutations, Mendelian disorders, Karyotyping, Diagnosis of genetic diseases
 - 10.6 Diseases of immunity: Types of immunity, cell involved, cytokines, Histocompatibility molecules, Hypersensitivity reaction and types, Autoimmune diseases, Immunological immunodeficiency syndromes, AIDS, Amyloidosis
 - 10.7 Neoplasia: Definition, nomenclature, biology of tumor growth, cell cycle, Molecular basis of cancer, Carcinogenic agents, paraneoplastic syndrome, tumor

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markers, clinical features of tumors, grading and staging, laboratory diagnosis of cancer

10.8 Environmental and nutritional pathology: Common environmental and occupational hazards, food safety, nutrition deficiencies.

10.9 Infectious disease: General principle of microbial pathogenesis, Agents of bio-terrorism, Infections in immunocompromised host, Special techniques in diagnosing infectious agent

11. Laboratory management:

11.1 Fundamental of Total Quality management

11.2 Statistical process in quality control

11.3 Element of quality assurance program

11.4 Concept of Evidence based medical practice

11.5 Concept of critical values and alert values in laboratory practice

11.6 The laboratory information system

11.7 Concept of reference laboratory

11.8 Implementation of reference system in laboratory medicine

11.9 Standard operating procedure and their preparation

11.10 Errors and identification of the source of error in hematology laboratory

11.11 Internal and External quality control and proficiency testing

11.12 Preparation of quality policy manual

11.13 Laboratory Accreditation, Key component of accreditation, ISO 15189 and others laboratory related accrediting bodies

11.14 Quality control in procedure, equipment, NEQAS, EQAS

11.15 Ethics in medicine

11.16 Health and Safety measures (Physical/Chemical/Biological/Radiation)

11.17 Waste disposal

11.18 Management of under resourced laboratory