

पाटन स्वास्थ्य बिज्ञान प्रतिष्ठान, सेवा आयोग
प्राज्ञिक सेवा, रेडियोलोजी समूह, प्राध्यापक पद (११ औं) तहको
खुल्ला र अन्तरिक प्रतियोगिता प्रतियोगितात्मक परीक्षाको पाठ्यक्रम
एवं परीक्षायोजना

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :- लिखित परीक्षा (Written Examination)

पूर्णाङ्क :- २००

द्वितीय चरण :- अन्तर्वार्ता (Interview)

पूर्णाङ्क :- ३०

प्रथम चरण (First Phase) : लिखित परीक्षा योजना (Written Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage		Time Allowed
I	General Subject	Part I: Management, General Health Issues, Academic Research and Teaching-Learning Practices	50	100	40	10 × 5 = 50 (Subjective)	1.30 hrs	2.15 hrs
		Part II: Technical Subject (Relevant Subject)	50			50 × 1 = 50 (Objective Multiple Choice)	45 min	
II	Technical Subject (Relevant Subject)			100	40	7 × 10 = 70 (Long answer) 2 × 15 = 30 (Critical Analysis)		3.00 hrs
द्वितीय चरण (Second Phase)								
	Interview			30		Oral		

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
- प्रतिष्ठानको प्राज्ञिक सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरूको लागि प्रथमपत्रको Part I को पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर प्रथम पत्रको Part II र द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरूप फरक फरक हुनेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । प्रथम पत्रको Part II र द्वितीय पत्रको विषयवस्तु एउटै समूहको हकमा समान 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 ।

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८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
११. पाठ्यक्रम लागु मिति : २०७९/१२/२१

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Paper I: General Subject

Part I: (Management, General Health Issues, Academic Research and Teaching - Learning Practices)

Section (A) - 25 Marks

1. General Administration and Management:

- 1.1. Health care management system in Nepal and other parts of the world
- 1.2. Rules and regulations of Ministry of Health and Population, Nepal
- 1.3. Fundamental principles of healthcare institution and hospital management.
- 1.4. Effective hospital management principles
- 1.5. Purpose of medical and non-medical data and records
- 1.6. Ethics and responsibility of management
- 1.7. 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, effectiveness
 - 1.7.4 Coordination: Concept, need, types, techniques and approaches 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 disadvantages, 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 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration
 - 1.7.14 Human resource management: Concept, functions and different aspects
 - 1.7.15 Hospital management
 - 1.7.16 Health manpower recruitment and development
 - 1.7.17 Project management: Concept, process, techniques and approaches

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- 1.8. Current financial and administrative regulations
- 1.9. Private sector health institution, its regulation and management

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 2071
- 2.5. Second Long term health plan (1997-2017)
- 2.6. Health Management Information System, forms, indicators, annual reports
- 2.7. Human Development Indices, Millennium Development Goals, Sustainable Develop Goals
- 2.8. Health Service Act 2053, Health Service Regulation 2055
- 2.9. Health volunteers in the national health system, its rationale, use and effectiveness
- 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. Health and Human Right
- 2.20. Social justice and social inclusion in the health planning, human resources and services
- 2.21. Patan Academy of Health Sciences Act, Mission, Goals, Organogram
- 2.22. Scope and function of Patan Academy of Health Sciences executive bodies (senate, executive committee, academic council, faculty board, hospital management committee, subject committee), various other committees

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General Academic and Research Issues

Section (B) - 25 Marks

3. Bio-ethics (including Medical Ethics/ Research Ethics) and Research Methodology

- 3.1. Ethics
- 3.2. Bioethics
- 3.3. Professionalism
- 3.4. Human dignity and Human Right
- 3.5. Benefit and Harm
- 3.6. Autonomy and Individual responsibility
- 3.7. Consent and capacity to consent
- 3.8. Privacy and confidentiality
- 3.9. Respect for humans and personal integrity
- 3.10. Equality, justice and equity
- 3.11. Non-discrimination and non-stigmatization
- 3.12. Respect for cultural diversity and pluralism
- 3.13. Solidarity and cooperation
- 3.14. Social responsibility and health
- 3.15. Sharing of benefits
- 3.16. Protecting future generation
- 3.17. National Health Research Council (NHRC), its guidelines and Institutional Review Board
- 3.18. Institutional Review Committees, formation, use and mandate, coordination with NHRC
- 3.19. Research process: ethical research proposal development, research principles, methods and materials, conclusion/recommendation/lesson learnt, commonly used referencing styles
- 3.20. IRB/IRC forms, types, use, importance; getting IRB/IRC clearance,
- 3.21. Ethics on research methodology: sample selection, sample size calculation, ensuring reliability and validity of the instruments as well as methods proposed for health research
- 3.22. Publication ethics, plagiarism including self-plagiarism
- 3.23. Research process: research proposal development and ethical clearance
- 3.24. National Health Research Council (NHRC), its guidelines and Institutional Review Board
- 3.25. Institutional Review Committees, formation, use and mandate, coordination with NHRC
- 3.26. IRB/IRC forms, types, use, importance; getting IRB/IRC clearance,
- 3.27. Research ethics on non-vulnerable population
- 3.28. Research ethics on vulnerable population
- 3.29. Research proposal/protocol/publication:

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- 3.29.1 Abstract Section: writing abstract or executive summary for the appropriate study/research
 - 3.29.2 Introduction Section: Background, Rationales, Statement of the Problem, Aim and Objectives of the research, research hypothesis
 - 3.29.3 Methodology Section:
 - 3.29.3.1. Quantitative studies: Study design, inclusion and exclusion criteria, sample size calculation, tool development and validation techniques, data management (good practice on data entry, data verification, data cleaning)
 - 3.29.3.2. Qualitative studies: Guiding questions, Saturation point, memo, notes, transcribe, themes, codes, triangulation
 - 3.29.3.3. Data analysis (data visualization, descriptive statistics, inferential statistics with statistical hypotheses and appropriate tools/methods for quantitative studies; theme and code generation, thematic analysis, content analysis, grounded theory for qualitative and triangulation for mixed method studies
 - 3.29.4 Result Section: Presentation of results, tables, graphs, diagrams, plots, maps etc. Legend and index on table and graphs/maps.
 - 3.29.5 Discussion Section: Compare and contrast the results, literature review and citation, limitation of the study
 - 3.29.6 Conclusion section: writing conclusion, lesson learnt, and recommendation for appropriate research studies
- 3.30. Publication ethics, plagiarism including self-plagiarism

4. Teaching-Learning, Assessment and Evaluation:

- 4.1. Lancet Commission Report on Education of Health Professionals for the 21st Century
- 4.2. Adult learning: Theories, principles, Use, Importance and Outcomes in Nepal and beyond, Andragogy vs Pedagogy
- 4.3. Conventional teaching-learning: Didactic lectures, Teacher Centred Approaches, Use and Importance in Nepal and beyond
- 4.4. Surface learning, deep learning and metacognition
- 4.5. Integrated teaching: Genesis, use, importance and outcomes in Nepal and beyond
- 4.6. Problem-based learning: Genesis, use, importance and outcomes in Nepal and beyond
- 4.7. SPICES model its use, importance and outcomes in Nepal and beyond
- 4.8. Socialization, self-directed learning, mentoring, role model
- 4.9. Community orientation/community posting, re-orientation of medical education camp, community based learning and community engaged teaching-learning methods/models, use, importance and outcomes in Nepal and beyond

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- 4.10. Outcome Based Education (Competency-based Medical/Health Professions Education): Genesis, use, importance and outcomes in Nepal and beyond
- 4.11. Experiential learning, Reflective practice, Feedback and feed-forward, Situated learning, Co-operative learning, Communities of practice
- 4.12. Assessment of students: Blueprinting (Table and specification), use and importance, outcomes in Nepal and beyond
- 4.13. Assessment of students: Bloom's taxonomy of cognitive, psychomotor and affective domains, use and importance in Nepal and beyond
- 4.14. Assessment of students: Diagnostic, Formative, Summative and Professional exams
- 4.15. Assessment of knowledge: Selection methods like Multiple Choice Questions, Extended Matching Items and supply methods like Short Answer Question, Problem Based Question, Long Answer Question with or without model answers and marking schemes, unstructured, semi-structured and structured viva-voce examination, advantages and limitations, use and importance, outcomes and its use in quality control in Nepal and beyond
- 4.16. Assessment of performance (in-vitro): Direct observation of skills in the simulated setting, lab, ward etc. with or without checklist, Objective Structured Practical Examination, Objective Structured Clinical Examination, Standardized patients, use and importance, analysis, quality assurance, outcomes and its use in quality control in Nepal and beyond
- 4.17. Assessment of performance (in-vivo): Mini-Clinical Evaluation Exercise (Mini-CEX), Direct Observation of Procedural Skills (DOPS), Case-Based Discussion (CbD), OSATS/PBA, Multi-Source feedback (360 degree evaluation) etc., use and importance for competency based health professions education, analysis, quality assurance, outcomes and its use in quality control in Nepal and beyond
- 4.18. Assessment of observable behaviours in small groups e.g. Problem Based Learning sessions, Community Based Learning and Education sessions, Clinical clerkship rotations
- 4.19. Evaluation: Difference between assessment and evaluation, theory of change and its use in health professions education, process and outcome evaluation, qualitative, quantitative and mixed methods used in evaluation of health professions education, their use and importance for self-review and quality assurance system of the course, program, institute and beyond.

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Paper I

Part II: Technical Subject

Section (C) - 25 Marks

I. Physics in radiology

1. Production of x-rays.
2. Interaction of x-rays with metals.
3. X-ray tube.
4. Radiation protection.
5. Basic physics and advances in fluoroscopy/ imaging intensifier.
6. Basic physics and advances in CR/DR system.
7. Basic physics and advances in CT
8. Basic physics and advances in MRI
9. Basic physics and advances in USG
10. Introduction to nuclear medicine.

II. Sectional and Imaging anatomy.

1. Cross-sectional & imaging anatomy of brain
2. Cross-sectional and imaging anatomy of chest
3. Cross-sectional and imaging anatomy of abdomen & pelvis
4. Anatomy of orbits and its bones
5. Vascular anatomy of brain/head.
6. Vascular anatomy of abdominal aorta and its branches.
7. Vascular anatomy of upper and lower limbs.
8. Relevant Embryology

III. Nervous system

1. Craniocerebral Trauma
2. Imaging of non-traumatic SAH
3. Imaging of non-traumatic ICH
4. Imaging of stroke
5. Cerebral ischemia
6. Brain tumors and tumor like processes
7. Extra-axial Tumors
8. Imaging of sellar tumours
9. Non-neoplastic and neoplastic spinal cord pathologies
10. CNS congenital anomalies

IV. Head & Neck

1. Radiological imaging of diseases and conditions related to Ear, Nose, Throat, paranasal sinus
2. Radiological imaging of diseases of thyroid, salivary gland and other soft tissue neck.

V. CVS & Interventional

1. Radiological imaging of aortic and peripheral arterial diseases
2. Radiologic approach to pulmonary thromboembolism
3. Heart and pericardium
4. Congenital and acquired heart disease

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5. Image guided radiological procedures and contrast media

VI. Musculoskeletal System

1. Skeletal trauma
2. Radiological imaging of bone tumors
3. Radiological imaging of large and small joints
4. Haemopoietic bone disorder
5. Osteomyelitis and septic arthritis
6. Degenerative bony abnormalities
7. Metabolic bone disorder

Section (D) - 25 Marks

VII. Thoracic / respiratory system

1. Radiological imaging of Chest
2. Chest trauma
3. Radiological imaging of chest malignancy
4. ILD/Infective/Inflammatory pathology

VIII. Gastrointestinal & hepatobiliary system

1. Imaging of non-neoplastic / neoplastic esophageal pathology
2. Imaging of gastric pathology/ neoplasm
3. Liver neoplasms
4. Inflammatory bowel disease/ Neoplastic lesion of bowel
5. Imaging and interventions in GI bleed
6. Imaging of pancreatic neoplasm/ Inflammatory pathology

IX. Genito-urinary system

1. Renovascular disease/ Neoplastic lesion
2. Genitourinary trauma
3. Genito-urinary tumor
4. Urinary bladder & Prostate imaging/ its pathology
5. Role of MRI in Gynecology

X. Breast and diagnostic ultrasound

1. Breast imaging including USG, Mammography, MRI and Breast cancer screening
2. Role of USG in IUGR
3. Diagnostic ultrasound in obstetrics / anomaly scan
4. Thyroid sonography
5. Cranial sonography
6. Elastography

XI. Paediatric imaging

1. Imaging of the kidneys and urinary tract in children
2. Imaging of congenital CNS malformations
3. Respiratory Distress
4. Developmental GI and Hepatobiliary anomalies
5. Childhood fractures

XII. Recent advances in radiology and imaging

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1. Teleradiology, Radiology Information System & PACS
2. Newer advances in CR/ DR system, Fluoroscopy and Mammogram
3. Newer advances in CT and MRI
4. Advances in Ultrasound
5. Pet Scan
6. Fusion Imaging, Molecular imaging
7. Artificial intelligence
8. CT dose reduction
9. Image quality.

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