प्रदेश लोक सेवा आयोग

बागमती प्रदेश

मदन भण्डारी स्वास्थ्य विज्ञान प्रतिष्ठान

प्राध्यापन सेवा, मेडिकल समूह, क्लिनिकल फिजियोलोजी उपसमूह, नवौ तह, लेक्चरर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस खुला प्रतियोगितात्मक परीक्षामा उम्मेदवार छनौटको आधार निम्न बमोजिम हुनेछः

आधार	अङ्कभार
शैक्षिक योग्यता	२०
अनुसन्धान तथा कृति प्रकाशन	३०
लिखित परीक्षा	२००
अन्तर्वार्ता	५०
जम्मा	**३००**

प्रथम चरण : लिखित परीक्षा **पूर्णाङ्कः २००**

Paper	Subject		Marks of Parts	Number of Questions & Weightage	Full Marks	Pass Marks	Time Allowed
I	General Subject	Part I: Research, Biostatistics and Ethics	50	2x10=20 (Long answer) [LAQ]	100	40	3.00 hours
				6x5=30 (Short answer) [SAQ]			
		Part II: Health Professions Education	40	1x10=10 (Long answer) [LAQ]			
				6x5=30 (Short answer) [SAQ]			
		Part III: Relevant Acts and Laws	10	5x2=10 (Multiple Choice) [MCQ]			
II	Technical Subject		-	20x1=20 (Multiple Choice) [MCQ]	100	40	3.00 hours
				8x5=40 (Short answer) [SAQ]			
				2x20=40 (Problem-based) [PBQ]			

द्वितीय चरण : अन्तर्वार्ता **पूर्णाङ्कः ५०**

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा अंग्रेजी हुनेछ ।

२. प्रथम पत्रको बहु-वैकल्पिक प्रश्नको प्रत्येक सहि उत्तर वापत २ अङ्क र द्वितीय पत्रको बहु-वैकल्पिक प्रश्नको प्रत्येक सहि उत्तर वापत १ अङ्क प्रदान गरिनेछ भने प्रत्येक गलत उत्तर वापत २०% अङ्क कट्टा गरिनेछ ।

३. प्रथम पत्रको Part-I, Part-II र Part-III को लागि छुट्टाछुट्टै (Part-I को लागि एउटा, Part-II को लागि एउटा र Part-III को लागि एउटा) उत्तरपुस्तिका हुनेछ भने द्वितीय पत्रको Part-I र Part-II को लागि पनि छुट्टाछुट्टै (Part-I को लागि एउटा र Part-II को लागि एउटा) उत्तरपुस्तिका हुनेछ ।

४. Paper I - General Subject को पाठ्यक्रम बमोजिमको विषयगत अङ्कभार निम्न बमोजिम हुनेछः

पाठ्यक्रमको भाग	Part I: Research, Biostatistics and Ethics							
प्रश्न न.	1	2	3	4	5	6	7	8
किसिम	LAQ	LAQ	SAQ	SAQ	SAQ	SAQ	SAQ	SAQ
पाठ्यक्रमको बुँदा न.	1.3	2.2	1.2	1.1	1.4	2.1	2.3	3

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प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रमको भाग	Part II: Health Professions Education						
प्रश्न न.	9	10	11	12	13	14	15
किसिम	LAQ	SAQ	SAQ	SAQ	SAQ	SAQ	SAQ
पाठ्यक्रमको बुँदा न.	2	1	3	4	5	6	7

पाठ्यक्रमको भाग	Part III: Relevant Acts and Laws				
प्रश्न न.	16	17	18	19	20
किसिम	MCQ	MCQ	MCQ	MCQ	MCQ
पाठ्यक्रमको बुँदा न.	1	2	3	4	5

५. Paper II- Technical Subject को पाठ्यक्रम बमोजिमको विषयगत अङ्कभार निम्न बमोजिम हुनेछः

पाठ्यक्रम भाग	Part II: Technical Subject (Clinical Physiology)														
प्रश्न संख्या	1	1	1	1	1	1	1	2	1	1	2	2	2	2	1
किसिम	Multiple Choice Questions (MCQ)														
पाठ्यक्रमको बुँदा न.	1	2	3	4	5	6	7	8	9	10	11	12	13	15	16

पाठ्यक्रमको भाग	Part II: Technical Subject (Clinical Physiology)									
प्रश्न संख्या	1	1	1	1	1	1	1	1	1	1
किसिम	SAQ	SAQ	SAQ	SAQ	SAQ	SAQ	SAQ	SAQ	PBQ	PBQ
पाठ्यक्रमको बुँदा न	1	2	3	4	5	7	9	14	6	10

६. प्राध्यापन सेवा अन्तर्गतका सबै समूह/उपसमूहहरूको लागि प्रथम पत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ।तर द्वितीय पत्रको पाठ्यक्रम समूह/उपसमूह अनुरूप फरक फरक हुनेछ ।

७. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जुनसुकै कुरा लेखिएको भएता पनि पाठयक्रममा परेका कानूनहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधित भई हटाईएका) कायम रहेकालाई यस पाठ्यक्रममा परेको मानिनेछ ।

८. पाठ्यक्रम लागू हुने मितिः **२०७८/०८/१२**

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प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper-I: General Subject

Part I: Research, Biostatistics and Ethics (50 marks)

1. Research

1.1. Research principles (Scientific Method) and research proposal development

1.2. Ethical clearance

1.2.1. Research ethics on non-vulnerable population

1.2.2. Research ethics on vulnerable population

1.2.3. Roles of regulatory bodies

1.2.3.1. National Health Research Council (NHRC), its guidelines and Ethical Review Board

1.2.3.2. Institutional Review Committees, formation, use and mandate, coordination with NHRC

1.3. Research methods and materials

1.3.1. Sample selection and randomization

1.3.2. Sample size calculation

1.3.3. Ensuring reliability and validity of the instruments

1.3.4. Methods proposed for health research

1.3.4.1. Quantitative studies: Study design (including systematic review and meta-analysis and Double blind RCT), inclusion and exclusion criteria, sample size calculation, tool development and validation techniques, data management (good practice on data entry, data verification, data cleaning)

1.3.4.2. Qualitative studies: Guiding questions, Saturation point, memo, notes, transcribe, themes,

1.4. Research writing

1.4.1. Abstract Section: writing abstract or executive summary for the appropriate study/research

1.4.2. Introduction Section: Background, Rationales, Statement of the Problem, Aim and Objectives of the research, research hypothesis

1.4.3. Methodology Section: Research protocol

1.4.4. Result Section: Presentation of results, tables, graphs, diagrams, plots, maps

1.4.5. Discussion Section: Compare and contrast the results, literature review and citation, limitation of the study

1.4.6. Conclusion section: writing conclusion, lesson learnt, and recommendation for appropriate research studies

1.4.7. Publication ethics, plagiarism including self-plagiarism, and peer-reviewing

1.4.8. Commonly used referencing styles

2. Biostatistics

2.1. Descriptive statistics

2.2. Inferential statistics with statistical hypotheses and appropriate tools/methods for quantitative studies, commonly used statistical softwares, and data visualization

2.3. Data analysis for qualitative data - theme and code generation, thematic analysis, content analysis, grounded theory for qualitative and triangulation for mixed method studies

3. Ethics

3.1. Principles of medical ethics

3.2. Human dignity and human rights

3.3. Benefit and Harm

3.4. Autonomy and Individual responsibility

3.5. Consent and capacity to consent

3.6. Privacy and confidentiality

3.7. Equality, justice and equity

3.8. Non-discrimination and non-stigmatization

3.9. Respect for cultural diversity and pluralism

3.10. Solidarity and cooperation

3.11. Professionalism

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Part II: Health Professions Education (40 marks)

1. Achievements and Challenges of Health Professions Education

1.1. Definition of health professions education
1.2. History
1.3. Current status of health professions education – global and Nepal
1.4. Changes proposed or required in health professions education after the Coronavirus pandemic
1.5. International dimensions of health professions education – standards, trends, and challenges
1.6. Advances in Health Professions Education
  1.6.1. Health professions education research
  1.6.2. Involving patients as educators
  1.6.3. Digital technologies in health professional education

2. Curriculum Planning and Development

2.1. Definitions of curriculum, syllabus, and microsyllabus
2.2. Theories of curriculum design in health professions education
2.3. Types of curricula
2.4. Undergraduate Curriculum
  2.4.1. Forces shaping the undergraduate curriculum
  2.4.2. Critical components of the undergraduate health professions education programs
2.5. Postgraduate Medical Education
  2.5.1. Key elements of postgraduate health professions education programs
  2.5.2. Competency-based health professions education
2.6. The Hidden Curriculum
  2.6.1. Definition
  2.6.2. Applications: exploring/assessing the hidden curriculum
2.7. Curriculum themes
  2.7.1. Curricular models – traditional, SPICES, PRISMS
  2.7.2. Relevance of foundational sciences (basic sciences) to the curriculum
  2.7.3. Social and behavioral sciences in the curriculum
  2.7.4. Clinical Communication Skills in the curriculum
  2.7.5. Professionalism, ethics, empathy, and attitudes in the curriculum
  2.7.6. Medical research in the curriculum
  2.7.7. Evidence-based medicine in the curriculum
  2.7.8. Medical humanities in the curriculum
  2.7.9. Integrative medicine in the curriculum
  2.7.10. Clinical reasoning in the curriculum
  2.7.11. Information management in the digital era in the curriculum

3. Learning Situations

3.1. Science of learning
  3.1.1. Assumptions around learning
  3.1.2. Multiple definitions of learning
  3.1.3. Learning theories and strategies
  3.1.4. Metacognition
  3.1.5. Learning skills and learning styles
  3.1.6. Learning approaches and contexts
3.2. Lectures in health professions education
  3.2.1. Pros and cons of lectures as a primary learning event
  3.2.2. Learning in a lecture environment
  3.2.3. Organizing a lecture
  3.2.4. Developing teaching materials

3.2.5. Active learning in the lecture hall

3.3. Learning in small groups
- 3.3.1. Definition of small group learning
- 3.3.2. Situations for using small group learning
- 3.3.3. Conducting a small group learning session effectively

3.4. Clinical teaching
- 3.4.1. Definitions
- 3.4.2. Educational strategies for clinical teaching – inpatient, outpatient, ward, hospital units, and ambulatory care

3.5. Learning in community settings - urban and rural communities
- 3.5.1. Community posting and health camps
- 3.5.2. Community-based learning
- 3.5.3. Use, importance, and outcomes in Nepal and beyond

3.6. Workplace-based learning
- 3.6.1. Experiential learning
- 3.6.2. Learning in longitudinal integrated clerkships
- 3.6.3. Continuing professional development

3.7. Learning in a Simulated Environment
- 3.7.1. Terminologies and definitions
- 3.7.2. Simulated patients and role plays
- 3.7.3. Simulation in the skill lab

3.8. Independent learning and distance education
- 3.8.1. Self-directed learning
- 3.8.2. Self-regulated learning
- 3.8.3. Digital world and distance learning
- 3.8.4. Digital literacies for independent learning and distance learning

3.9. Outcome-Based Education
- 3.9.1. Definitions
- 3.9.2. Implementation of outcome-based education

3.10. Integrated Learning
- 3.10.1. Definitions
- 3.10.2. Rationale for integrated learning
- 3.10.3. Curricular/program integration
- 3.10.4. Horizontal versus vertical integration
- 3.10.5. Course level versus session level integration and the benefits of causal networks
- 3.10.6. Strategies to achieve integrated learning at the session level
- 3.10.7. Challenges to integration

3.11. Interprofessional Education
- 3.11.1. Interprofessional education and collaborative practice
- 3.11.2. Evidence for the effectiveness of interprofessional education
- 3.11.3. Theories underpinning interprofessional education and interprofessional collaborative practice
- 3.11.4. Implementation of interprofessional education

3.12. Problem-Based Learning
- 3.12.1. Philosophy, principles, and techniques
- 3.12.2. Implementation of problem-based learning

3.13. Team-Based Learning
- 3.13.1. Philosophy, principles, and techniques
- 3.13.2. Implementation of team-based learning

4. Assessments

4.1. Basics of assessments
- 4.1.1. Measurement theories
- 4.1.2. Types of assessment
- 4.1.3. Qualities of good assessment
- 4.1.4. Score interpretation
- 4.1.5. Self-assessment
- 4.1.6. Objective versus subjective assessments
- 4.1.7. Formative versus summative assessments

4.2. Written assessment
- 4.2.1. Types of written assessment
- 4.2.2. Response formats
- 4.2.3. Stimulus formats

4.3. Performance and workplace assessment
- 4.3.1. Types of performance assessment
- 4.3.2. Assessments of clinical skills and competence
- 4.3.3. Assessing performance in the workplace

4.4. Portfolios, projects, and theses
- 4.4.1. Objectives and contents of portfolios
- 4.4.2. Portfolio assessment
- 4.4.3. Thesis and project work

4.5. Feedback, reflection, and coaching
- 4.5.1. Giving feedback
- 4.5.2. Critical reflection
- 4.5.3. Coaching in health professions education

4.6. Assessment of attitudes and professionalism
- 4.6.1. Rationales
- 4.6.2. Tools

4.7. Programmatic Assessment
- 4.7.1. Definition
- 4.7.2. Approach

5. Students and Trainees

5.1. Selection of students and trainees - types of selection errors
5.2. Students and trainees in need of additional support
5.3. Student engagement in the educational program – peer-to-peer teaching
5.4. Professional identity and career choice

6. Health Professional Teachers

6.1. The changing roles of the medical teacher
6.2. The teacher as an information provider and coach
6.3. The teacher as a facilitator and mentor
6.4. The teacher as a curriculum developer and implementer
6.5. The teacher as an assessor and diagnostician
6.6. The teacher as a role model as teacher and practitioner
6.7. The teacher as a manager and leader
6.8. The teacher as a scholar and researcher
6.9. The teacher as a professional

7. Health Professional Schools

7.1. Health professions education leadership
7.2. Role in curriculum evaluation

7.3. Role in teacher evaluation
7.4. Role in social accountability
7.5. Role in faculty development program and mentoring
7.6. Role in providing the educational environment
7.7. Role in maintaining the well-being of health professional teachers, staff, and students

Part III: Relevant Acts and Laws (10)

1. Madan Bhandari Academy of Health Sciences
   1.1. Act, Mission, Goals, Organogram
   1.2. Scope and function of Madan Bhandari Academy of Health Sciences executive bodies (Senate, Executive Committee, Academic Council, Faculty Board, Hospital Management Committee, Subject Committee) and various other committees
2. Constitution of Nepal (Part 1 to 5, 13 to 23 and All Schedules 1-9)
3. Health-related provisions
   3.1. Health related aspects of Sustainable Development Goals (SDGs)
   3.2. Ministry of Health and Population
   3.3. Ministry of Health of Bagmati Province
4. Health Insurance
   4.1. Health Insurance Act, 2074
   4.2. Health Insurance Regulation, 2075
   4.3. Social Health Security (Health Insurance) Program
5. General Information
   5.1. Prevention of Corruption Act, 2059
   5.2. Right to Information Act, 2064
   5.3. Knowledge on Geographical, Economical and Social Sectors of Bagmati Province

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Paper-II: Technical Subject

1. General and Cellular Physiology

1.1. General functional organization of the human body

1.2. Cell-organelles and their functions.

1.3. Cell to cell and local communications, Transport across the cell membrane

1.4. Body fluid compartments: Define and explain

1.5. Homeostasis: Definition, maintenance, control of the internal environment, different regulatory systems in homeostasis.

1.6. Principles of control systems :

1.7. Membrane Potential:

1.8. Synapses ultrastructure, properties, synaptic plasticity, neurotransmitters, and mode of transmission.

2. Nerve and muscle physiology

2.1 Structure and functions of a neuron and neuroglia.

2.2 Nerve fiber types, function, and nerve injury.

2.3 Molecular basis of resting membrane and action potential, compound action potential, Recording.

2.4 Structure and transmission across the neuromuscular junction.

2.5 Neuro-muscular blocking agents.

2.6 Skeletal Muscle:

2.7 Smooth Muscle

3. Autonomic nervous system

3.1. Anatomical organization of the nervous system

3.2. Functional organization of nervous system: Divisions, distribution, and functions.

3.3. Higher control of the autonomic nervous system.

3.4. The physiological role of the autonomic nervous system.

4. Blood, reticuloendothelial and immune system

3.5. Blood as a body fluid: Composition and functions of blood.

3.6. Plasma: Normal constituents.

3.7. Plasma Proteins: Types, concentrations, properties, and functions.

3.8. Blood cells: Types, distribution, and overview of hematopoiesis.

3.9. Erythrocytes - morphology, functions, fate, normal count, PCV, ESR, Fragility, hemolysis. Erythropoiesis: Definition, stages, and regulating factors.

3.10. Blood indices and their clinical usefulness.

3.11. Anemias and polycythemia

3.12. Leukocytes classification, morphology, normal counts, functions, development, and related applied aspects.

3.13. Platelets morphology, functions, development, and related applied aspects.

3.14. Blood groups

3.15. Hemostasis: Physiology of coagulation, tests for clotting, clot retraction, and anticoagulation, Bleeding, and coagulation disorders.

3.16. Reticuloendothelial system: Functions of spleen and lymph nodes.

3.17. Lymph and tissue fluids: Formation and functions.
3.18. Immunity and its disorders.

5. Respiratory system

5.1. Functional anatomy of the respiratory system, Mechanics of breathing:
5.2. Spirometry, lung volumes & capacities
5.3. Pulmonary gas exchange, Applied physiology shunt, and alveolar-capillary block
5.4. Ventilation-perfusion ratio and its importance in respiratory diseases.
5.5. Gas Transport, Regulation of respiration :
5.6. Respiration in unusual environments :
5.7. Abnormal breathing, Artificial respiration
5.8. Pulmonary function tests, Pulmonary abnormalities.

6. Cardiovascular system

6.1. Systemic and pulmonary circulation. Introduction of the venous pressure, flow, and resistance. Types of blood vessels and their functions.
6.2. Properties of myocardial cells
6.3. Molecular basis of contraction and excitation-contraction coupling (in brief)
6.4. Effect of ions and chemicals on myocardial contractility.
6.5. Cardiac cycle: Mechanical and electrical events, pressure-volume relationship
6.6. Electrocardiography
6.7. Cardiac output: Definition, normal values, and variations, major determinants of cardiac output and regulation, Heart-lung preparation - measurement of cardiac output, Fick's principle and its application, indicator dye methods of measurement, Regulation of heart rate and stroke volume.
6.8. Hemodynamics: Definition of terms- pressure, flow, resistance, velocity, etc. Laminar and turbulent flow, Poiseuille law, factors affecting blood flow and resistance, critical closing pressure
6.9. Various types of circulation, local regulation of blood flow to tissues.
6.10. Arterial Blood Pressure: Definition, normal value, variations, measurement, mean arterial pressure (MAP), and its determinants.
6.11. Regulation of arterial blood pressure:
6.12. Regional circulation: Coronary, cerebral, cutaneous, splanchnic, skeletal muscle, and fetal. Normal values, special features, and regulation.
6.13. Cardiovascular changes during exercise.
6.14. Applied Physiology: Cardiac failure, circulatory shock, hypertension, hypotension

7. Gastrointestinal system

7.1. Introduction to gastrointestinal Physiology: Functions of GI System - individual parts. Innervation of the gut, regulation of GI functions - general overview.
7.2. Oral Cavity: Mastication and digestion in the mouth and its importance.
7.3. Salivary secretion: mechanism, composition, functions, and regulation.
7.4. Physiology of deglutition: Definition, stages and neural control and applied aspects.
7.5. Stomach: Overview of functions
7.6. Pancreatic secretions: Composition, mechanism, functions, and control.

7.7. Small intestine: Secretion, movement, and control.
7.8. Large intestine: Functions, secretions, movements.
7.9. Gastrointestinal hormones and their role in secretomotor functions of the gut.
7.10. Defecation: Mechanism and control.
7.11. Physiology of vomiting, diarrhea, and constipation.
7.12. Digestion, absorption, and metabolism of carbohydrate, protein, and lipid
7.13. Nutrition and vitamins
7.14. Obesity and starvation.

8. Hepatobiliary system

8.1. Liver: Functions
8.2. Entero-hepatic circulation
8.3. Bile formation, secretion, regulation, and jaundice
8.4. Physiological basis of liver function tests
8.5. Gall bladder: Functions, Mechanism and regulation of gall bladder contraction, applied aspects and Oral cholecystography

9. The Body Fluids and Renal Physiology

9.1. Body fluid compartments and their regulation.
9.2. Renal circulation, Urine formation
9.3. Water diuresis and osmotic diuresis.
9.4. Regulation of acid-base balance.
9.5. Structure and function of a Juxta-glomerular apparatus.
9.6. Renal mechanisms for the control of volume, blood pressure, and ionic composition.
9.7. Innervations of bladder, micturition, and abnormalities of micturition.
9.8. Artificial kidney, dialysis, and renal transplantation.
9.9. Renal Function test, Diuretics, Renal failure.

10. Endocrinology

10.1. General Endocrinology
10.2. Mechanism of action and Regulation of hormones
10.3. Physiological actions and applied aspects of the pituitary gland, Thyroid gland, Parathyroid gland, Adrenal gland, Pancreas and hypothalamus, Growth Hormone.
10.4. Estimation and assessment of Hormones.
10.5. Local hormones.
10.6. Endocrine functions of other organs: Pineal gland, thymus, kidneys, heart

11. Reproductive System

11.1. Introduction: Sexual differentiation and development.
11.2. Male reproductive system
11.3. Female reproductive system

12. Growth, Development, and Genetics

12.1. Growth and development: Definition
12.2. Disorders of normal growth

12.3. Abnormalities of fetal and postnatal growth
12.4. Hereditary short stature.
12.5. Physiology of aging:
12.6. Apoptosis.
12.7. Genetic control of protein synthesis, genetic code and regulation of gene expression, cell cycle, and its regulation.
12.8. Applied genetics

13. Integumentary System

13.1. Skin: Functions
13.2. Sweat glands: Types, secretion, and functions.
13.3. Thermoregulation: Mechanism, receptors
13.4. Hypothalamic thermostat
13.5. Acclimatization
13.6. Disorders of thermoregulation

14. Central Nervous System

14.1. Introduction: Organization of the nervous system
14.2. Neuroglia - types, morphology, functions, and classification of nerves
14.3. Signal transmission in the nervous system :
14.4. Graded potential - definition, characteristics, and physiological significance
14.5. Response of neurons and nerve fibers to injury
14.6. Types of injuries.
14.7. Types of changes - Wallerian degeneration and regeneration
14.8. Factors influencing regeneration
14.9. The microenvironment of the neuron: CSF-composition, formation & circulation, Blood-brain barrier, and its importance
14.10. Synapse: Definition and types, structure, mechanism of transmission, and properties
14.11. Sensory receptors: Definition, classification, and properties
14.12. Reflexes: Definition and classification
14.13. Somatosensory system :
14.14. Control of posture and movement
14.15. Reticular formation: Definition, connections, and functions
14.16. Physiological basis of consciousness and sleep
14.17. EEG: Evoked potentials and their clinical significance.
14.18. Hypothalamus: Components, connections, and functions
14.19. Thalamus: Components, connections, functions, thalamic syndrome
14.20. Limbic system: Components, connections, and functions
14.21. Frontal, parietal, occipital and temporal lobe: components, connections, functions, and effects of lesions
14.22. Higher cortical functions
14.23. Learning, memory, language, and speech.

15. Special Senses

15.1. Visual system :

15.2. Auditory system:

15.3. The Olfactory System: Location of receptors and pathways, physiology of olfaction, and disorders of olfactory sensation.

15.4. The Gustatory System: Location of receptors and pathways, physiology of gustation, and disorders of gustatory sensation.

16. Recent advances in physiology

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