प्रदेश लोक सेवा आयोग

बागमती प्रदेश

मदन भण्डारी स्वास्थ्य विज्ञान प्रतिष्ठान

प्राध्यापन सेवा, नन–मेडिकल समूह, मेडिकल वायोकेमेष्ट्री उपसमूह, नवौ तह, लेक्चरर पदको खुला प्रतियोगितात्मक लिखित 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 ।

2. प्रथम पत्रको बहु–वैकल्पिक प्रश्नको प्रत्येक सहि उत्तर वापत २ अङ्क र द्वितीय पत्रको बहु–वैकल्पिक प्रश्नको प्रत्येक सही 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 छुटाछुटै (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

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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

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	Multiple Choice Questions (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 (Medical biochemistry)																	
प्रश्न संख्या	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
किसिम	Multiple Choice Questions (MCQ)																	
पाठ्यक्रमको बुँदा न.	1.1	1.2	1.3	1.5	1.6	1.7	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	3	4

पाठ्यक्रमको भाग	Part II: Technical Subject (Medical biochemistry)									
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	1.4	1.5	1.6	2.3	2.4	2.5	2.8	2.9	3

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 कानूनहरू 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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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

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. Principles of Human Biochemistry

1.1 Basics: Acid-Base, pH, Henderson Hasselbalch equation, pH measurements, Buffer solutions, biological membrane, and transport system, Gibbs Donnan equilibrium

1.2 Biomolecules

1.2.1 Carbohydrates: Introduction, biochemical importance, classification, structure, isomerism, properties, detection of carbohydrates

1.2.2 Lipids: Introduction, biochemical importance, classification, properties of lipid; Fatty Acids, lipoproteins, triglycerides, phospholipids, glycolipids, and steroids; Prostaglandins and their biological significance

1.2.3 Proteins: Classification, structure, and properties of amino acid; Structure, classification, properties, and techniques of separation for proteins

1.2.4 Nucleic Acids: Nucleosides, nucleotides, nucleoproteins, and nucleic acids; Structure, properties, types, and functions of DNA and RNA

1.3 Enzymes: Definitions, classification, nomenclature, catalysis, mechanism of enzyme action, factors affecting the enzyme activity, units of activity, diagnostic/clinical enzymology.

1.4 Micronutrients

1.4.1 Vitamins: Biochemical importance and roles in metabolism, deficiency manifestations, effects of hypervitaminosis, the toxicity of fat-soluble vitamins and water-soluble vitamins

1.4.2 Minerals: Biochemical roles, roles in metabolism and disease, bulk and trace elements, mineral deficiencies, and toxicity

1.4.3 Nutritional Value of Food: BMR, Respiratory Quotient and its significance; Energy calculation, balanced diet, plan diet in health and disease, the biological value of proteins, protein-energy malnutrition, malabsorption, parental nutrition, Modification and supplementation of dietary requirements in health and disease

1.5 Metabolism: Concepts, Biochemical Roles, Importance and Related Disorders

1.5.1 Carbohydrates: Glycolysis, Krebs cycle, gluconeogenesis, glycogen metabolism, HMP pathway and metabolism of fructose, galactose, amino sugars, and lactose synthesis; Biological oxidation and Bioenergetics including the Electron Transport Chain and Oxidative Phosphorylation.

1.5.2 Lipids: Fatty acid oxidation, biosynthesis of fatty acids, cholesterol and triacylglycerol, lipoprotein metabolism (composition, metabolism, function, and significance of chylomicron, VLDL, LDL, and HDL), apolipoproteins and their role in lipoprotein metabolism, dyslipidemia, atherosclerosis, obesity.

1.5.3 Proteins: Transamination, deamination, urea cycle, ammonia transport, and its toxicity and individual amino acids metabolism.

1.5.4 Nucleic Acids: Synthesis and degradation of purine and pyrimidine; Replication, Transcription, and post-transcriptional modification, Translation and post-translational modifications, types of mutation and its repair mechanisms, gene regulation, operon hypothesis.

1.6 Inborn Errors of Metabolism (Congenital disorders): Carbohydrate disorders, Amino acids metabolism disorders, Lipids, and Lipoprotein metabolism disorders, Purine, Pyrimidine, and Nucleic Acids disorders, laboratory findings, and their management

1.7 Integration of Metabolism: Feed and fast cycle, metabolic interrelationships of tissues (Liver, Brain, Skeletal muscles, Adipose tissue, Placenta), metabolism in obesity, starvation, exercise.

2. Clinical Biochemistry

2.1 Basic Laboratory Principles

2.1.1 Sample collection, preservation, transport, and storage

2.1.2 Handling and use of laboratory equipment (Centrifuge, Water Bath, Electronic Balance, pH Meters, Pipettes, Glassware, Dispensers, Hot Air Oven)

2.2 Instruments: Principles, operation protocols, and applications of photometry; Concepts of colorimeter, visible and ultraviolet spectrophotometer, turbidometry, nephelometry, fluorimetry, flame Photometer, ion-selective electrodes, atomic adsorption, and mass spectrometry.

2.3 Separation Techniques

2.3.1 Chromatography: Principles, types, and applications in biochemistry

2.3.2 Electrophoresis: Principles, types, working techniques, and application in biologic systems

2.4 Immunoassays

2.4.1 Enzyme based Assays: Principle and applications of ELISA and EIA, modified enzyme-based investigative techniques and Chemiluminescent Immunoassay and Enhanced Chemiluminescent Immunoassays

2.4.2 Radioactivity and RIA: Application of radioactive substances in medicine and hazards of radioactivity and prevention; principle and applications of Radioimmunoassay

2.5 Molecular Diagnostics tools

2.5.1 Polymerase Chain Reaction (PCR): Introduction, Primer and its designing, Phases of reactions (denaturation, annealing, and annexing), Open array, digital PCR and their application

2.6 Automation Techniques in Clinical Chemistry (Autoanalyzers, Automated Immunoassays)

2.7 Body Fluids: Biochemical analysis of ascetic, peritoneal, pleural and synovial fluids, CSF and urine analysis

2.8 Analytical Biochemistry and Data Interpretation

2.8.1 General Tests: Knowledge, principle, application, and predictive values for routine biochemical tests along with their evolution over time

2.8.2 Special Tests: Testing principles and applications of hormone tests, iron profile, lipids, special proteins, and other emerging biomarkers

2.8.3 Special Tests: Introduction and interpretation of Liver function tests (LFT), Renal function tests (RFT), Pancreatic function tests (PFT), Cardiac function tests (CFT), and Thyroid function tests (TFT).

2.8.4 Other Tests and Tumor Markers: Principle, application, and techniques for tests used for collagen disorders, tumor markers in diagnosis and monitoring of cancers, hormone profiles, metals, vitamins, and enzymes in clinical syndromes

2.9 Quality Control: Precision, accuracy, errors of laboratory instruments; use of standardization units: SI and conventional; Process of internal quality control, external quality control; Use of statutory proficiency testing programs: primary and secondary standards; Use of Reference materials: international reference materials and reference methods; Course of action of evaluation and comparison of methods and instruments

2.10 Role of the Clinical Biochemist in Laboratory Management

2.10.1 Laboratory Reporting Systems: Ensuring that the information reaches the attending physician within a time frame, critical values, directing attention to abnormal results when necessary, providing clinical interpretation when appropriate, laboratory information system, electronic data transfer, instrument interfacing

2.10.2 Laboratory Records: Retention policies, workload measurement system, preparation, and maintenance of proper laboratory manuals, SOPs accreditation requirements

2.10.3 Laboratory Reagents: Assessing the quality, stability, cost of reagents, commercial "kits", inventory, proper storage, and management

2.10.4 Instruments: Laboratory instruments and analyzers; and their technical implications and maintenance

2.10.5 Test Interpretation: Effect of biological/physiological variation in biochemical tests results. Normal or reference ranges and clinically significant limits.

2.10.6 Laboratory Hazards: Laboratory safety measures, waste disposal management

2.10.7 Laboratory Management: Leadership role, manpower management, planning and implementation of operation protocols

3. Biochemical monitoring of treatment of various diseases

4. Recent Advances: Emerging biomarkers / Laboratory techniques and their implications

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