प्रदेश लोक सेवा आयोग

बागमती प्रदेश

मदन भण्डारी स्वास्थ्य विज्ञान प्रतिष्ठान

प्राध्यापन सेवा, नन-मेडिकल समूह, फार्मासी/फार्माकोलोजी 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 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

प्रदेश लोक सेवा आयोग

बागमती प्रदेश

मदन भण्डारी स्वास्थ्य विज्ञान प्रतिष्ठान

प्राध्यापन सेवा, नन–मेडिकल समूह, फार्मासी/फार्माकोलोजी उपसमूह, नवौ तह, लेक्चरर पदको खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

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 (Pharmacy/Pharmacology)							
प्रश्न संख्या	3	3	3	3	2	2	2	2
किसिम	Multiple Choice Questions (MCQ)							
पाठ्यक्रमको बुँदा न.	1	2	3	4	5	6	7	8

पाठ्यक्रमको भाग	Part II: Technical Subject (Pharmacy/Pharmacology)									
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	6	7	8	1	2

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 संसोधित भई हटाईएका) कायम रहेकालाई यस पाठ्यक्रममा परेको मानिनेछ ।

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

प्रदेश लोक सेवा आयोग

बागमती प्रदेश

मदन भण्डारी स्वास्थ्य विज्ञान प्रतिष्ठान

प्राध्यापन सेवा, नन-मेडिकल समूह, फार्मासी/फार्माकोलोजी उपसमूह, नवौ तह, लेक्चरर पदको खुला प्रतियोगितात्मक लिखित 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

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

Paper-II: Technical Subject

1. Basic Pharmacology

1.1 General pharmacology
- 1.1.1 Pharmacokinetics: drug absorption, distribution, biotransformation and elimination, concepts of linear and non-linear compartment models, the significance of protein binding
- 1.1.2 Pharmacodynamics: mechanism of drug action and the relationship between drug concentration and effect, structural and functional families of receptors, quantitation of drug receptors interaction, and elicited effect

1.2 Neurotransmission: neurohumoral transmission in the autonomic nervous system and central nervous system, non-adrenergic non-cholinergic transmission (NANC)

1.3 Systemic pharmacology: pathophysiology of diseases, mechanism of action, pharmacology and toxicology of existing as well as novel drugs pertaining to
- 1.3.1 Autonomic pharmacology
- 1.3.2 Central nervous system pharmacology
- 1.3.3 Cardiovascular pharmacology
- 1.3.4 Hematinics, coagulants, anticoagulants, fibrinolytic, and anti-platelet drugs
- 1.3.5 Autocoid pharmacology
- 1.3.6 Pharmacology of antihistamines and 5HT antagonists

1.4 Endocrine pharmacology
- 1.4.1 Molecular and cellular mechanism of action of hormones such as growth hormone, prolactin, thyroid, insulin, and sex hormones

1.4.2 Anti-thyroid drugs, oral hypoglycemic agents, oral contraceptives, corticosteroids

1.5 Chemotherapy: cellular and molecular mechanism of actions and resistance of following agents, beta-lactams, aminoglycosides, quinolones, macrolide antibiotics, antifungals, antivirals, and anti-TB drugs, anti-protozoal drugs, and anti-helminthiasis drugs, chemotherapy of cancer

1.6 Immunopharmacology: cellular and biochemical mediators of inflammation and immune response, allergic or hypersensitivity reactions, pharmacotherapy of asthma and COPD, immunosuppressants, and immunostimulants.

1.7 GIT Pharmacology: antiulcer drugs, prokinetics, antiemetics, antidiarrheals, and drugs for constipation and irritable bowel syndrome.

1.8 Chronopharmacology: biological and circadian rhythms, applications of chronotherapy in various diseases like cardiovascular disease, diabetes, asthma, and peptic ulcer

1.9 Free radical pharmacology: generation of free radicals, the role of free radicals in etiopathology of various diseases such as diabetes, neurodegenerative diseases, and cancer. protective activity of certain important antioxidant

1.10 Recent advances in treatment: Alzheimer's disease, Parkinson's disease, cancer, diabetes mellitus

2. Modern Pharmaceutical Analytical Techniques

2.1 UV-Visible spectroscopy: theory, laws, instrumentation

2.2 IR spectroscopy: theory, modes of molecular vibrations, sample handling

2.3 Flame emission spectroscopy and atomic absorption spectroscopy: principle, instrumentation interferences, and applications.

2.4 NMR spectroscopy: quantum numbers, principle, instrumentation

2.5 Mass Spectroscopy: principle, instrumentation, applications

2.6 Chromatography: principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution, isolation of drug from excipients, data interpretation and applications of thin-layer chromatography, high-performance thin-layer chromatography, ion-exchange chromatography, column chromatography, gas chromatography, high-performance liquid chromatography, ultra-high performance liquid chromatography, affinity chromatography, and gel chromatography

2.7 Electrophoresis: principle, instrumentation, working conditions, factors affecting separation and applications of paper electrophoresis and gel electrophoresis

2.8 X-ray crystallography: principle, instrumentation

2.9 Potentiometry: principle, ion-selective electrodes, applications

2.10 Thermal Techniques: principle, thermal transitions, and instrumentation

3 **Pharmacological and Toxicological Screening Methods**

3.1 Common laboratory animals: description, handling, and applications of different species and strains of animals.

3.2 Good laboratory practice. bioassay - principle, scope and limitations, and methods

3.3 Preclinical screening of new substances for the pharmacological activity using in vivo, in vitro, and other possible animal alternative models
3.4 Limitations of animal experimentation and alternate animal experiments.
3.5 Extrapolation of in vitro data to preclinical and preclinical to humans
3.6 Basic definition and types of toxicology (general, mechanistic, regulatory, and descriptive)
3.7 Regulatory guidelines for conducting toxicity studies
3.8 Principles of good laboratory practice (GLP) - history, concept, and its importance in drug development
3.9 Acute eye irritation, skin sensitization, dermal irritation & dermal toxicity studies.
3.10 Reproductive toxicology studies, male reproductive toxicity studies, female reproductive studies, teratogenicity studies, genotoxicity studies, in vivo carcinogenicity studies
3.11 IND enabling studies (IND studies)- Definition of IND, the importance of IND, industry perspective, list of studies needed for IND submission.
3.12 Toxicokinetics- Toxicokinetic evaluation in preclinical studies, saturation kinetics Importance and applications of toxicokinetic studies. Alternative methods to animal toxicity testing

4 **Cellular and Molecular Pharmacology**

4.1 Basics of cell biology: structure and functions of the cell and its organelles, genome organization. gene expression and its regulation, importance of siRNA and micro- RNA, gene mapping and gene sequencing, cell cycles and its regulation, cell death– events, regulators, intrinsic and extrinsic pathways of apoptosis, necrosis, and autophagy
4.2 Cell signaling: intercellular and intracellular signaling pathways, classification of receptor family and molecular structure ligand-gated ion channels; G-protein coupled receptors, tyrosine kinase receptors, and nuclear receptors, secondary messengers: cyclic AMP, cyclic GMP, calcium ion, inositol 1,4,5-trisphosphate, (IP3), NO, and diacylglycerol
4.3 Principles and applications of genomic and proteomic tools DNA electrophoresis, PCR (reverse transcription and real-time), recombinant DNA technology, and gene therapy
4.4 Basic principles of recombinant DNA technology, restriction enzymes, various types of vectors. applications of recombinant DNA technology.
4.5 Gene therapy- various types of gene transfer techniques, clinical applications, and recent advances in gene therapy
4.6 Pharmacogenomics, gene mapping and cloning of disease gene, genetic variation and its role in health/ pharmacology. polymorphisms affecting drug metabolism.

5 **Principles of Drug Discovery**

5.1 An overview of modern drug discovery process: target identification, target validation, lead identification, and lead optimization. economics of drug discovery
5.2 Rational Drug Design: traditional vs rational drug design, methods followed in traditional drug design, high throughput screening, concepts of rational drug

design, rational drug design methods: structure and pharmacophore-based approaches

5.3 Virtual screening techniques: drug-likeness screening, the concept of pharmacophore mapping, and pharmacophore-based screening

5.4 Molecular docking: rigid docking, flexible docking, manual docking; docking-based screening.

6 **Clinical Research and Pharmacovigilance**

6.1 Regulatory perspectives of clinical trials: origin and principles of the international conference on harmonization - good clinical practice (ICH-GCP) guidelines

6.2 Clinical Trials: types and design, RCT and non-RCT, clinical trial study team roles and responsibilities of clinical trial personnel: investigator, study coordinator, sponsor, contract research organization, and its management

6.3 Observation Study: cohort, case-control, cross-sectional

6.4 Pharmacovigilance: basic aspects, terminologies and history, and progress, the significance of safety monitoring, adverse drug reactions (definition and types. detection and reporting methods. severity and seriousness, predictability and preventability assessment and management, ADR reporting and tools

6.5 Pharmacoepidemiology, pharmacoeconomics, safety pharmacology

7 **Basics of Industrial Pharmacy**

7.1 Preformulation studies

7.2 Formulation Additives

7.3 Pilot plant design (basic requirements for design, facility, equipment selection, for tablets, capsules, liquid orals, parenteral and semisolid preparations)

7.4 Scale-up: importance and process

8 **Recent Advances**

8.1 Novel drug delivery system (NDDS)

8.2 Targeted drug delivery systems

.

****