प्रदेश लोक सेवा आयोग

बागमती प्रदेश

मदन भण्डारी स्वास्थ्य विज्ञान प्रतिष्ठान

प्राध्यापन सेवा, नन-मेडिकल समूह, फार्मासी/स्पेक्ट्रोस्कोपी 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] 6x5=30 (Short answer) [SAQ]	100	40	3.00 hours
		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] 8x5=40 (Short answer) [SAQ] 2x20=40 (Problem-based) [PBQ]	100	40	3.00 hours

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 ।

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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

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/Spectroscopy)									
प्रश्न संख्या	2	2	2	2	2	2	2	2	2	2
किसिम	Multiple Choice Questions (MCQ)									
पाठ्यक्रमको बुँदा न.	1	2	3	4	5	6	7	8	9	10

पाठ्यक्रमको भाग	Part II: Technical Subject (Pharmacy/Spectroscopy)									
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	6	7	8	9	5	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 **<u>२०७८/०८/१२</u>**

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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 Ultraviolet and visible spectrophotometry

Introduction, absorption laws, instrumentation, types of electronic transition, chromophore concept, auxochrome, absorption & intensity shifts, types of absorption bands, choice of solvent & solvent effects, Woodward-Feiser & Feiser-Kuhn rules for calculating absorption maxima, applications of UV spectroscopy.

2 Fluorimetry:

Introduction, principle, factors affecting fluorescence intensity, instrumentation & applications of fluorimetry.

3 Infrared spectrophotometry:

Introduction, theory of IR spectroscopy, modes of vibration, factors affecting vibrational frequencies, instrumentation, position & intensity of absorption bands, sampling methods, applications of IR spectroscopy, interpretation of IR spectra, limitations of IR spectroscopy.

4 Nuclear Magnetic Resonance spectroscopy including ^{13}C NMR:

Introduction, principle, instrumentation, number of signals, chemical shift & factors affecting chemical shift, internal standards, shielding & de-shielding effects, solvents in NMR, splitting of signals, spin-spin coupling, coupling constant, double resonance (spin decoupling), nuclear over Hauser effect (NOE), introduction to ^{13}C NMR, applications of NMR spectroscopy, interpretation of NMR spectra.

5 Mass Spectrometry

Introduction, principle, instrumentation, mass spectrogram, types of ion produced in the mass spectrometer, index of hydrogen deficiency, nitrogen rule, ring rule, interpretation of molecular spectra & applications of mass spectroscopy.

6 Flame Photometry

Introduction, principle, instrumentation, the effect of solvent, applications in qualitative & quantitative analysis, methods of quantitative analysis, interferences in flame photometry & limitations of flame photometry.

7 Emission Spectroscopy:

Introduction, theory, instrumentation, advantage & disadvantage of emission spectroscopy, applications.

8 Atomic Absorption Spectroscopy:

Introduction, theory, instrumentation, detection limit & sensitivity, interference, applications of AAS.

9 X-ray Diffraction

Introduction, theory, instrumentation, applications.

10 Chromatography

Introduction, classification of chromatographic techniques, modes of separation, distribution coefficient, retention volume, dead volume, retention time, dead time, selectivity factor, capacity factor, resolution, chromatographic theories- plate theory & rate theory, Sources of band broadening- eddy diffusion, longitudinal diffusion & non-equilibrium mass transfer, Van Demeter equation.

10.1 Paper Chromatography

Principle, Migration parameters- Rf & hRf, Rm, Rx, types of paper chromatography- ascending, descending, ascending-descending, radial & two-dimensional chromatography, choice of filter paper, developing solvent, detection method, applications of paper chromatography.

10.2 TLC:

Principle, Advantages of TLC over paper chromatography; steps in TLC- selection of coating material, preparation of TLC plate, activation of the plate, purification of the plate, sample application, selection of mobile phase, development of plate, detection of components; Problems in TLC: Over-large Spots, Uneven Advance of Solvent Front and Streaking, applications of TLC.

10.3 HPTLC

Comparison of HPTLC & TLC; HPLC & HPTLC; Principle, Instrumentation- Sample applicator, Development Chamber, Scanner; Applications.

10.4 HPLC

Principle, Instrumentation: Solvent reservoir & degassing system, Solvent programming, Pumps- reciprocating pump, syringe pump, constant pressure pumps, Sample injection system, Columns, Bonded phase, Column switching, Detectors- bulk & solute property detectors, Photometric detectors, fluorescence detectors, refractive index detectors, electrochemical detectors; Elution methods: Gradient, Isocratic & Stepwise elution; Internal Standard; Peak asymmetry, peak tailing & peak fronting; Ghost peaks, System suitability test, Pharmaceutical applications of HPLC.

10.5 GC

Principle, Instrumentation-carrier gas supply & flow regulators, sample injection system, detectors (ECD, FID, DTC, thermionic emission detector); Temperature programming, Headspace analysis, pharmaceutical applications of GC; limitations of GC.

10.6 Column Chromatography:

Principle, Applications, Ion Exchange Chromatography, Principle, cation exchanger, Anion exchanger, Ion exchange capacity; Suppressor column, Pharmaceutical applications of IEC, Size Exclusion Chromatography, Principle; Gel Permeation & Gel Filtration chromatography; Packing Material for column and Solvent; Detector, Applications of SEC.

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