PURNEA UNIVERSITY, PURNIA

Paper-I

Research Methodology + Mathematics

Full Marks: 100

Duration of Examination: 2 Hours

Questions shall consist of 3 parts:

Part-A : Short Questions (06 in number of which 04 to be answered, each carrying 10 marks) = 40

Part-B : Long Answer Question (04 to be asked of which 02 to be answered, eachcarrying 30 marks) = 60

1. Introduction to Research: What is Research; Why is Research Conducted; Stages in Research; Changing Nature and Expanding Scope of Research; Why Research Methodology.

2. Introduction to Major Research Methods: Natural Observation; Historical Research; Ethnographic Research; Cross-Sectional Study; Longitudinal Study; Cohort Study; Case Study; Correlational Research; Action Research; Quantitative and Qualitative Research; theoretical research, applied research and empirical research; Experimental Research: Cause and Effect Relationships, Hypothesis in Experiments, Principles of Experimentation, Classification of Experiments, Experimental Design, Requirements of a Good Experiment; Reasoning in Research : Introduction to Logical Terms; Evidences; Inductive and Deductive Reasoning; Fallacious Reasoning; Formal and Informal Fallacies; Common Fallacies.

3. Research Design: Study designs in quantitative research; Study designs in qualitative research; Other commonly used philosophy-guided designs; Choice of Variables; Constructing hypotheses, Mechanisms and Design for Data Collection; Collection of Primary Data: Observation, Interview, questionnaire and schedule Sample Surveys and Designed Experiments, Estimation without Sampling, Methods of data collection in qualitative research; Collection of Secondary Data; Data Integration; Using Publications and the Library; Using Academic Databases: Search Engines, Citation Indexes and Citation Analysis, Government of India Initiatives for

06/12/23
PSW

Knowledge Management- INFLIBNET: e-ShodhSindhu, Shodhganga, ShodhGangotri, and N-List Projects.

4. Data analysis: Statistical analysis; Thematic analysis; Analysing narrative; Discourse analysis; Content analysis; Grounded Theory; Using computers in data analysis.

5. Ethics and Related Issues in Research: Concepts in Ethics in Research; Intellectual Property Rights; Scientific Values: Needed a Code of Conduct; Fraud and Misconduct in Science; Plagiarism: What is Plagiarism, Acknowledge Sources Appropriately, Paraphrasing, Direct and Indirect Quotations, Plagiarism Checking: ShodhShuddhi, UGC (Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions) Regulations, 2018, LNMU Plagiarism Policy and Regulations-2018.

6. Writing a Research Proposal: Introduction; The research problem; Objectives of the study; Hypotheses to be tested; Study design; Measurement procedures; Analysis of data; Structure of the report; Problems and limitations.

7. The Structure of a Thesis: Thesis Vs Dissertation; Parts of a Thesis; Preliminary Pages of a Thesis: Title Pages, Certificate Pages, Acknowledgements, Table of Contents, List of Tables, List of Figures, Dedication; The Subject Proper: Introduction, Review of Literature, Materials and Methods, Results, Analysis/ Discussion, Summary/Conclusion, References, Appendixes; The Abstract; Formatting Requirements of a Thesis: Margins, Page Numbering, Design and Formatting of Chapters, Numbering the Sections, Lay-Out of Tables, Language and Style, Typeface and Fonts, Paper and Text Spacing; Thesis Editing.

06/11/23

Ph.D. COURSE WORK-PAPER-II
SUBJECT- MATHEMATICS

UNIT-1 (PROGRAMMING)

Introduction to C, Introduction to Mat Lab.

UNIT-2 (WRITING SOFTWARE)

Latex, Letter writing, Research Paper writing, Bibliography style, Thesis writing.

UNIT-3 (MATHEMATICAL TECHNIQUE)

Introduction to Numerical Analysis, Numerical Analysis with Mat Lab, Numerical Methods.

UNIT-4 (ADVANCE ANALYSIS)

Abastract Integration, The concept of measurability, simple functions, Elementary properties of measures Arithmetic in $(0,\infty)$, Integration of positive functions, Integration of Complex functions.

UNIT-5 (ALGEBRIC TOPOLOGY)

The Fundamental group, Homotopy of paths, The Fundamental Theorem of Algebra, The Borsuk-Ulam Theorem, Deformation retracts and Homotopy types, Separation Theorem in the plane: The Jordan separation Theorem, Invariance of domain, The Jordan curve Theorem.

References:-

1. *Let Us C*
2. *Introduction of Mat Lab:-Delores M. Etter*
3. *Numerical Methods with Mat Lab:-Dana Zelenko*
4. *Learning latex:-Desmond Higham*
5. *Real and Complex Analysis:-Walter Rudin*
6. *Topology: J.R. Munkers*
7. *Algebric Topology-An Introduction:-W. S. Massey*

06/12/23