



MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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University Examinations 2024/2025

THIRD YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF MEDICAL LABORATORY SCIENCES AND BACHELOR OF MEDICAL MICROBIOLOGY

HML 3318/HMM 3313: RESEARCH METHODOLOGY

DATE: JANUARY 2025

TIME: 3 HOURS

INSTRUCTIONS:

Answer *All* questions

Ensure that all your answers are properly numbered

Part I multiple Choice Questions (MCQ): Write the correct answer on the space provided in the answer booklet. Each MCQ is one mark

Part II: Short Answer Questions – Answer questions following each other on the answer booklet

Part III: Long Answer Questions – Answer each question on the answer booklet

SECTION A: MULTIPLE CHOICE QUESTIONS (20 marks)

1. The final step in the research process is to:
 - a) Collect and organize data
 - b) Formulate a hypothesis
 - c) Test the conclusions to determine if they fit the hypothesis
 - d) Define the problem
2. What is one of the key objectives of research?
 - a) To confirm previous assumptions

- b) To uncover truths hidden and not yet discovered
 - c) To maintain the status quo in knowledge
 - d) To replicate earlier studies
3. What is the first step in an effective problem-solving process?
- a) Evaluate the options
 - b) Identify the issues
 - c) Document the agreement
 - d) Select an option
4. What should be done before selecting an option in the problem-solving process?
- a) Documenting the agreements
 - b) Understanding everyone's interests
 - c) Evaluating the options
 - d) Identifying the issues
5. Which of the following is a type of qualitative research that focuses on exploring and understanding people's lived experiences?
- a) Ethnography
 - b) Case study
 - c) Grounded theory
 - d) Phenomenology
6. Which qualitative research method involves the study of cultural groups and communities by immersing the researcher into the culture?
- a) Case study
 - b) Grounded theory
 - c) Ethnography
 - d) Narrative research
7. A good research title should be:
- a) Long and detailed
 - b) Simple, clear, concise, and specific

- c) General and broad
 - d) Vague and open-ended
8. What are study designs in research?
- a) Detailed descriptions of findings
 - b) Structured approaches to address specific research questions
 - c) Randomly chosen methods to analyze data
 - d) General conclusions from experiments
9. Research objectives may also be specified in the form of:
- a) Conclusions
 - b) Hypotheses
 - c) Statements or questions
 - d) Literature reviews
10. What is the target population in a research study?
- a) The people conducting the research
 - b) The complete group of specific population elements relevant to the research project
 - c) The individuals who critique the study
 - d) The variables being measured
11. Which of the following statements is true about probability sampling?
- a) It eliminates sampling bias completely
 - b) It allows researchers to make statistical inferences about the population
 - c) It is less reliable than non-probability sampling
 - d) It is based solely on the researcher's discretion
12. The Belmont Report serves as a model for:
- a) Environmental research regulations
 - b) Guidelines adopted by specific disciplines in research
 - c) Business ethics standards
 - d) Clinical practice guidelines

13. What information should be provided to respondents regarding the return of the questionnaire?
- a) A deadline for its return and a return address
 - b) Only a deadline
 - c) A return address only
 - d) Instructions for submitting via email
14. A good literature review should be organized around and related directly to:
- a) Personal opinions of the researcher
 - b) The topic under study
 - c) Random studies from unrelated fields
 - d) Previous research methodologies
15. What is the first step in conducting a descriptive study?
- a) Defining the disease under study
 - b) Defining the population
 - c) Measuring the disease
 - d) Comparing different populations
16. Fully informed consent aims to:
- a) Simplify the research process
 - b) Ensure that participants understand all aspects of the study before agreeing to participate
 - c) Increase the number of participants in the study
 - d) Limit the amount of information shared with participants
17. What characterizes non-probability sampling?
- a) Random selection of participants
 - b) The probability of selection for each element is known
 - c) Personal knowledge and opinion play a major role in selection
 - d) Equal chance of inclusion for all population elements
18. What is a double-barreled question?
- a) A question that is asked multiple times

- b) A question that contains two or more different inquiries
 - c) A question that is too long and confusing
 - d) A question that has no clear answer
19. Which of the following is an example of a null hypothesis?
- a) HO: There is a significant effect of a new drug on health.
 - b) HO: Increased study time leads to better grades.
 - c) HO: There is no difference in test scores between students who study alone and those who study in groups.
 - d) HO: Higher income results in higher expenditure on luxury items
20. After the initial citation of a source with three to five authors, how should you reference it in the text?
- a) Frank, Prasad, Smith and Perera (2002)
 - b) Frank et al. (2002)
 - c) Frank, Prasad, Smith (2002)
 - d) Frank, Prasad, Perera (2002)

SECTION B: SHORT ANSWER ALL QUESTIONS (40 MARKS)

1. Explain the significance of research (5 marks)
2. Explain keys areas an abstract cover in research (5 marks)
3. Differentiate between cross sectional study design and case study design citing examples on each (5 marks)
4. Differentiate between stratified sampling method and snowball sampling citing examples of each (5 marks)
5. Explain Beneficence and Respect for human dignity in research (5 marks)
6. Explain how you will Formulate the topic during research development (5 marks)
7. Explain two types of data during data collection citing examples on each (5 marks)
8. Outline four consideration when formulating a questionnaire giving at least an example (5 marks)

SECTION C: LONG ANSWER TWO QUESTIONS (40 MARKS)

1. Recent studies in your region have shown a worrying rise in hospital-acquired infections due to multi-drug resistant (MDR) pathogens, especially Methicillin-resistant *Staphylococcus aureus* (MRSA) and Extended Spectrum Beta-Lactamase (ESBL)producing bacteria. Your preliminary data from clinical samples at a local hospital show that nearly 30% of infections caused by these bacteria are resistant to more than three classes of antibiotics. This poses a significant threat to patient safety and complicates treatment protocols. Write a research proposal process based on the above information (20 marks)
2. You are a researcher conducting a study on the efficacy of a new antibiotic to combat microbial resistance in hospital-acquired infections. The study involves collecting clinical samples from patients, running diagnostic tests, and administering the experimental drug to a subset of participants. In designing the study, you must create an Informed Consent Form to ensure participants fully understand the nature of the research, any risks involved, and their rights. This is crucial for obtaining ethical approval and ensuring compliance with research standards. Discuss the contents that will be included in a consent form (20 marks)
3. You are part of a public health investigation team tasked with identifying the source of a food poisoning outbreak that has affected over 100 people in a small town. The symptoms reported by the affected individuals include severe stomach cramps, vomiting, and diarrhea, with most cases linked to a recent local food festival. The festival had numerous food stalls offering a variety of foods, including meats, dairy products, salads, and street food. Your goal is to determine the pathogen responsible for the outbreak and the specific food source that caused the contamination. You are required to choose the most appropriate sampling techniques to ensure accurate identification of the contaminate. Identify the Sampling Methods you will use in sample collection for analysis (20 marks)