

# MAULANA AZAD NATIONAL URDU UNIVERSITY

Ph.D Zoology (Research Admission Test) RAT - 2022

## QUESTION PAPER BOOKLET

Time: 2 hours

Max. Marks: 100

Hall Ticket No.

OMR Serial No.

### INSTRUCTIONS TO THE CANDIDATES

1. Candidate should write their Hall Ticket number and OMR number on the space provided above. Candidate should not write their Hall Ticket number and OMR at any other place.
2. This booklet contains 16 pages. Candidate should check the booklet before taking the test. In case of misprint or irregularity in question numbers / pages, etc., should report to the Invigilator immediately.
3. There are 100 Multiple Choice Questions in the booklet. For each question there are four options. The candidate is required to choose the correct answer and darken the circle with blue / black ballpoint pen in the OMR sheet against the corresponding answer number.
4. Candidate will get one mark each for each correct reply in the OMR sheet. If the candidate does not bubble the correct answer against the corresponding question number in the OMR sheet, he will not get marks.
5. If the candidate bubbles more than one circle in OMR Sheet for any question, marks shall not be awarded for the question.
6. There are no Negative marks.
7. At the end of Entrance Test, candidates are allowed to take their question booklet.

**Part - A**  
**(Research Methodology)**

1. Why do you need to review the existing literature?
  - A. To make sure you have a long list of references
  - B. Because without it, you could never reach the required word-count
  - C. To find out what is already known about your area of interest
  - D. To help in your general studying
  
2. What do you mean by Unit of Analysis?
  - A. Main parameter
  - B. Variables
  - C. Sample
  - D. Constructs
  
3. An image, perception, or concept that is capable of measurement is called.
  - A. Scale.
  - B. Hypothesis.
  - C. Type.
  - D. Variable
  
4. To pursue the research, which of the following is priorly required?
  - A. Developing a research design
  - B. Formulating a research question
  - C. Deciding about the data analysis procedure
  - D. Formulating a research hypothesis
  
5. What are the conditions in which Type-I error occurs?
  - A. The null hypotheses get accepted even if it is false
  - B. The null hypotheses get rejected even if it is true
  - C. Both the null hypotheses as well as alternative hypotheses are rejected
  - D. None of the above
  
6. How to judge the depth of any research?
  - A. By research title
  - B. By research duration
  - C. By research objectives
  - D. By total expenditure on research

7. Research is
  - A. Searching again and again
  - B. Finding a solution to any problem
  - C. Working scientifically to search for the truth of any problem
  - D. None of the above
  
8. In the process of conducting research ‘Formulation of Hypothesis’ is followed by
  - A. Statement of Objectives
  - B. Analysis of Data
  - C. Selection of Research Tools
  - D. Collection of Data
  
9. Concepts are ..... of Research
  - A. Guide
  - B. Tools
  - C. Methods
  - D. Variables
  
10. Which of the following is not a data-collection method?
  - A. Research questions
  - B. Unstructured interviewing
  - C. Postal survey questionnaires
  - D. Participant observation
  
11. The essential characteristics of a researcher
  - A. The passion for finding answers to questions
  - B. Reliance on observations and evidence
  - C. Organizing knowledge or forming a theory
  - D. All of them
  
12. A formal document that presents the research objectives, design of achieving these objectives and the expected outcomes/deliverables of the study is called
  - A. Research design
  - B. Research proposal
  - C. Research hypothesis
  - D. Research report
  
13. The survey is a ..... Study
  - A. Descriptive
  - B. Fact-finding
  - C. Analytical
  - D. Systematic

14. In a survey, there is an enumerator and a .....
- A. Guide
  - B. Respondent
  - C. Supervisor
  - D. Messenger
15. The first purpose of a survey is to .....
- A. Description
  - B. Evaluation
  - C. Propagation
  - D. Provide Information
16. What are the core elements of a Research Process?
- A. Introduction; Data Collection; Data Analysis; Conclusions and Recommendations
  - B. Executive Summary; Literature Review; Data Gathered; Conclusions; Bibliography
  - C. Research Plan; Research Data; Analysis; References
  - D. Introduction; Literature Review; Research Methodology; Results; Discussions and Conclusions
17. Identifying causes of a problem and possible solutions to a problem is
- A. Field Study
  - B. Diagnostic study
  - C. Action study
  - D. Pilot study
18. The second step in problem formulation is
- A. Statement of the problem
  - B. Understanding the nature of the problem
  - C. Survey
  - D. Discussions
19. The main problem in the questionnaire is
- A. Accessible to Diverse Respondent
  - B. Greater Anonymity
  - C. Shows an inability of the respondent to provide information
  - D. None of these

20. Research is classified based on..... .. and methods
- Purpose
  - Intent
  - Methodology
  - Techniques
21. The wrong questionnaire is an example of .....
- Primary data collection problem
  - Secondary data collection problem
  - a and b both
  - None of the above
22. An example of scientific knowledge is \_\_\_\_\_
- Laboratory and field experiments
  - Social traditions and customs
  - Authority of the Prophet or great men
  - Religious scriptures
23. Which technique is generally followed when the population is finite?
- Systematic Sampling Technique
  - Purposive Sampling Technique
  - Area Sampling Technique
  - None of the above
24. Which one is called non-probability sampling?
- Quota sampling
  - Cluster sampling
  - Systematic sampling
  - Stratified random sampling
25. Research undertaken for increasing knowledge in the scientific world is called
- Pure and Basic Research
  - Action and applied Research
  - Pilot study
  - Survey
26. What is a sampling unit?
- The population.
  - The basic unit contains the elements of the population to be sampled.
  - All the individual elements of the final sample, are drawn together.
  - The method used to collect the sample.

27. Which of the following is not a non-random sampling method?
- A. Cluster sampling
  - B. Quota sampling
  - C. Convenience sampling
  - D. Accidental sampling
28. Which test is the part of the parametric test?
- A. Sign Test
  - B. Run Test for Randomness
  - C. Kruskal-Willis Test
  - D. z-test
29. SPSS is an acronym of the following?
- A. Statistical Predictions for Social Sciences.
  - B. Statistical Predictions for scientific study
  - C. Statistical Package for the Social Sciences.
  - D. Statistical Package for Scientific Survey
30. The final stage in the Research Process is
- A. Problem formulation
  - B. Data collection
  - C. Data Analysis
  - D. Report Writing
31. A comprehensive full Report of the research process is called.
- A. Thesis
  - B. Summary Report
  - C. Abstract
  - D. Article
32. The first page of the research report is
- A. Appendix
  - B. Bibliography
  - C. Index
  - D. Title Page

33. The chi-square test is:
- A. A mean
  - B. A multi-question test.
  - C. A statistical mistake.
  - D. A statistic
34. ANOVA is
- A. A government body that collects social statistics.
  - B. The name of a statistical software package.
  - C. A one-way analysis of variance.
  - D. A New-way analysis of variance.
35. Which of the following is not one of the seven major parts of the research report?
- A. Results
  - B. Abstract
  - C. Method
  - D. Footnotes
36. In SPSS, what is the "Data Viewer"?
- A. A table summarizing the frequencies of data for one variable
  - B. A spreadsheet into which data can be entered
  - C. A dialog box that allows you to choose a statistical test
  - D. A screen in which variables can be defined and labeled
37. A reasoning where we start with certain particular statements and conclude with a universal statement is called
- A. Inductive Reasoning
  - B. Deductive Reasoning
  - C. Abnormal Reasoning
  - D. Transcendental Reasoning
38. High-Level Language is .....
- A. Disc space-dependent
  - B. O.S. dependent
  - C. Machine independent
  - D. Machine dependent

39. A common test in research demands much priority on
- A. Reliability
  - B. Useability
  - C. Objectivity
  - D. All of the above
40. “Controlled Group” is a term used in.....
- A. Survey Research
  - B. Historical Research
  - C. Experimental Research
  - D. Descriptive Research
41. How is the stochastic equation of information solved?
- A. By statistical rules
  - B. By dynamic rules
  - C. By statistical and dynamic rules
  - D. None of these
42. Whether Library is a system?
- A. Yes, it has various sections as sub-systems.
  - B. It is quite impossible
  - C. No, it cannot be a system
  - D. A library is separate from a system.
43. The case study is type of ..... research
- A. Qualitative
  - B. Quantitative
  - C. Survey
  - D. None of them
44. Which of the following is not covered under Intellectual Property Rights?
- A. Copyrights
  - B. Patents
  - C. Trade Marks
  - D. Thesaurus
45. Informal self-education is possible in what kind of library?
- A. National Library
  - B. Public Library
  - C. Specific Library
  - D. College Library



46. Conference proceedings are considered as ..... documents.
- A. Primary
  - B. Conventional
  - C. Secondary
  - D. Tertiary
47. Innovation is commonly known as
- A. The commercialization of the invention.
  - B. Something that already existed but had not been found
  - C. New product or process that solves a technical problem
  - D. All the above
48. Who defined "research" as a "systematic effort to acquire new knowledge"?
- A. Tom & Zerry
  - B. Redman and Mori
  - C. F. W. Taylor
  - D. Ross Taylor
49. What is the purpose of a research aptitude test for UGC NET candidates?
- A. Provide candidates with basic search ideas
  - B. Screening of scientific-minded people
  - C. Provide the government with a database of the country's 'future' scientists
  - D. Putting obstacles in the way of candidates
50. What is a hypothesis?
- A. A provisional statement whose veracity is yet to be verified.
  - B. Assumption based on past experiences.
  - C. Statement of Truth
  - D. All of them

**Part - B**

**(Zoology)**

51. Which of the following metabolite negatively regulates pyruvate kinase?  
A. Fructose-1,6-Bisphosphate                      B. Citrate  
C. Acetyl CoA    D. Alanine
52. Insects are thought to be so very evolutionary successful because of  
A. Their small size  
B. Ability to utilize many food sources  
C. Reproductive potential  
D. All of the above
53. An ommatidium is a functional unit of.....  
A. Excretory system                                      B. Nervous system  
C. Compound eye                                        D. Reproductive system
54. Galactosemia is caused by a deficiency of which enzyme.  
A. galactokinase  
B. Galactose 1- phosphate-uridyl-transferase  
C. DP-4- Epimerase  
D. Galactose dehydrogenase
55. The conversion of pyruvate to acetyl CoA is catalyzed by the enzyme pyruvate dehydrogenase. In this reaction  
A. ADPH is oxidized to NADP                      B. NADH is oxidized to NAD  
C. ADP is reduced to NADPH                      D. NAD is reduced to NADH
56. Which of the following is false regarding enzyme pyruvate dehydrogenase?  
A. It is a multi-enzyme complex  
B. It catalyzes the reversible reaction  
C. It is a mitochondrial enzyme  
D. It requires thiamine, flavin, and nicotine vitamin co-enzymes
57. Transport of sodium in the renal tubules involve:  
A. Na<sup>+</sup>/K<sup>+</sup>-ATPase located on the membrane of proximal tubules  
B. Na<sup>+</sup>/K<sup>+</sup>-ATPase located on the membrane of distal tubules  
C. The entry of sodium into tubular cells by passive transport  
D. Na<sup>+</sup> is neither reabsorbed nor secreted in the renal tubules

58. Amino acids are transported via specific transporter that is present in
- A. Proximal tubules
  - B. Loop of Henle
  - C. Distal tubules
  - D. Collecting ducts
59. Which of the following parts of the nephrons is important for the concentration of urine.
- A. Proximal tubules
  - B. Distal tubules
  - C. Loop of Henle
  - D. Collecting ducts
60. Albumin (69kDa) is the major plasma protein constituting 60% of total plasma proteins. Which of the following is not the function of albumin
- A. Maintenance of osmotic pressure
  - B. Binding and transport of fatty acids and bilirubin
  - C. Transport of iron
  - D. Transport of drugs such as sulphonamides
61. During development, if a cell has committed to a specific fate, it is said to be
- A. pluripotent
  - B. totipotent
  - C. determined
  - D. differentiated
62. The pathway from a gene to a protein in eukaryotic cells involves:
- A. Transport of mRNA → processing → transcription → translation
  - B. Transcription of the RNA → transport → processing → translation
  - C. Translation of the RNA → transport → processing → transcription
  - D. Transcription of RNA → processing → transport → translation
63. Which of the following are the characteristic features of type 1 diabetes mellitus?
- A. Type 1 diabetes is caused by an absolute deficiency of insulin.
  - B. Type 1 diabetes is associated with the autoimmune destruction of beta cells.
  - C. Patients with type 1 diabetes present with diabetic ketoacidosis
  - D. All of the above
64. Which of the following statement is NOT true about the important properties of the Corona virus?
- A. Non-Enveloped RNA virus
  - B. Enveloped RNA virus
  - C. ssDNA Virus
  - D. dsDNA Virus
65. The envelope protein gp120 (Glycoprotein 120) is required for the attachment of HIV to CD 4 receptors of target host cells. Identify the immune cells that consist of CD 4 receptors?
- A. T helper cells
  - B. Monocytes
  - C. Macrophages
  - D. Dendritic cells

66. A very large ecosystem on land having the distinct type of vegetation and wildlife is called?  
A. Ecology  
B. Biodiversity  
C. Biome  
D. Biosphere reserve
67. Which one of the following is not an in-situ conservation method?  
A. Zoo  
B. National Parks  
C. Biosphere Reserves  
D. Sanctuaries
68. Which of the following hormones is synthesized by the posterior pituitary gland  
A. LH & FSH  
B. TSH  
C. Antidiuretic hormone and Oxytocin  
D. Growth hormone and Prolactin
69. The release of Anterior Pituitary hormones is regulated by the hormones secreted from the hypothalamus. Which of the following hormone is not released from the hypothalamus?  
A. Growth hormone-releasing hormone  
B. Thyroid Stimulating hormone  
C. Gonadotropin-releasing hormone  
D. Corticotrophin-releasing hormone
70. The upper part of an aquatic ecosystem contains  
A. Nekton  
B. Benthos  
C. Plankton  
D. both (A) and (B)
71. Which of the following factor increases insulin secretion?  
A. Increased Blood glucose  
B. Somatostatin  
C. Norepinephrine  
D. All of the above
72. Which term of genetics represents the potential ability of a cell to grow into a complete organism?  
A. Pluripotency  
B. Totipotency  
C. Cloning  
D. Variation
73. The tendency of an offspring to resemble its parent is known as  
A. Variation  
B. Resemblance  
C. Heredity  
D. Inheritance
74. Homozygosity and heterozygosity of an individual can be determined by  
A. Back cross  
B. Self-fertilization  
C. Test cross  
D. All of the above

75. Which of the following is the sequential process of gene arrangement of kappa light chain of antibody?
- A. VJ joining → Transcription → Alternative RNA splicing → VJC joining → Translation
  - B. Transcription → VJ joining → Alternative RNA splicing → VJC joining → Translation
  - C. Transcription → Alternative RNA splicing → VJ joining → VJC joining → Translation
  - D. None of the above
76. Which of the following antibodies may be co-expressed by the B-cells?
- A. IgM and IgA
  - B. IgM and IgD
  - C. IgG and IgD
  - D. IgG and IgE
77. Which of the following is true for the antigenic peptide that is presented via MHC class I and MHC class II?
- A. They are non-covalently but stably bound to MHC
  - B. They are covalently bound to the MHC
  - C. The antigen peptide dissociate from MHC once it reaches the cell surface
  - D. The antigen can be replaced by other peptides on the cell membrane
78. Complements are the proteins that are involved in the clearance of antigens/bacteria. Which of the following pathway is involved in the adaptive immune response?
- A. Alternative Pathway
  - B. Lectin Binding Pathway
  - C. Classical Pathway
  - D. All of the above
79. Cytokines recognize and engage with their receptors for biological action. Which of the following is the correct sequence of high-affinity to low-affinity interactions?
- A. Antibody > MHC > Cytokine
  - B. MHC > Antibody > Cytokine
  - C. Cytokine > Antibody > MHC
  - D. None of the above
80. Which of the following is not the class of T cells?
- A. T-helper cells
  - B. T-cytotoxic cells
  - C. T-suppressor cells
  - D. T-activator cells
81. The monomeric immunoglobulin consists of heterodimers of heavy (H) and light (L) chain bound together by non-covalent interaction and disulfide bonds. Which of the following is the antigen-binding site?
- A. Fab
  - B. Fc
  - C. Hinge region
  - D. None of the above

82. Which of the following combination is correct?
- A. Penicillin: inhibition of cell wall synthesis
  - B. Cephalosporin: inhibition of protein synthesis
  - C. Aminoglycoside: inhibition of cell wall synthesis
  - D. Fluoroquinolones: inhibition of cell wall synthesis
83. Which of the following statement is true for ACE inhibitors?
- A. ACE inhibitors reduce both cardiac preload and afterload, thereby decreasing cardiac work
  - B. ACE inhibitors increase both angiotensin II and bradykinin levels
  - C. ACE inhibitors decrease both angiotensin II and bradykinin levels
  - D. None of the above
84. Which of the following are at risk of getting influenza flu? Choose the correct answer
- A. A 70-year-old woman
  - B. A healthy 4-year-old boy
  - C. A 35-year-old man with diabetes
  - D. All of the above
85. In some viruses, RNA serves as the storage of genetic materials, and DNA is synthesized from RNA by the enzyme known as:
- A. DNA synthetase
  - B. DNA polymerase
  - C. Reverse transcriptase
  - D. DNA convertase
86. In a DNA which of the following base-pairing rule is true:
- A. Adenine pairs with Guanine and Thymine pairs with Cytosine
  - B. Adenine pairs with Thymine and Guanine pairs with Cytosine
  - C. Adenine pairs with Cytosine and Guanine pairs with Thymine
  - D. DNA base pairing is nonspecific
87. A short strand of ..... primer is required for the replication of DNA:
- A. DNA
  - B. RNA
  - C. Histone
  - D. hnRNA
88. Which of the following DNA technology is used to identify the suspects in the criminal investigation?
- A. Western blot
  - B. RFLP
  - C. Northern blot
  - D. Southern blot

89. Which of the following is the FALSE statement: Lac Operon is activated when;
- A. glucose is absent
  - B. lactose is present
  - C. glucose is absent and lactose is present
  - D. glucose is present and lactose is absent
90. The genetic code is a triplet nucleotide sequence in the mRNA that determines the amino acid sequence of the protein. Following are the characteristics of amino acid EXCEPT:
- A. Specificity
  - B. Universal
  - C. Redundant
  - D. Overlapping
91. In eukaryotes, the consensus promoter sequences (TATA box) that are required for initiation of transcription is generally present
- A. 10 nucleotide upstream of transcription start site (TSS)
  - B. 25 nucleotide upstream of TSS
  - C. 10 nucleotide downstream of TSS
  - D. 25 nucleotide downstream of TSS
92. Larva of the sponge is known as
- A. planula larva
  - B. trochophore larva
  - C. glochidium larva
  - D. amphiblastula larva
93. The minimum components of an artificial yeast chromosome include
- A. An autonomously replicating sequence
  - B. A centromere sequence
  - C. A telomere sequence
  - D. All of the above
94. The sensitivity of the immunoassays increases in the order of
- A. Precipitin tests, agglutination tests, Enzyme immunoassays
  - B. Enzyme immunoassays, agglutination tests, Precipitin tests
  - C. Agglutination tests, precipitin tests, Enzyme immunoassays
  - D. Precipitin tests, enzyme immunoassays, Agglutination tests
95. Which one of the following is correct regarding chickenpox and smallpox
- A. The attenuated cowpox virus works as a vaccine for both the viruses
  - B. Attenuated cowpox virus works as a vaccine for smallpox virus but not for chickenpox virus
  - C. Attenuated cowpox virus works as a vaccine for Chickenpox virus but not for smallpox virus
  - D. Both the viruses belong to the family poxviridae

96. The RNA virus having DNA as an intermediate in the life cycle is
- A. Human immunodeficiency virus (HIV)
  - B. Hepatitis C virus (HCV)
  - C. Hepatitis B virus (HBV)
  - D. None
97. Severe reactions are likely after transfusion of blood group
- A. B to a group AB person.
  - B. A to a group O person.
  - C. A to a group AB person.
  - D. Rh-negative to a group AB Rh-positive person.
98. Rapid infusion of 2 litres of normal saline causes:
- A. Increased ECF, increased ICF, decreased [Na<sup>+</sup>]
  - B. Increased ECF, unchanged ICF, increased [Na<sup>+</sup>]
  - C. Unchanged ECF, increased ICF, increased [Na<sup>+</sup>]
  - D. Increased ECF, unchanged ICF, unchanged [Na<sup>+</sup>]
99. During strong exercise, oxygen consumption is greatest in:
- A. Brain
  - B. Heart
  - C. Skeletal muscle
  - D. Liver
100. Water filtration by the kidney: Select the correct option
- A. Is 180 l/hr
  - B. Is 125 ml/min
  - C. Up to 90% is reabsorbed
  - D. Most drugs have MW less than 600 and are freely filtered