DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

23-0009-AA1 TEST BOOKLET

ZOOLOGY

Time Allowed: 3 hours | **PAPER – II** | **Maximum Marks: 300**

INSTRUCTIONS TO CANDIDATES

***Read the instructions carefully before answering the questions*: -**

1. This Test Booklet consists of 12(twelve) pages and has 75 (seventy-five) items (questions).
2. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS BOOKLET *DOES NOT* HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
3. **Please note that it is the candidate's responsibility to fill in the Roll Number and other required details carefully and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet and the Separate Answer Booklet. Any omission/discrepancy will render the OMR Answer Sheet and the Separate Answer Booklet liable for rejection.**
4. Do not write anything else on the OMR Answer Sheet except the required information. Before you proceed to mark in the OMR Answer Sheet, please ensure that you have filled in the required particulars as per given instructions.
5. Use only **Black Ball Point Pen** to fill the OMR Answer Sheet.
6. This Test Booklet is divided into 4 (four) parts – **Part – I, Part – II, Part - III** and **Part – IV**.
7. All three parts are **Compulsory**.
8. **Part-I consists of Multiple Choice-based Questions.** The answers to these questions have to be marked in the **OMR Answer Sheet** provided to you.
9. **Part-II, Part-III and Part-IV consist of Conventional Essay-type Questions.** The answers to these questions have to be written in the separate **Answer Booklet** provided to you.
10. In Part-I, each item (question) comprises of 04 (four) responses (answers). You are required to select the response which you want to mark on the OMR Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose *ONLY ONE* response for each item.
11. After you have completed filling in all your responses on the OMR Answer Sheet and the Answer Booklet(s) and the examination has concluded, you should hand over to the Invigilator *only the OMR Answer Sheet and the Answer Booklet(s)*. You are permitted to take the Test Booklet with you.
12. **Penalty for wrong answers in Multiple Choice-based Questions:**

THERE WIL BE **PENALTY** FOR WRONG ANSWERS MARKED BY A CANDIDATE.

(i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, one-third of the marks assigned to the question will be deducted as penalty.

(ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct and there will be same penalty as above to the question.

(iii) If a question is left blank. i.e., no answer is given by the candidate, there will be no penalty for that question.

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PART - I
(Multiple Choice-based Questions)

Instructions for Questions 1 to 50:

- *Choose the correct answers for the following questions.*
- *Each question carries 3 marks.* *[3x50=150]*

1. Plant cells differ from animal cells in the absence of -
   (a) ER
   (b) Ribosomes
   (c) Mitochondria
   (d) Centrioles

2. Which of the following represents the smallest known cell?
   (a) Blue-green algae
   (b) Bacteria
   (c) Mammalian egg
   (d) PPLO

3. Cellular organelle containing hydrolytic enzymes are called -
   (a) Microsomes
   (b) Lysosomes
   (c) Oxysomes
   (d) Ribosomes

4. Which among the following are non-membranous cell organelles?
   (a) Ribosomes
   (b) Centriole and Ribosomes
   (c) Endoplasmic reticulum
   (d) Mitochondria

5. Which of the following statements about Mitochondria is true?
   (a) It is related with Glucose formation
   (b) It is related with ADP formation
   (c) It is related with AMP formation
   (d) It is related with ATP formation

6. Protein secretion is carried out by which of the following?
   (a) Nucleolus
   (b) Plastids
   (c) Endoplasmic reticulum
   (d) Golgi complex

7. The cytoskeleton of the cell is made up of -
   (a) Endoplasmic reticulum
   (b) Mitochondria
   (c) Cell wall
   (d) Cytoplasm

8. Where do the Balbiani rings occur?
   (a) Polytene chromosomes
   (b) Lampbrush chromosomes
   (c) Polysomes
   (d) Heterosomes

9. The presence of sodium and chloride in the animal bodies indicates that life first evolved in/on the -
   (a) Land
   (b) Ocean
   (c) Air
   (d) None

10. Which of the following statements about Darwin's theory is/are true?
   1. The theory is not applicable to vestigial organs
   2. The theory did not explain the arrival of the fittest
   3. The theory did not account for degeneration of organs

   Codes:
   (a) Only 1 is true
   (b) Only 3 is true
   (c) Both 1and 2 are true
   (d) All of the above are true

11. Which one of the following is lacking in Apes?
   (a) Prognathous face
   (b) Small cranium
   (c) Longer hindlimbs
   (d) None of the above

12. In which of the following does Holoblastic cleavage occur?
   (a) Alecithal eggs
   (b) Homolecithal eggs
   (c) Mesolecithal eggs
   (d) All of these

13. The main body axes in animals is established by -
   (a) Morulation
   (b) Gastrulation
   (c) Blastulation and Gastrulation
   (d) Morulation and Blastulation

14. Which of the following statements about enzymes is/are correct?
   1. They are Biological Catalysts
   2. Enzymes are generally large protein molecules
   3. They are usually very specific as to what substrates they bind

   Codes:
   (a) Only 1 is correct
   (b) Only 2 is correct
   (c) Both 1and 3 are correct
   (d) All of the above are correct

15. Urine in humans -
    (a) Is isotonic
    (b) Is hypotonic
    (c) Is hypertonic
    (d) Varies depending on physiological condition.

16. Spermatogenesis in mammals is regulated by -
    (a) FSH
    (b) LH
    (c) Testosterone
    (d) FSH, LH, and Testosterone

17. Which one of the following is not a characteristic of muscles?
    (a) Excitability
    (b) Rigidity
    (c) Contractility
    (d) Extensibility

18. The Double Helix structure of DNA was discovered by -
    (a) Nirenberg
    (b) Kornberg
    (c) Holley and Nirenberg
    (d) Watson and Crick

19. The enzyme reverse transcriptase catalyzes the synthesis of -
    (a) mRNA
    (b) cDNA
    (c) tRNA
    (d) rRNA

20. Mendel formulated the Law of purity of gametes on the basis of which of these?
    (a) Test cross
    (b) Back cross
    (c) Monohybrid cross
    (d) Dihybrid cross

21. A gene that shows its effect on more than one character is
    (a) Poly gene
    (b) Pleiotropic gene
    (c) Multifactor gene
    (d) Multiple gene

22. Chromosomes are made up of:
    (a) DNA + Protein
    (b) RNA + DNA
    (c) DNA + Histones
    (d) DNA only

23. Point mutation is -
    (a) Loss of gene
    (b) Change in a base of gene
    (c) Addition of a gene
    (d) Deletion of a segment of a gene

24. Satellite DNA contains -
    (a) Repetitive DNA
    (b) Segments forming sn RNA
    (c) Segments forming sc RNA
    (d) Both b and c

25. Neanderthal man differs from modern man in terms of -
    (a) Receding jaws
    (b) Protruding jaws
    (c) Short neck
    (d) None of the above

26. Which of the following best expresses the common origin of Man and Chimpanzee?
    (a) Chromosome number
    (b) Dental formula
    (c) Cranial capacity
    (d) Binocular vision

27. Species inhabiting different geographical areas is known as -
    (a) Allopatric
    (b) Sympatric
    (c) Sibling
    (d) Biospecies

28. Lamarck's theory of evolution is known as
    (a) Natural selection
    (b) Inheritance of acquired characters
    (c) Survival of the fittest
    (d) Mutation theory

29. Frequency of a gene in a population will increase if the gene is -
    (a) Lethal
    (b) Dominant
    (c) Recessive
    (d) Favorably selected

30. Which of these cells are immortal?
    (a) Germ cells
    (b) Somatic cells
    (c) Pituitary cells
    (d) Glomerular cells

31. The chief agent of evolution is -
    (a) Natural selection
    (b) Mutations
    (c) Acquired characters
    (d) Sexual reproduction

32. Which one of the following is a reducing sugar?
    (a) Sucrose
    (b) Lactose
    (c) Maltose
    (d) All of the above

33. Proteins often function as -
    (a) Antibodies
    (b) Hormones
    (c) Enzymes
    (d) All of the above

34. Synthesis of fatty acids require which of the following?
    (a) NAD^+
    (b) FAD
    (c) NADH
    (d) NDPH

35. The most abundant enzyme is -
    (a) Amylase
    (b) Catalase
    (c) Rubisco
    (d) Alcohol dehydrogenase

36. Water soluble vitamins are not stored in the body, except vitamin
    (a) B_6
    (b) B_7
    (c) B^{12}
    (d) C

37. Respiratory pigment having a high affinity for oxygen is -
    (a) Chlorocruorin
    (b) Haemoglobin
    (c) Haemocyanin
    (d) Haemerythrin

38. The gray matter is composed of large masses of -
    1. Cell bodies
    2. Dendrites
    3. Unmyelinated axons

    Codes:
    (a) Only 1
    (b) Only 2
    (c) Only 3
    (d) All of the above

39. Which of the following statements about human retina is/are correct?
    (a) It contains one million optic nerves
    (b) It contains 6 million cones
    (c) It contains 100 million rods
    (d) All of the above

40. The site where fertilization occurs is -
    (a) Ovary
    (b) Fallopian tube
    (c) Uterus
    (d) Vagina

41. During menstrual phase, the level of -
    (a) LH is high
    (b) FSH and Estrogen is high
    (c) Estrogen and progesterone are high
    (d) Estrogen and progesterone are low

42. During pregnancy, which one of the following acts as a temporary endocrine structure?
    (a) Placenta
    (b) Fallopian tube
    (c) Uterus
    (d) All of the above

43. Low blood sugar does not cause secretion of -
    (a) Glucagon
    (b) Thyroxine
    (c) Parathormone
    (d) Epinephrine

44. Insulin has either little or no effect on uptake of glucose in the cells of -
    (a) Heart
    (b) Bone marrow
    (c) Brain
    (d) Kidney

45. In Meroblastic cleavage, division is -
(a) Complete
(b) Partial
(c) Spiral
(d) Horizontal

46. In Protostomia, blastopore becomes mouth opening, except in -
(a) Echinoderms
(b) Hemichordates
(c) Echinoderms and Hemichordates
(d) Mollusca and Echinoderms

47. Thyroid and Parathyroid develop from -
(a) Ectoderm
(b) Mesoderm
(c) Endoderm
(d) Ecto-mesoderm

48. Which one of the following crosses placenta?
(a) Nicotine
(b) Cocaine
(c) Heroin
(d) All of these

49. Which of the following about Gastrulation is/are incorrect?
1. High rate of Oxidation
2. Insignificant growth
3. Increased rate of Cell Divisions
4. Synthesis of new types of proteins

Codes:
(a) Only 1
(b) Only 2
(c) Only 3
(d) Both 1 and 4

50. Massive cell death occurs in the development of -
(a) Brain
(b) Brain and Eyes
(c) Limbs
(d) Eyes and Limbs

PART - II
(Short Answer-type Questions)

Instructions for Questions 51 to 63:

- *Write the answers in short for any 10 (TEN)out of the thirteen questions.*
- *Each question carries 5 marks.* *[5x10=50]*

51. Draw a well-labeled diagram of the structure of the nucleus.
52. What is mitotic apparatus? What is its significance?
53. What are polytene chromosomes and where are they found?
54. Define interrupted gene with an example.
55. Write a note on pedigree analysis.
56. What is Hardy -Weinberg law? Give example.
57. Give an overview of Cladistics.
58. Draw a flow chart of Krebs cycle.
59. Differentiate between co-enzymes and co-factors with examples.
60. What are anti-coagulants? Give examples.
61. Define totipotency. Why are plant cells called totipotent?
62. State the Biogenetic Law as proposed by Haeckel. Cite its importance.
63. What are fate maps? Draw one as an example.

PART - III
(Long Answer-type Questions)

Instructions for Questions 64 to 71:

- ***Answer any 5 (FIVE) out of the eight questions.***
- ***Each question carries 10 marks.*** ***[10x5=50]***

64. Compare and contrast Heterochromatin with Euchromatin.

65. Outline the events of Mitosis. Illustrate your answer with suitable diagrams.

66. The ability to roll the tongue into almost a complete circle is conferred by a dominant gene, while its recessive allele fails to confer this ability. A man and his wife can both roll their tongues and are surprised to find that their son cannot. Explain this by showing the genotypes of all three persons.

67. Explain the genetic mechanism of sex- determination in humans.

68. Lamarck's theory of acquired characters does not agree with present evidences. Elucidate.

69. Describe the factors and mechanisms of coagulation in humans.

70. What are stem cells? Explain their types and uses.

71. Aquaporins are proteins embedded in the plasma membrane that allow water molecules to move between the extracellular matrix and the intracellular space. Based on its function and location, describe the key features of the protein's shape and the chemical characteristics of its amino acids.

PART - IV
(Essay-type Questions)

Instructions for Questions 72 to 75:

- *Answer any 2 (TWO) out of the four questions.*
- *Each question carries 25 marks.* *[25x2= 50]*

72. Describe in detail the process of transcription, RNA processing and translation.

73. Give a detailed account of the evolutionary lineage of the horse.

74. Describe the role of enzymes in metabolic pathways and explain how enzymes function as molecular catalysts. Discuss enzyme regulation by various factors.

75. What is a neuron and synapsis? Explain in detail the conduction of nerve impulse and synaptic transmission.