

## ENTRANCE TEST FOR Ph.D. PROGRAMME, 2023

## ZOOLOGY

Time : Three Hours

Maximum : 100 Marks

## Part A

*Answer all questions.**Each question carries 1 mark.*

Choose the correct answer from the choices given :

1. Which among the following is the main difference between Chondrichthyes and Osteichthyes ?
  - A) Endoskeleton composition.
  - B) Fins.
  - C) Type of blood.
  - D) Type of jaws.
2. \_\_\_\_\_ is an example of an ex-situ conservation.
  - A) Sacred groves.
  - B) Wildlife sanctuary.
  - C) Seed bank.
  - D) National park.
3. Global warming can significantly be controlled by \_\_\_\_\_.
  - A) Increasing solid waste.
  - B) Reducing water wastage.
  - C) Burning human-generated waste.
  - D) Reducing fossil fuel consumption.
4. \_\_\_\_\_ is the basic unit of classification and a taxonomic rank.
  - A) Species.
  - B) Genus.
  - C) Class.
  - D) Order.
5. Which of the following animals is now extinct ?
  - A) Tasmanian tiger.
  - B) Tasmanian devil.
  - C) Pademelon.
  - D) Quol.

Turn over

6. The hot spots of biodiversity are characterized by :—
- A) Low endemism and low threat of extinction.
  - B) Low endemism and high threat of extinction.
  - C) High endemism and low threat of extinction.
  - D) High endemism and high threat of extinction.
7. Which of these is related to Ex-situ conservation of threatened plants and animals :
- A) Biodiversity hotspots.
  - B) Wildlife safari parks.
  - C) Amazon rainforest.
  - D) Himalayan region.
8. Name the site where digestion of proteins occurs :
- A) Pancreas.
  - B) Rectum.
  - C) Liver.
  - D) Ileum.
9. Night blindness and xerophthalmia are generally conditions associated with the deficiency of which vitamin ?
- A) Vitamin B.
  - B) Vitamin K.
  - C) Vitamin B2.
  - D) Vitamin A.
10. Where are the parotid glands located ?
- A) Below the stomach.
  - B) Behind and above the pancreas.
  - C) Below and in front of the ear canal .
  - D) Underneath the armpits .
11. The maximum amount of carbon dioxide in the human body is transported as :
- A) Bicarbonate.
  - B) Carbide.
  - C) Amylase.
  - D) None of the above.

12. Altitude sickness is typically caused due to :
- A) The partial pressure of oxygen.
  - B) Increased levels of  $\text{CO}_2$  in blood.
  - C) Cold temperatures.
  - D) None of the above
13. Hypopnea is a condition where :
- A) The airway becomes partially obstructed.
  - B) The blood does not clot properly.
  - C) The lungs cannot eliminate the excess carbon dioxide from the body.
  - D) The blood oxygen levels are abnormally low.
14. The lungs are protected by :
- A) Sternum.
  - B) Rib cage.
  - C) Backbone.
  - D) All of the above.
15. The primary function of the cerebrospinal fluid is to :
- A) Protect the brain.
  - B) Provide nutrients to the surrounding tissues.
  - C) Remove waste products.
  - D) All of the above.
16. Which of the following organs is known as the "graveyard" of RBCs ?
- A) Spleen.
  - B) Kidney.
  - C) Liver.
  - D) Gall bladder.
17. Single uriniferous tubule does not contain :
- A) Loop of Henle.
  - B) Collecting duct.
  - C) Distal convoluted tubule.
  - D) Bowman's capsule.

Turn over





33. The process of cell respiration is carried out by \_\_\_\_\_.
- A) Mitochondria.                      B) Chloroplast.  
C) Nucleus.                              D) None of the above.
34. ELISA is :
- A) Using radiolabelled second antibody.  
B) Usage of RBCs.  
C) Using complement-mediated cell lysis.  
D) Addition of substrate that is converted into a coloured end product.
35. Plasmids are used as cloning vectors for which of the following reasons ?
- A) Can be multiplied in culture.  
B) Self-replication in bacterial cells.  
C) Can be multiplied in laboratories with the help of enzymes .  
D) Replicate freely outside bacterial cells.
36. The vaccines prepared through recombinant DNA technology are :
- A) Third generation vaccines.                      B) First-generation vaccines.  
C) Second-generation vaccines.                      D) None.
37. RNA interference helps in :
- A) Cell proliferation.                      B) Micropropagation.  
C) Cell defence.                              D) Cell differentiation.
38. The Golden Rice variety is rich in :
- A) Vitamin C.                              B) B-carotene and ferritin.  
C) Biotin.                                      D) Lysine.
39. Which bacterium is used in the production of insulin by genetic engineering ?
- A) Saccharomyces.                      B) Rhizobium.  
C) Escherichia.                              D) Mycobacterium.

40. The DNA fragments have sticky ends due to :
- A) Endonuclease.
  - B) Unpaired bases.
  - C) Calcium ions.
  - D) Free methylation
41. Which is a genetically modified crop ?
- A) Bt-cotton.
  - B) Bt-brinjal.
  - C) Golden rice.
  - D) All the above.
42. Capillary hydrostatic pressure during filtration is built in the glomerulus as :
- A) Size of Bowman's capsule is significantly large.
  - B) An afferent arteriole is narrow compared to efferent.
  - C) Bowman's capsule is cup-shaped.
  - D) An efferent arteriole is narrow compared to afferent.
43. This happens if the proximal convoluted tubule is removed from nephron :
- A) Urine is not formed.
  - B) Quality and quantity of urine is unaffected.
  - C) Urine is more concentrated.
  - D) Urine is more diluted.
44. A decrease in blood pressure/volume will not cause the release of :
- A) ADH.
  - B) Renin.
  - C) Atrial natriuretic factor.
  - D) Aldosterone.
45. This is a common characteristic observed in both human beings and adult frogs :
- A) Ureotelic mode of excretion.
  - B) Internal fertilization.
  - C) Nucleated RBCs.
  - D) Four-chambered heart.
46. The walls of the ventricles possess thick muscular projections, they are known as :
- A) Conus arteriosus.
  - B) Truncus arteriosus.
  - C) Chordae tendineae.
  - D) Columnae carnaeae.

Turn over

47. Bundle of His is a network of :
- A) Muscle fibres present only in the ventricle wall.
  - B) Nerve fibres distributed in ventricles.
  - C) Muscle fibres distributed throughout the heart walls.
  - D) Nerve fibres found throughout the heart .
48. The tricuspid valve is present between :
- A) Ventricle and pulmonary artery.
  - B) Ventricle and aorta.
  - C) Left auricle and left ventricle
  - D) Right auricle and right ventricle .
49. Which of the following cells are found in liver ?
- A) Kupffer Cells.
  - B) Neurons.
  - C) Sperm Cells.
  - D) None of the above.
50. "Glisson's Capsules" is seen in \_\_\_\_\_ ?
- A) Kidneys.
  - B) Pancreas.
  - C) Liver.
  - D) Stomach.

(50 × 1 = 50 marks)

### Part B

*Answer any ten questions.  
Each question carries 5 marks.*

- 51. Explain the role of cortical granules in fertilization and add note on species specificity of fertilization.
- 52. Describe different phases of cell cycle.
- 53. Explain the process of electrophoresis and its applications.
- 54. Define gene therapy. Explain ex-vivo and in-vivo methods of gene therapy.
- 55. List the data collection tools used in quantitative designs and write in detail about questionnaire.
- 56. What are Antibodies ? Explain the structure of antibody molecules and comment on classes and subclasses of immunoglobulins.



57. Describe the process of translation.
58. Explain the structure of proteins and highlight the factors that affect the stability of the proteins.
59. Discuss various data collection methods with suitable examples.
60. Write in detail about the essential components of good research proposal and what are the factors affecting the research design ?
61. Explain Lotka-voltera equations and its applications in advance ecological theory.
62. What is scientific research and write in brief about ethics involved ?
63. Describe the necessity and importance of wildlife conservation.
64. Explain the role of bees in pollination. Describe how bees are structurally and behaviourally efficient pollinators.

(10 × 5 = 50 marks)