

Ph.D. ENTRANCE EXAMINATION, APRIL 2022

ZOOLOGY

Time : Two Hours

Maximum : 100 Marks

*Put a (✓) mark against most appropriate answer.
Each question carries 1 mark.
(Use ball point pen only).*

1. Leydig cells in adult mammals produce :
 - (a) Estrogen.
 - (b) Testosterone.
 - (c) Progesterone.
 - (d) Follicle stimulating hormone.
2. Polar bodies.
 - (a) Nurse the egg as it leaves the follicle.
 - (b) Extra chromosomal materials representing the x-chromosome in female cell.
 - (c) Orient the sperm towards egg.
 - (d) Allow a reduction in chromosome while preserving all the food for one egg.
3. Which of the germ layer is the best associated with the development of heart ?
 - (a) Ectoderm.
 - (b) Mesoderm.
 - (c) Endoderm.
 - (d) All of these.
4. When purine is replaced by a pyrimidine in a base substitution process, the phenomenon is termed as ?
 - (a) Transition.
 - (b) Transversion.
 - (c) Frame shift mutation.
 - (d) Tautomerisation.
5. Frame shift mutations occur following :
 - (a) Tautomeric shifts.
 - (b) Base substitutions.
 - (c) Dimer formation.
 - (d) Insertion /deletion of single base.

Turn over

6. A non-coding segment of a gene is :
- (a) Intron.
 - (b) Exon.
 - (c) Muton.
 - (d) Recon.
7. Alteration of a codon to UGA, a codon that result in premature termination of polypeptide chain of bacteria is :
- (a) Silent mutation.
 - (b) Lethal mutation.
 - (c) Ochre mutation.
 - (d) Deletion.
8. Morphologically repeating unit of DNA containing 190 base pairs of DNA folded together with 8 histone molecules is :
- (a) Cistron.
 - (b) Nucleosome.
 - (c) Recon.
 - (d) Polysome.
9. Enzyme that catalyses the hydrolysis of a single nucleotide residues from the end of a DNA chain is :
- (a) Endonuclease.
 - (b) Exonuclease.
 - (c) DNA ligase.
 - (d) DNA polymerase.
10. Extra nuclear chromosomes occur within various organelles including :
- (a) Lysosome.
 - (b) Endoplasmic reticulum.
 - (c) Chloroplast.
 - (d) All the above.
11. Studies by Beadle and Tatum that produced the 'one gene one enzyme hypothesis' were conducted using the :
- (a) Bread mold *Neurospora crassa*.
 - (b) Bacterium *Escherichia coli*.
 - (c) Mushroom *Agaricus bisporus*.
 - (d) All the above.
12. A ribozyme is :
- (a) A section of DNA that is expressed in the mRNA.
 - (b) A self splicing intron that acts like an enzyme.
 - (c) A complex made up of many ribosomes replicating the same strand of mRNA.
 - (d) One of the small ribosomal subunit.

13. Name the process by which protein is constructed :
- (a) Translation.
 - (b) Transcription.
 - (c) Transformation.
 - (d) Transposition.
14. The correct sequence of events in the production of a polypeptide is :
- (a) Initiation, termination, elongation.
 - (b) Elongation , termination, initiation.
 - (c) Termination, elongation, initiation.
 - (d) Initiation, elongation, termination.
15. A *lac operon* is transcribed when :
- (a) Lactose needed by the cell.
 - (b) Lactose available to the cell.
 - (c) Lactic acid is needed by the cell.
 - (d) Lactic acid is available to the cell.
16. Restriction enzyme breaks bonds between the :
- (a) Base pairs of a DNA molecule.
 - (b) Sugar and phosphate component of a nucleic acid molecule.
 - (c) Base pairs of DNA-RNA hybrid molecule.
 - (d) Exons and introns of DNA molecule.
17. RNA retroviruses have a special enzyme that :
- (a) Disintegrates host DNA.
 - (b) Polymerises host DNA.
 - (c) Transcribes viral RNA to cDNA.
 - (d) Translate host DNA.
18. In recombinant DNA technology, a plasmid vector must be cleaved by :
- (a) The same enzyme that cleaves the donor gene.
 - (b) Modified DNA ligase.
 - (c) A heated alkaline solution.
 - (d) Four separate enzymes.

19. ——— is multiple, identical copies of a collection of DNA fragments inserted into plasmids.
- (a) DNA clone.
 - (b) Gene map.
 - (c) DNA probe.
 - (d) DNA library.
20. Function of vector in genetic engineering is to :
- (a) Cut DNA into many fragments.
 - (b) Carry DNA to a new cell.
 - (c) Link together newly joined fragments of DNA.
 - (d) Make millions of copies of specific segments of DNA.
21. Which of the following is not a technique for introducing recombinant DNA into a host cell ?
- (a) Infection by agrobacterium.
 - (b) Microinjection.
 - (c) Electrophoresis.
 - (d) Infection by bacteriophage.
22. Members of biologic species are potentially able to :
- (a) Compete.
 - (b) Introgress.
 - (c) Interbreed.
 - (d) Express all the same genes.
23. Which one of the following organisms is the first to colonise a bare rock ?
- (a) Lichens.
 - (b) Mosses.
 - (c) Perennial plants.
 - (d) Metazoans.
24. The term biodiversity was coined by :
- (a) Walter G. Rosen.
 - (b) Aristotle.
 - (c) Darwin.
 - (d) Wallace.

25. The process in which a plant or animal species faces a gradual or drastic diminishing or complete loss of its unique gene pool is called as :
- (a) Gene pool.
 - (b) Genetic conservation.
 - (c) Genetic erosion.
 - (d) Gene bank.
26. Which of the following organisms does not have the ability to fix atmospheric nitrogen ?
- (a) *Nostoc*.
 - (b) *Ulothrix*.
 - (c) *Rhizobium*.
 - (d) *Acetobacter*.
27. The cells that actually release antibodies are :
- (a) Helper T-cells.
 - (b) Cytotoxic T-Cells.
 - (c) Plasma cells.
 - (d) Suppressor cells.
28. There is no immunization against :
- (a) Measles.
 - (b) Amoebiasis.
 - (c) Small Pox.
 - (d) Polio.
29. White blood cells that are non-specific killers of microbes are ?
- (a) Phagocytes.
 - (b) B-Cells.
 - (c) Killer T-Cells.
 - (d) Helper T-Cells.
30. Which of the following antibodies initiates an allergic reaction ?
- (a) IgA.
 - (b) IgE.
 - (c) IgG.
 - (d) IgM.
31. Cell mediated immune responses are :
- (a) Enhanced by depletion of complement.
 - (b) Suppressed by cortisol.
 - (c) Enhanced by depletion of T cells.
 - (d) Suppressed by antihistamine.

32. Vaccines are :

- (a) Treated bacteria or viruses or one of their proteins.
- (b) MHC proteins.
- (c) Same as monoclonal antibodies.
- (d) T cells.

33. Macrophages are derived from :

- (a) Basophiles.
- (b) Monocytes.
- (c) Neutrophils.
- (d) Eosinophils.

34. Which of the following substance is produced by the body cells to protect uninfected cells from viral invasion ?

- (a) Histamine.
- (b) Complement.
- (c) Natural killer cells.
- (d) Interferons.

35. Larva of bivalves is :

- (a) Bipinnaria.
- (b) Glochidium.
- (c) Tornaria.
- (d) Doliolum.

36. When the population is small, there is a greater chance of ———.

- (a) Mutation.
- (b) Natural selection.
- (c) Genetic drift.
- (d) Gene flow.

37. Tobacco Mosaic Virus (TMV) was discovered by :

- (a) Louis Pasteur.
- (b) Ivanovsky.
- (c) Muller.
- (d) Jenner.

38. The phenomenon of reverse transcription was first discovered by :

- (a) Beadle and Tatum.
- (b) Howard Temin and David Baltimore.
- (c) Watson and Crick.
- (d) Hardy and Weinberg.

39. Foetal circulation differs from that of adult circulation is :
- (a) Blood does not circulate through kidney and lungs.
 - (b) Heart is not functional.
 - (c) Foetal liver is developed.
 - (d) Blood is not found.
40. DNA sequence of base pairs that reads same on the two strands when orientation of reading is kept the same is :
- (a) Recognition sequence.
 - (b) Okasaki fragment.
 - (c) Palindrome.
 - (d) Plasmids.
41. Plasmids that can integrate into the bacterial DNA are called :
- (a) Episomes.
 - (b) Transgenes.
 - (c) Structural genes.
 - (d) Luxury gene.
42. In life cycle of plasmodium schizogony takes place in :
- (a) Mosquito.
 - (b) Man.
 - (c) Both of the above.
 - (d) None of the above.
43. Scroll valve is found in :
- (a) Human brain.
 - (b) Human heart.
 - (c) Intestine of shark.
 - (d) Heart of rabbit.
44. Which of the following is a fish ?
- (a) Starfish.
 - (b) Silverfish.
 - (c) Catfish.
 - (d) All the above.
45. An intervening sequence in eukaryotic gene that is not an active part of the gene is called :
- (a) Intron.
 - (b) Exon.
 - (c) Replicon.
 - (d) Muton.
46. A virus that can reproduce without killing its host is called :
- (a) Temperate virus.
 - (b) Lytic virus.
 - (c) Retroactive virus.
 - (d) Viron.
47. A form of symbiosis in which both participants benefit is :
- (a) Commensalism.
 - (b) Mutualism.
 - (c) Parasitism.
 - (d) Depredation.

Turn over

48. In his Laboratory apparatus, Stanly Miller synthesised :
- (a) Carbohydrate.
 - (b) Protein.
 - (c) Lipids.
 - (d) Amino acids.
49. Technique used to separate charged molecule is :
- (a) Gel filtration.
 - (b) Electrophoresis.
 - (c) Paper chromatography.
 - (d) Centrifugation.
50. Part of nephron impermeable to water is :
- (a) Ascending limb of loop of Henle.
 - (b) Descending limb of loop of Henle.
 - (c) Proximal convoluted tubule.
 - (d) Distal convoluted tubule.

(50 × 1 = 50 marks)

*Answer any ten of the following.
Each question carries 5 marks.*

1. Write an account on enzyme inhibition.
2. Write notes on proteins.
3. Write an account on western blotting.
4. Klinefelter's syndrome.
5. Air pollution.
6. Tabular presentation of data.
7. Write an account on climate change.
8. Write an account on food chain.
9. Circadian rhythm.
10. Write an account on parasitism.
11. Write an account on ribosomes.
12. Write notes on thyroid gland.
13. Write notes on ecological succession.
14. Write notes on coastal aquaculture.
15. Write an account on Pest management.

(10 × 5 = 50 marks)