

WBCS MADE EASY

MWC(O)-ZOO-II/23

2023
ZOOLOGY
PAPER-II

Time Allowed — 3 Hours

Full Marks — 200

If the questions attempted are in excess of the prescribed number, only the questions attempted first up to the prescribed number shall be valued and the remaining ones ignored.

Answer may be given either in English or in Bengali but all answers must be in one and same language.

Group-A

1. Answer any ten questions:

4×10=40

- What is DNA methylation?
- Comment on the pancreatic endocrine secretions and functions.
- Mention the factors that can destabilize the Hardy-Weinberg Equilibrium of a population.
- State the points of difference between B-DNA and Z-DNA.
- Comment on the basic structure of nucleosome with proper illustration.
- State the role of co-enzyme in an enzyme action.
- State the significance of abundance of cysteine and proline in the hinge region of an immunoglobulin molecule.
- Compare the R-form and T-form of haemoglobin.
- State two examples of passive immunization mentioning the types of immunoglobulin involved.
- How are the single stranded regions of DNA at the ends of human chromosomes remain protected from degradation by nucleases and other enzymes?
- Explain the theory of endosymbiosis with respect to the origin of life.
- How does foetal haemoglobin differ from adult haemoglobin?
- State the techniques involved with the process of subcloning in case of plasmid vectors in *E. coli*.
- Explain the terms relapse and recrudescence with reference to the occurrence of malaria.
- Compare precipitin and agglutinin with reference to antigen-antibody interaction.

Group-B

Answer any four questions.

20×4=80

- Describe the pentose phosphate pathway in relation with glucose metabolism citing proper flow-chart.
 - How does oxidative phosphorylation occur in the mitochondria?

15+5

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(2)

3. (a) Establish the fluidic nature of plasmamembrane citing experimental proof.
(b) Comment on the asymmetric distribution of phospholipids in plasmamembrane.
(c) Explain the operational principle of voltage gated sodium channel during nerve impulse propagation. 5+5+10
4. (a) Illustrate the Enzyme Commission's scheme for the classification of enzymes with examples.
(b) How can you express the different types of reversible enzyme inhibition?
(c) Describe briefly the molecular structure of t-RNA with proper illustration. 6+8+6
5. (a) Compare the objectives and working principles of indirect and sandwich enzyme linked immunosorbent assay (ELISA) with suitable illustrations.
(b) Comment on the significance of Bombay Phenotype in a patient.
(c) A woman has two dominant traits: cataract, which she inherited from her father and polydactyly, which she inherited from her mother. Her husband has neither of the mentioned traits. If the gene for these two traits are 20 cM (centimorgan) units apart on the same chromosome, what is the chance that the first child of this couple will have both cataract and polydactyly? 10+5+5
6. (a) How does hormone regulate G-protein coupled receptors?
(b) How does aldosterone maintain homeostasis?
(c) What are 'atretic follicles'?
(d) What are the primary functions of estrogen? 10+5+3+2
7. (a) How can you elucidate the "one gene one polypeptide" concept with respect to the occurrence of sickle cell anaemia?
(b) Explain the phenomenon of transport of oxygen by haemoglobin from lungs to tissue. 10+10
8. Write short notes on: 5×4=20
 - (a) Polymerase Chain Reaction (PCR)
 - (b) Ultrastructure of mitochondria
 - (c) Turner syndrome
 - (d) Thalassemia

Group-C

Answer *any four* questions.

20×4=80

9. (a) How can you determine the age of a fossil?
(b) Why is it inappropriate to rely on radiocarbon dating while determining the age of a fossil which is million years old?
(c) What is index fossil? Give example.
(d) Describe the event of biogeny with relation to the theory of origin of life. 5+3+2+10

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10. (a) Describe the ultrastructure of the promastigote of *Leishmania* sp.
(b) What is T-cell anergy?
(c) Describe the life cycle of *Ancylostoma* sp. with illustration.
(d) Why is gametogenesis restricted within the secondary host in the life-history of *Plasmodium* sp.? 5+4+6+5
11. (a) State the disadvantages of using chemical pesticides to control pests.
(b) Enumerate the role of exotic carps in the polyculture of fish.
(c) Provide an account of the equipment necessary for mulberry silkworm rearing.
(d) Why cannot membrane attack complex induce innocent bystander lysis to healthy cells? 5+3+7+5
12. (a) Give an account of the structural and physiological adaptations found in desert animals.
(b) Why are camels best suited for desert life?
(c) Explain aggressive mimicry with proper example. 10+5+5
13. (a) "The secondary humoral immune response is more intense than the primary response against same antigen"— Explain.
(b) Describe the events of development of heart in chick.
(c) Mention the forces involved in the formation of the antigen-antibody complex.
(d) Describe the process of spermiogenesis in human/rodent. 5+7+3+5
14. Write short notes on: 5×4=20
(a) Immunoglobulin G
(b) Vertebrate fauna in Oriental realm
(c) Pathophysiology of tuberculosis
(d) Problems of 'deep litter' system in poultry keeping
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