2016

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.

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

GROUP - A

1. Answer any ten questions:- 4 x 10 = 40

a. Which amino acids are most abundant in the hinge region of an immunoglobulin molecule and why?

b. Explain the terms relapse and recrudescence with reference to the occurrence of malaria.

c. Compare active and passive immunization citing examples.

d. How are the single-stranded regions of DNA at the ends of human chromosomes protected from degradation by nucleases and other enzymes?

e. State the technical steps involved with the process of subcloning in case of plasmid vectors in *E. coli*.

f. Compare precipitin and agglutinin with reference to antigen-antibody interaction.

g. Which factors might destabilize Hardy-Weinberg equilibrium?

h. What is DNA methylation?

i. State the role of co-enzyme in an enzyme action.

j. How R-form and T-form of haemoglobin differ from each other?

k. State the differences between B-DNA and Z-DNA.

l. How haemoglobin of an adult human differ from that of foetal haemoglobin?

m. Comment on the pancreatic endocrine secretions and functions.

n. 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 trait. If the genes for these two traits are 15 cM apart on the same chromosome, what is the chance that the first child of this couple will have both cataract and polydactyly?

o. Comment on basic structure of nucleosome.

GROUP - B

(Answer any four questions)

2. Illustrate the Enzyme Commission's scheme for classification of enzymes with examples. How can you express the different types of reversible enzyme inhibition? Explain multienzyme complex citing example.

6 + 9 + 5 = 20

3. Establish the fluidic nature of biomembrane citing experimental proof. Comment on the asymmetric distribution of phospholipids in biomembrane. Explain the operational principle of voltage gated sodium channel during nerve impulse propagation.

6 + 6 + 8 = 20

4. How can you elucidate the "one gene one polypeptide" concept with respect to the occurrence of sickle cell anaemia? Explain the phenomenon on transport of oxygen by haemoglobin from lungs to tissue.

10 + 10 = 20

5. Describe the pentose phosphate pathway in relation with glucose metabolism citing proper flowchart. Explain the clinical significance of the pentose phosphate pathway.

15 + 5 = 20

6. How does hormone regulate G-protein coupled receptors? Describe the structure and function of neuroendocrine glands observed in the insects.

10 + 10 = 20

7. Compare the objectives and working principles of indirect and sandwich enzyme linked immunosorbent assay (ELISA) with suitable illustration. Comment on the hopes and concerns regarding genetically modified organisms (GMOs).

14+ 6 = 20

GROUP - C

(Answer any four questions)

8. Explain the concept of test tube baby. Describe the process of development of vertebrate eye.

5 + 15 = 20

9. How can you determine the age of a fossil? Why is it inappropriate to rely on radiocarbon dating while determining the age of a fossil which is million years old? What is index fossil? Describe the event of biogeny with relation to the theory of origin of life.

5 + 3 + 2 + 10 = 20

10. Discuss the disadvantages associated with the use of chemical pesticides to control pest. Explain the concept of integrated pest management citing its advantages and problems. Provide an account of the rearing equipment necessary mulberry silkworm.

5 + 7 + 8 = 20

11. Give an account of the structural and physiological adaptations found in desert animals. Why camels are best suited for desert life?

15 + 5 = 20

12. Describe the ultrastructure of the promastigote form of *Leishmania* sp. Why gametogenesis is restricted within the secondary host in the life cycle of *Plasmodium* sp. Describe the life cycle of *Fasciola* sp. with proper illustration.

5 + 5 + 10 = 20

13. The primary humoral immune response is more intense than the secondary humoral immune response against same antigen - explain. Why membrane attack complex cannot induce innocent-bystander lysis to healthy cells? Describe the structure of T cell receptor complex.

5 + 5 + 10 = 20