2021

ZOOLOGY — HONOURS

First Paper

(Unit - II)

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer ***question no.* 1** and ***any one*** question from **Group-A** and ***any three*** questions from **Group-B**.

1. Answer the short questions (***any five***) : 2×5

(a) What do you mean by resolving power of a microscope?

(b) What is meant by dextral and sinistral shell coiling?

(c) Distinguish between mitochondrial DNA and nuclear DNA.

(d) What is the role of signal peptide in protein transport?

(e) What is Chargaff's rule?

(f) What do you mean by nonsense codon?

(g) What is meant by isoallele? Give example.

(h) Differentiate between transition and transversion type of point mutation.

Group - A

2. (a) Enumerate four major differences between transmission and scanning electron microscopy.

(b) Why phase contrast microscopy is so named?

(c) Describe the working principle of phase contrast microscope. 4+2+4

3. Write short notes on ***any two*** of the following : 5×2

(a) Fluid mosaic model of Plasma membrane

(b) GERL System

(c) Facilitated Diffusion

(d) Protein Glycosylation.

4. (a) What is meant by membrane fluidity? Elucidate an experiment to demonstrate this membrane property.

(b) How do freeze-fracture and freeze-etching techniques contribute in understanding the structural organization of plasma membrane?

(c) Define liposomes. (1+3)+(2+2)+2

Group - B

5. (a) What is meant by polymerase switching?

(b) Mention the structural features of oriC along with functional significance.

(c) Distinguish between complete and incomplete linkage.

(d) State the function of ligase in DNA replication. 2+4+2+2

6. (a) Explain monosomy and nullisomy.

(b) Elucidate two major differences between the mechanism of telomeric DNA replication in eukaryotes and genomic DNA replication in *E.coli*.

(c) What is Shine Dalgarno sequence?

(d) If the T content of a dsDNA sample is 32%, what is the percentage of other bases? 2+4+2+2

7. (a) Distinguish between physical and chemical mutagens with suitable examples.

(b) State the significance of Bombay phenotype in man.

(c) Elucidate the mechanism of mutagenesis by 5-bromouracil and EMS. 2+4+(2+2)

8. (a) Explain the role of Philadelphia chromosome in the development of CML.

(b) What is Robertsonian translocation?

(c) Explain the role played by *Sxl* gene in Dosage compensation in *Drosophila*. 4+2+4

9. Wild type male *Drosophila* was crossed with female *Drosophila* homozygous for three recessive X-linked mutations— *scute* (*sc*) bristles, *echinus* (*ec*) eyes and *crossveinless* (*cv*) wings to obtain F_1 progeny which are intercrossed to produce F_2 flies, classified and counted as follows—

scute, echinus, crossveinless	1158
wild type	1455
scute	163
echinus, crossveinless	160
scute, echinus	192
crossveinless	188
scute, crossveinless	1
echinus	1

From the above data :

(a) Determine gene order.

(b) Construct a genetic map.

(c) Find out the co-efficient of coincidence and interference. 2+4+(2+2)
