

2 0 1 4

ZOOLOGY

(Major)

Paper : 4.2

Full Marks : 60

Time : 2½ hours

*The figures in the margin indicate full marks
for the questions*

1. Answer the following as directed : 1×7=7

- (a) Name the gene that causes death of carrier individuals with appropriate genotype, before they reach adulthood.
- (b) What term is used to those animals that show male characteristics in a part of their body and remaining parts show female phenotype?
- (c) What is the type of chromosomal aberration in which a segment is lost from a chromosome?

(d) Which one of the following is not a genetic disease?

- (i) Haemophilia
- (ii) Phenylketonuria
- (iii) Albinism
- (iv) Cretinism

(Choose the correct answer)

(e) Write the function of snRNA.

(f) UV-rays are the only non-ionizing radiation with mutagenic property.

(Write True or False)

(g) In which stage of cell division the synaptonemal complex is formed?

2. Answer the following briefly :

2×4=8

(a) Write the differences between back-cross and testcross.

(b) Give at least two differentiating characteristics of heavy strand and light strand of mitochondrial DNA.

(c) What is replisome? Name different components of a replisome.

(d) Who proposed the central dogma of molecular biology? Express the current state of the central dogma.

3. Answer any *three* from the following questions : $5 \times 3 = 15$

(a) Explain the structural features of a eukaryotic mRNA. 5

(b) What is synapsis? Write about terminalization stage of a meiotic crossing-over. State two significances of crossing-over. $1+2+2=5$

(c) Mention various conditions of aneuploidy. Explain Down's syndrome, Turner's syndrome and Klinefelter's syndrome in view of aneuploidy. $2+3=5$

(d) Write briefly about the characteristics of genetic code. 5

(e) Who first demonstrated sexuality in bacteria? Explain the three common methods of transferring genetic material in bacteria involving sexuality and recombination. $1+4=5$

4. Answer any *three* from the following questions : $10 \times 3 = 30$

(a) Write the chromosome theory of linkage. Describe Morgan's experiment on *Drosophila* to illustrate complete and incomplete types of linkage. $2+4+4=10$

(4)

- (b) State the Chargaff's rule on composition of DNA molecule. Give detailed account of different forms of DNA in living organisms. What are sense and antisense strands? $1+7+2=10$
- (c) Explain various types of incidents that cause mutation in molecular level. Add a note on the consequences of mutation. $8+2=10$
- (d) State different chromosomal banding techniques used in karyotype study. Write about the preparation of human karyogram with the help of banding technique. $3+7=10$
- (e) What is transcriptional unit? Write how expression of genes is regulated at transcriptional level in prokaryotes. $2+8=10$
- (f) What are the characteristics of multiple alleles? Write how the multiple alleles are represented symbolically. Illustrate multiple alleles both phenotypically and genotypically taking coat colour of rabbit as an example. $3+3+4=10$
