2 0 1 6

(April)

ZOOLOGY

(Elective/Honours)

SECOND PAPER

(Cell Biology and Genetics)

Marks : 56

Time : 3 hours

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

Answer Question No. **1** and *any* **four** from the rest

1. Answer any *three* of the following : 4×3=12

   (a) Microfilaments and microtubules are composed of specialized proteins. Elaborate.

   (b) In eukaryotes, nucleolus is the site of ribosome formation. Explain.

   (c) Explain sickle-cell anemia.

(d) Define codominant and complementary genes.

(e) The diploid (2n) number of an animal is 10. How many chromosomes would be expected in monosomic, nullisomic and trisomic?

2. (a) With the help of labelled diagram, give a brief account of the ultrastructure of mitochondria.   6

(b) Write a note on Na-K-pump.   5

3. (a) Distinguish between euchromatin and heterochromatin.   5

(b) Write a note on the structure and significance of polytene chromosome.   6

4. (a) Give a brief account of meiotic prophase–I.   6

(b) Distinguish between active and passive immunity. Which is more advantageous?   4+1=5

5. (a) Deduce Mendel's principle of independent assortment with the help of suitable cross.   6

(b) Explain multiple alleles with reference to ABO blood group in man.   5

6. (a) What is linkage? Explain complete and incomplete linkage. Linkage is an exception to Mendel's which law?   1+4+1=6

(b) What is inversion? Discuss pericentric and paracentric inversions.   1+4=5

7. Write short notes on any *two* of the following :   5½×2=11

(a) Golgi complex

(b) Cell cycle

(c) Synaptonemal complex

(d) Chromosomal basis of sex determination

8. Discuss mitosis with suitable illustrations. Write a note on its significance.   5+3+3=11

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1. Answer any *three* of the following :   4×3=12

   (a) Write down the differences between prokaryotes and eukaryotes.

   (b) Give an account of the Tay-Sachs disease.

   (c) Why are lysosomes called the suicidal bags of a cell?

   (d) Explain Mendel's law of segregation.

(e) Differentiate between primary and secondary constrictions of chromosome.

2. (a) Give an account of the ultrastructure of Golgi complex. 6

(b) Mention its important functions. 5

3. (a) Describe the different types of chromosomal abberations in relation to their structures. 6

(b) Explain the chromosomal theory of inheritance. 5

4. (a) Define immunity. Explain briefly the mechanism of cell-mediated immunity. 1+5=6

(b) Differentiate between active and passive immunities. 5

5. (a) What is cancer? Classify the different types of cancer according to tissue types. 1+5=6

(b) Write a note on the characteristic features of cancer cells. 5

6. (a) Differentiate between mitosis and meiosis. 6

(b) Write a note on the significance of meiosis. 5

7. (a) Explain the cellular activities that are likely to occur at G_1, S and G_2 phases of the cell cycle. 6

(b) Write a note on lampbrush chromosome. 5

8. Write short notes on any *two* of the following : 5½×2=11

(a) Mitochondria

(b) Carcinogens

(c) Pleiotropic genes

(d) Crossing-over

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Answer Question No. **1** and *any* **four** from the rest

1. Answer any *three* of the following questions :

    4×3=12

    (a) Write briefly about different types of ribosomes and mention their functions.

    (b) What are the important features of polytene chromosomes?

    (c) Explain cell cycle and its regulation with a suitable diagram.

(*Turn Over*)

(d) What is incomplete dominance? Give an example.

(e) Explain pleotropic genes with example.

2. (a) Write a note on the fluid mosaic model of plasma membrane with a proper diagram. 5

(b) Explain active and passive transports with suitable examples. 6

3. (a) What is chromatin? Write a note on chemical composition of chromatin. 6

(b) In human female, one of the X-chromosome is inactivated. Explain. 5

4. (a) Give a brief account of the meiotic prophase-I with proper diagram. 6

(b) What are T-lymphocytes and B-lympho-cytes? Write a note on their functions. 5

5. (a) Explain multiple alleles with reference to ABO type blood groups in man. 6

(b) Deduce Mendel's principle of independent assortment with suitable cross. 5

6. (a) Write a note on different types of structural chromosomal aberrations. 6

(b) Explain linkage with a suitable example. 5

7. (a) What is centromere? How are chromosomes classified on the basis of position of centromere? 6

(b) Explain lethal gene interaction with reference to sickle cell anemia. 5

8. Write short notes on any two of the following : 5½×2=11

(a) Mitochondria

(b) Innate and acquired immunity

(c) Genic balance theory

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