

1/H-77 (i) (Syllabus-2015)

2018

(October)

BIOTECHNOLOGY

(Honours)

(Cell Biology and Genetics)

Marks : 56

Time : 3 hours

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

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

1. Differentiate between the following : $3 \times 4 = 12$

- (a) Telocentric and Acrocentric chromosomes
- (b) Heterochromatin and Euchromatin
- (c) Diploid and Haploid
- (d) Primary constriction and Secondary constriction

2. (a) Define sphingolipid and glycolipid. How do they contribute to the lipid bilayer structure of plasma membrane? 4

(2)

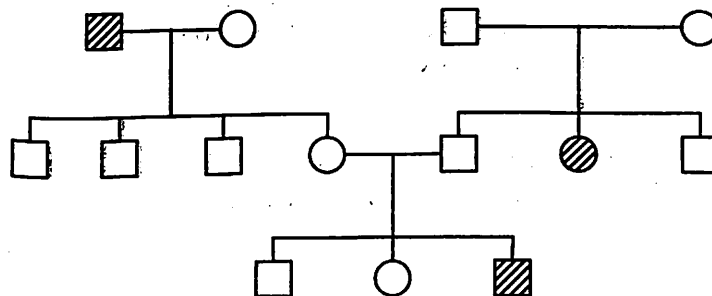
- (b) Cite a suitable explanation as why plasma membrane or cell membrane is semipermeable or selectively permeable. Support your answer with suitable diagrams.
- (c) Discuss the importance of GERL region.
3. (a) What are svedberg units? How do they contribute to the structural integrity of prokaryotic and eukaryotic ribosomes?
- (b) Discuss the roles of cdk and cyclins in the regulation of cell cycle.
4. (a) Differentiate between testcross and backcross with suitable examples.
- (b) The tri-hybrid Yy, Xx, Zz is test-crossed to triple recessive xx, yy, zz and the following phenotypes are obtained in the progeny $64xyz, 2xyz, 11xYz, 14XyZ, 17Xyz, 3XYZ$ and $71XYZ$:
- (i) Which of these loci are linked?
- (ii) What is the correct genotype of each parent?
- (c) What are miocene and frameshift mutation?

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(Continued)

(3)

5. (a) The following is a pedigree for recessive albinism (shaded symbols) :



- (i) Give an analytical explanation of the pedigree. 6
- (ii) Discuss the significance of these pedigree charts. 2
- (b) Discuss the formation and functions of spindle apparatus. 3
6. (a) Why is *Drosophila* considered to be the model organism for studying linked genes? Justify your answer. 5
- (b) Differentiate between cytological and linkage maps. 5
- (c) Define centiMorgan cM units. 1

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(Turn Over)

7. (a) What is crossing over? How is meiosis I related to this phenomenon? 2+4=6
- (b) What are kappa particles? How are they related to the cytoplasmic inheritance? 5
8. What are mutations? Describe with suitable examples the various types of mutations. 2+9=11
