Odd Semester, 2020

(Held in March, 2021)

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. Write briefly on the following : 2×6=12

(a) Cell theory

(b) Cell cycle

(c) Multiple alleles

(d) Complementary gene interaction

(e) Primary and secondary lysosomes

(f) Kinesin and dynein motor proteins

2. *(a)* What was the experiment that Stanley Miller conducted in his laboratory in the 1950s? What did he conclude from that experiment? 3+1=4

(b) In association with the evolution of prokaryotes, explain the hypothesis of endosymbiosis. Illustrate with suitable diagrams. How do mitochondria and chloroplasts resemble bacteria? 4+3=7

3. What are the factors that contribute to the fluidity of plasma membranes? Give four functions of the plasma membrane. Why are lysosomes known as digestive bags of a cell? 4+4+3=11

4. Write short notes on the following : 4+4+3=11

(a) Nucleolus

(b) Euchromatin and heterochromatin

(c) Nucleosome

5. *(a)* Define mutation rate. Discuss the factors affecting mutation rates. 1+6=7

(b) Explain the deamination of cytosine with the help of a proper figure. 4

6. What are mutagenic agents? List the different types of chemical mutagenic agents. Giving suitable examples, explain the mechanism of action of any one chemical mutagenic agent. 2+3+6=11

7. Explain polygenic inheritance. How does this inheritance affect skin colour in human beings? 4+7=11

8. What are bacterial mutants? Differentiate between an autotroph and an auxotroph. How can bacterial auxotrophic mutants be isolated? 2+2+7=11

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