Exam. Code: 0907
Sub. Code: 33354

2124

B.E. (Biotechnology) Third Semester
BIO-314: Cell Biology and Genetics

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: ***Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section.***

x-x-x

1. Write a very short answer to following (1*10=10)

a) What does a superhelical density of -0.05 in DNA indicate?
b) What is the function of the p21 protein?
c) What role do cell plates play?
d) What does a 15:1 dihybrid ratio indicate?
e) What condition does the genotype 47,XY+21 refer to?
f) What causes variegated coloured kernels in maize?
g) Which cytoskeletal element predominates in the skin?
h) Myosin and lamins interact with which cytoskeletal elements?
i) Pseudopodia and microvilli are primarily composed of what structures?
j) Name any examples of retrotransposons

Section-A

2. Explain the fluid mosaic model of biological membranes, describing its structural components and how they contribute to membrane function. (10)
3. a) How malfunctions in ECM signalling can affect cellular processes. Give example.(5)
   b) Detail the chemical composition of DNA and its structural organization in the nucleus, including the formation of nucleosomes, chromosomes, centrosomes, and telomeres. (5)
4. a) Compare the structural characteristics of Polytene chromosomes with those of Lampbrush chromosomes. (5)
   b) Briefly describe the key regulatory proteins involved in the control of the cell cycle. (5)

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Section-B

5. a) Describe the structure and function of heterochromatin and euchromatin, and explain their role in chromosomal organization. (4)

   b) Summarize the types of transposons, providing brief definitions for each IS, Tn, and retrotransposons. (6)

6. a) Define codominance and incomplete dominance, and provide examples of each from genetics. (5)

   b) Differentiate between structural and numerical chromosomal aberrations, providing examples of each. (5)

7. a) Explain the chromosome theory of inheritance and the role of genetic linkage in heredity. (4)

   b) Define codominance and incomplete dominance, and provide examples of each from genetics. (6)

x-x-x