

Parvatibai Chowgule College of Arts and Science
Autonomous

B.Sc. Semester End Examination, January/February 2022

Semester: V

Subject: Biochemistry

Title: Concepts in Genetics (Elective)

Duration: 2 Hours

Max. Marks: 45

- Instructions: 1. All the questions are compulsory; an internal choice is available.
2. Figures to the right indicate maximum marks to the question.
3. Draw neatly labeled diagrams wherever necessary.

Q. 1. Answer ANY THREE of the following:

(09)

- Define the 3 popular modes of gene transfer that occur in bacteria.
- With the help of an example, define epistasis and hypostasis.
- Justify and explain why *Arabidopsis thaliana* is an ideal model organism for plant-based genetic studies.
- Briefly explain any one of the deviations that are seen of Mendel's laws of inheritance.

Q. 2. Answer ANY TWO of the following:

(12)

- Describe the experiment that was carried out by T. H. Morgan that explained the concept of linkage.
- Explain the mechanism of meiotic crossing over. Add a short note on the significance of crossing over.
- What are different techniques that are used for human genetic studies?

Q. 3. Answer ANY TWO of the following:

(12)

- Define heterogametes. Write brief notes on the types of heterogametes seen in most organisms.
- Describe the different types of structural changes that occur in chromosomes. Add a short note on albinism.
- What happens when there is an abnormal chromosome number in humans? State 2 examples and identify the common symptoms seen in these chromosome disorders.

Q. 4. Answer ANY ONE of the following:

(12)

12)

- A) i. Explain with the help of examples and Punnett's square, Mendel's laws of inheritance. (6)
- ii. Mr. and Mrs. both have dimples which is a dominant trait. They first had Carla who has dimples but their second child - Karen did not have dimples. Mr. Smith accused his wife of cheating on him. Is his claim justified? Support your answer with a Punnett's square. (6)

OR

- B) i. With respect to the pedigree chart below, answer the following questions:
- What do the symbols indicate for individual's 1 and 6

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