

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

B.Tech-III Semester (Biotechnology)

Course Code: 18B11BT311

Max. Marks: 25

Course: Genetics

Instructor: Prof. Sudhir Kumar

Max. Time: 1 hour 30 minutes

**Note:** (a) All questions are compulsory.

(b) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	a) A sinistral snail female having Dd gene mates with dextral snail male having dd genotype. What type of shell coiling will be present in progeny? Justify the reason of your answer.	III	3
	b) Assess the similarities and dissimilarities between nuclear inheritance and cytoplasmic inheritance.		3
Q2	a) Demonstrate how nondisjunction in human female gametes can give rise to Klinefelter and Turner syndrome offspring following fertilization by a normal male gamete.	IV	2
	b) How do we know that in humans the X chromosomes play no role in human sex determination while the Y chromosome causes maleness and its absence causes femaleness?		2
Q3	a) Evaluate the linkage relationship and recombination frequency between the two genes in a dihybrid individual AaBb, which when test crossed gives the following data: AaBb (Dihybrid parent) x abab (Test cross parent) Result:- 40% AaBb, 40% aabb, 10% Aabb, 10% aaBb	V	2
	b) The map distance A-----B = 15 and B-----C = 25 map units and the observed crossover in a test cross experiment were 2.5%. Calculate the strength of interference.		2
Q4	a) Explain endosymbiotic theory, and why is this theory relevant to the study of extranuclear DNA in eukaryotic organelles?	III	3
	b) Predict the results of a cross between ascospores from a segregational petite strain of yeast and suppressive strain. Assess the phenotypes of the zygote and the ascospores it may subsequently produce.		2
Q5	a) Calculate the frequency of heterozygotes Tt in a randomly mating population if the frequency of recessive phenotype (aa) is 0.2.	I	2
	b) Interpret the probability of a diseased child to be born to parents who are carriers for autosomal recessive disorder.		2
	c) A cross between yellow and green seeded pea plant produces yellow and green seeds in equal frequency in F1. Design the cross and show your work.		2