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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Make-up Examination-November-2025

M.Sc. Biotechnology First Semester

COURSE CODE (CREDITS): 20MS1BT115 (02)

MAX. MARKS: 25

COURSE NAME: Genetics

COURSE INSTRUCTOR: Prof. Sudhir Kumar MAX. TIME: 1 Hour 30 Minutes

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

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

Q.No.	Question	CO	Marks
Q1	a) Explain the usefulness of the Mating Switch mechanism in yeast and describe how it functions at the molecular level. b) Analyze the genetic and evolutionary consequences of inbreeding depression in a population.	I	2.5+2.5
Q2	a) Apply the rules of probability to calculate the likelihood of having all four daughters in a family. b) Determine the probability that two children out of three will be normal if both parents are carriers of an autosomal recessive disorder.	II	2.5+2.5
Q3	a) Compute the frequency of heterozygotes in a population if 25 individuals out of 250 express a recessive trait. b) List and explain the key assumptions underlying the Hardy–Weinberg equilibrium.	II	2.5+2.5
Q4	Differentiate between Genetic Drift, Founder Effect, and Bottleneck Effect, and illustrate how these processes can alter allele frequencies in small populations.	IV	05
Q5	Compare and contrast Epistasis with classical Mendelian inheritance. Illustrate your answer with an example of any one type of epistasis and explain its genetic interaction.	I	05