

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -I EXAMINATION- 2024
M.Sc. - I Semester (Biotechnology)

Course Code: 20MS1BT115 (02 Credits)
Course: Genetics
Course Instructor: Prof. Sudhir Kumar

Max. Marks: 15

Max. Time: 1 Hour

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

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

Q1: a) Prepare a branch diagram of a cross TTYy of TtYy and work out the number of phenotypes and genotypes.

b) How many different gametes could result from AABB and AaBb genotypes? What are they? [2+2]

Q2: a) How do we know whether an organism expressing a dominant trait is homozygous or heterozygous?

b) How does quantitative inheritance differ from monogenic inheritance. Justify your answer with the help of an example. [2+2]

Q3: a) What is the probability that two out of three children of a couple carrier for an autosomal recessive disorder will be diseased?

b) Are purines and pyrimidines equal in DNA? Justify your answer.

c) Why do precursors to mRNA longer than mRNA? [2+1+1]

Q4: a) If a cross between a black and a white guinea pig, all members of the F1 generation are black. The F2 generation is made up of approximately $\frac{3}{4}$ black and $\frac{1}{4}$ white guinea pigs. Diagram this cross showing genotypes and phenotypes.

b) Which of the Mendel's postulates can only be demonstrated in crosses involving two pairs of traits? State the postulate. [2+1]
