

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2023

M.Sc.-I Semester (Biotechnology)

COURSE CODE (CREDITS): 20 MS1BT115

MAX. MARKS: 25

COURSE NAME: Genetics

COURSE INSTRUCTOR: Prof. Sudhir Kumar

MAX. TIME: 1 Hour 30 Minutes

Note: (a) All questions are compulsory. You may use calculator.

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

Q1: a) Differentiate among directional, disruptive and stabilizing natural selection and illustrate with the help of graphical representation. [4]

b) What is the utility of test cross in plant genetics? [1]

Q2: a) If a normal man marries a woman who is heterozygous for muscular dystrophy – X linked recessive lethal mutation, in this case what would be the sex ratio of their healthy children?

b) Phenylketonuria is an autosomal recessive disease. If two carriers of the allele marry and have four children, then what is the chance that all four children will be unaffected? [2.5+2.5]

Q3: a) Differentiate between dominance and epistasis. Explain with the help of an example.

b) What is Bombay Phenotype? What are the implications linked to it? [3+2]

Q4: a) You have sampled a population in which you know that the percentage of the homozygous recessive genotype (aa) is 46%. Using that 46%, calculate the all possible genotypes and allelic frequencies

b) X linked genetic diseases will be more in daughters? Is this statement correct? Support your answer with example and logical reasoning. [3+2]

Q5: - a) What are the probable genotypes and phenotypes of progeny if father is having A blood group with Rh⁺ status and mother is having B blood group with Rh⁻ status. Solve the question by taking into consideration of all possible genotypes of parents.

b) What is the pattern of inheritance in the following pedigree? Write possible genotypes of individuals of all generations. [3+2]

