JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

M.Sc.-Ist Semester (BT)

COURSE CODE (CREDITS): 20 MS1BT115 (02)

MAX. MARKS: 35

COURSE NAME: Genetics

COURSE INSTRUCTOR: Prof. Sudhir Kumar

MAX. TIME: 2 Hours

Note: (a)All questions are compulsory.

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

Q1: a) If a normal man marries a woman who is heterozygous for muscular dystrophy – X linked linked recessive lethal mutation in this case, what would be the sex ratio of their healthy children?

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

Q2: a) What is the upper limit of Non Cross Over products in a crossing over event and why?

b) What are the function of exons and introns in a fine structure of a gene?   [2.5+2.5]

Q3: a) Why does p=0.9, q=0.1 allelic frequencies lead to less genetic variance compared to p=0.5, q=0.5, Justify your answer with logical reasoning and drive the Fischer's theorem to explain it.   [5]

Q4: a) A woman with type AB blood gave birth to a baby having B blood group. Two different men claim to be the father; one has A blood, the other B blood. Can the genetic evidence on this basis decide in favor of either? Give reasoning.

b) Do yeast cells undergo sexual reproduction? Explain.   [2.5+2.5]

Q5: Explain the concept of complementary inheritance with examples.   [5]

Q6: Define and explain various types of heterosis in plant genetics and how does heterosis differ from luxuriance; explain with the help of an example.   [5]

Q.7: A female Drosophila, heterozygous for the recessive allele 'a' and 'b' when mated with a male showing the dominant characters corresponding to these alleles, fall in the following phenotypes:-

a) AB   444

b) Ab   46

c) aB   54

d) ab   456

Calculate the percentage of recombination between two genes and distance between two genes.   [5]