

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION-2022

M.Sc.-Ist Semester (Biotechnology)

COURSE CODE: 20MS1BT115 (4)

MAX. MARKS: 25

COURSE NAME: Genetics

COURSE INSTRUCTOR: Dr. Sudhir Kumar

MAX. TIME: 1 Hour 30 Min

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q1: a) Predict the function of "Any 1 gene" with relation to "neo 1-2" gene at temperature 22°C and 38°C in yeast.

b) Double mutant xxxΔyyyΔ of yeast may increase the fitness level through genetic suppression. Highlight the importance of this with relation to yeast. [3+2]

Q2: a) Genetic linkage in yeast produces the tetrad expectation as PD>TT>NPD. Provide the reason with suitable illustrations wherever required.

b) Calculate the recombination frequency in yeast having 36 parental ditypes (PD), 32 tetra types (TT) and 02 non parental ditypes. [3+2]

Q3: a) Reciprocal crosses in male and female Drosophila X linked genes did not yield the same result. Justify this statement with logical reasoning and an example.

b) Two plants in a cross were each heterozygous for two pairs (Ab/aB) whose loci are linked and 25 mu apart. Assuming that crossing over occurs during formation of both male and female gametes and that the A and B alleles are dominant, determine the phenotype ratio of their offspring.

c) Is it possible to have two genes 75 mu distance apart? Comment upon the statement giving suitable reason. [2+2+1]

Q4: a) Calculate the frequencies of the AA, Aa, and aa genotypes after one generation if the initial population consists of 0.3 AA, 0.4 Aa, and 0.3 aa genotypes and meets the requirement of Hardy-Weinberg relationship. What genotype frequencies will occur in next generation?

b) If 16% of a population shows recessive phenotype. Calculate the percentage of heterozygous population. [3+2]

Q5: a) A red green colourblind male (X- linked recessive disorder) marries a carrier woman. What is the probability that 02 out of 03 children will be normal?

b) What is the relationship of interlocus distance, crossing over and linkage? [3+2]

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