

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS-2022

B.Tech-III Semester (BT)

COURSE CODE (CREDITS): 18B11BT311(4)

MAX. MARKS: 25

COURSE NAME: Genetics

COURSE INSTRUCTORS: Prof. Sudhir Kumar

MAX. TIME: 1 Hour and 30 Minutes

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

Q1. A) The phenotype is the result of combined influence of the individual's genotype and the effects of environment. Classify the various types of selections on the basis of these traits and provide adequate examples and illustrations. CO V [5]

Q2. A) In a diploid plant species, an F1 with the genotype Gg Ll Tt is test-crossed to a pure-breeding recessive plant with the genotype gg ll tt. The offspring genotypes are as follows:-

Genotype	Number
Gg Ll Tt	621
Gg Ll tt	3
Gg ll Tt	64
Gg ll tt	109
gg Ll Tt	103
gg Ll tt	67
gg ll Tt	07
gg ll tt	626

What is the order of these three linked genes? Calculate the recombination frequency between each pair of genes and value of interference. CO II [5]

Q3. A) The recombination frequency between linked genes is less than 50%. Why is 50% recombination the maximum value?

B) Why are double-cross over events expected less frequently than single-crossover events?

C) How do we know that sister chromatids undergo recombination during mitosis?

CO III [2+2+1]

PTO

Q4: A) Cystic fibrosis is the most common autosomal recessive disorder in certain Caucasian populations. In some populations, approximately 1 in 2000 children have Cystic fibrosis. Determine the frequency of carriers in this population. PTO

B) What is the relationship between mutations and Polymorphism ?

C) Under what circumstances might a lethal dominant allele persist in a population?

CO IV[2+2+1]

Q5: A) If an individual with the minimum height specified by four gene pairs (homozygous recessive) marries an individual of intermediate (all heterozygous gene pairs) Will any of their children be taller than the tall parent? Why or why not?

B) In spite of contrasting phenotypes – Diabetic and Non Diabetic individuals, why do Diabetes is categorised under polygenic inheritance?

C) If two deaf parents have a hearing child, what conclusions can be drawn about the genetic control of deaf?

COIII [2+2+1]

12 Examinations October 2022