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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T2 EXAMINATIONS, OCTOBER-2019

B.Tech III Semester (Biotechnology)

Course Code: 10B11BT311

Max. Marks: 25

Course Name: Genetics

Max. Time: 1.5 Hours

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Marks are indicated in square brackets against each question.

Q1: a) Explain with the help of illustrations that crossing over involves a physical exchange between chromatids?

b) Write three criteria to execute a successful mapping cross. [3+2] CO I

Q2: a) Explain with the help of an example origin and nature of amphidiploid species.

b) What is gene redundancy and how it is linked to Bar mutation in Drosophila? [3+2] CO IV

Q3: a) What is paracentric inversion and genetic composition of gametes derived from tetrad of inversion heterozygote?

b) Explain why a wheat and rye hybrid is usually sterile? [3+2] CO V

Q4: a) In the test cross

$$\begin{array}{r} + \quad + \quad + \\ \hline \end{array} \quad (x) \quad \begin{array}{r} r \quad s \quad z \\ \hline \end{array}$$
  
$$\begin{array}{r} r \quad s \quad z \\ \hline \end{array} \quad \begin{array}{r} r \quad s \quad z \\ \hline \end{array}$$

where the gene order is unknown, progeny with the following phenotypes were obtained.

$r + z = 58$ ,  $r s z = 770$ ,  $r s + = 2$ ,  $+ s + = 38$ ,  $+ s z = 130$ ,  $r + + = 170$ ,

$+ + + = 830$ ,  $+ + z = 2$ . i) Which gene is located in the middle? ii) What are linkage intensities among the three genes? iii) What is the coefficient of coincidence value?

b) If nondisjunction of the sex chromosomes occurs in a female at the second meiotic division, what type of eggs will arise? [4+1] CO II

Q5: a) Discuss a syndrome which results in due to monosomy in human beings.

b) A woman with normal vision whose father was color-blind mates a man with normal vision. They have a color-blind daughter with Turner Syndrome. In which parent did nondisjunction occur? [3+2] CO I