

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS -2022

M.Sc. -IInd Semester MICROBIOLOGY

COURSE CODE (CREDITS): 21MS1MB212

MAX. MARKS: 25

COURSE NAME: MICROBIAL GENETICS AND PHYSIOLOGY TIME: 1 H 30 Min

COURSE INSTRUCTORS: Dr. ASHOK KUMAR NADDA & Prof. SUDHIR KUMAR

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

Section I

Q1. Very short answer type questions. Each question is carrying one mark only.

- The total percentage of transposons in the human genome is _____% of total human genome. (1 mark COII)
- The simplest type of transposons that occurs in bacteria are known as _____. (1 mark COII)
- A famous plant scientist _____ discovered the transposable elements in corn in 1940 and also awarded with Nobel prize for the breakthrough discovery. (1 mark COII)
- A highly coordinated cellular activity in which many multienzyme systems (metabolic pathways) cooperate with each other is known as _____. (1 mark COIII)
- The metabolic activity that involves the oxidative breakdown of larger complex molecules (carbohydrates, fats, and proteins) into smaller, simpler end products (such as lactic acid, CO₂, NH₃) is called as _____. (1 mark COIII)

Section II

Q 2 Describe the characteristics and mechanism of transposition in longest transposon known so far. Discuss the various uses of transposons in modern biology. (2 mark COII)

Q 3 In a population that is in Hardy Weinberg equilibrium the frequency of the recessive allele is 0.30. calculate the percentage of individuals homozygous for dominant allele. (2 mark COII)

Q 4 Name the enzyme that mediates the fusion of two circular molecules, one carrying Tn3 and other not carrying the Tn3 elements in the bacterial transposable elements. With the help of a diagram explain the transposition and formation of co-integrate. (2 mark COIII)



Section III

Q 5 Single cell yeast (*Saccharomyces cerevisiae*) displays simple sexual differentiation, which is indicated by the mating types. Justify this statement by providing relevant explanation. (3 mark COII)

Q 6 About 45% of human genome consists of sequence derived from Transposable elements and most common TE in human genome is Alu transposed through an RNA intermediate, The various transpositions results in development of genetic diseases in human beings. Name the four major diseases in human beings caused by transposons. (3 mark COII)

Section IV

Q 7 The frequency of two alleles in a gene pool is 0.26 (A) and 0.74 (a). Assume that the population in Hardy –weinberg equilibrium (4 mark COIV)

- a) Calculate the percentage of heterozygote individuals in the population
- b) Calculate the percentage of homozygous individuals in the population

Q 8 Suppose that the cells of *Escherichia coli* have a generation time of 20 minutes. If you start with 1 *E. coli* cell in the production medium under controlled conditions of temperature and nutrients then how many do you have after 120 minutes? (4 mark COIII)

