

P. P. SAVANI UNIVERSITY

Third Semester of B.Sc. Examination

December-2021

SSMB2090-Microbial Genetics

08.12.2021, Wednesday Time: 9:00 a.m. to 11:30 p.m. Maximum Marks: 60

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

Section-I (Total Marks - 30)

Q.1 Short Questions

[10]

1.1 Objectives

[05]

1.1a Which of the following stores the genetic information in DNA

- A Nitrogenous base
- B Phosphates
- C Sugars
- D None of these

1.1b Alfred Hershey and Martha Chase did experiments using

- A A medium containing potassium
- B A medium containing radioactive uranium
- C A medium containing radioactive phosphorous
- D A medium containing radioactive chloride

1.1c Who among the following were pioneer in understanding the genetic transformation in bacteria

- A T H Morgan
- B Watson and Crick
- C Frederick Griffith
- D Harshey and Chase

1.1d Conclusive results proving DNA to be genetic material was demonstrated by

- A Meselson and Stahl
- B Hershey and Chase
- C Avery, Macleod and MacCarty
- D Fredrick Griffith

1.1e Which of the following is a part of stem of the hairpin loop of RNA

- A A, T
- B C, T
- C A, G
- D G, C

1.1f Radioactive ^{32}P was used by Harshey and Chase to culture bacteriophages which resulted in

- A Viral proteins
- B Viral DNA
- C Bacterial capsule
- D Protein capsule of bacteriophage

1.1g In which carbon do the deoxyribonucleotides lack an -OH molecule?

- A C1

- B C2
- C C3
- D C4

1.1h A DNA molecule consists of 80 thymine and 80 guanine bases. What will be the total number of nucleotides in the DNA fragment? Choose among the following.

- A 100
- B 50
- C 320
- D 160

1.1i Unusual purines and pyrimidines are contained in

- A tRNA
- B nRNA
- C mRNA
- D rRNA

1.1j When one strand passes through the other in order to get separated is known as

- A Toroid
- B Linking number
- C Twist
- D Writh

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks)

[05]

1.2a Twist is the number of _____ turns in the DNA.

1.2b The backbone of RNA contains six carbon sugar-T/F

1.2c What is the most important characteristics of genetic material

1.2d What is nucleic acid

1.2e Define DNA topology

Q.2 Short Notes (Attempt any two)

[06]

A Major features of Watson Crick Model of DNA

B B-DNA

C Supercoiling of DNA in prokaryotes & eukaryotes

Q.3 Explain in detail (Attempt any two)

[14]

A Describe tRNA structure

B Describe about messenger RNA (m RNA)

C Describe Harshey & Chase experiment of bacterial transformation

Section-II (Total Marks - 30)

Q.1 Short Questions

[10]

1.1 Objectives

[05]

1.1a Choose the incorrect statement for plasmid

- A F plasmid carry tra genes
- B Multiply within a cell independently of the main bacterial chromosome
- C Relaxed plasmids are present in multiple copies of 50 or more per cell
- D Plasmids range from 2.0kb for the smallest to over 200kb for the largest.

1.1b Different plasmids to exist together must be

- A Conjugative
- B Of high copy number
- C Stable at high temperatures
- D Compatible

1.1c The unit of recombination is known as

- A Muton
- B Recon
- C Cistron
- D All of these

1.1d Haploid contains

- A (n) number of chromosomes
- B (2n) number of chromosomes
- C More than one set of chromosomes
- D Sets of chromosomes

1.1e The term genome was coined by

- A Hans Winkler
- B Morgan
- C Strasburger
- D Waldeyer

1.1f In transduction, bacteriophage does the role of

- A Episome
- B Recipient
- C Donor
- D Vector

1.1g The ability of cells to uptake DNA fragments from the surroundings is known as

- A HFR
- B Competence
- C Fecundity
- D Fitness

1.1h Which of the following process involves a formation of pilus structure

- A Vectoring
- B Transformation

C Transduction

D Conjugation

1.1i A phage that invades (attacks) in a host cell but does not destroy it is known as

A Temperate phage

B Sexduction

C Phycophage

D Virulent phage

1.1j Choose the incorrect statement regarding specialized transduction

A Viral genome is incorporated in the bacterial genome

B Observed in lambda phages such as K12

C Variety of genes can be transformed in this case

D Lysogenic viruses are capable of performing this

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks)

[05]

1.2a DNA of prokaryote is called _____

1.2b Recon are the regions within a gene between which _____ can occur

1.2c Any gene of donor bacterium can be transduced into recipient -T/F

1.2d Define genotype

1.2e Define F factor

Q.2 Short Notes (Attempt any two)

[06]

A The features of mitochondrial genome

B Cistron, recon & muton

C Features of B Chromosomes

Q.3 Explain in detail (Attempt any two)

[14]

A What is the mechanism of bacterial transformation? Explain with diagram

B Explain bacterial conjugation with diagram

C What is general and specialized transduction. Describe in detail.