P. P. SAVANI UNIVERSITY

Third Semester of B.Sc. Examination

December-2021

SSBT2030–Genetics-II

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 32P 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-I (Total Marks - 30)

Q.1 Short Questions **[10]**

1.1 Objectives **[05]**

1.1a Plasmid incompatibility is

A Inability of a plasmid to grow in the host
B Inability of two different plasmids to coexist in the same host cell in the absence of selection pressure.
C Both (1) and (2)
D None of the above

1.1b Plasmids which are maintained as limited number of copies per cell are known as

A stringent plasmids
B relaxed plasmids
C cryptic plasmids
D all of these

1.1c When viral genome can become integrated into the bacterial genome they are known as

A episome
B Temperate phage
C Prophge
D Bacteriophage

1.1d Conjugation between F+ and F- cell results in:

A Two F- cells
B F-cell becomes F+
C F- cell remains F- cell with a little DNA from F+ cell
D remains same without ant change

1.1e Specialized transduction is mediated by

A Lytic phages
B Lysogenic phages
C Both lytic and lysogenic phages
D T4 phages

1.1f Which characteristics do F-plasmids confer to the host bacterium

A Antibiotic resistance
B Florescent colonies
C Conjugative ability
D Virulence

1.1g Pilus structure is visible in

A Transduction
B Conjugation
C Transformation
D All of these

1.1h The unit of recombination is known as

A Muton
B Recon
C Cistron
D All of these

1.1i Who introduced the term 'genome'

A Strasburger
B Morgan
C Hans Winkler
D None of these

1.1j The unidirectional transfer of genetic material from a donor bacterium to recipient bacterium by cell to cell contact is termed as

A Transformation
B Transduction
C Conjugation
D Recombination

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a Define genome

1.2b What is Hfr

1.2c In prokaryotes, supercoiling is achieved with histones to form a 10nm fiber-T/F

1.2d Define copy number of plasmid

1.2e ColE1 of E. coli codes for toluene and salicylic acid-T/F

Q.2 Short Notes (Attempt any two) **[06]**

A Genome organization in prokaryotes

B Eukaryotic gene structure

C Factors affecting 'Transformation'

Q.3 Explain in detail (Attempt any two) **[14]**

A Describe Transduction with possible diagram

B Describe Transformation with possible diagram

C Describe conjugation with possible diagram