

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 a.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 Who were the first to take step to understand genetic transformation in bacteria

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

1.1b In Harshey and Chase experiments, radioactive ^{32}P was used to culture bacteriophages which resulted in

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

1.1c On which medium were the viruses cultivated by Alfred Hershey and Martha Chase

- A A medium containing radioactive potassium
- B A medium containing radioactive Uranium
- C A medium containing radioactive phosphorus
- D A medium containing potassium

1.1d Definite results proving DNA to be genetic material was given by

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

1.1e What stores the genetic information in DNA?

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

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

- A C1
- B C2
- C C3
- D C4

1.1g The stem of the hairpin loop of RNA consists mostly of

- A A, T

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

1.1h A short length of DNA molecule has 80 thymine and 80 guanine bases. The total number of nucleotide in the DNA fragment is

- A 160
- B 40
- C 320
- D 640

1.1i Passing of one strand through the other in order to get separated is known as

- A Twist
- B Linking
- C Write
- D Toroid

1.1j Which of the following RNA characteristically contains unusual purines and pyrimidines

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

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

[05]

1.2a Define nucleic acids

1.2b _____ is also called as RNA cap

1.2c Quadruple structure is one of the structure of DNA.

1.2d What is Chargaff's rule

1.2e Write two most important characteristics of genetic material

Q.2 Short Notes (Attempt any two)

[06]

A Factors for stability of DNA

B Z-DNA

C DNA topology

Q.3 Explain in detail (Attempt any two)

[14]

A Write in detail conformational flexibility of DNA molecules

B Write in detail about ribosomal RNA (rRNA)

C Describe Griffith 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 Prophage
- 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 any 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