2021

MICROBIOLOGY— GENERAL

Paper : GE/CC-4

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Question No. 1 is compulsory. Answer ***any 3*** from the rest.

1. Answer ***any ten*** questions: 2×10

(a) What is point mutation? Give an example.

(b) What is linker DNA? What is its function?

(c) What are the different bases found in RNA?

(d) What do you mean by operon? Give the name of basic components that make up an operon.

(e) Write down the functions of DNA helicase and primase in DNA replication.

(f) What is episome? Give an example.

(g) What is natural transformation? Give the name of a bacteria where it occurs.

(h) Write down any two characteristics of B DNA.

(i) What is the function of DNA topoisomerase II?

(j) Differentiate between denaturation and renaturation of DNA.

(k) Write down the salient features of the genetic code.

(l) What is intercalating agent? What is its role in mutation?

(m) What is Ti plasmid? Give an example.

(n) Who discovered (i) Semiconservative mode of replication, (ii) DNA double helix?

(o) Name two physical agents and chemical agents of mutation.

2. What is Okazaki fragment? Schematically discuss the semi-conservative model of DNA replication. What are the different polymerases found in prokaryotic DNA replication and write down their functions? What is the role of DNA ligase? 1+5+3+1

3. What is Hfr strain? What do you mean by competence? What are the different methods for generating artificial competence in bacterial cell? Write down the principle of generating chemical competence in bacteria cell. Write down the differences between generalized and specialized transduction. 2+2+2+2+2

4. What is gratuitous inducer? Give an example. Draw a schematic diagram of lac operon and write down the name of structural enzymes. What will be the fate of lac operon in the following conditions?

(a) When glucose is present and lactose is absent in the medium.

(b) When glucose is absent and lactose is present in the medium.

(c) When both glucose and lactose are present in the medium.

(d) When both glucose and lactose are absent in the medium. 1+1+2+2+4

5. What are the features of F-plasmid? What is transposon and why it is important in biological system? What are the differences between composite and non-composite transposons? Write down two important uses of transposon in biological system. 2+3+3+2

6. "In prokaryotes transcription and translation processes are coupled"– Justify the statement. What is Pribnow box? What is the role of sigma subunit of RNA polymerase in transcription? Discuss briefly how transcription termination happens in prokaryotes. 2+2+2+4

7. What is tRNA? What is the role of aminoacyl tRNA synthetase in translation? What is Shine-Dalgarno sequence and why it is important? Briefly describe the elongation process of translation. 2+2+3+3

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