Seat No. : _____

JG-123

January-2021

B.Sc., Sem.-V

CC-301 : Microbiology

(Molecular Biology & Genetics of Prokaryotes)

(New Syllabus)

Time : 2 Hours] **[Max. Marks : 50**

Instruction : (1) Students should write the answers from the question paper applicable to them; either **"New Course"** or **"Old Course"** and it must be mentioned at the beginning of the answer paper.
(2) Answer any **three** questions out of **eight** questions. Question No. **9** is compulsory.
(3) Draw figures wherever necessary.
(4) Figures to the right indicate marks.

1. Describe different experiments that convinced that DNA is a genetic material. **14**

2. (A) Discuss contributions of various scientists in elucidation of DNA structure. **7**
   (B) Explain the following events of DNA replication with diagram : **7**
   (1) formation of initiation complex
   (2) leading and lagging strands
   (3) proof reading

3. Differentiate between the initiation and elongation events of transcription and translation. **14**

4. (A) Describe salient characters of genetic code. **7**
   (B) Explain the role of cAMP and CAP in regulation of lac operon. **7**

5. Describe giving one example the mode of action of physical, chemical and biological mutagen. **14**

6. (A) Replica plate technique conclusively proves the spontaneous nature of mutation. Justify. **7**
   (B) Describe in detail the effects of mutation in protein coding gene. **7**

7. Differentiate between : **14**

(1) Horizontal and vertical gene transfer

(2) Generalized and specialized transduction

(3) F^+ and Hfr cells

(4) Chromosome and plasmid.

8. (A) Discuss the process of transformation in Gram-negative bacteria. **7**

(B) Enlist and describe different types of plasmids. **7**

9. Give short and specific answers in **1-2** lines only : (any **eight**). **8**

(1) Define nucleoid.

(2) What is phenotype ?

(3) Which were the two different elemental radioactive isotope we utilized by Hershey and Chase in their experiment that verified genes were made of DNA ?

(4) Name the technique used by Rosalind Franklin, which provided crucial clues to the Watson-Crick DNA model.

(5) Write the diagrammatic flow-sheet of central dogma.

(6) Name the enzyme needed for unwinding of DNA during transcription.

(7) Which enzyme formylates the amino acid during the process of initiation of translation ?

(8) What are Shine-Delgarno sequences ?

(9) Define diauxic growth curve.

(10) What types of mutation results due to addition or deletion of nucleotides in an intron ?

(11) What are transposons ?

(12) Define auxotrophs.

(13) In which phase of bacterial growth cycle the competence is usually obtained ?

(14) Which type of plasmid imparts the ability to carry out conjugation ?

(15) Name the genes that are picked up by lambda phage from E.coli during specialized transduction.

(16) What is the status of F' ?

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1. Describe different experiments that convinced that DNA is a genetic material. **14**

2. (A) Discuss the structure of DNA. **7**
   (B) Explain the following events of DNA replication with diagram : **7**
   (1) formation of initiation complex
   (2) leading and lagging strands
   (3) proof reading

3. Explain with diagram the process of translation in *Escherichia Coli.* **14**

4. (A) Describe salient characters of genetic code. **7**
   (B) Explain the role of cAMP and CAP in regulation of *lac* operon. **7**

5. Explain the following: Reverse mutation, nonsense mutation, frame-shift mutation, transversion and conditional lethal mutation. **14**

6. (A) Write short note on transposons. **7**
   (B) Describe in detail direct and indirect repair mechanisms. **7**

7. Explain in detail the following events and differentiate between them : **14**
$F^+ \times F^-$, Hfr $\times F^-$ and F' $\times F^-$

8. (A) Discuss the process of transduction in bacteria. **7**

(B) Enlist and describe different types of plasmids. **7**

9. Give short and specific answers in **1-2** lines only : (any **eight**). **8**

(1) Define allele.

(2) What is genotype ?

(3) Which were the two different elemental radioactive isotope we utilized by Hershey and Chase in their experiment that verified genes were made of DNA ?

(4) Name the technique used by Rosalind Franklin, which provided crucial clues to the Watson-Crick DNA model.

(5) Write the diagrammatic flow-sheet of central dogma.

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