



**DBJ-MICRO-313**

Seat No. \_\_\_\_\_

**M. Sc. (Sem. III) (CBCS) (W.E.F. 2016) Examination**

**June - 2022**

**Microbiology : Micro 313**

***(Genome Organization & Regulation of Gene Expression)***  
***(Core-I)***

Time : **2.30** Hours]

[Total Marks : **70**

**Instructions:**

- (1) Answer any five questions.
- (2) Each question carries 14 marks.
- (3) Support your answers with suitable illustrations.

- 1** Answer the following: (2 marks each) **14**
  - (a) What is the significance of genome organization?
  - (b) What are viroids?
  - (c) Why cAMP is referred as global starvation signal?
  - (d) What are the positive and negative controls of the operons?
  - (e) What are the salient features of the lac operon?
  - (f) Compare transformation and conjugation process in bacteria.
  - (g) Explain whether the inducible nature of the operon can be lost.
  
- 2** Answer the following: (2 marks each) **14**
  - (a) Do bacteria have choice or compulsion to use simple sugars against complex carbon sources? Comment.
  - (b) What are the basic features of the prions?
  - (c) What is DNA supercoiling?
  - (d) How is plasmid copy number in bacterial cells controlled?
  - (e) What are the structural features of the HU proteins?
  - (f) Comment on the moderately and highly repetitive sequences.
  - (g) What are the heterochromatin and euchromatin?
  
- 3** Answer the following: (7 marks each) **14**
  - (a) What are the basic differences between nucleus and nucleoid? Discuss.
  - (b) Discuss histone like proteins associated with the prokaryotic genome organization.

- 4 Answer the following : (7 marks each) 14
- (a) Discuss the history and concept behind the repressor-mediated regulation of the transcription.
- (b) Discuss positive control of lac operon with respect to the structure of CAP protein and role of cAMP.
- 5 Discuss: (7 marks each)
- (a) Mechanism of transduction. 7
- (b) Molecular basis of the bacterial conjugation. 7
- 6 (a) Discuss bacterial transformation and its significance in rDNA Technology. 7
- (b) With the salient features of Ara operon, compare it with lac operon. 7
- 7 Write comments on the following: (7 each)
- (a) Genetic Exchange and evolution in bacteria. 7
- (b) Variable impact of the DNA binding proteins in operon regulation. 7
- 8 Write comments on the following:
- (a) Bacterial Transposition and its significance in evolution. 7
- (b) Control of lysogeny and lytic cycles in viruses. 7
- 9 Write comments on the following:
- (a) C-value paradox and complexity of the organisms. 7
- (b) Interrupted mating and its significance in bacterial genetics. 7
- 10 Write comments on the following:
- (a) Histone like proteins involved in archeal genome organization. 7
- (b) Attenuation control of transcription. 7
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