

U.G. 3rd Semester Examination - 2020

MICROBIOLOGY

[HONOURS]

Course Code : MB-H-CC-L-07

(Molecular Biology)

Full Marks : 40

Time : 2½ Hours

The figures in the right-hand margin indicate marks.

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

1. Answer any **five** of the following: 2×5=10

- i) What is Klenow fragment?
- ii) What is role of sigma factor (σ) in bacterial transcription?
- iii) What is spliceosome?
- iv) How does viral DNA differ from human DNA?
- v) Why in DNA replication primers made of RNA?
- vi) What is an inducer?
- vii) What is linker DNA?

viii) What do you mean by Shine-Dalgarno sequence?

2. Answer any **two** of the following: 5×2=10

- i) What is Operon? What are the components of lac operon? 2+3
- ii) Which RNA polymerase is used to get tRNA? Write the differences between rho-dependent and rho-independent transcription terminations? 1+4
- iii) What do you mean by Hoogsteen base pairing? Differentiate between B DNA and Z-DNA. 2+3
- iv) Design an experiment to prove semi-conservative mode of DNA replication.

3. Answer any **two** of the following: 10×2=20

- i) Describe diauxic growth curve of bacteria in a medium containing both glucose and lactose in the light of lac operon. Which subunit of DNA pol III has the polymerase activity? What do you mean by the telomere repeat sequence? RNA is readily hydrolyzed by alkali, whereas DNA is not. Why? 4+1+3+2

- ii) What is the numeric relationship between pyrimidine and purine bases in DNA molecules? Is this valid for RNA molecules? What are the similarities and the differences between the transcription process and the replication processes? Why is RNA synthesis not as carefully monitored for errors as is DNA synthesis? 1+2+5+2
- iii) What is Shine-Dalgarno sequence? What is its function? Genetic codes are comales, universal and triplet in nature - explain. Briefly describe the initiation of translation process of bacteria. How does it differ from eukaryotic initiation process? 1+1+2+4+2
- iv) Distinguish between introns and exons. Describe how t-RNA are activated during translation. What is nonsense codon? The sequence of part of an mRNA is 5'-AUGGGGAACAGCAAGAGUGGGG-CCCUGUCCAAGGAG-3'. What is the sequence of the DNA coding strand? 2+4+1+3
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