

U.G. 4th Semester Examination - 2020**Molecular Biology and Biotechnology****[HONOURS]****Course Code : MBBT(H)401-T-CCR-8**

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
- a) What do you mean by 'processivity' of DNA Polymerase?
 - b) "DNA replication is semiconservative".— Explain.
 - c) What is a transposon? What do you mean by 'hybrid dysgenesis'?
 - d) What is the importance of Kozak sequence and Shine-Dalgarno sequence?
 - e) Write any two features of genetic code.
 - f) Name two inhibitors of translation in

prokaryotes.

- g) What is a non-sense mutation? Name one disease that occurs due to non-sense mutation in gene.
 - h) Write two differences between prokaryotic and eukaryotic transcription.
2. Answer any **two** of the following: 5×2=10
- a) What kind of repair machinery is used to remove uracil that results from spontaneous deamination of cytosine in DNA? Explain the repair process with diagram. 1+4
 - b) What is Holliday Intermediate? Write the importance of RecA proteins in homologous recombination.
 - c) Explain the different steps of DNA synthesis in leading and lagging strand with diagram.
 - d) What are retrotransposons? How do transposable elements contribute to genome evolution? 2+3

3. Answer any **two** of the following: $10 \times 2 = 20$
- a) Explain the role of photolyase enzyme in removal of pyrimidine dimer. How is the formation of kernel colour regulated in maize? Explain the mechanism. $4+6$
 - b) Distinguish between an inducible and a repressible operon. There are two mutations in the lac operon I^s and O^c . In presence of inducer what will be the state of expression of LacZ, LacY and LacA genes? Why is genetic code triplet? Describe the different steps of elongation of a polypeptide chain. $2+2+2+4$
 - c) What is the importance of topoisomerase in DNA replication? What are catenanes? Describe a model for recombinational DNA repair of stalled replication forks. $2+2+6$
 - d) Describe the structure of prokaryotic RNA polymerase and explain how this structure is appropriate for production of abortive transcripts and selection of correct nucleotides for incorporation in RNA. "There is no endonuclease and no ligase involved in any of the three types of splicing reaction. Explain. $5+2+3$