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**Question Paper Code:U5D01**

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Fifth Semester

Biotechnology

21UBT501- MOLECULAR BIOLOGY

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10x 2 = 20 Marks)

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|--|----------|
| 1. List out the forces that stabilize the structure of DNA   | CO1-U    |
| 2. Give the significance of phosphodiester bond.   | CO1-U    |
| 3. List out the enzymes required for DNA replication in prokaryotes.                                     | CO1-U    |
| 4. Relate bidirectional replication in prokaryotes and eukaryotes  | CO2- App |
| 5. Add a note on core enzyme and holo enzyme of <i>E.coli</i> RNA polymerase                             | CO1-U    |
| 6. Mention the beneficial effects of polyadenylation.  | CO2-App  |
| 7. Comment on degeneracy of genetic code.  | CO1- U   |
| 8. Differentiate TIM & TOM.  | CO2-App  |
| 9. List three mechanisms a bacterial cell uses to control the amount of protein present inside the cell. | CO1-U    |
| 10. Differentiate negative and positive regulators with examples.  | CO1-U    |

PART – B (5 x 16= 80 Marks)

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|--|-------|------|
| 11. (a) Outline the structure and functions of DNA. Classify and explain the variants of double helical DNA. | CO1-U | (16) |
| Or   |       |      |
| (b) Describe the secondary structure of RNA with a neat diagram.   | CO1-U | (16) |

12. (a) Explain in detail about the error that occurs during replication process and how the following mechanisms repair DNA  
(i) Mismatch repair  
(ii) Recombination Repair  
CO1-U (16)
- Or
- (b) Interpret different types of plasmid replication with appropriate diagram.  
CO1-U (16)
13. (a) Explain self-splicing introns. How do class I introns differ from class II introns.  
CO2-App (16)
- Or
- (b) Describe the role of class-II transcription factors in eukaryotic transcription.  
CO2-App (16)
14. (a) Give a detailed account on prokaryotic tRNA and rRNA processing.  
CO2-App (16)
- Or
- (b) Relate the steps of trafficking of protein that occurs inside a cell.  
CO2-App (16)
15. (a) What are the 5 structural genes of Trp Operon? Tryptophan is externally supplied to *E.coli* then, Trp Operon is switched OFF. How can you support this statement?  
CO3-App (16)
- Or
- (b) Discover the involvement of regulatory protein AraC, both as a repressor and an activator.  
CO3-App (16)