

# RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2025

SECOND YEAR [BATCH 2022-25]

**MICROBIOLOGY**

**Paper : 4MCBMJC1**

Date : 03/05/2025

Time : 11 am – 1 pm

Full Marks : 50

1. Answer **any ten** questions: [10×2]
  - a) What is the role of gRNAs in RNA editing process?
  - b) Distinguish between introns and exons.
  - c) What do you mean by alternative splicing?
  - d) Write down the functions of TFIID transcriptional factor in Eukaryote.
  - e) What do you mean by polyadenylation?
  - f) Mention the various segments present in Eukaryotic RNA Polymerase II core promoter.
  - g) What is abortive initiation?
  - h) What is IPTG?
  - i) Name the allosteric effector of catabolite activator protein of *lac* operon.
  - j) Write down two features of genetic code.
  - k) What is the leader sequence of *trp* operon made up of?
  - l) What is Shine-Dalgarno sequence?
  - m) Write down the function of eIF4E.
  - n) Mention the function of aminoacyl tRNA synthetases.
  - o) Name two inhibitors of protein synthesis in prokaryotes.
  
2. Answer **any three** questions: [3×10]
  - a) Write down the role of CPSF and CSTF protein complex in polyadenylation event.
  - b) Write a short note on RNA splicing.
  - c) Promoter escape requires phosphorylation of the polymerase CTD tail of RNA polymerase. Why do you think it is very much necessary?
  - d) Write down major differences between transcription in prokaryotic and transcription in eukaryotic systems. [(1.5+1.5)+3+2+2]
  
3.
  - a) How sigma factor does mediate the binding of RNA polymerase to the promoter?
  - b) Schematically explain the mechanism of *siRNAs* mediated *RNAi*.
  - c) Explain the catalytic mechanism of RNA polymerase enzyme in prokaryotes.
  - d) State the differences between rho-dependent and rho-independent termination process. (3+3+2+2)
  
4.
  - a) Explain the principle of DNA foot printing experiment.
  - b) What is RNA interference?
  - c) List out the various processing events of Eukaryotic pre-rRNA.
  - d) How does an enhancer mediate activation of its corresponding promoter? (3+2+2+3)
  
5.
  - a) Draw a labeled diagram of 70S translation initiation complex.
  - b) Name a GTP-binding translation initiation factor in prokaryotes. Explain its function.
  - c) Describe the fidelity of translation. What is codon? [2+4+(3+1)]
  
6.
  - a) What do you mean by allosteric site?
  - b) Mention histone acetylation mechanisms.  
What do you mean by yeast mating type switching?
  - c) With a neat diagram show that the *trp* operon is a repressible operon. [2+(2+2)+4]