Progressive Education Society's
Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16
End Semester Examination: April 2023
Faculty: Science and Technology

Program: B. Sc. Biotech (04) **Semester: II** **SET: B**
Program (Specific): Biotechnology **Course Type: Core**
Class: S. Y. B. Sc. **Max. Marks: 35**
Name of the Course: Molecular Biology II
Course Code: 23 BBT 402 **Time: 2 Hr**

Instructions to the candidate:

1) ***There are 4 sections in the question paper. Write each section on separate page.***
2) ***All Sections are compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw a well-labeled diagram wherever necessary.***

SECTION: A

Q1) Answer any FIVE of the following (5/6) **5**

1. Mention the role of aminoacyl tRNA synthetase.
2. What is the primary function of DNA repair mechanisms in cells?
3. Name the operator and promoter in the tryptophan operon.
4. What is the role of the promoter sequence in prokaryotic RNA transcription initiation?
5. What is transition mutation?
6. What is the role of the lacZ gene product in the lac operon?

SECTION: B

Q2) Answer any FIVE of the following (5/6) **10**

1. How does termination occur in prokaryotic RNA transcription, and what structural feature is often involved?
2. Explain pre-mRNA processing in the eukaryotic transcription mechanism.
3. Demonstrate the degeneracy of codes in protein synthesis.
4. Diagrammatically represent the Tryptophan operon.
5. Compare and contrast nucleotide excision repair (NER) and mismatch repair (MMR) mechanisms in repairing DNA damage.
6. What is the importance of ribosome binding site (RBS) in prokaryotic protein synthesis?

P.T.O.

SECTION: C

Q3) Answer any TWO of the following (2/4) 8

1. Highlight the key steps of prokaryotic RNA transcription and explain the role of RNA polymerase.
2. Illustrate the mechanism of termination of protein synthesis in prokaryotes.
3. What are the mechanisms of DNA repair, and explain photoreactivation?
4. Describe the post-translational modifications of proteins in eukaryotes.

SECTION: D

Q4) Answer any TWO of the following (2/4) 12

1. What are the steps involved in eukaryotic RNA processing? Discuss how these modifications contribute to the regulation and stability of the mRNA.
2. Explain in detail the eukaryotic protein synthesis and briefly discuss the inhibitors of protein synthesis.
3. list and explain the various factors responsible for causing DNA damage and give an overview of the different DNA repair pathways cells utilize to counteract and control the damage.
4. Explain in detail with a diagrammatic representation of the lactose operon.