Final Assessment Test – April 2025

VIT
Vellore Institute of Technology

Course: BBIT209L - Molecular Biology
Class NBR(s): 1279 / 1281
Time: Three Hours

Slot: B1+TB1
Max. Marks: 100

- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

General Instruction: Draw neat diagrams wherever necessary.

Answer ALL Questions
(10 X 10 = 100 Marks)

1. Relate the following with gene expression:
   a) H3, H4 b) Chromatin remodeling complex c) lysine d) acetylation.
2. Compare and contrast the properties, characteristic features of DNA polymerase I, II and III. Also state its significance in DNA replication.
3. Distinguish DNA damage reversal and damage removal with suitable examples
4. a) Which region on DNA is vital for RNA polymerase binding? Brief the mechanism of transcription termination by rho-independent method. **[5]**
   b) *7-Methyl guanosine is attached to the first ribonucleotide. This helps in protection and recognition.* Which molecule this statement refers to and what is the name given to that modification. Name the enzymes involved in the modification. **[5]**
5. a) A sequence of the picture of polypeptide synthesis shows a ribosome holding two transfer RNAs. One t-RNA has a polypeptide chain attached to it and the other t-RNA has a single amino acid attached to it. What should be the next step? Explain the mechanism. **[6]**
   b) How does a tRNA become charged with the methionine in bacterial cells? What is the energy source for this reaction? **[4]**
6. How tryptophan operon is different from other operon models? Explain the attenuation mechanism of trp operon.
7. Define recombination. Compare and contrast transformation and transduction.
8. What is CRISPR Cas9? Relate its application in gene editing and synthetic biology?

9. a) Compare and contrast genetic and non-genetic RNA with suitable examples. Make a note on the structure and significance of t-RNA tailoring process.

OR

9. b) Draw the codon dictionary. And elaborate the statement "Genetic code is a triplet, redundant, non-overlapping and degeneracy".

10. a) Differentiate the following:

i. Pribnow box and Hogness box [3]

ii. Nucleoside and nucleotide [2]

iii. A, B and Z model of DNA [5]

OR

10. b) List any five inhibitors of transcription, translation and replication and comment on its significance in drug discovery.

⇔⇔⇔ **W/D/TY** ⇔⇔⇔