

Parvatibai Chowgule College of Arts and Science
Autonomous

B.Sc. Semester End Examination, January/February 2022

Semester: V

Subject: Biochemistry

Title: Regulation of Gene Expression (Elective)

Duration: 2 Hours

Max. Marks: 45

- Instructions:** 1. All the questions are compulsory; an internal choice is available.
2. Figures to the right indicate maximum marks to the question.
3. Draw neatly labeled diagrams wherever necessary.
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Q. 1. Answer ANY THREE of the following:

(09)

- a) Describe, with the help of a diagram, the processes that were added as extensions to the classic Central Dogma of Molecular Biology.
- b) Write a brief note on rho-dependent termination of transcription in prokaryotes.
- c) Write a short note on promoters that are commonly found in eukaryotes.
- d) What is the CTD? Write down two functions of the CTD.

Q. 2. Answer ANY TWO of the following:

(12)

- a) Define and write the significance of alternative splicing, exon shuffling, and exon skipping.
- b) With the help of neat labeled diagrams, describe the structures of the 3 main types of RNA molecules that are found universally in all living organisms.
- c) Briefly explain the general process of translation. Add a short note on why certain inhibitors of prokaryotic translation make good antibiotics.

Q. 3. Answer ANY TWO of the following:

(12)

- a) Draw and explain the *trp* operon
- b) Explain the significance of gene regulation. Add a detailed note on the various levels of gene expression in eukaryotes.
- c) What are the different types of chromatin? Add a short note on how cis- & trans-acting elements and RNAi are important for gene expression.

Q. 4. Answer ANY ONE of the following:

(12)

- A) Much important confirmatory evidence on the genetic code has come from assessing changes in the amino acid sequence of mutant proteins after a single base has been changed in the gene that encodes the protein. Which of the following amino acid replacements would be consistent with the genetic code if the replacements were caused by a single base change? Which cannot be the result of a single-base mutation? Why?

P.T.O.