



B.E/B.TECH DEGREE EXAMINATIONS: NOV / DEC 2024

(Regulation 2018)

Fourth Semester

BIOTECHNOLOGY

U18BT14204 : Cell and Molecular Biology

COURSE OUTCOMES

- CO1: Critically evaluate and comprehend the fundamental concepts of cell and cell membrane structure and functions.
- CO2: Imbibe the concept of membrane transport and signal transduction in cells.
- CO3: Critique the concepts of genome organization and replication of prokaryotes and eukaryotes.
- CO4: Comprehend the process involved in transcription and translation and interpret the consequences of mutation.
- CO5: Apply the concept of gene activity regulation and DNA repair mechanisms in prokaryotes.

Time: Three Hours

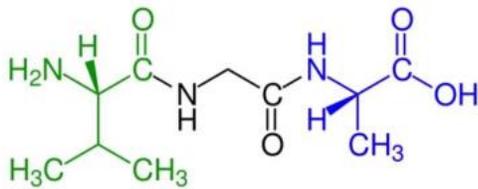
Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

1. Compare constitutively expressed genes and inducible genes. CO5 [K₂]
2. What is promotor melting? And Explain how it takes place in eukaryotic transcription. CO3 [K₃]
3. The figure below represent the polypeptide chain. Identify the aminoacids acids present in this peptide linkage and explain their unique properties. CO1 [K₂]



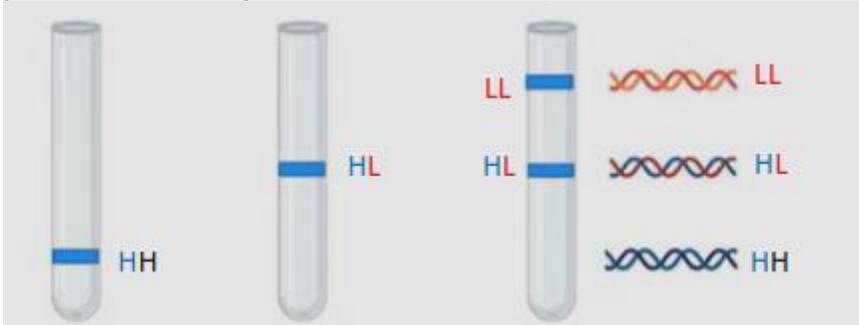
4. What is CoT analysis? State on the importance of CoT analysis in finding Complexity of genomes. CO3 [K₄]
5. What are transcriptional inhibitors? Give any two examples. CO4 [K₅]
6. Evaluate the role of centrosome in plant cell. CO1 [K₂]
7. Differentiate between passive and active transport. CO2 [K₂]
8. Analyze the role of rho proteins in termination of transcription in prokaryotes. CO3 [K₄]
9. Draw a neat sketch of molecular structure of phospholipid bilayer of the cell. CO2 [K₃]

10. Differentiate between Spindle checkpoint and DNA damage Checkpoint

CO3 [K₄]

**Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)**

11. a) The figure below represents the results of Meselson and Stahl experiment. (i) 8
Frame the hypothesis for this experiment and comment on the design of this experiment ii) What can be proved from the results of this experiment? Provide your answers with justification.



CO3 [K₂]

- b) Elaborate with neat sketch on the mechanism of protein synthesis in Eukaryotes. 8
In addition, comment on various translational inhibitors with suitable examples. CO4 [K₂]
12. a) Summarize the role of carrier proteins & pumps in membrane transport. 8 CO2 [K₃]
- b) How does a secondary messenger help to transmit signal transduction in cell? 8 CO2 [K₄]
13. a) In Eukaryotes, mitosis results in production of two diploid cells, critically analyze various phases of eukaryotic cell cycle and explain the process of cytokinesis with neat sketch. 8 CO1 [K₂]
- b) Elaborate with neat sketch on the roles of checkpoint proteins in regulation of cell cycle. 8 CO1 [K₂]
14. a) Explain the mechanism of gene regulation in bacteria citing 'lac' operon as model. 8 CO5 [K₃]
- b) Examine the effect of UV radiation on DNA structure and add a note on "Photoreactivation". 8 CO5 [K₃]
15. a) What are Spliceosome complex? Explain with schematic diagram on the role of snRNPs in splicing of pre-mRNA. 8 CO4 [K₄]
- b) Elaborate in detail on the process of capping and polyadenylation of eukaryotic mRNA. 8 CO4 [K₃]
16. a) Design an experiment to prove DNA as genetic material using the bacterial strain Streptococcus Pneumoniae. 8 CO3 [K₄]

- b) The figure below represents the terminal end of Eukaryotic chromosome. (i) elobrate on the process that involves in creation of the 3' overhang in the figure below. (ii) Disuss on the mechnism that prevents the shortenining of the eukaryotic chromosome during replication.

8 CO3 [K₅]

