Register Number:……..

KUMARAGURU college of technology
character is life

B.E/B.TECH DEGREE EXAMINATIONS: APRIL /MAY 2024

(Regulation 2018)

Fourth Semester

BIOTECHNOLOGY

U18BTI4204: 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.	Outline the various the cell cycle regulation points	CO1	[K_2]
2.	What are constitutive genes also known as? Are all genes constitutively expressed?	CO5	[K_2]
3.	State the role of protein kinase in cell signaling.	CO2	[K_2]
4.	How is voltage sensed in Voltage gated channel proteins.	CO2	[K_3]
5.	Summarize the role of proto oncogenes in signal transduction.	CO2	[K_3]
6.	What is C-value in DNA?	CO3	[K_2]
7.	Tabulate various Classes of RNA molecules and its functions in cellular development.	CO4	[K_2]
8.	Examine the role of capping in transcription.	CO4	[K_3]
9.	Outline any three post-translational modifications in proteins.	CO4	[K_3]
10.	Nucleic acids are macromolecules that store information and provide the instructions for building proteins. They are building blocks of genetic material. There are two types of Nucleic acid, one is stable other is reactive. Mention the Nucleic acid which is stable and why it is stable?	CO1	[K_4]

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

11.	a)	Summarize with neat diagram on the structure and functions of various eukaryotic Intracellular organelles.	10	CO1	[K_3]
	b)	Infer the various cell-cycle checkpoints and Aneuploidy on the path to Cancer.	6	CO1	[K_3]
12.	a)	Enumerate how autocrine, endocrine and paracrine models of cell signaling help in passing a signal from extracellular into the cell.	10	CO2	[K_3]
	b)	Examine the role of bacterial quorum sensing in virulence of bacteria.	6	CO2	[K_4]
13.	a)	Illustrate with neat diagram on the various processes of transcription in eukaryotes. Discuss the various post-transcriptional process that the mRNA undergoes before it reaches ribosomes.	8+4	CO4	[K_4]
	b)	Outline the role of snRNA in transcription.	4	CO4	[K_3]
14.	a)	Mutations of genes are responsible for most of the diseases. It was found that there are various types of mutagens. In this regard, compare with examples the Physical, Chemical and Biological mutagens leading to various mutations causing cancer.	6	CO5	[K_3]
	b)	Explain various steps in eukaryotic transcription.	10	CO4	[K_3]
15.	a)	DNA is arguably the most important molecule in the whole of biology. When a cell divides an identical copy of its DNA is made in a process called DNA replication. (i) Explain how pairing of nitrogenous bases allows identical copies of DNA to be made. (ii) Outline how the process of DNA replication is completed, following the pairing of nitrogenous bases. (iii) Why is DNA replication described as semi-conservative?	2+6 +2	CO3	[K_4]
	b)	Analyze what did Avery, Mc Leod and Mc Carty's experiment proved. .	6	CO3	[K_2]
16.	a)	Inspect and explain the various DNA repair mechanisms available with examples.	12	CO5	[K_3]
	b)	Explain the mechanism of gene regulation in bacteria citing "tryptophan operon" as model.	4	CO5	[K_4]

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