JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION-2025

MSc-I Semester (BT)

Course Code(Credits): 20MS1BT112 (3) Max. Marks: 35

Course Name: Cell and Molecular Biology

Course Instructors:Dr. Abhishek Chaudhary Max. Time: 2 Hour

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q.No	Question	Marks
Q1	Insulin regulate the expression of specific gene consist of a cascade of protein kinase each of which activate next. The Insulin binding to its cell surface transmembrane receptor stimulates intrinsic protein tyrosine kinase activity, autophosphorylation, and subsequent tyrosyl phosphorylation of insulin receptor substrate (IRS) proteins and adapter proteins. Schematically detail-out the the regulation of gene expression by Insulin as well as explain the role of following in the regulation of gene expression (a) IRS-1 (b) Grb-2 (c) Ras (d) Raf (e) MEK (f) ERK	3+3
Q2	Epinephrine (also known as adrenaline) activates the beta-adrenergic pathway by binding to beta-adrenergic receptors (β-ARs). This interaction triggers a "fight-or-flight" response, primarily through the production of the second messenger cyclic adenosine monophosphate (cAMP). Pictorially explain the β- adrenergic pathway using epinephrine as signal molecule. Also explain the desensitization of β- adrenergic receptor in the continued presence of epinephrine.	3+3
Q3	Protein biosynthesis, or protein synthesis, is a core biological process, occurring inside cells, balancing the loss of cellular proteins (via degradation or export) through the production of fresh proteins. a. Describe the process of protein translation with **suitable ray diagram** with special emphasis on Initiation, Elongation and termination. Also signify the role of various IF, EF and Termination factor in the successful completion of translation process. b. Outline the post-translation modification that occur after translations c. A mutatuion change a codon from UAU to UAA. Explain how this affects translation and the resulting protein. d. Describe how antibiotics such as Cyclohexamide, Tetracycline and Puromycin inhibit translation	4+2+2 +3
Q4	DNA repair is a collection of processes by which a cell identifies and corrects damage to the DNA molecules that encode its genome. A weakened capacity for DNA repair is a risk factor for the development of various disease incuding cancer. Illustrate the repair mechanism of DNA by a. Nucleotide-Excision Repair and b. Direct repair mechanism	2+2

Q5	RNA processing is the term collectively used to describe the sequence of events through which the primary transcript from a gene acquires its mature form. a. Describe the RNA processing with special focus on 5' capping Splicing Polyadenylation b. what do you understand by degeneracy of genetic code c. what do you mean by shine dalgarno sequence	**6+1+1**