U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

Program: B.E. **Semester: VI**
Branch: Biotechnology **Duration: 3 hrs.**
Course Code: 19BT6DE3STN **Max Marks: 100**
Course: Signal Transduction **Date: 17.07.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

			UNIT – I	CO	PO	Marks
1	a)		Differentiate autocrine, endocrine and paracrine signaling with suitable examples.	*CO1*	*PO1*	**04**
	b)		Illustrate and explain the role of voltage-gated and ligand-gated ion channels in neural transmission.	*CO2*	*PO2*	**10**
	c)		Describe the series of events and molecular consequences of photon absorption by rhodopsin in the rod cells.	*CO1*	*PO1*	**06**
			OR			
2	a)		Neurotransmitters are released at synapses when intracellular vesicles loaded with neurotransmitter fuse with the plasma membrane. Describe the transduction pathway with suitable example.	*CO2*	*PO2*	**08**
	b)		In the mucous layer over laying the olfactory neurons, the odorant molecule binds directly to an olfactory receptor or to a specific binding protein that carries the odorant to a receptor. Describe the molecular events that follow the interaction between odorant and receptor.	*CO2*	*PO2*	**08**
	c)		Define signal transduction. Explain the components of intracellular signal transduction.	*CO1*	*PO1*	**04**
			UNIT – II			
3	a)		Describe the role of stimulatory G protein in transduction of the epinephrine signal.	*CO1*	*PO1*	**07**
	b)		Two intracellular second messengers are produced in the hormone-sensitive phosphatidyl inositol system, which contribute to the raising cytosolic calcium. Identify the second messengers and explain their formation.	*CO2*	*PO2*	**08**
	c)		Discuss RTKs class of receptor and their representative ligand with signalling mechanism.	*CO3*	*PO3 PO4 PO12*	**05**

			OR			
	4	a)	Name the major components of the MAPK signaling pathways and describe their general function in these pathways.	*CO3*	*PO3 PO4 PO12*	**08**
		b)	Describe the regulation of PKA by cAMP. What other regulatory mechanisms contribute to PKA control?	*CO3*	*PO3 PO4 PO12*	**07**
		c)	Explain the activation of guanylyl cyclase by nitric oxide.	*CO3*	*PO3 PO4 PO12*	**05**
			UNIT-III			
	5	a)	What are the structural features of HREs? Explain how ligand binding is coupled to transcription activation?	*CO2*	*PO2*	**07**
		b)	Describe the JAK-STAT transduction mechanism with an example.	*CO2*	*PO2*	**07**
		c)	Describe the domain structure of nuclear receptors and the function of the domains.	*CO3*	*PO3 PO4 PO12*	**06**
			UNIT –IV			
	6	a)	Describe the major structural characteristics of CDKs. What are the major regulatory phosphorylation sites, and which protein kinases are responsible for these phosphorylations?	*CO2*	*PO2*	**08**
		b)	Illustrate and explain the control points of the cell cycle. Explain the external factors controlling cell-cycle progression.	*CO2*	*PO2*	**5**
		c)	What are the major components of the DNA damage check points, and how do these proteins convey signals to the cell cycle?	*CO2*	*PO2*	**07**
			UNIT – V			
	7	a)	Describe the general characteristic of a tumor suppressor with suitable example and signalling pathway.	*CO2*	*PO2*	**10**
		b)	Discuss signalling mechanism that involves inflammation responses to bacterial LPS.	*CO2*	*PO2*	**10**

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