INDIRA UNIVERSITY, PUNE

SCHOOL OF PHARMACY- M. PHARM ((Pharmacology)

Term End Examination (2025 Pattern) December – 2025 - Semester – I

Subject Name: Cellular & Molecular Pharmacology **Max. Marks: 75**
Subject Code: MPL104T **Time: 3 Hours**

Instructions

- All Questions are Compulsory. Write two sections on separate answersheets.
- Neat diagram must be drawn wherever necessary.
- Figures to the right indicate full marks.

Section : I

Q.1 **Solve any ONE from the following** **15 Marks**

a Differentiate between prokaryotic and eukaryotic cells. Describe the structure and functions of the nucleus, nucleolus, ribosomes, centriole, and centrosome with suitable diagram.

b Describe in detail the principle, procedure and applications of DNA electrophoresis and polymerase chain reaction (PCR).

Q.2 **Solve any FOUR from the following** **20 Marks**

a Explain the Phospholipase C (PLC)–IP_3/DAG signaling pathway, describing its mechanism of action and physiological significance.

b Explain in detail the various levels of genome organization in eukaryotic cells.

c What are ion channel receptors? Describe their structure and function.

d What is gene regulation? Discuss the Operon Model of gene regulation.

e Outline the key steps and regulatory mechanisms of the cyclic AMP, MAPK, and JAK/STAT signalling pathways and their importance in cellular communication.

f Explain the principle, procedure and applications ELISA techniques in protein analysis.

Section : II

Q.3 **Solve any ONE from the following** **15 Marks**

a Describe the various types of immunotherapeutics with suitable examples and explain their mechanisms and therapeutic applications.

b Describe the various types of vectors used in genetic engineering and discuss their applications in recombinant DNA technology.

Q.4 **Solve any TWO from the following** **15 Marks**

a Discuss the viral and non-viral gene delivery systems along with examples.

b What is G-protein coupled receptors (GPCRs)? Describe how genetic variations can modify their structure and function.

c What is gene mapping? Explain the various techniques used for mapping disease-associated genes.

d Write short notes on restriction enzymes.

Q.5 Solve any TWO from the following **10 Marks**

a What are the basic equipments used in a cell culture laboratory? Explain their applications.

b What is metabolomics? Explain its importance in understanding human diseases and drug development.

c Write a short note on the cell viability assay.

d Discuss the role of antibody humanisation in drug development.

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