

# INDIRA UNIVERSITY, PUNE

## SCHOOL OF PHARMACY- MPHARM (Pharmaceutics)

*Term End Examination (2025 Pattern) April- May – 2026- Semester – II*

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**Subject Name: Computer Aided Drug Development**  
**Subject Code: MPH 203T**

**Max. Marks:75**  
**Time: 3:00 Hrs.**

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### 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.
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### Section : I

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

**15 Marks**

- a. Discuss the computational models in predicting drug disposition. Elaborate with examples of how these models help in optimizing drug dosing regimens?  
Brief on History of Computers in Pharmaceutical Research and Development.
- b. Differentiate between Descriptive modelling and Mechanistic modelling in the context of pharmaceutical sciences.

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

**20 Marks**

- a. Enlist various tools and software's used in computational modelling. Elaborate anyone of them.
- b. Discuss elements of QbD in formulation development
- c. Discuss how confidence regions are utilized to assess reliability in pharmacokinetic or pharmacodynamic studies.
- d. Explain active transport in drug delivery. List two transporters involved and their importance in computational modelling.
- e. Describe sensitivity analysis in the context of pharmaceutical research. Explain its role in model validation and optimization.
- f. Discuss role of Physiologically Based Pharmacokinetic (PBPK) Models.

## Section : II

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

**15 Marks**

- a. Describe the theoretical background and model construction for computer aided biopharmaceutical characterization. Write note on different specialized features of this model.
- b. Describe in detail principle, working and applications of computational fluid dynamics in pharmaceutical industry.

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

**15 Marks**

- a. Describe role of AI in drug discovery & development.
- b. Describe computer simulation for PK & PD in isolated tissues & organs.  
Explain how computers assist in market analysis, particularly through data processing, forecasting, and supporting business decisions in changing market conditions.
- c. Describe role of automation in pharmaceutical industry.

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

**10 Marks**

- a. Discuss patents and its significance in pharmaceutical research & development.
- b. Discuss formulation of pharmaceutical emulsions using computers.
- c. Explain briefly clinical data monitoring. Elaborate on various clinical data collection methods.
- d. Explain the fundamental principles of optimization, including how objective functions, constraints, and different types of optimization problems influence the choice of solution methods.

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