BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.PHARM **SEMESTER: IV**
BRANCH: PHARMACY **SESSION: SP2025**

SUBJECT: BP403T PHYSICAL PHARMACEUTICS-II

TIME: 3.00 Hours **FULL MARK: 75**

INSTRUCTIONS:

1. **The missing data, if any, may be assumed suitably.**
2. **Before attempting the question paper, be sure that you have got the correct question paper.**
3. **Tables/Data handbook/Graph paper etc. to be supplied to the candidates in the examination hall.**
4. **This question paper consists of (03) three parts. Read the part wise instructions before attempting the questions.**

PART-I
Objective type questions
(Instruction: Answer all questions)

Q1. (10 x 2 = 20 Marks)

A. Define Suspension? What are the ideal properties of a pharmaceutical suspension?

B. Define creaming and caking in suspensions.

C. Mention any two advantages of preparing emulsion.

D. What is a dispersed system? Give two examples.

E. An Ostwald viscometer is used to measure the viscosity of acetone at 25°C, which is found o be 0.323 cp. Its density at 25°C is 0.812 g/cm^3. Calculate the kinematic viscosity of acetone at 25°C.

F. Define mobility and write the relation with plastic viscosity.

G. $2NO + O_2 = 2NO_2$

The above equation is not termolecular rather bimolecular. Explain.

H. A solution of a drug of a drug contained 600 units/mL when prepared. It was analysed after 50 days and was found to contain 150 units/mL. Assuming the decomposition is first order, at what time will the drug have decomposed to one-half of its original concentration?

I. Under what flow conditions of the dispersion medium is Stoke's law applicable?

J. Compare the particle sizes of two powders with angles of repose of 35° and 45°, assuming no lubricants are used.

PART-II
Short Answers
(Instruction: Answer seven out of nine questions)

(7 x 5 = 35 Marks)

Q2. Discuss the interfacial properties of suspended particles and their impact on suspension stability.

Q3. Explain the various theories of emulsification with suitable diagram.

Q4. Discuss the formulation and evaluation of pharmaceutical emulsion.

Q5. A sample of powdered zinc oxide, density 5.6 g/cm^3, is allowed to settle under the acceleration of gravity, 981 cm/sec^2, at 25 °C. The rate of settling is 7.30×10^{-5} m/sec; the density of the medium is 1.01 g/cm^3, and its viscosity is 0.01 g/cm sec. Calculate the Stokes diameter of the zinc oxide powder and express it in μm.

Q6. Discuss the various derived properties of powder.

Q7. Define Martin's diameter, Feret's diameter, and Projected area diameter with suitable diagram.

Q8. Pseudoplastic flow is typically exhibited by polymer solution. Explain with proper justification.

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Q9. A prescription for a liquid preparation is called for. It is to contain 350 mg/5 mL of a drug. The solubility of the drug at 25°C is 0.3 g/100 mL; The first order rate constant for drug degradation in this solution is 4.6×10^{-6} sec^{-1}. Calculate the apparent zero-order rate constant and shelf-life of the drug.

Q10. Describe the half-life method to determine the order of a reaction.

PART-III
Long Answers
(Instruction: Answer two out of three questions)

(2 x 10 = 20 marks)

Q11. Explain the mechanism of flocculation. How can flocculating agents be used to improve suspension stability.

Q12. Classify colloids and give a comparative account of lyophilic, lyophobic and association colloids in terms of stability, viscosity, and preparation.

Q13. Derive Michaelis-Menten equation by assuming that the interaction of a substrate (S) with an enzyme (E), to yield a product (P).

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