

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

CLASS: BPHARM  
BRANCH: PHARMACY

SEMESTER: IV  
SESSION: SP2023

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 hand book/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. Mark-Houwink is based on
- i. Osmotic pressure method to determine Molecular Weight
  - ii. Viscosity method to determine Molecular Weight
  - iii. Diffusion method to determine Molecular Weight
  - iv. Sedimentation method to determine Molecular Weight
- B. Primary maxima is responsible for
- i. Flocculation
  - ii. Coagulation
  - iii. Peptization
  - iv. All of the above
- C. Suspended particles tends to aggregate in order to:
- i. Increase the surface free energy.
  - ii. Decrease the surface free energy
- D. Ideal sedimentation volume (F) should be
- i.  $<1$
  - ii.  $>1$
  - iii.  $=1$
- E. "Deflocculating agent is NOT required to measure stoke's diameter in concentrated suspension": T/F
- i. True
  - ii. False
- F. Classify non-Newtonian fluid flow with graphical representation.
- G. Write down the formula and unit of kinematic viscosity.
- H. Classify powder densities.
- I. Write down the unit of second order rate constant.
- J. Explain the concept of  $Q_{10}$  and state the importance of it.

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

(7 x 5 = 35 Marks)

- Q2. Differentiate between Lyophilic and Lyophobic colloids
- Q3. Derive a method to estimate molecular weight of colloids using viscosity method.
- Q4. Explain settling is suspension focussing on stoke's law
- Q5. Consider an o/w emulsion containing mineral oil with a specific gravity of 0.90 dispersed in an aqueous phase having a specific gravity of 1.05. If the oil particles have an average diameter of 5  $\mu\text{m}$ , or  $5 \times 10^{-4}$  cm, the external phase has a viscosity of 0.5 poise (0.5 dyne sec/cm<sup>2</sup> or 0.5 g/cm sec), and the gravity constant is 981 cm/sec<sup>2</sup>, what is the velocity of creaming in cm/day?
- Q6. Explain optical method to determine various types of diameters.
- Q7. Discuss pseudoplastic flow and explain the reason of pseudoplastic flow with proper example.
- Q8. Describe the various methods for the measurement of thixotropy.
- Q9. Describe the half-life method to determine the order of a reaction.
- Q10. Derive Michaelis-Menton equation.

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

(2 x 10 = 20 marks)

- Q11. Discuss sedimentation parameters in detail.
- Q12. Derive the rate kinetics equation for parallel or side reaction with suitable example.
- Q13. The rate constant  $k_1$  for the determination for the decomposition of s-hydroxymethylfurfural at 120 °C is 1.265 hr<sup>-1</sup> and  $k_2$  at 150 °C is 5.5400 hr<sup>-1</sup>. What is the activation energy,  $E_a$ , in kcal/mole and frequency factor, A, sec<sup>-1</sup> for the break down of 5-HMF within this temperature range?

:26/04/2023:M