

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

CLASS: BPHARM
BRANCH: PHARMACY

SEMESTER: IV
SESSION: SP2022

SUBJECT: PHYSICAL PHARMACEUTICS II BP403T

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 types questions (Instruction: Answer all questions)

- Q1. (10 x 2 = 20 Marks)
- A. Compute the CMC in moles/L of a mixture of surfactant A (CMC = 0.000086 moles/L and mole fraction is 0.45) and surfactant B (CMC = 0.00073 moles/L).
 - B. A centrifuge is rotating at 800 rpm. The midpoint of the cell containing the sample is located 6 cm from the center of the rotor. What is the number of 'g' on the suspended particles?
 - C. An Ostwald viscometer was used to measure the viscosity of acetone which was found to have a viscosity of 0.00036 PaS. If the density of acetone at 25 deg C is 0.705 g/cu. cm, then what will be the kinematic viscosity at the same temperature?
 - D. In any powder compaction process, the interparticulate voids is considered as a reactant and densification of powder is considered as a product. As per the Heckle equation, which rate kinetics the powder compaction process is following?
 - E. Express the formula for the determination of degree of flocculation.
 - F. If we disperse bismuth subnitrate in water in presence of mono basic potassium phosphate, which type suspension will be produced?
 - G. Which type of emulsion will form in presence of Sorbitan monooleate as an emulsifying agent?
 - H. What will be formula to calculate surface-number mean diameter as per Edmundson's formula?
 - I. What is the formula to calculate zero order degradation half-life?
 - J. What is the unit of Arrhenius factor or frequency factor?

PART-II

Short Answers

(Instruction: Answer seven out of nine questions)

(7 x 5 = 35 Marks)

- Q2. Describe various methods of preparation of lyophobic colloids with proper examples.
- Q3. Represent graphically the changes of the following properties that occur at the critical micelle concentration of surface-active agents. i) Density; ii) Detergency; iii) interfacial tension; iv) conductivity and v) osmotic pressure.
- Q4. Demonstrate the Donnan membrane theory.
- Q5. How sodium carboxymethylcellulose can be used to increase the drug absorption of sodium salicylate?
- Q6. Discuss Heckle equation for the determination of volume reduction mechanism during compression.
- Q7. Describe the various methods for the measurement of thixotropy.
- Q8. Write a short note on monomolecular adsorption in the perspective of emulsion.
- Q9. Describe Feret diameter, Martin diameter and projected area diameter of an asymmetric particle.

- Q10. A sample of powdered zinc oxide, density 7600 kg/m^3 , is allowed to settle under the acceleration of gravity, 981 cm/sec^2 , at 25°C . The rate of settling, v , is $7.50 \times 10^{-3} \text{ cm/sec}$; the density of the medium is 1.03 g/cm^3 , and the viscosity is 1 centipoise. Calculate the stokes diameter in micron of the zinc oxide powder.

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PART-III
Long Answers

(Instruction: Answer two out of three questions)

(2 x 10 = 20 marks)

- Q11. Derive the equation for second order rate kinetics where the initial molar concentrations are different.
- Q12. Write a short on normal distribution and log-normal distribution of particle size distribution.
- Q13. The average particle diameter of calcium carbonate in aqueous suspension is 75 microns. The densities of calcium carbonate and water are 3400 and 1000 kg/m^3 , respectively. The viscosity of water is 0.001 Pa.s at 25°C . Compute the rate of fall for calcium carbonate by considering the nonuniformity in particle shape & size and hindered settling, samples at two different porosities (0.96 and 0.55). The degree of hindering (n) is 18.58 .

:::::27/04/2022:::::