B. PHARMACY SECOND YEAR, SECOND SEMESTER EXAMINATION, 2023
PHYSICAL PHARMACEUTICS II

Time: Three hours   Full Marks: 75

Answer any five questions taking at least one from each group

Group A

1. Why stability studies are necessary? Derive the half-life and the shelf-life of a first order reaction. Write in detail about the effects of solvent and ionic strength on the degradation of drugs. A solution of a drug contained 500 units/mL when prepared. It was analyzed after 40 days and was found to contain 300 units/mL. Assuming the decomposition is first order, at what time will the drug have decomposed to one-half of its original concentration?

$$2+3+(4+3)+3=15$$

2. a) What is Accelerated stability testing? What are the objectives of accelerated stability testing? How can we predict shelf life by accelerated stability testing?

b) A prescription for a liquid aspirin preparation is called for. It is to contain 325 mg/5 mL or 6.5 g/100 mL. The solubility of aspirin at 25°C is 0.33 g/100 mL; therefore, the preparation will definitely be a suspension. The other ingredients in the prescription cause the product to have a pH of 6.0. The first-order rate constant for aspirin degradation in this solution is 4.5 × 10^{-6} sec^{-1}. Calculate the zero-order rate constant. Determine the shelf life, $t90$, for the liquid prescription, assuming that the product is satisfactory until the time at which it has decomposed to 90% of its original concentration (i.e., 10% decomposition) at 25°C.   (2+3+4) +6 = 15

Group B

3. Answer any three of the following questions   5x3=15

i) "Particle size & the related surface area has great significance in the field of Pharmacy and Medicine". --- Justify this statement.

ii) Measures to improve flow properties of the materials to be compressed into tablet or encapsulated into hard gelatin capsules.

iii) Differentiate between macro & micro emulsions.

iv) Theories of emulsifications.

4. Write short notes on any three of the following   5x3=15

i) Oswald ripening related to physical stability of the dispersed systems.

ii) Syneresis related to paste.

iii) zeta potential & physical stability of dispersed systems.

iv) mechanism of liquid crystal formation.

Group C

5. What is called Reynolds number? What is its significance? Explain Reynolds experiment. Define viscosity. Give its units? What do you mean by limiting viscosity, reduced viscosity, specific viscosity and apparent viscosity? How will you determine viscosity of a liquid by Oswald U-tube viscometer? Derive its equation for measuring viscosity from Poiseuille's equation. What is fluidity?   1+2+ 2 + 1+1 + 2 + 3 + 2 + 1 = 15

6. What is a rheogram? Draw rheograms of plastic, pseudoplastic and dialatant flows with their description and the equations for the determination of the respective viscosity. What is called thixotropy? Give its significances.

Describe creep curves of a cross-linked system. How will you determine viscosity using concentric cylinder method? Describe it with the respective equations. What is Weissenberg effect?   1+6+1+1+2+3+1=15

Group D

7. Write the types of colloid and differentiate in between. Classify the properties of colloid, and write in details about optical and kinetic properties of colloid.   (1+4)+(2+4+4)=15

8. i. Write short notes on   (2X5=10)

a. CMC   b. Protective colloid   c. Stability of colloid   d. Use of colloid   e. Stokes's law

ii. Write the application of colloid in details.   (5)