Ex/Pharm/ BP302T/2024

Bachelor of Pharmacy Second Year First Semester-2024

Physical Pharmaceutics I

Time: **Three hours** Full Marks: **75**

Answer any five questions taking at least one from each group.

Group A

1. a) What is surface free energy. Derive the equation $\Delta G = \gamma \times \Delta A$, where ΔG = increase in surface free energy, γ = surface tension, ΔA = increase in surface area. b) Explain the effect of temperature on surface tension c) When a drop of liquid is suspended in air, it assumes a spherical shape. Why? d) A soap solution having surface tension of 49.05 dyne/cm is applied to the metal frame bar of 5 cm. Calculate the work required to pull the wire down by 2 cm. 6+3+3+3=15

2. a) Define surface active agent. How it reduces the surface and interfacial tension? Classify surface active agent with example b) What is HLB number? Write HLB number scale with different properties. How to calculate the HLB values of simple alkyl ether and polyhydric alcohol fatty acid esters? c) Calculate the HLB of a mixture of 40% Span 60 and 60% of Tween 60. HLB of Span 60 = 4.7 and HLB of Tween 60=14.9. (1+2+3)+(1+3+2)+3=15

Group B

3. a) Write any two solubility expression tables. b) Explain the factors influencing the solubility of drugs. c) Write in details about the diffusion principles in Biological membrane system. d) What is distribution law? 4+4+5+2=15

4. a) What is molar refraction? b) Write the types refractometer? c) Write the working principles and application of Abbe's Refractometer with diagram. d) Define i) dielectric constant ii) dipole moments 2+2+(3+3+3) +2=15

Group C

5. Define buffers. Derive the expression of the buffer equation for a weak acid and its salt. What do you mean by dilution value? Discuss pH indicators. How much NaCl is required to render a 100ml of 1% solution of apomorphine HCl isotonic with blood serum? The freezing point depression of 0.9% NaCl solution is 0.52°C and that of 1% apomorphine HCl is 0.08°C. 2+3+2+3+5=15

6. Write short notes on any three of the following: 5*3=15

a) Sublimation- triple point

b) Eutectic mixtures

c) Polymorphism

d) Hydrates and solvates

[Turn over

Group D

7. Define storage modulus, and loss modulus of a viscosity stress-strain curve. What is loss tangent? Give its importance. What is called viscoelasticity? Describe creep curve for an uncrossed-link and crossed-link systems. What is called Weissenberg effect? Give its significance. What is Huggins' constant? Write its importance.

2+1+2+2+3+1+1+2+1 = 15

8. Define intrinsic viscosity. Explain how "single point viscosity determination" can cause resultant errors. Describe the rheograms of non-Newtonian fluids. Describe the method and equations for the determination of viscosity by concentric cylinder viscosity.

2+3+6+3+1= 15