UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES
DEPARTMENT OF PHARMACY
FIRST BPHARM PART II EXAMINATION – AUGUST 2022
PH 1242 PHARMACEUTICS IB - SEQ

TIME: TWO HOURS

INSTRUCTIONS

- There are **four** questions in **part A, B, C and D** of this SEQ paper.
- Answer **all** questions.
- No paper should be removed from the examination hall.
- Do not use any correction fluid.

PART A

1.
  1.1.
    1.1.1. What is fractional distillation? (**10 marks**)
    1.1.2. Draw the set-up of the apparatus use for fractional distillation. Label five important parts of it. (**30 marks**)
  1.2.
    1.2.1. What is freeze drying? (**10 marks**)
    1.2.2. List five advantages of freeze-drying process. (**20 marks**)
    1.2.3. Explain the steps of the freeze-drying process. (**30 marks**)

2.
  2.1. Briefly describe lyophobic colloids. (**15 marks**)
  2.2. Write three methods use to purify colloidal solutions after preparation. (**15 marks**)
  2.3. Discuss the stability of the colloids. (**20 marks**)

PART B

2.4.
  2.4.1. Surfactants are a primary component of cleaning detergents. Characterize surfactants by stating three properties of it. (**09 marks**)
  2.4.2. Briefly discuss the following statement addressing the underlined parts with thermodynamics view point. (**15 marks**)

"A typical micelle in aqueous solution forms a roughly <u>spherical</u> or <u>globular aggregate</u> with the <u>hydrophilic "head" regions in contact with surrounding solvent</u>, <u>sequestering the hydrophobic tail regions in the micelle center</u>."

  2.4.3. Define the term 'surface tension'. Write SI units. (**10 marks**)

2.4.4. Consider the contact angle of water on clean gas as approximately zero and calculate the surface tension of water at 20 °C if water rises to a height of 4.96 cm in a clean glass capillary tube of internal radius 0.300 mm at the same temperature. The density of water at 20 °C is 998.2 kgm^{-3}. (*16 marks*)

PART C

3.

3.1. Define the kinematic viscosity of a liquid. Write SI units. (*15 marks*)

3.2. Two parallel plates are placed 6 mm apart, the space between them being filled with an oil of density 870 kgm^{-3}. A force of 2 Nm^{-2} is needed to move the upper plate at 3 ms^{-1} relative to the lower plate. Calculate the dynamic and kinematic viscosities of the oil. (*15 marks*)

3.3. Using a viscosity diagram, explain the following non-Newtonian fluids. Give two appropriate examples for each.

    3.3.1. Thixotropic (*20 marks*)

    3.3.2. Rheopectic (*20 marks*)

3.4.

    3.4.1. Write the first law of thermodynamics. (*15 marks*)

    3.4.2. A gas in a closed container is heated with 8 J of energy, causing the lid of the container to move 50 cm away under a force of 5 N. Calculate the total change in internal energy of the system. (*15 marks*)

4.

4.1. List five additional properties of X-rays compared to non-ionizing radiation.

(*15 marks*)

4.2. Brief three basic methods used to reduce exposure to external gamma radiation.

(*15 marks*)

4.3. Using appropriate diagrams, explain the direct and indirect action of ionizing radiation on DNA. (*20 marks*)

PART D

4.4. Draw the concentration versus time graph for a second order reaction. (*15 marks*)

4.5. State one difference between zero order and first order reactions. (*10 marks*)

4.6. Name five tests used to identify the type of emulsion. (*25 marks*)

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