Max. Marks: 25   **CLOSED BOOK**
**Date 12-03-2022**   **Duration: 90 Minutes**

All questions are compulsory.
Attempt all the questions in the order as given in the question paper and all the parts of a question should be attempted together.
Supplement your answers with suitable figure wherever applicable

1. A basic drug molecule CE944 was modified into its prodrug to improve its physicochemical properties. The figure depicts the plasma concentration time profile of a) Prodrug of CE944 (▲), b) free base, CE944 (●) and c) CE944 released after enzymatic hydrolysis of the prodrug (■).   [1+1+1 M]
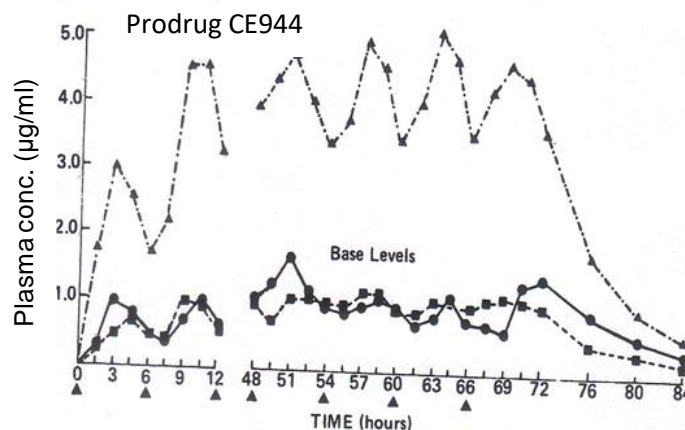
   a. What do you interpret from the graph regarding the plasma concentration of CE944 when administered as a free base vs. as a prodrug?
   b. What could be the reasons for such an observation?
   c. What could be applications/advantages of converting CE944 into its prodrug?

2. Discuss the working of an Andreasen pipette and how to calculate particle size using this apparatus. [3 M]

3. Using a flow chart, write down the protocol for stability testing of an oral formulation under different conditions. [3M]

4. Justify the following statements-   [4M]
   a. Why Log D is measured at different values of pH?
   b. Why partial miscibility of the two solvents used for studying partition coefficient gives physiologically more relevant results?
   c. Flocculated systems exhibit plastic behavior but deflocculated system exhibit dilatant behavior?
   d. Tear substitutes should exhibit shear thinning character?

5. Two drug molecules AMS456 (pKa 4.5) and AMS987 (pKa 8) exhibit the same intrinsic solubility however, the solubility @pH9 is 236 mg/ml and 18 mg/ml respectively. How do you justify this observation?   [3M]

6. Given the following data, calculate the cumulative percentage frequency undersize (number and weight) and draw a cumulative frequency number and weight distribution curve for this data. [4M]

SIZE (µm)	No. of particles
20-40	14
40-60	26
60-80	32
80-100	47
100-120	52
120-140	21

7. What do you understand by thixotropy? Explain any 02 of its pharmaceutical applications. [3M]
8. How are the parameters, F and G calculated in a Stormer viscometer?   [2M]

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