MANIPAL COLLEGE
OF PHARMACEUTICAL SCIENCES
MANIPAL
(A constituent unit of MAHE, Manipal)

BPharm Semester IV - End Semester (Make-up) Examination, November 2021

PCE-BP403T: Physical Pharmaceutics II (Theory)

Date: 19.11.2021 **Duration:** 3h **Max. Marks:** 75

Instructions: Answer ALL questions.

Tick (√) one single correct option. Marks will be deducted for over-writing and multiple selected options.

I Multiple Choice Questions **(MCQs) 20 Q × 1 mark = 20 marks**

1. Following are the examples of Electrical properties of colloidal dispersion EXCEPT.
A. Light scattering
B. Electrophoresis
C. Sedimentation potential
D. Electro-osmosis

2. Which of the following colloid is difficult to prepare?
A. Association
B. Hydrophilic
C. Lyophobic
D. Lyophilic

3. System undergoing sol-to-gel transformation is known as:
A. Plastic
B. Shear thinning
C. Pseudoplastic
D. Shear thickening

4. In thixotropy, the down-curve is positioned with respect to up-curve:
A. Left
B. Origin
C. Right
D. Superimposable

5. What type of flow is exhibited by deflocculated suspension with high dispersed solid content?
A. Newtonian
B. Dilatant
C. Plastic
D. Pseudoplastic

6. Heckel equation is based on the assumption that densification of powder under force follows -------
A. Plastic deformation
B. Fragmentation
C. First order kinetics
D. Elastic deformation

7. Working principle of capillary viscometer is based on----------
A. Stoke's law
B. Newton's law
C. Ostawald's law
D. Poiseullies law

8. Creaming in emulsion is a ---------- process
A. Reversible
B. Irreversible
C. Phase inversion
D. Coalescence

9. Ideal phase volume ratio for stable emulsion is----------
A. 74:26
B. 50:50
C. 24:76
D. 20:70

10. Surfactants with HLB value in the range of ---------- are used as wetting agent in the formulation of suspension.
A. 7-9
B. 3-6
C. 10-14
D. 1-3

11. Sedimentation volume is defined as ----------
A. Ultimate volume of sediment/original volume of suspension
B. Ultimate sediment volume of flocculated system/ Ultimate sediment volume of deflocculated system
C. Ultimate sediment volume of deflocculated system/ Ultimate sediment volume of flocculated system
D. None of the above

12. In an emulsion, negative rate of sedimentation indicates ---------- of creaming.
A. Absence
B. Both directions
C. Downward direction
D. Upward direction

13. In Stokes' equation, a property that greatly influences the velocity of settling is:
A. Density of medium
B. Density of particle
C. Viscosity of medium
D. Radius of the particle

14. For which of the following conditions of dispersion medium, Stoke's law can be applied,
A. If the Reynolds number is between 0.01 to 0.18
B. If the Reynolds number is between 0.21 to 0.38
C. If the Reynolds number is between 0.41 to 0.58
D. If the Reynolds number is between 0.61 to 0.78

15. Which of the following reaction is observed in the degradation of drugs having beta-lactam ring?
A. Oxidation
B. Hydrolysis
C. Photolysis
D. Decarboxylation

16. Which expression is correct for the reaction that follows first order kinetics?
A. $t_{90} = 0.152t_{1/2}$
B. $t_{90} = 0.251t_{1/2}$
C. $t_{90} = 0.9t_{1/2}$
D. $t_{90} = t_{1/2}$

17. On a product, the label states "Protect from Light". What type of decomposition does the product undergo?
A. Hydrolysis
B. Pyrolysis
C. Solvolysis
D. None of the above

18. Boyle's law expresses the effect of ..... on rate of reaction.
A. Pressure
B. Catalyst
C. Temperature
D. Light

19. The specific rate constant (K) determined for aspirin hydrolysis in pH 1.0 buffer at 1 mg/mL concentration is 5.0 $\times 10^{-3}$ min^{-1} at 25 °C. The shelf-life (in min) of the product is:
A. 20
B. 21
C. 100
D. 139

20. As the temperature increases the rate of degradation also increases, due to .....
A. Constant kinetic energy
B. Decrease in kinetic energy
C. Constant activation energy
D. Increase in activation energy

II Long Answers **2 Q × 10 marks = 20 marks**

1. Discuss thixotropy and plastic flow of liquids.

2. Enlist methods for determination of particle size and explain any one method in detail.

III Short Answers **7 Q × 5 marks = 35 marks**

1. Define electric double layer and show a labelled electric double layer at the surface of solid-liquid interface.

2. Classify and discuss in brief the characteristics of various colloidal systems.

3. What are the differences between flocculated and deflocculated suspensions?

4. Discuss the theory of emulsification using surfactants as emulsifying agents.

5. Explain factors affecting flowability of powder.

6. The initial stage of a chemical reaction was found to be first order. The initial concentration of solution was 450 µg and after 10 h at 38 °C, the concentration was found to be 350 µg. (a) Compute the specific rate constant. (b) Report half-life of the reaction. (c) What is the concentration after 5 h?

7. Explain hydrolytic degradation of drugs with their preventive methods.