



**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, December 2021**

**Course: Pharmaceutical Engineering**  
**Program: B. Pharmacy**  
**Course Code: BP304T**

**Semester: III**  
**Duration: 03 hrs.**  
**Max. Marks: 75**

**Instructions: Attempt all questions in Section A. Attempt 2 questions out of 3 in Section B and 7 questions out of 9 in Section C.**

Q.No	Section A (Type the answers in test box)	20Qx1M=20Marks	COs
Q1	A stirred tank reactor containing a fluid with a density of 2.5 g.ml <sup>-1</sup> and viscosity of 0.002 kg m <sup>-1</sup> s <sup>-1</sup> is mixed at 120 rpm. If the fluid is mixed with an impeller having diameter 50 cm, then the Reynolds number of the liquid in the reactor is (a) 12,50,000 (b) 10,00,000 (c) 100 (d) 2500		CO1
Q2	Total 4 screens can separate _____ differently sized particles (a) 3 (b) 4 (c) 5 (d) 6		CO1
Q3	Which of the following is NOT a reason to affect the effectiveness of a screen? (a) Broken mesh wire (b) Insufficient time for food particle to pass through the sieve (c) Blocked apertures (d) None of the mentioned		CO1
Q4	The literature of heat transfer generally recognizes distinct modes of heat transfer. How many modes are there? (a) one (b) two (c) three (d) four		CO2
Q5	Which of the following statements is true regarding one and two-dimensional flows? (a) Flow in a pipe is taken as one-dimensional flow when average flow parameters are considered (b) Flow in a pipe is taken as two-dimensional flow when average flow parameters are considered (c) Flow in a pipe is always taken as two-dimensional flow		CO1

	(d) Flow in a pipe is always taken as one-dimensional flow	
Q6	Statement 1: Dispersion of one immiscible liquid into another also involves size reduction. Statement 2: Leaching requires size reduction. (a) True; False (b) True; True (c) False; False (d) False; True	CO1
Q7	Which of the following is NOT true with respect to size reduction? (a) Size reduction is an energy inefficient process as the energy required for grinding is very high (b) Some of the energy liberated in the formation of new small surface is the grinding energy required by food material per unit surface area to form new surface areas and the rest is generally just heat (c) The crushing efficiency is inversely proportional to the surface created (d) None of the mentioned	CO1
Q8	What is the pore size of the filtration membrane to remove bacteria? (a) 0.25 $\mu\text{m}$ (b) 0.22 $\mu\text{m}$ (c) 0.27 $\mu\text{m}$ (d) 0.26 $\mu\text{m}$	CO4
Q9	Which of the following does not influence filtration? (a) Temperature (b) Density (c) Viscosity (d) pH	CO4
Q10	Which of the following is not separated through distillation process? (a) Acetone and water (b) Aniline and chloroform (c) Impurities in Sea water (d) Milk and water	CO2
Q11	If the surface area of liquid is large then evaporation will be? (a) Small (b) Large (c) Moderate (d) Slow	CO2
Q12	The evaporation from the surface of any liquid depends on (a) temperature (b) wind (c) nature of liquid (d) all of the above	CO2
Q13	Which of the following with respect to mixing is true? (a) It is used to distribute heat uniformly to all the components of the mixture (b) Mixing becomes difficult when one of the phases to be mixed is in minor quantity (c) Solid-solid mixing is more difficult than other phases (d) All of the mentioned	CO3
Q14	In which type of mixer, the trough is stationary? (a) Barrel mixer	CO3

	(b) Ribbon mixer (c) Double cone blender (d) Zigzag mixer	
Q15	Which equipment is used for drying methyl cellulose? (a) Drum dryer (b) Spray dryer (c) Tray dryer (d) Vacuum dryer	CO3
Q16	Why direct heating by hot air cannot be done in some cases? (a) The material can degrade (b) High temperature not required (c) Low temperature not required (d) Conduction gives best results	CO3
Q17	When are drum dryers used? (a) When the material is too thick for spray dryer and too thin for rotary dryer (b) When the material is too thick for rotary dryer and too thin for spray dryer (c) When the material is not biodegradable (d) When large crystal size is to be obtained	CO3
Q18	A double cone mixer is used for carrying out mixing? (a) Solids (b) Liquids (c) Semi-solids (d) Suspension	CO3
Q19	Centrifugation is based on? (a) Patrick's Law (b) McLaren's law (c) Stoke's Law (d) Stain's Law	CO4
Q20	Water attack test is performed on glass in order to find the limits of one of the following (a) Acid liberated (b) Alkali liberated (c) Conductivity (d) Metal ions	CO5
	<b>Section B (Scan and upload)</b> <b>Attempt 2 questions out of 3</b>	<b>2Qx10M= 20 Marks</b>
Q1	Discuss various theories of corrosion. Explain their types along with their prevention.	CO5
Q2	Write principle, construction, working, uses, merits and demerits of sieve shaker and cyclone separator	CO1
Q3	Write principle, construction, working, uses, merits and demerits of Silverson Emulsifier and twin shell blender	CO3
	<b>Section C (Scan and upload)</b> <b>Attempt 7 questions out of 9</b>	<b>7Qx5M=35 Marks</b>

Q1	Suppose you are given a root based crude drug. The active principles of these crude drug are highly water soluble and thermolabile. Initially you are told to carry out its size reduction followed by isolation of its active constituents in dry form. Explain in brief how you will carry out this task.	CO3
Q2	Discuss the theory behind filtration along with the factors affecting rate of filtration.	CO4
Q3	Explain the mechanisms behind solid-solid and liquid-liquid mixing?	CO3
Q4	What are constant boiling mixtures? Give suitable examples and explain how such mixtures are separated.	CO2
Q5	What is centrifugation? State the classification of centrifuges and write a brief note on perforated basket centrifuge.	CO4
Q6	Explain the principle, working and applications of venturimeter	CO1
Q7	Explain the modes of heat transfer mechanisms along with examples.	CO2
Q8	Suppose you are given viscous thermolabile material and asked to carry out its evaporation. Note that this material has tendency to cause scaling, salting, and fouling. Which evaporator you will use for handling this material? Explain it in brief.	CO2
Q9	Explain principle and working of multiple effect evaporator? Please comment on the economy of this evaporator?	CO5