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2021

B.Pharm. 3rd Semester (Repeater) Examination
BASIC ENGINEERING – I (UNIT OPERATIONS – I)
(Old Regulation)

Full Marks – 100

Time – Three hours

The figures in the margin indicate full marks
for the questions.

Answer question No. 1 and any six from the rest.

1. Answer the following questions : (10 × 1 = 10)
- (i) Rate of filtration can be best described by
- (a) Poiseuille's equation
 - (b) Fick's law
 - (c) Noyes Whitney equation
 - (d) Moh's equation
- (ii) Following is/are dimensionless number(s)
- (a) Reynold's number
 - (b) Power number
 - (c) Mass transfer number
 - (d) None of the above
- (iii) Crystallization is an example of _____ incompatibility.
- (a) Delayed
 - (b) Immediate
 - (c) Both
 - (d) None

[Turn over

- (iv) Centrifugal effect = $\frac{\text{Centrifugal force}}{\text{Gravitational force}(G)}$
- (v) General description of Type II glass is _____.
- (vi) In _____, the pumping element moves in forward and backward directions in a cylinder.
- (vii) Corrosion of metals is high in one of the following media.
- Acidic
 - Alkaline
 - Neutral
 - Non-aqueous
- (viii) The driving force is the _____ between the upstream and downstream of the filter.
- (ix) Manometers are the devices used for measuring _____.
- (x) A severe form of corrosion that develops in highly localized areas of the metal surface is called as
- Erosion
 - Galvanic corrosion
 - Pitting corrosion
 - Stress corrosion

2. Answer the following questions :

- Describe various types of corrosion and suggest the methods to tackle the same in pharmaceutical industries. (10)
- Compare the characteristics of centrifugal pumps and reciprocating pumps. (5)

3. Answer the following questions :

- Explain the types of energy losses that occur when a fluid flows through a pipe. (5)
- Discuss the Mier's super-saturation theory of crystallization. What are the limitations of the Mier's theory? (5)
- What is vena contracta? Write the construction and working of the orifice meter. (5)

4. Answer the following questions :

- Give Reynolds number, and explain the symbols used therein and explain its significance. (5)
- Discuss the objectives and advantages of conveying. Describe the construction and working of the belt conveyor system for solid transport. (4 + 6 = 10)

5. Answer the following questions :
- (a) What are the properties of glass? What are its applications in the pharmaceutical industry? (5)
 - (b) Describe the important features of humidity charts. (5)
 - (c) Discuss perforated basket centrifuge with figure. (5)
6. Answer the following questions :
- (a) Water is flowing through a pipe at an average velocity of 50 cm/sec. If the inner diameter of the pipe is 5 cm, density of water 1 gm/cc and viscosity of water 1 cp, calculate Reynolds number and Friction factor. (5)
 - (b) Explain the construction, working, advantages and disadvantages of the filter press. (10)
7. Answer the following questions :
- (a) Write a note on factors affecting caking of crystals. (5)
 - (b) Write short notes on : (5 + 5 = 10)
 - (i) Pneumatic conveyors
 - (ii) Pitot tube
8. Answer the following questions :
- (a) Explain the principle and construction of the Venturi meter with a neat diagram. (10)
 - (b) What are the stepwise events in refrigeration cycle? (5)
9. Answer the following questions :
- (a) Discuss solubility curves and their usefulness. (5)
 - (b) Explain the mechanism dehumidification. (10)
10. Answer the following questions :
- (a) Discuss the theory of centrifugation. Give few applications of centrifugation in pharmaceutical fields. (10)
 - (b) What are different types of pump used in transportation of liquids? How the reciprocating pump works? (5)