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15/2/2022
BINA CHOWDHURY CENTRAL LIBRARY
(GIMT & GIPS)
Azara, Hatkhowapara
Guwahati - 781017

Roll No. of candidate

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2023

B.Pharm. 3rd Semester End-Term Examination

PHARMACEUTICAL ENGINEERING

Full Marks – 75

Time – Three hours

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

Answer Question No. 1 is compulsory.

1. Answer the following questions :

(20 × 1 = 20)

(i) Sensing element is found in _____.

- (a) Pitot Tupe (b) Rota meter
(c) Orifice meter (d) Venturi meter

(ii) Venturi meter is referred to as _____.

- (a) Velocity head (b) Variable head meter
(c) Insertion meter (d) None of the above

(iii) Roughness factors of inner surface of old steel pipe is _____.

- (a) 1.6 (b) 1.0
(c) 0.6 (d) 2.5

(iv) Which of the following is a merit of size reduction?

- (a) Contamination (b) Drug degradation
(c) Poor mixing (d) Increase drug dissolution

(v) In Fluid energy mill size reduction is done by _____.

- (a) Crushing (b) Compaction
(c) Attrition (d) Attrition and impact

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- (vi) As per IP-96, the pharmaceutical powders were classified into _____ types.
- (a) 3 (b) 4
(c) 5 (d) 6
- (vii) Fourier's law is applicable to one of the following types of heat flow.
- (a) Conduction (b) Convection
(c) Emission (d) Radiation
- (viii) Heat exchangers are NOT used in one of the following unit operations.
- (a) Crystallization (b) Drying
(c) Evaporation (d) Size Separation
- (ix) Macro mixing is also referred as _____.
- (a) Convective mixing (b) Diffusive mixing
(c) Shear mixing (d) None of the above
- (x) _____ determined by plotting the standard deviation as a function of time.
- (a) Mixing Index (b) Arithmetic mean
(c) Relative standard deviation (d) All of the above
- (xi) Trituration is the mechanism of _____ type mixer.
- (a) Batch type mixer (b) Static mixer
(c) Air mixer (d) Planetary mixer
- (xii) Axial flow pattern is occurs with _____ type impeller.
- (a) Propellers (b) Turbines
(c) Paddles (d) Paddle with Pitch
- (xiii) For explaining dry corrosion of iron metal, which of the following is necessary?
- (a) Chlorine (b) Hydrogen
(c) Oxygen (d) Sulphur

(xiv) Distillation operation involves one of the following steps.

- (a) Vaporization
- (b) Vaporization and condensation
- (c) Vaporization and condensation and crystallation
- (d) None of the above

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(xv) The pressure and temperature at which the frozen solid vaporises without conversion to a liquid is referred to as the _____.

- (a) Sublimation
- (b) Lyophilisation
- (c) Eutectic point
- (d) None of the above

(xvi) Which of the following dryer is for thermo labile substances?

- (a) Freeze dryer
- (b) Fluidized bed dryer
- (c) Drum dryer
- (d) All of the above

(xvii) Which of the following is not a mechanism of heat transfer?

- (a) Conduction
- (b) Convection
- (c) Radiation
- (d) Transmission

(xviii) Plate and Frame filter press functions as a _____ for separation of particles.

- (a) Surface filtration
- (b) Depth filtration
- (c) Impingement
- (d) All of the above

(xix) Which of the following equation is correct?

- (a) Centrifugal effect = $2.013 n^2 d$
- (b) Centrifugal effect = $4.013 n^2 d$
- (c) Centrifugal effect = $2.013 n d^2$
- (d) Centrifugal effect = $3.013 n^2 d$

(xx) Which of the following gives direct reading of flow of fluids?

- (a) Orifice meter
- (b) Pitot tube
- (c) Rotameter
- (d) Venturi meter

2. Answer any *seven* questions : (7 × 5 = 35)
- (a) Differentiate fluid statics and fluid dynamics. Give Reynolds number and explain the symbols used therein.
 - (b) Proof that pressure difference is directly proportional to height differences when fluid is in rest.
 - (c) What is vena contracta? Deduce relevant equations for calculation of flow rates using orifice meter.
 - (d) Explain the theories related to the size reduction of a powder. Differentiate the mechanisms, attrition and impact in size reduction.
 - (e) What are the reasons for vortex formation? Suggest the solution for the problems of vortex formation?
 - (f) Explain the construction and working of a forced circulation evaporator.
 - (g) Describe the conduction of heat through a circular pipe. Give suitable equations for rate of heat transfer and explain terms.
 - (h) Describe the principle with the help of a labelled diagram of fluidized bed dryer.
 - (i) What is meant by corrosion? Explain factors influencing corrosion.
3. Answer any *two* questions : (2 × 10 = 20)
- (a) (i) Explain different types of energy losses in pipe fittings. (4)
(ii) Water flows in a pipe such that the Reynold number is 6000. The ID of the pipe is 5 cm the viscosity and density of water can be taken as 0.95 cp and 1 g/cc respectively. Calculate velocity and volumetric flow rate. (6)
 - (b) Differentiate surface filtration and depth filtration. Explain the principle, construction and working of plate and frame filter press. (3 + 7)
 - (c) Explain the theories of corrosion and classify corrosion and write their preventive measures. (4 + 2 + 4)
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