Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.PHARM (N)/SEM-3/PT-307/2012-13

2012

PHARMACEUTICAL ENGINEERING

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) Which of the following is a reciprocating pump ?

      a) Jet pump b) Plunger pump

      c) Gear pump d) Peristalic pump.

   ii) Bernoulli's theory is based on the

      a) Laws of conservation of energy

      b) Laws of conservation of mass

      c) Newtons law of fluid

      d) both (a) and (b).

iii) If $N_{Re} < 2000$, flow of fluid is

a) Turbulent b) Laminar

c) Transition d) Critical.

iv) Dimensional formula for heat transfer coefficient (h) is equal to

a) $QL^{-2}\theta^{-1}T^{-1}$ b) $ML^{-1}\theta^{-1}$

c) $QL^{-1}\theta^{-1}T^{-1}$ d) $MQL^{-2}\theta^{-1}T^{-1}$.

v) The point at which laminar flow becomes turbulent flow is known as

a) Super critical velocity b) Critical velocity

c) Sub critical velocity d) none of these.

vi) Reynolds number is having the following dimensions :

a) $M^0L^0T^0$ b) $M^1L^1T^2$

c) $M^3L^2T^4$ d) $M^2L^5T^1$.

vii) Centrifugal effect is directly proportional to

a) speed of Rotation

b) Gravitational force

c) None of these.

viii) Momentum / thermal diffusion is

a) Prandtl number b) Sherwood number

c) Reynold's number d) none of these.

ix) Orifice coefficient discharge in an orifice meter is

a) 0·98 b) 0·61

c) 0·45 d) none of these.

x) Example of plastic flow is

a) petrolatum base b) suspension

c) emulsion d) none of these.

xi) Pascal is the unit of

a) velocity b) pressure

c) mass d) gravity.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Explain the operating cycle of a centrifuge.

3. What is a filter aid ? Write the different ways of using it.

1 + 4

4. Write down the difference between Orifice meter and Venturi meter.

5. Write an account on Chemical Burns and its First Aid Management.

6. a) What is Reynolds number ? What is its significance in fluid flow ?

   b) Fine the type of flow of an oil of specific gravity 0·9 and dynamic viscosity 20 poise flowing through a pipe of diameter 20 cm and giving a discharge of 10 lt/sec.

2 + 3

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. State the importance of conveying in pharmaceutical industry. Describe the construction and working of a pneumatic conveyor system. 7 + 8

8. Why is dimensionless analysis important in pharmaceutical industry. Deduce the pressure drop (ΔP) expression for laminar flow by dimensional analysis. 5 + 10

9. A pump draws a liquid of Sp.Gravity 1·84 from a storage tank of large cross-section through a 3 inch I.d pipe. The velocity of the suction line is 2 ft/sec. The pump discharges the liquid to an over head tank through 2 inch. I.d. pipe. Both the storage and over head tanks are open to atmosphere. The end of the discharge line is 100 ft above of the liquid in the storage tank. Frictional losses in the entire system is 200 ft of liquid. What pressure must the pump develop in Lb/inch ^{2}. What is the theoretical horse power of the pump ?

10. a) A solution of napthalene $\left(C_{10}H_8 \right)$ in benzene $\left(C_6H_6 \right)$ contains 25 mole percent of napthalene. Express the composition of the solution in weight percent.

    b) What do you mean by mechanical hazards ?

    c) Write a short note on fans. Differentiate between fans and blomers. 5 + 5 + 5

11. Write short notes on any *three* of the following : 3 × 5

    a) Leaf filter

    b) Reciprocating pump

    c) Newton's law of fluid flow

    d) Bernoulli's equation.