Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.PHARM/SEPARATE SUPPLE/SEM-7/PT-707/2011

2011
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 any *ten* of the following : $10 \times 1 = 10$

a) Volatile oil is separated from crude drugs by

i) Vacuum distillation ii) Steam distillation

iii) Simple distillation iv) None of these.

b) Constant boiling solutions are completely separated by

i) Fractional distillation

ii) Azeotropic distillation

iii) Distillation under reduced pressure

iv) Simple distillation.

c) Which solutions are called ideal solutions ?

i) solutions that obey Roault's Law

ii) solutions that obey Dalton's Law

iii) solutions that disobey both Roault's and Dalton's Law

iv) None of these.

d) Thermolabile substances are extracted by

i) Percolation Method

ii) Maceration Method

iii) Reserved Percolation Method

iv) All of these.

e) Mechanisiom of Freeze Drying is

i) Lyophylization ii) Partial Evaporation

iii) Segregation iv) None of these.

f) Fluidised Bed Dryer is

i) Faster than tray dryer

ii) Purchase cost is less expensive than tray dryer

iii) Operation is simple than tray dryer

iv) All of these.

g) Brine system acts as

i) Cold reservoir

ii) Hot reservoir

iii) Thermal transformer system

iv) Air reservoir.

h) Cover-And-Row-Down Method is used in

i) Distillation

ii) Evaporation

iii) Extraction

iv) Refrigeration.

i) Common bricks are made from

i) Carbon or acid proof refractory materials

ii) Silicon or alkali proof refractory materials

iii) Non-metallic refractory materials

iv) All of these.

j) Fick's Second Law is mostly related with

i) The change in concentration with time at a definite location

ii) The mass diffusing across a unit area of barrier in unit time

iii) The change in concentration with direction

iv) all of these.

k) Adiabatic cooling line is related with

i) Extraction ii) Evaporation

iii) Drying iv) Humidity.

l) Drugs release from Polymer Matrices followed

i) Fick's First Law

ii) Fick's Second Law

iii) Higuchi's equation

iv) all of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. With neat labelled diagram, describe the design and working of a compartment dryer. 5

3. Describe the principle of working of refrigerators. 5

4. Explain the modified maceration processes and what are their advantages. 3 + 2

5. State Raoult's law and explain how it is applied in distillation. 2 + 3

6. State Fick's second law and explain what is the difference between Fick's first and second laws. 3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Giving a neat labelled diagram, describe the working of Robert diffusion battery.

   b) With a neat sketch, explain the construction and working of Rotocel extractor. $2 \times 7\frac{1}{2} = 15$

8. a) With a neat sketch describe the method of fractional distillation and write a note on the efficiency of fractionating columns.

   b) Turpentine oil with boiling point 160° and approximate MV of 136 is to be distilled in presence of water. The mixture boils at atmospheric pressure and the boiling point of the mixture is 95.6° C. The vapour pressure of pure water at 95.6° C is 647 mm Hg. Find the ratio of the oil in the distillate. $2 \times 7\frac{1}{2} = 15$

9. a) Describe the operation and advantages of a flooded evaporation system and compare it with the expansion valve system in compression refrigeration.

   b) With a neat labelled diagram, describe a refrigeration system using a compression refrigeration system.

   $2 \times 7\frac{1}{2} = 15$

10. a) Describe, with examples, the applications of automatic process control systems in pharmaceutical industry.

    b) Explain unit operations control, unit process control and plant level control. $2 \times 7\frac{1}{2} = 15$

11. a) With a neat labelled diagram, explain the design and working of a fluidized bed dryer.

b) During a drying operation it was found that 100 kg of a moist drug granulation sample reached its equilibrium moisture content (EMC) and was found to contain 96 kg of dry material. What is the equilibrium moisture content of this sample under these conditions ?

$2 \times 7\frac{1}{2} = 15$