

Name :

Roll No. :

Invigilator's Signature :

CS/B.Pharm (New)/SEM-4/PT-407/2010

2010

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 × 1 = 10

- i) Constant boiling solutions are completely separated by
 - a) Fractional distillation
 - b) Azeotropic distillation
 - c) Distillation under reduced pressure
 - d) Simple distillation.
- ii) Volatile oil separated from crude drugs by
 - a) Vacuum distillation
 - b) steam distillation
 - c) simple distillation
 - d) none of these.

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- iii) In the sieving method, the powder is passed through a set of sieves which are arranged
- a) in descending order
 - b) in ascending order
 - c) at random
 - d) one's own choice.
- iv) The equipment suitable for mixing of free flowing solids is
- a) planetary mixer
 - b) sigma blender
 - c) V-cone blender
 - d) none of these.
- v) The output of size reduction of material in a machine depends on
- a) Bulk density
 - b) Material structure
 - c) Ratio of feed size to product size
 - d) Chemical nature.



vi) The Tyler standard screen series is based on mesh screen

- a) 240
- b) 200
- c) 150
- d) all of these.

vii) A roller mill is used mainly to reduce particle size in

- a) tablet granulation
- b) ointments
- c) emulsions
- d) bulk powders.

viii) Which of the following is true for black body radiation ?

- a) $\alpha = 1, \epsilon = 1$
- b) $\alpha = 1, \epsilon < 1$
- c) $\alpha < 1, \epsilon < 1$
- d) none of these.

ix) The three dimensional arrangement of particles in a crystal is called

- a) crystal lattice
- b) space lattice
- c) faces
- d) none of these.

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- x) 'Magma' is a term related to
- a) mixing
 - b) distillation
 - c) crystallization
 - d) evaporation.
- xi) The power number (N_p) of an impeller is determined by
- a) fifth power of the impeller's diameter
 - b) fourth power of the impeller's diameter
 - c) third power of the impeller's diameter
 - d) none of these.
- xii) Stoke's diameter is
- a) directly proportional to the viscosity of medium
 - b) directly proportional to the square root of viscosity of medium
 - c) inversely proportional to the square of viscosity of medium
 - d) none of these.

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GROUP – B

(Short Answer Type Questions)

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

2. State Rittinger's and Kick's law for size reduction.
3. What should be the diameter of a set of rolls to take feed of a size equivalent to 1.5 inch spheres and crush to 0.5 inch, if co-efficient of friction is 0.35 ?
4. Write short note on finned tube heat exchanger.
5. Distinguish between evaporation, distillation and crystallisation.
6. What is caking of crystals ? List the factors affecting and preventive measures for caking. 2 + 3

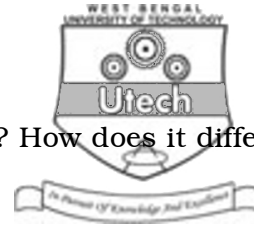
GROUP – C

(Long Answer Type Questions)

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

7. a) What do you mean by angle of nip ? Prove that for crushing roll, if the angle of nip is 2α and the co-efficient of friction is μ , then $\mu > \tan \alpha$ for efficient crushing.
- b) What is critical speed of a ball mill ? Show that critical speed of a ball mill = $\frac{1}{2\pi} \sqrt{\frac{g}{R-r}}$, where R and r are the radii of mill and ball respectively. 7 + 8

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8. a) What do you mean by crystallization ? How does it differ from precipitation ?

b) What are the pharmaceutical application of crystallization ?

c) Discuss the Mier's super saturation theory of crystallization. What are the limitations of the Mier's theory ? 2 + 3 + 10

9. a) What do you mean by vortex formation ? What problems may arise due to vortex formation ? How do you overcome such problems ?

b) What is the importance of mixing index ? Derive the equation to calculate mixing index. 8 + 7

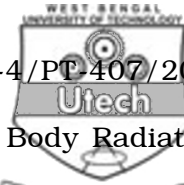
10. a) Classify different types of evaporators.

b) Discuss the factors effecting the rate of evaporation.

c) What do you mean by 'Economy of a multiple effect evaporator ? 4 + 8 + 3

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11. a) Explain Stefan-Boltzmann law of Black Body Radiation and define Stefan-Boltzmann constant from the law.

Define Kirchhoff's law. $2\frac{1}{2} + 1\frac{1}{2} + 1$

- b) Write units with magnitudes of Stefan-Boltzmann constant in F.P.S. and S.I. system. $1 + 1$

- c) Define gray body and Stefan's law of radiation exchange of two black bodies of temperatures T_1 and T_2 respectively [$T_1 > T_2$]. $2 + 2$

- d) Two radiating surfaces (A and B) are of temperature 212°F and 1000°F respectively. If the temperature of B is raised to 1200°F , find the percentage increase of radiation. 4

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