



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.PHARM(OLD)/SEM-3/PT-307/2009-10  
2009**

**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**

**( Objective Type Questions )**

1. Explain with reasons about the justification for any *ten* of the following statements : 10 × 1 = 10
- i) Filter aids are essentially granular, non-compressible materials.
  - ii) String discharge filters are only modified rotary drum filters.
  - iii) Sand can be used as a filter bed.
  - iv) Rotary pump gives pulsating flow.
  - v) Gear pumps can handle liquids of high viscosity.
  - vi) Plug cocks are used to regulate accurate flow of liquids.
  - vii) Design of Centrifugal pumps and Centrifugal compressors is identical.
  - viii) Poiseulli's law is applicable in streamline and turbulent flow.

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- ix) Fanning equation is applicable for turbulent flow also.
- x) The cross-section of the glass tube in a Rotameter is uniform.
- xi) HACCP should be mandatory for Product safety in FMCG industry.

**GROUP – B**

**( Short Answer Type Questions )**

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

- 2. What are the advantages of differential manometers over simple manometers ? Describe the usage of manometers in GMP accredited Clean Room Production Areas.
- 3. With neat sketches explain the design and operation of Reciprocating pumps.
- 4. Write a note on Membrane Filters. Give their applications & limitations in Pharmaceutical Industry .
- 5. Comment briefly on the following :
  - a) Filtration of Sugar Syrup containing suspended matters
  - b) Separation of tanins from a turbid alcoholic solution.
  - c) Pore size of the Filter should be smaller than the size of impurities being removed.
  - d) Gear pumps can be throttled.
  - e) Ejector pumps are used for transportation of gases.

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**GROUP – C**

**( Long Answer Type Questions )**

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

6. Derive Bernoulli's theorem and explain how this can be employed for measuring the rate of flow in horizontal pipeline.
7. Write short notes on the following :
  - a) Orifice meter & Ventury meter
  - b) Sintered Glass Filters
  - c) Gate valve & Check valve
  - d) MSDS & PPE
  - e) Critical speed of centrifuge.
8.
  - a) Compare merits & demerits of Centrifugal and Reciprocating Compressors. Mention their uses in Pharmaceutical Industry.
  - b) Give the construction, working and application of De Laval Clarifier.
9. Describe different types of hazards encountered in Pharmaceutical Industry. How is Safety plan chalked out ? Enlist the action plan of a Safety Audit.

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