

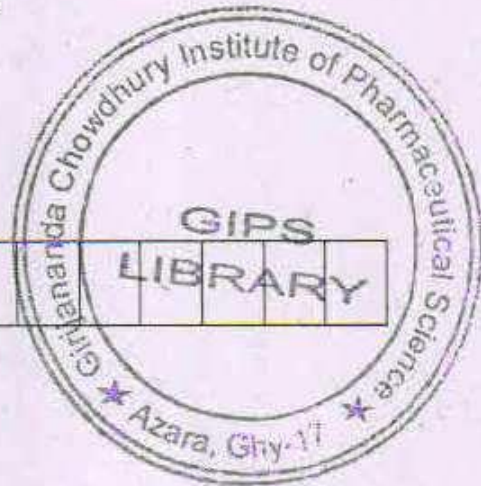
27-11-17 (Reg)

Total No. of printed pages = 4

**PY 132303**

Roll No. of candidate

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2017

**B.Pharm. 3rd Semester End-Term Examination**

**BASIC ENGINEERING — I (UNIT OPERATION — I)**

Full Marks – 100

Time – Three hours

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

Answer Question No. 1 and any six from the rest.

1. MCQ/fill in the blanks : (10 × 1 = 10)

(a) For a laminar flow, Re value is

- (i) <2000
- (ii) >4000
- (iii) >2000
- (iv) between 2000 to 4000

(b) Crystallization is an example of \_\_\_\_\_ incompatibility.

- (i) Delayed
- (ii) Immediate
- (iii) Both (i) and (ii)
- (iv) None

[Turn over

- (c) Following is/are dimensionless number(s)
- (i) Reynold's number
  - (ii) Power number
  - (iii) Mass transfer number
  - (iv) None of the above
- (d) Borax is an example of \_\_\_\_\_ substance.
- (i) Hygroscopic
  - (ii) Efflorescent
  - (iii) Deliquescent
  - (iv) None of the above
- (e)  $V = \frac{\pi \Delta Pr^4}{8L\eta}$  is the expression of
- (i) Darcy's equation
  - (ii) Poiseuille's equation
  - (iii) Bernoulli's equation
  - (iv) Hagen-Poiseuille's equation
- (f) Cast iron consists of \_\_\_\_\_ with a proportion of \_\_\_\_\_
- (g) Stainless steel is an alloy of \_\_\_\_\_
- (h) Principle of horizontal centrifugation is \_\_\_\_\_ (sedimentation/filtration)
- (i) Rate of filtration can be best described by
- (i) Poiseuille's equation
  - (ii) Fick's law
  - (iii) Noyes Whitney equation
  - (iv) Moh's equation



(j) Match the following quantities with their respective units (1) to (4).

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|---------------------------|-----------------------|
| (i) Frequency             | (1) W(watt)           |
| (ii) Viscosity(dynamic)   | (2) Hz(Hertz)         |
| (iii) Power               | (3) Ns/m <sup>2</sup> |
| (iv) Thermal conductivity | (4) W/mk              |

2. (a) What are psychometric charts? Discuss their uses. Write a short note on equipments for dehumidification of air. (5 + 4)

(b) Define the terms : (1.5 × 4 = 6)

- (i) Relative humidity
- (ii) Wet bulb temperature
- (iii) Adiabatic saturation temperature
- (iv) Solubility curve

3. Write a brief note on material and energy balance. Discuss the factors to be considered in the selection of materials for pharmaceutical plant construction. (8 + 7)

4. Describe the construction and working principle of belt conveyor system for solid transport. List advantages of screw conveyor and screw elevator. How do you compare these with pneumatic transport of solid? (10 + 5)

5. Discuss the advantages and disadvantages of filter press. Describe the theory of filtration. Write a short note on filter aids and filter media. (10 + 5)

6. Write the significance of Reynold's number. Prove that Reynold's number is dimensionless. Discuss their application in pharmaceutical field. (5 + 10)

7. Write about Mier's theory with its limitation. What is Nucleation? Describe the working principle of Swenson Walker crystallizer. (7 + 1 + 7)
  8. Write a brief note on Fire triangle. What is corrosion resistance? Discuss about chemical hazard and write their prevention. (7 + 8)
  9. What is centrifugation? Describe the principle. Write a note on sedimentation type centrifuges. (1 + 4 + 10)
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