

Total No. of printed pages = 3

Ch-405/PUO-II/4th Sem/2016/N

PRINCIPLES OF UNIT OPERATION – II

Full Marks – 70

Pass Marks – 28

Time – Three hours

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

Answer question No. 1 and any *five* from the rest.

1. Fill in the blanks : 1×10=10
- (a) Henry's law is applied for _____ solution.
 - (b) The reverse of the absorption is called _____.
 - (c) _____ dryer is used in cement industry.
 - (d) Bollman extractor is a _____.
 - (e) In stream distillation, the product must be _____ with water.
 - (f) Refractory bricks are usually dried in a _____.

[Turn over

- (g) The rate of extraction in solid – liquid extraction system decreases with increase in _____.
- (h) Operating velocity in a packed tower is usually _____ the flooding velocity.
- (i) Relative volatility of azeotropic mixture is _____.
- (j) The dew point of a saturated gas phase is equals the _____.

2. (a) Distinguish between : $2 \times 3 = 6$

- (i) Absorption and desorption.
- (ii) Distillation and extraction.
- (iii) Evaporation and drying.

(b) Name the different equipments required for leaching of coarse, medium and fine solid. What are the different equipments used in extraction ? $3 + 3 = 6$

3. Why reflux is provided at the top of the distillation column ? Draw a single stage crude distillation unit (column) and describe briefly rectifying section and stripping section. Also mention the different products obtained from it. $2 + 10 = 12$

4. What is diffusion ? Explain the various types of diffusion process. Write different factors that influence the rate of absorption. Describe with a suitable diagram the flooding, loading and channeling of an absorption column.

$$2+2+2+6=12$$

5. What are the purposes of drying ? Describe with a suitable diagram the working principle, construction, operation and industrial applications of a tray dryer.

$$2+10=12$$

6. Classify different types of distillation. Explain how the reflux ratio affects the number of trays inside the distillation column. Explain minimum reflux, maximum reflux and optimum reflux ?

$$3+6+3=12$$

7. Write short notes on any *three* :

$$3 \times 4 = 12$$

- (a) Packed bed extractor.
- (b) Ficks law.
- (c) Choice of solvent used in extraction.
- (d) Dry bulb and wet bulb temperature.
- (e) Absolute and relative humidity.