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PY 132403

Roll No. of candidate

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2016

**B. Pharm 4th Semester End-Term Examination**

**BASIC ENGINEERING - II**

**(Unit Operation - II)**

Full Marks-100 Pass Marks-35 Time-Three hours

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

1. Answer any *fifteen* questions :  $2 \times 15 = 30$
- (a) Define "coefficient of thermal conductivity."  
Name different methods of heat transfer.
  - (b) Explain the term "evaporator capacity".
  - (c) What are the advantages of liquid heat exchanger ?
  - (d) What are the pharmaceutical applications of drum dryer ? Name a dryer which is used for thermolabile substances.
  - (e) State the Rittinger's law applied in size reduction.

[Turn over

- (f) What do you mean by "positive mixing" and "negative mixing" ? Name two powder mixers used in pharmaceutical industry.
- (g) What is the principle of freeze drying operation ?
- (h) Explain "efficiency of screening" and "drag coefficient".
- (i) What do you mean by "critical speed" of a ball mill ?
- (j) What are the advantages of multieffect evaporator ?
- (k) What do you mean by "angle of nip" ?
- (l) What do you understand by "constant rate period" and "falling rate period" in a drying process ?
- (m) Explain the terms : 'equilibrium moisture content' and 'critical moisture content'.
- (n) Explain Rault's law and its application in distillation.
- (o) Give the principle of rectification. What are demerits of bubble-cap rectification column ?
- (p) What do you mean by "case hardening" and 'shrinkage' ?
- (q) What do you mean by 'steam economy' ?

2. Answer any *eight* questions : 5×8=40

- (a) What are the basic mechanisms of heat flow ? State Fourier's law of heat conduction.
- (b) Derive the equation for the flow of heat through compound resistance in series.
- (c) What are bound water and unbound water ? Show the different parts of a typical drying curve.
- (d) With a neat sketch, describe the working principle of a hammer mill.
- (e) Explain the principle involved in the operation of a cyclone separator. Indicate its use in pharmaceutical industry.
- (f) Why in case of evaporation of some substances, the scale formation is more ? Suggest measures for decreasing the scale formation.
- (g) What is steam distillation ? Discuss the advantages with this technique of distillation.
- (h) What are the sources of air pollution ? What measure should be taken to control air pollution ?
- (i) What is "Reflux ratio" ? Draw the neat sketch of a rectification column and explain the term.

(j) Describe a method to study the degree of uniformity of mixed semisolid products.

3. Answer any *three* questions :  $10 \times 3 = 30$

(a) Explain the terms "deliquescence" "efflorescence" and "spray congealing". Which dryer would you suggest for a material when the liquid evaporated is a valuable solvent ? Discuss its principle, working and applications.

$3+2+5=10$

(b) What are the factors that influence size reduction and choice of equipments for size reduction ? Explain the different standard parameters for sieves.

$5+5=10$

(c) Explain the principle of operation of any one equipment used in pharmaceutical industry in mixing viscous masses. Discuss the importance of the operation of evaporation under reduced pressure with examples.

$6+4=10$

(d) What is "differential distillation"? Bring out the importance of Rayleigh's equation in differential distillation and discuss the theory of distillation of miscible liquids.

$1+4+5=10$