

B.Tech. SEM -VII (Chemical 2014 Course (CBCS) : WINTER - 2018

SUBJECT : CHEMICAL PROCESS EQUIPMENT DESIGN – II

Day : Monday
Date : 26/11/2018

W-2018-2521

Time : 02.30 PM TO 05.30 PM
Max. Marks : 60

N. B. :

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Draw neat and labeled diagram **WHEREVER** necessary.
 - 4) Assume suitable data, if necessary.
-

Q. 1 What are the general design considerations in evaporators? (10)

OR

What are the general design considerations in crystallizers? (10)

Q. 2 6250 kg/hr of dry potassium chloride is to be produced in a fluidized bed (10)

dryer. Initial moisture content is 10 % while final moisture content is 0.5 %
the feed enters the dryer at 20⁰ C

Density of potassium chloride = 2000 kg/m³

Minimum size of particle = 0.1 mm

Maximum size of particle = 0.5 mm

Min particle size = 0.5 mm

Flue gas available at 800⁰ C are used for drying the temperature of exhaust
flue gas from the fluidized bed dryers = 125⁰ C

Heat loss can be assumed as 15 %

The temperature of dry salt at discharge = 125⁰ C

Specific heat of flue gas = 1050 J/kg.

Latent heat of vaporization = 2470 kJ/kg

Specific heat of ----- vapor = 1970 J/kg

Density of flue gas at standard condition = 1.29 kg/m³

Viscosity of the gas at exit temperature = 0.22×10^{-3} N-s/m²

Porosity of the fluidized bed $E = 0.4$

Fluidized bed height = 360 mm (Approx)

OR

a) Explain basket centrifuge in detail. (05)

b) Write down general design procedure for dryer. (05)

Q. 3 a) Explain plate design procedure. (05)

b) Explain design variables in distillation. (05)

OR

Explain design methods for Binary systems. (10)

Q. 4 Explain various types of packing used in pack column. Also elaborate (10)
selection of packing

OR

Explain methods used for finding height of transfer unit. (10)

Q. 5 a) What are the different standards used in piping? **(05)**

b) Explain various types of flanges used in piping. **(05)**

OR

Explain pipe manufacturing methods in detail. **(10)**

Q. 6 a) Explain significance of color codes in piping design. **(05)**

b) Explain the stress analysis. **(05)**

OR

a) Explain mechanical design of pipes. **(05)**

b) Explain selection and design of supports. **(05)**

* * * * *