53 (FPT 702) PEDG

2016

FOOD PROCESS EQUIPMENT DESIGN

Paper : FPT 702

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions.*

1. *(a)* Write short notes on the non-metals used in the designing of a food plant equipment. 10

   (b) Discuss about the different types of stresses to be considered during the fabrication of food equipment. 10

2. *(a)* Write in detail about the construction characteristics that should be considered during the selection of food equipment. 10

   (b) List the sequential operations involved with CIP systems. 4

(c) A belt conveyor with the inclination of 10° to the horizontal is to be used for the transport of wheat grains to the processing site. The particle size of wheat grains varied from 25 to 40 *mm* and the bulk density was 3000 kg/m^3. Production at the site was 2000 *kg/min.* Calculate the width of the belt for a belt speed of 2·5 *m/s.* 6

Data :

$K_a = 0{\cdot}072$

$C_i = 0{\cdot}90$

3. (a) Explain about the Roll and Skate wheel conveyor systems with proper diagrams. 8

(b) Draw schematic diagrams for segmented belt conveyor and screw conveyor systems. 3+3

(c) 30 tonnesh of rice flour is to be transported to the packaging area by a screw conveyor. With the following data find the bulk density of the material which is conveyed horizontally in the screw conveyor. 6

Data :

Filling co-efficient = 0·150

Screw pitch = 0·5*m*

Screw diameter = 0·2*m*

Speed of the shaft = 50*rpm*

Correction factor = 1·0

4. *(a)* Define Sorting and Grading. 2+2

   (b) Explain cylindrical and disc separators with neat sketch. 4+4

   (c) Discuss about *any three* screws used in the solid/solid separations. 3+3+2

5. *(a)* Explain the pneumatic conveying systems with proper diagram. 10

   (b) Discuss about spiral and graphite heat exchanger with neat schematics. 5+5

6. *(a)* Classify shell and tube heat exchangers and explain in detail with suitable diagrams. 5×4=20

7. Write short notes on the following pressure vessel components with proper diagrams. 10+10

   (i) Nozzle

   (ii) Head *or* Cover.
