

Total No. of printed pages = 3

FPT-502/FEO-I/5th Sem/2014/N

## FOOD ENGINEERING OPERATIONS - I

Full Marks – 70

Pass Marks – 28

Time – Three hours

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

Instructions :

- \* Answer any *five* questions.
- \* Preferably, write the answer in sequential order.
- \* Illustrate your answer with suitable sketches and examples wherever necessary.

1. (a) Describe a belt conveyor with a neat diagram.

7

(b) What are the various applications of transportation systems in food processing industries ?

7

[Turn over

2. (a) How do you classify size-reduction processes ?  
Describe them briefly. 7
- (b) To crush 300 ton/hour of a material 270 kW of power is required if 80% of the feed passes through 50 mm screen and 80% of the product passes through 3 mm screen, calculate the work index of the material. 7
3. (a) What is the purpose of material and energy balances ? 5
- (b) It is required to mix the juice concentrate and fresh juice to maintain flavour in the product. Determine the quantity of juice containing 65% soluble solids and single strength juice containing 15% soluble solids that must be mixed to produce the 100 kg of a concentrated product having 45% soluble solids. 9
4. (a) Describe a batch crystallizer with a neat diagram explaining its application in Food Processing. 9
- (b) We have a 40% ( $MgCl_2$ ) magnesium chloride solution in water at  $20^\circ C$ . Find the  $MgCl_2$  crystallized out, if the saturated concentration is only 54.5 kg/100 kg of water at  $20^\circ C$ . 5

5. Write short notes on : 5+4+5=14

(a) Plate and Flame Filter Press

(b) Bucket elevator

(c) Cleaning in place (CIP)

6. (a) What do you mean by homogenization ?  
Discuss the effect of homogenization on  
milk. 7

(b) A 5 cylinder acting homogenizer with a bore  
of 3 cm and stroke of 15 cm operate at 440  
rpm. How many liters of milk will it  
homogenized per hour ? 7

7. (a) What are the various laws of Grinding ?  
Explain them. 7

(b) Write a note on constant rate filtration. 7