FPT-502/FEO-I/5th Sem/2017/N

FOOD ENGINEERING OPERATIONS – I

Full Marks – 70

Time – Three hours

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

GENERAL INSTRUCTIONS

1. Answer all question from Part – A and any *five* questions from Part – B.

2. Illustrates your answers with suitable sketches and examples wherever necessary.

3. Make suitable assumption(s) wherever, whenever applicable.

4. Preferably, write the answers with sequential order.

PART – A

1. Match the Column :   1×5=5

Column – A	Column – B
(a) Kurkure	(i) Lifting of food materials
(b) Intermediate crushers	(ii) Homogenization
(c) Milk	(iii) Extrudate
(d) Bucket elevators	(iv) Ball mill
(e) Moisture content	(v) Drying

2. Multi-choice questions :   1×10=10

(i) The hammer mill is used to reduce the size by

   (a) Shear   (b) Impact

   (c) Cutting   (d) Crushing

(ii) In a Ball mill, size reduction of material is achieved by

   (a) Shearing   (b) Crushing

   (c) Cutting   (d) Impact

(iii) When a material is subjected to sudden blow of force in excess of its strength, if fails is called

   (a) Impact   (b) Shearing

   (c) Cutting   (d) Crushing

(iv) Ratzinger's law is applicable for the feed size of

   (a) Less than 0.05 mm

   (b) More than 0.05 mm

   (c) Greater than 50 mm

   (d) Less than 50 mm

(v) Temperature and time combination for LTLT pasteurization

   (a) 63°C and 30 min

   (b) 63°C and 30 sec

   (c) 72°C and 15 sec

   (d) 72°C and 15 min

(vi) Temperature and time combination for HTST pasteurization

   (a) 63°C and 30 min

   (b) 63°C and 30 sec

   (c) 72°C and 15 sec

   (d) 72°C and 15 min

(vii) Preheating temperature (°C) of milk before pasteurization is

   (a) 30-35   (b) 35-40

   (c) 40-45   (d) 45-50

(viii) Belt conveyor is used in

   (a) Material transportation over long distance

   (b) Material transportation within the premises

   (c) Both (a) and (b)

   (d) Lifting of materials

(ix) In Single screw extruder, screw extruders runs at speed of

   (a) 100-400 rpm

   (b) 20-60 rpm

   (c) 10-20 rpm

   (d) None of the above

(x) Law of grinding which is more applicable for fine grinding is

   (a) Bond's Law

   (b) Kick's Law

   (c) Ratzinger's law

   (d) None of the above.

3. Define the following :   2×5=10

   (a) Idlers

   (b) Belt conveyor

   (c) Single screw extrusion

   (d) Pasteurization

   (e) Hammer mill.

PART – B   9×5=45

1. How much power is required to crush 2 ton/hr of a material if 80% of the feed passes through IS sieve number 480 (4.75 mm opening) and 80% of the product possess through IS Sieve number 50 (0.5 mm opening) ? (Given Work index = 5.30)

2. What do mean by size reduction ? Discuss different factors which affect size reduction of agricultural food materials.

3. Explain the functioning of single screw conveyor with a neat diagram.

4. What are the various laws of grinding ? Explain them.

5. Classify various materials handling/transportation systems. What are various application of material handling systems in Food Processing Industries ?

6. What is meant by crystallization ? With neat diagram discuss batch crystalizer.

7. Differentiate the following :   4.5×2=9

   (i) Crushing and Grinding

   (ii) Jaw crusher and Gyratory crusher.