Total No. of printed pages = 6

END SEMESTER EXAMINATION–2019

Semester – 5th

Subject Code : FPT-502

FOOD ENGINEERING OPERATIONS-I

Full Marks – 70

Time – Three hours

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

Instructions :

1. *All* questions of PART – A are compulsory.

2. Answer any *five* questions from PART – B.

PART – A

Marks – 25

1. Fill in the blanks :   1×5=5

    (a) In spiral separator, the adjustable component
        for separation is _____.

    (b) Disc separators separate materials on the
        basis of _____.

    (c) Jaw crusher is of two types : 1st black type
        and 2nd is _____.

[Turn over

(d) In a ball mill, most of the size reduction is achieved by _____ which methods ?

(e) Pascal is a unit of _____ .

2. Write true or false : 1×10=10

(a) Operation of hammer mill is an example of dynamic force application by impact.

(b) Energy neither be created nor be destroyed : As per laws of Conservation of Energy.

(c) Bucket elevators is used to transport materials within the plant premises.

(d) Pneumatic conveying is the excellent methods of transporting powders in closed containers.

(e) Hammer mill is categorized under grinding.

(f) Ultra-filtration is a classic example of cross-flow filtration.

(g) Diatomaceous earth is used as filter aid.

(h) The tension developed at the drive pulley in transmitting the required powder to move the loaded belt is known as effective tension.

(i) The unit of universal gas constant is Erg/°K.

(j) Holding time under high temperature short time milk pasteurizer is 15 second.

3. Choose the correct answer : 1×10=10

(a) Belt conveyor is used in

(i) Material transportation over long distance

(ii) Material transportation within the premises.

(iii) Both (i) and (ii)

(iv) Lifting of materials

(b) HTST pasteurization means

(i) High temperature simple tank

(ii) High time short temperature

(iii) High temperature short time

(iv) High time small temperature

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

(i) shear (ii) impact

(iii) cutting (iv) crushing

(d) In which process of size reduction, minimum deformation and rupture results and the new surface created is more or less undamaged

(i) Impact (ii) Compression

(iii) Cutting (iv) Crushing
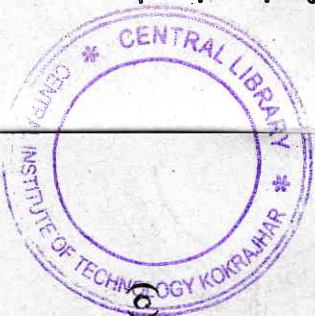
(e) The size of the agricultural products may be reduced by

   (i) Shear

   (ii) Impact

   (iii) Crushing and compression

   (iv) All of the above

(f) When a material is subjected suddion blow of force in excess of its strength, if fails is called

   (i) Shear   (ii) Impact

   (iii) Cutting   (iv) Crushing

(g) The process of heat treatment in which partial cooking of product takes place to inactivates and destroys the enzymes

   (i) Blanching   (ii) Cooking

   (iii) Deep-fat frying (iv) Roasting

(h) Transpiration of powder materials inside the plant is taken place using

   (i) Bucket elevator

   (ii) Belt conveyors

   (iii) Pneumatic conveyors

   (iv) None of the above

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

   (i) Bond's law   (ii) Kick's law

   (iii) Rittinzer's law (iv) None of the above

(j) In which process of size reduction, minimum deformation and rupture results and the new surface created is less or more undamaged.

   (i) Impact   (ii) Compression

   (iii) Crushing   (iv) Cutting.

PART – B

Marks – 45

4. (a) Write the law of conservation of mass. 3

   (b) Write all different steps to be followed during material balances. 6

5. (a) What is the importance of material handling in food processing ? 3

   (b) Describe a belt conveyor with a neat diagram and its application in food processing. 6

6. (a) Write a brief note on size reduction operations. 3

   (b) Explain the functioning of hammer mill with a neat diagram. 6

7. (a) Compare and contrast dehydration and drying. 3

   (b) In a rice milling industries, it was found that to grind 4.33 mm sized grains to seive opening of 0.351 mm, the power requirement was 8 KW. Calculate the power requirement for milling of rice by the same mill to sieve opening of 0.157 mm with a feed rate of milling is 200 kg/hr using Kick's law. 6

8. Differentiate the following :

   (a) Crushing and Grinding. 3

   (b) Jaw crusher and Gyratory crusher. 3

   (c) Cross flow filter and Cake filters. 3

9. (a) What is meant by crystallization ? What are the various types of crystallizers available in industrially ? 5

   (b) Describe a batch crystallizer with a neat diagram. 4

10. Write short notes on :

   (a) Idlers 3

   (b) Bonds law 3

   (c) Screw conveyor. 3

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