Total No. of printed pages = 3

FPT-502/FEO-I/5th Sem/2016/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.

Answer any *five* questions.

Instructions :

(i) Illustrate your answer with suitable sketches and examples wherever necessary.

(ii) Make suitable assumptions wherever applicable.

(iii) Preferably write the answers in sequential order.

1. (a) A belt conveyor with an inclination of 15° to the horizontal is to be used for the transportation of iron ore from the mine to the washing plant. The iron ore particles are of size 10 to 30mm and of bulk density 2600 kg/m^3. Production at the mine is 1600 ton/h. The materials with around 10% moisture may be

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taken as medium flowable. For belt speed of 1.6 m/s, calculate the width of the belt to be used for the above purpose.

(Data Ka = 0.067, Ci = 0.95). 7

(b) Describe a belt conveyor with a neat diagram and its application in food processing. 7

2. (a) In a rice milling industry, it was found that to grind 4.33mm sized grains to sieve opening of 0.351mm, the power requirement was 8 kW. Calculate the power requirement for milling of rice by the same mill to sieve opening of 0.15mm with a feed rate of milling is 200 kg/hr using Rittingen's law. 7

(b) What are the various laws of grinding ? Explain them. 7

3. (a) Explain in detail, the construction and working of any one intermediate crusher with neat sketches. 7

(b) How much power is required to crush 5 ton/h of a material, if 80% of the feed passes through sieve of 4.75 mm opening of 80% of the product passes through sieve of 0.5 mm opening. Given work index = 6.30. 7

4. (a) What are the functions of idler in belt conveyors ? 7

(b) Discuss different factors which affect capacity of conveyor. 7

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

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

6. Write short notes on : $3\frac{1}{2} \times 4 = 14$

(a) Pneumatic conveyor

(b) Hammer mill

(c) Centrifugation

(d) Cyctrone separator.

7. (a) Write down the law of conservation of mass. 7

(b) Discuss the different steps of mass balance. 7