Fden.2104   **Crop Process Engineering (2+1)**

Marks: 50
Time: 2 hours

I   **Fill in the blanks**   (10x1=10)

1   The optimum moisture content for paddy harvesting is _____

2   Psychrometric chart is a graphical representation of _____ properties of air.

3   The spiral separator separates the grains as per their _____

4   In case of hammer mill, the disintegration is caused by _____ forces.

5   A _____ conveyor is an endless belt operating between two pulleys with its load supplied on idlers.

State True or False

6   The relationship between equilibrium moisture content (M_e) and relative humidity (rh) for biological materials has been given by Janssen.

7   Bond's law is used to calculate work index.

8   Parboiled rice takes less time for cooking and grains are sticky.

9   Corn milling seldom involves dry and wet milling process.

10   The indented cylinder separators separate the materials on the basis of relative lengths.

II   **Write Short notes on any FIVE of the following**   (5x2=10)

1   Differentiate dry bulb temperature and wet bulb temperature

2   Importance of equilibrium moisture content (EMC)

3   Factors influencing the design of an air screen grain cleaner

4   Calculate critical speed and operating speed of rotation in revolutions per minute of a ball mill of 2000 mm diameter charged with 100 mm balls. The rotational speed of the ball mills are kept at 80 % of the critical speed. Assume the ball mill grinding solid matter.

5   Parboiling methods for rice processing

6   Reduction rolls in wheat milling component.

7   Wet milling method of pulses by flow diagram.

III **Answer any FIVE of the following.**   (5x4=20)

1   In a wheat milling experiment it was found that to grind 4.33 mm sized grains to IS sieve 35 (0.351 mm opening), the power requirement was 8 kW. Calculate the power requirement for milling of wheat by the same mill to IS sieve 15 (0.157 mm opening) using (1) Rittinger's law and (2) Kick's law. Feed rate of milling is 200 kg/hr.

2   Advantages and disadvantages of parboiling for paddy.

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3   A screw conveyor mounted on a 4 cm diameter shaft has screw pitch and diameter both equal to 30 cm. Estimate its actual capacity of conveying wheat weighing 850 kg/m^3 while operating at 150 rpm. Assume actual capacity as 50 % of theoretical capacity. Also determine the horsepower requirement of motor for a screw length of 8 m, if the horsepower material factor for wheat is 0.4.

4   During evaluation of an air screen grain cleaner with two screens 250 g samples were collected for analyzing the clean seed fraction from different outlets. The data are presented in following table. Calculate the cleaning efficiency of the cleaner.

Sample fraction	Feed (g)	Cleaned grain outlet (g)	Blower outlet (g)	Oversize (g)	Undersize (g)
Cleaned seed (g)	231.25	246.50	1.25	4.50	2.00
Impurities (g)	18.75	3.50	248.75	245.50	248.00

5   If 800 kg of paddy at 24 % moisture content (wb) is dried to 13 % moisture content (wb) for milling, calculate the amount of moisture removed in drying.

6   Explain soymilk and Tofu in soybean processing products in brief. Also give list of breakfast cereal foods.

7   Tempering-degerming (T.D.) method for corn dry milling.

IV   Answer any ONE of the following   (1x10=10)

1   Describe with figure, principle, construction and operation of rubber roll husker/Sheller. Also write advantages and disadvantages of rubber roll husker/Sheller.

2   What is the importance of material handling equipments in the food industry? Also write the points to be kept in mind while selecting the conveyor. Describe bucket elevators in details.

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