

**M.Tech Odd Semester (CBCS) Exam.,
December—2016**

AGRICULTURAL ENGINEERING

(1st Semester)

Course No. : MAEEL-09

(Processing of Cereals, Pulses and Oilseeds)

Full Marks : 50

Pass Marks : 15

Time : 2 hours

Note : 1. Answer **any five** questions.

2. Begin each answer in a new page.

3. Answer parts of a question at a place.

4. Assume reasonable data wherever required.

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

1. Derive the formula of screen overall effectiveness. Explain the working principle of hammer and ball mill. 10
2. Write down the classification of separation and their principle. Explain any one machine related to them with neat diagram. 10

3. A tray-type paddy separator is used to separate paddy from a binary mixture of paddy and brown rice fed at the rate of 1600 kg h^{-1} . Mass fractions of paddy in feed, separated paddy and separated rice are 0.2, 0.7 and 0.02 respectively. The mass of 1000 paddy grains is 24.5 g. Find out separation effectiveness and number of paddy grains recycled per second. 10

4. Define the following terms : 10

- (a) Critical moisture content
- (b) Free moisture
- (c) Thermal diffusivity
- (d) Time of advanced drying

5. (a) What do you mean by hydrothermal treatment of grains? What are its effects on the quality of grains? 3

- (b) The initial moisture content of a food product is 77% (Wb) and the critical moisture content is 30% (Wb). If the constant drying rate is $0.1 \text{ kg H}_2\text{O (m}^2/\text{s)}$, compute the time required for the product to being falling rate drying period. The product has a cube shape with 5 cm sides and initial product density is 950 kg/m^3 . 7

6. Explain solvent extraction of soybean oil with neat flow diagram. 10
7. (a) Describe the batch extraction method for rice bran oil. 5
- (b) What are the byproducts obtained during the processing of the paddy? Mention their utilization. 5
8. (a) A grain storage bin having internal diameter of 5 m is completely filled with paddy weighing 400 kg/m^3 . The angle of internal friction for paddy can be taken as 35° , while the angle of friction between paddy and bin wall is 30° . The ratio of horizontal and vertical pressure intensity k is 0.4. Calculate the lateral pressure intensity at 2.0 m and 5.0 m depth using Janssen theory. 4
- (b) Write short notes on : 6
- (i) BIS
 - (ii) ISO
 - (iii) CAC

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