B.Tech Even Semester (CBCS) Exam., April—2017

AGRICULTURAL ENGINEERING

(4th Semester)

Course No. : AECC–15

(Post-Harvest Operations)

Full Marks : 50
Pass Marks : 15

Time : 2 hours

Note : 1. Attempt *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. *(a)* What do you mean by screen effectiveness? Derive the formula for it. 5

(b) Explain the physical, chemical and biological properties of grain with example. 5

2. *(a)* Define the following with working principle and neat diagram : 5

(i) Spiral separator

(ii) Disk separator

(b) Explain the working principle of Hammer and Ball mill with neat diagram. 5

3. Explain the effects of parboiling on milling, nutritional and cooking qualities of rice. Define the improved parboiling method of CFTRI and Schule process with the help of neat flow diagrams. 10

4. *(a)* Explain all the three laws associated with size reduction. 6

(b) A food material is milled from particle size of 5 mm to 0·0012 mm using 7 kW motor. What size motor will be required to reduce the same feed particle to product particle size of 0·0005 mm? Assume same feed rate and apply Rittinger's law. 4

5. *(a)* Define the following terms : 6

(i) Critical moisture content

(ii) Free moisture

(iii) Bound moisture content

(iv) Falling rate period

(b) 1000 kg of wheat at 15% moisture content (wb) is dried to 10% moisture content (wb) for milling. Calculate the amount of water present in fresh and dried wheat. Also, find amount of wheat after drying. 4

6. *(a)* Explain the pressure theories related to storage structure design in detail. 6

(b) Paddy weighing 600 kg/m^3 is stored in a cylindrical bin of RCC measuring 5 m inside diameter and 20 m depth. The angle of internal friction for paddy is 35° while angle of friction between paddy and bin wall is 30°. The ratio of horizontal and vertical pressure intensity is 0·4. Calculate lateral pressure intensity at the bottom of bin. 4

7. Write down the types of drying. Define any two in detail. 10

8. *(a)* Calculate the storage capacity of a tower shallow of cylindrical shape having diameter 4 m and height 6 m the bottom of the silo is the conical shape of same diameter and height 2 m. 4

(b) Define the following : 6

(i) Thin layer drying

(ii) Deep bed drying

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