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B.E. / B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS, APR / MAY 2013

AGRICULTURAL AND IRRIGATION ENGINEERING BRANCH

Sixth Semester

<u>AI 9029 – POST HARVESTING TECHNOLOGY</u>

(Regulation 2008)

Time: 3 hours   <u>Answer ALL Questions</u>   Max Marks: 100

<u>Part – A (10 x 2 = 20 Marks)</u>

1) List out the optimum moisture content of any 4 cereals at the time of harvest, storage for 6-12 months and more than 1 year.

2) With few examples, write a note on angle of repose.

3) Write the Henderson's equation for equilibrium moisture.

4) What are the components of a psychrometric chart?

5) How is the velocity of a particle at any point on an inclined plane be found?

6) Calculate the grading efficiency of a groundnut grader for the following details. Sample size – 1000 g, weight of B grade in A grade – 150 g, weight of C grade in B grade – 200 g.

7) What is pitting?

8) Differentiate puffed rice and beaten rice.

9) Find the velocity required by a pneumatic conveyor to convey paddy of density 850 kg/m^3.

10) List the material characteristics to be considered while choosing a handling equipment.

<u>Part – B (5 x 16 = 80 Marks)</u>

11 i) Explain the features and working of a single scalper drum cleaner with a neat sketch. Also derive the formula for calculating its efficiency.   (16)

12 a) i) How is the structure and composition of food grains important for post harvest technology? Illustrate it with a neat sketch of a grain.   (8)

ii) A 5.5 m high and 12 m long composite wall of a cold storage is made up of 120 mm thick brick wall as the outside wall. The inner wall surface is of fibre glass of 63 mm thick. In between the two walls, insulating boards of two types I and II each of 22 mm thick are placed. The coefficients of thermal conductivity for the 4 different layers are as follows Brick wall – 1.14 W/m-°K, Fibre glass – 0.04 W/m-°K, Insulation board I – 0.05 W/m-°K, Insulation board II – 0.07 W/m-°K. If the outside atmospheric temperature is 30°C and cold room temperature is 5°C, calculate the heat loss per hour through the wall. Also determine the interface temperatures.   (8)

(or)

b) i) Explain in detail the various engineering properties of agricultural materials required for post harvest technology. (16)

13) a) i) Explain the direct methods of determination of moisture. (8)

ii) Prove that the amount of moisture lost $\Delta m = W_d (Mdb_1 - Mdb_2)$ (8)

(or)

b) i) With a neat sketch, explain the axial flow thresher. Also derive an expression for finding its Performance Index. (16)

14) a) i) List out the advantages and disadvantages of parboiled paddy. (7)

ii) What is white rice? Explain any one method with a neat sketch. (9)

(or)

b) i) How is the hulling mechanism classified? Explain with neat sketch. (8)

ii) Explain the solvent extraction process for rice bran oil extraction. (8)

15) a) i) A bucket elevator used for lifting paddy has 20 cm long buckets and a cross section of a circle having a radius of 15 cm and subtending an angle of 80° at the centre. The buckets are spaced 40 cm apart. The lift is 25 m and the head wheel has a diameter of 60cm. Calculate the belt speed so that the discharge is positive, capacity of the elevator to lift paddy that weighs 580 kg/m^3 and the HP required to power the elevator assuming the efficiency as 80%. If the same quantity has to be conveyed through a screw conveyor, find out the diameter of the shaft assuming recommended specifications. (8)

ii) Briefly explain the various parameters to be evaluated during commercial storage of grains.
(8)

(or)

b) i) Discuss the various processes of a modern rice mill with a flow chart. (10)

ii) Write a note on the problems of rats and their management in storage of grains. (6)