KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Food Technology) 2022 Admission
V Semester Final Examination – January 2025

Pafe.3128 **Food Storage Engineering (2+1)** **Marks: 50**
Time: 2 hours

I **Choose the correct answer** **(10x1=10)**

1. Sprouting of potato stored at 10°C can be prevented by application of _____
   (a) Ethylene
   (b) Natural gas
   (c) Oxygen
   (d) None of these
2. A type of modern permanent storage structure is_____
   (a) Squant silo
   (b) Mud kothi
   (c) Kothar type structure
   (d) Pusa bin
3. Food spoilage occurs due to _____
   (a) Bacteria
   (b) Molds
   (c) Yeast
   (d) All of the above
4. In modified atmosphere packaging_____
   (a) CO2 and O2 levels increases
   (b) CO2 level increases and O2 level decreases
   (c) CO2 level decreases and O2 level increases
   (d) CO2 and O2 level remains constant

Answer the following

5. Name any two fumigants used for storage disinfestation.
6. Write an equation of Janssen's theory for calculation of lateral pressure of deep bins.
7. Define the term "Warehouse".
8. Define the term "Plane of rupture

State True or False

9. Recommended storage temperature for Mango is 0°C."

Fill in the blanks

10. The process of moving air at low flow rate through stored grain to maintain its quality is known as _____

II **Write short notes on ANY FIVE of the following** **(5x2=10)**

1. Explain perishable, semi-perishable and durable agro-produce with examples.
2. Write a short note on the term "Permanent Tower Silo".
3. Write the requirements of a good storage structure for food grains.
4. Describe aeration system for a vertical silo with schematic sketch.
5. Explain the working principle of evaporative cooling storage systems.
6. What are the important factors to be considered in designing a storage structure for food grains.
7. Write comparison between silo and godown storage for food grains.

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

1. Describe the storage losses and damages to the stored products.
2. Describe the hypobaric storage of fruits and vegetables.
3. Describe Bukhari type traditional storage structure with neat sketch.
4. A R. C.C. cylindrical grain storage bin has internal diameter of 5 m and is 20 m deep. It is completely filled with paddy weighing 600 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 interval.
5. Describe the temperature and moisture changes in storage structure.
6. Describe the factors causing deterioration of perishable agro produce. How the deterioration can be controlled?
7. What are the major storage pests in grain storage? Explain in brief the management of storage insects.

IV **Write an essay on ANY ONE of the following** **(1x10=10)**

1. Eight tonnes of apple having specific heat of 0.8 kcal/kg°C is to be cooled from 25 to 14°C in 24 hours. The heat of respiration per 24 hour is 745 kcal/t. Three men will work for 4 hours and lighting load is estimated to be 100 watt. Air infiltration load is assumed as 980 kcal in 24 hours.
   The cold storage measures 6×6×3 m on the inside and is constructed of bricks laid in cement mortar. Wall thickness is 40 cm and there is 10 cm thick cork insulation on the inside of the four walls. The cement plaster is 1 cm thick. The heat transfer coefficient for the ceiling is 20 % more than that for the walls. The outside temperature is 30°C and the inside is maintained at 5°C. Calculate the plant capacity needed in tones of refrigeration.
   Thermal conductivity of brick = 0.45 kcal/hr/m°C
   Thermal conductivity of cork = 0.025 kcal/hr/m°C
   Thermal conductivity of cement plaster = 0.25 kcal/hr/m°C
   Heat of respiration of men = 170 kcal/hr
   There is no heat transfer through the floor.
2. Enlist different modern storage structures for food grains. Describe storage of food grains in warehouse. What are different Government agencies involved in storage of food grains in India.

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