



**KERALA AGRICULTURAL UNIVERSITY**  
**B.Tech.(Food Technology) 2021 Admission**  
**V Semester Final Examination – January 2024**

Pafe.3128

**Food Storage Engineering (2+1)**

**Marks: 50**  
**Time: 2 hours**

**I Answer the following**

**(10x1=10)**

1. Angle made by the material with respect to horizontal when piled is known as:
2. Name a fruit that undergoes the climacteric ripening process.
3. Enlist any two sources of infestation for food grain storage.

**Choose the correct answer**

4. Which of the following gas is more effective for ripening of fruits?  
(a) Propylene (b) Acetylene  
(c) Ethylene (d) None of the above
5. If  $\theta$  is the angle of internal friction, then the ratio of lateral pressure to vertical pressure in a grain bin, K, is given by as

(a)  $K = \frac{1-\sin \theta}{1+\sin \theta}$

(b)  $K = \frac{1+\sin \theta}{1-\sin \theta}$

(c)  $K = \frac{(1-\sin \theta)^2}{(1+\sin \theta)^2}$

(d)  $K = \frac{(1+\sin \theta)^2}{(1-\sin \theta)^2}$

6. Trench silo has:  
(a) Circular cross section (b) Trapezoidal cross-section  
(c) Rectangular cross section (d) Triangular cross section

**Fill in the blanks**

7. Janssen formula is used to determine the pressure in a.....bin.
8. .... is an example of bulk storage structure.
9. Air tight storage also known as..... storage.
10. Dehydrated food has longer shelf life because of their ..... water activity.

**II Write short notes on ANY FIVE of the following**

**(5x2=10)**

1. Write a short note on CAP storage structure.
2. What are the main objectives of aeration?
3. Briefly explain about rodent control measures in food storage system.
4. Differentiate deep and shallow bin.
5. What is the meaning of "MAP" in the context of food packaging?
6. Explain hypobaric storage by citing anyone product.
7. In a deep vertical silo of 4 m diameter, calculate maximum lateral pressure generated if the paddy grain having bulk density of 600 kg/m<sup>3</sup> is stored in it. Coefficient of friction between grain and wall may be taken as 0.3.

**III Answer ANY FIVE of the following**

**(5x4=20)**

1. What is the purpose of aeration? What are specific objectives of aeration in stored grain? Explain in brief about different types of ducting system used in aeration.
2. Explain the working of evaporative cooling system in brief and mention their specific advantages and limitation.
3. Differentiate Controlled atmospheric storage and modified atmospheric storage.
4. Explain the various cooling load needs to be considered during the design of cold storage structure.

5. A RCC cylindrical grain storage bin has internal diameter of 5 m and is 20 m deep. It is completely filled with paddy weighing  $600 \text{ kg/m}^3$ . The angle of internal friction for paddy can be taken as  $35^\circ$  while the angle of friction between paddy and bin wall is  $30^\circ$ . The ratio of horizontal and vertical pressure intensity,  $k$ , is 0.4. Calculate the lateral pressure intensity at 2 m interval.
6. Describe the essential features required for ideal storage structure.
7. Explain the flow pattern of grain while emptying a vertical silo with their significance during storage.

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

1. Explain moisture migration phenomenon in winter and summer with neat diagram.
2. Explain about traditional storage structure, improved storage structure and modern storage structures with their characteristic features.

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