Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **14FP2013** | **Duration :** | **3hrs** |
| **Sub. Name :** | **STORAGE ENGINEERING** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Discuss the construction of a LSU dryer and highlight its working methodology with illustration. Explain why it is considered as the most common dryers used for grain drying. | CO2 | 10 |
| b. | Moist air at 250C, dry bulb and 45% relative humidity is heated to 800C. Calculate the humid volume, percentage humidity and humid heat at the initial condition and check the results from psychometric chart. Find also the final condition of the air. | CO3 | 10 |
| **(OR)** | | | | |
| 2. | a. | Discuss the construction of a Recirculating batch dryer and highlight its working. | CO1 | 10 |
| b. | Summarise the physical, thermal and aerodynamical properties of grain that are considered by engineers while designing structures for storing grains. State the specific design criterias that are used in. | CO3 | 10 |
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| 3. | a. | Illustrate with diagrams if necessary, how to read a psychrometric chart for measuring drying parameters of wet grain. | CO2 | 10 |
| b. | Summarise the process of chemical drying with respect ro grain storage. | CO1 | 10 |
| **(OR)** | | | | |
| 4. | a. | In case the room temperature of a storage structure reads 300C at a RH of 100%. Calculate the wet bulb temperature. Rationalise your answer. | CO2 | 5 |
| b. | Illustrate the two major periods of drying using a graph drawn on Rate of Drying Vs Moisture content. | CO2 | 5 |
| c. | Discuss the construction of a Rotary dryer and highlight its working. | CO1 | 10 |
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| 5. | a. | Summarise the evolution of the pressure distribution theories that are used in the design of silo starting with the hydrostatic theory down to the airys pressure distribution theory. State the demerits of each of these theories in practice. | CO3 | 15 |
| b. | Illustrate with neat sketches, the moisture migration in silos during varied climatic conditions such as cold (winter) and hot (summer) and mention its effect on stored grain. | CO3 | 5 |
| **(OR)** | | | | |
| 6. | a. | Report the various techniques that are used in the modern storage units to control the onset and growth of pests. | CO2 | 10 |
| b. | Describe in detail the standard instrumentation involved in the detection of residual Methyl bromide or leakage of fumigants in fumigated zones. | CO1 | 10 |
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| 7. | a. | Illustrate with diagrams the two equipment used in obtaining primary samples from bagged grain. Illustrate the right method of drawing samples using these equipments. Use sketches to explain the subsampling technique of coning and quartering. | CO1 | 10 |
| b. | Case: In a storage godown of 700 bags. How can the below mentioned random table be used for sampling. Mention the principle behind the use of random tables and also the method by which random tables are to be read. | CO2 | 10 |
| **(OR)** | | | | |
| 8. | a. | Illustrate the parts of the “Bukhari” and “Morai” type of storage structures with neat sketches. | CO1 | 10 |
| b. | Explain the methodology used for control of vertebrate pests in the modern grain storage structures. | CO2 | 10 |
|  | | **Compulsory**: |  |  |
| 9. |  | Elaborate on the use of Modified Atmosphere (MAS) and Controlled Atmosphere (CAS) in Storage of grains starting with the types of gases that can be used in these systems down to the mechanism through which MAS and CAS works. | CO3 | 20 |