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

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**End Semester Examination – Nov/Dec– 2018**

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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. | Write in detail the engineering properties used for designing grain handling machinery. | CO2 | 16 |
| b. | Height of cone formed by natural heap of grain is 15 cm and the diameter is 12 cm. Determine angle of repose. | CO2 | 4 |
| (OR) | | | |  |
| 2. | a. | Draw psychrometric chart and define the properties of air. | CO3 | 12 |
| b. | In efforts to conserve energy a food dryer is being modified to reuse part of the exhaust air along with ambient air. The exhaust air flow of 10m3/s at 70 °C and 30 % relative humidity is mixed with 20 m3/s of ambient air at 30° C and 60 % relative humidity. Using the psychrometric chart determine the dry bulb temperature and humidity ratio of the mixed air. | CO3 | 8 |
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| 3. | a. | Differentiate shallow bin and deep bin dryer. | CO2 | 10 |
| b. | Explain constant and falling rate period of drying and the equation for determination of drying time. | CO3 | 10 |
| (OR) | | | |  |
| 4. | a. | Explain hysteresis. | CO3 | 5 |
| b. | Enlist the equilibrium moisture content models with their limitations. | CO3 | 10 |
| c. | Explain moisture movement through grain in summer and winter | CO1 | 5 |
|  |  |  |  |  |
| 5. | a. | Explain the structure of mud kothi and murai type structure. | CO2 | 5 |
| b. | Wheat weighing 9000 kg/m3 is loaded in a circular concrete silo of 3 m internal diameter and clear height of 8. The angle of internal friction for wheat is 25° and that for wheat and concrete is 24. Applying airy theory, calculate the maximum lateral pressure at the bottom of the bin section. | CO2 | 5 |
| c. | Draw a neat sketch for pusa bin and explain the features of CAP storage. | CO3 | 10 |
| (OR) | | | |  |
| 6. | a. | Discuss design of silos. | CO2 | 12 |
| b. | Explain the types of losses during storage causes and their control. | CO1 | 8 |
|  |  |  |  |  |
| 7. | a. | Write the methods and scope of application of insecticides in warehouses. | CO2 | 10 |
| b. | Enlist the moulds and bacteria involved in spoilage of grains and their control. | CO2 | 10 |
| (OR) | | | |  |
| 8. | a. | Explain the effect of pesticide residues in grains. | CO2 | 10 |
| b. | List the fumigants and various methods of application. | CO2 | 10 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Differentiate controlled and modified atmosphere storage. | CO2 | 10 |
| b. | List different types of scavengers used in controlled atmosphere storage. | CO2 | 5 |
| c. | List the favourable modified atmosphere conditions for any five fruits. | CO2 | 5 |