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



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

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| **Code :** | **14FP2011** | **Duration :** | **3hrs** |
| **Sub. Name :** | **REFRIGERATION, AIR CONDITIONING AND COLD STORAGE** | **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. | Illustrate with a neat sketch construction and working of a reciprocating compressor used in the Refrigeration system. | CO1 | 10 |
| b. | 750 kg of orange fruits at 35°C is to be cooled to 4°C in 8 hours. The radiation and other losses are estimated to be 10% of the refrigeration load. Find the tonnage of refrigeration and horsepower of the motor to be used if the efficiency of the motor is 85 percent. For want of data let us assume the specific heat of mango is equal to that of water. | CO3 | 10 |
| **(OR)** | | | | |
| 2. | a. | Illustrate with a neat sketch the working of vapor absorption cycle. | CO2 | 8 |
| b. | Describe in detail about environmental issue caused by usage of refrigerant. | CO1 | 7 |
| c. | Write a note on Pressure Enthalpy diagram. | CO1 | 5 |
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| 3. | a. | Explain in detail the process of freezing with neat diagrams wherever necessary. | CO 1 | 8 |
| b. | Illustrate with a neat sketch the working of cryogenic freezers. | CO 1 | 7 |
| c. | Write a note on IQF. | CO 1 | 5 |
| **(OR)** | | | | |
| 4. | a. | In efforts to conserve energy, a food dryer is being modified to reuse part of the exhaust air along with ambient air. The exhaust airflow of 10 m3/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. | CO 2 | 10 |
| b. | Explain in detail about construction and working of fluidized bed freezer. | CO 1 | 10 |
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| 5. | a. | Explain in detail about control of storage conditions and temperature monitoring in chilled food storage. | CO 3 | 10 |
| b. | Explain the direct expansion techniques used in chilling. | CO 1 | 10 |
| **(OR)** | | | | |
| 6. | a. | Describe in detail about packaging of chilled foods. | CO1 | 10 |
| b. | Explain in detail about construction and working of Blast chiller and Hydro cooler and vacuum cooler. | CO2 | 10 |
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| 7. | a. | Write a note of insulation and properties of insulating materials in cold storage systems. | CO 3 | 10 |
| b. | Describe in deatil on evaporative cooling with its applications. | CO 1 | 10 |
| **(OR)** | | | | |
| 8. | a. | Write briefly about expanded and extruded polystyrene materials in cold storage. | CO2 | 10 |
| b. | Explain in detail with a sketches of Doors used in cold storage | CO2 | 10 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Describe in detail about cold chain management of highly perishable food product. | CO3 | 10 |
| b. | Explain about the tracing and tracking technologies ued in cold chain | CO3 | 10 |