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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**Supplementary Examination – June – 2017**

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| **Code :** | **14FP2031** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DRYING TECHNOLOGY** | **Max. marks :** | **100** |

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

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. |  | Moist air at 50°C dry bulb temperature and 32% relative humidity enters the cooling coil of a dehumidification kiln heat pump system and is cooled to a temperature of 18°C. If the drying rate of 6 m3 of red oak lumber is 4 kg/hour, determine the kW of refrigeration required. | CO2 | 20 |
| (OR) | | | | |
| 2. | a. | How batch drying studies are conducted and explain constant and falling rate period using drying curve. | CO1 | 8 |
| b. | Write short notes on   1. Humid heat 2. Relative humidity, 3. Humid volume and 4. Saturation humidity | CO1 | 12 |
| 3. | a. | What are the principle and methods of feeding drum dryers? | CO1 | 8 |
| b. | Explain with neat sketch the construction and operation of drum dryer. | CO1 | 12 |
| (OR) | | | | |
| 4. | a. | What is the advantage and disadvantages of vacuum dryer over cabinet dryer? | CO1 | 10 |
| b. | Derive the expression for total time required for drying operation which includes constant rate period and variable rate period. | CO2 | 10 |
| 5. |  | A 100-kg batch of granular solids containing 30% moisture is to be dried in a tray dryer to 16% moisture by passing a current of air at 350 K across its surface at a velocity of 1.8 m/s. If the constant rate of drying under these conditions is 0.7x10-3 Kg/ (m2. s) and the critical moisture content is 15%, calculate the drying time. Drying surface = 0.03 m2/kg dry weight. | CO2 | 20 |
| (OR) | | | | |
| 6. | a. | What is the principle behind spray drying? and discuss about the importance of atomizer and powder separator in spray dryer. | CO1 | 15 |
| b. | What is the fundamental concept of freeze drying? Explain. | CO1 | 5 |
| 7. | a. | What are the various classification of industrial dryers? Explain in detail. | CO1 | 15 |
| b. | What is the effect of operating parameters in fludized bed drying? | CO1 | 5 |
| (OR) | | | | |
| 8. | a. | What are the equipmenstused for microwave , dielectricheating and drying? And explain its principle. | CO1 | 15 |
| b. | What are the advantages of modified fluidized bed dryer? | CO1 | 5 |
|  | | **Compulsory:** |  |  |
| 9. |  | A batch of solids is to be dried from 28% to 6% moisture, on wet basis. The initial weight of the solid is 380 kg and the drying surface is 0.15m2/40 kg of dry weight. The critical moisture content is 18% dry basis and the constant drying rate is 0.32 kg/m2h.  For the falling rate period, the following data are available   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Moisture content,  % dry basis | 25 | 21.9 | 19 | 16 | 13.6 | 11 | 8.2 | 7.5 | 6.4 | | Rate of drying  Kg/m2.h | 0.3 | 0.27 | 0.24 | 0.21 | 0.18 | 0.15 | 0.07 | 0.044 | 0.025 | | CO2 | 20 |

ALL THE BEST