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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

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

**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **14AE2022** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ROCKET PROPULSION** | **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. | How are solid propellant classified? | CO1 | 14 |
| b. | Write down the difference between turbojet engine, ramjet engine and rocket engine. | CO1 | 6 |
| (OR) | | | | |
| 2. |  | What are the characteristic a solid propellant must satisfy? | CO1 | 20 |
|  |  |  |  |  |
| 3. | a. | Write down the significance of any two major types of annular nozzle? | CO2 | 8 |
|  | b. | Explain truncated aerospike nozzle with a neat sketch? | CO2 | 12 |
| (OR) | | | | |
| 4. | a. | Draw the schematic diagram of thrust controller in liquid engine. | CO1 | 5 |
|  | b. | Discuss the valid assumptions made in case of an ideal rocket? | CO1 | 15 |
|  |  |  |  |  |
| 5. |  | Explain the different methods of cooling system used in liquid rocket engine. | CO1 | 20 |
| (OR) | | | | |
| 6. |  | What is the ratio of burning area to the nozzle area for a solid propellant motor with these characteristic?  Propellant specific gravity 1.71  Chamber Pressure 14 MPa  Burning rate 38 mm/sec  Temperature sensitivity 0.007 K-1  Specific heat ratio 1.27  Chamber gas temperature 2220 K  Molecular mass 23 kg/kg-mol  Burning rate exponent n 0.3  What would be the area ratio Ab/At if the pressure were increased by 10%? | CO2 | 20 |
|  |  |  |  |  |
| 7. | a. | What are the various types of electric thrusters? | CO1 | 6 |
|  | b. | Explain the working principle of arcjet thruster with a neat sketch. | CO2 | 14 |
| (OR) | | | | |
| 8. |  | What are the various components used in a simulated altitude test facility? Explain the significance of each of the components with a neat sketch. | CO2 | 20 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. |  | Write short note on |  |  |
|  |  | i. Binders | CO1 | 5 |
|  |  | ii. Burning rate modifier | CO1 | 5 |
|  |  | iii. Plasticizer | CO1 | 5 |
|  |  | iv. Curing agents | CO1 | 5 |

ALL THE BEST