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 – April / May – 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. |  | What is the various propellant grain design consideration? | CO1 | 20 |
| (OR) | | | | |
| 2. |  | Write short note on   1. Cartridge loaded grain 2. Case bonded grain | CO2 | 20 |
| 3. |  | With a neat sketch explain turbo pump feed system of a liquid rocket engine. | CO2 | 20 |
| (OR) | | | | |
| 4. |  | The following data are given for an optimum rocket  Average molecular mass 24 kg/kg –mol  Chamber pressure 3.0 Mpa  External temperature 2850K  Throat area 0.00070 m2  Specific heat ratio 1.33  Determine a. throat velocity b. specific volume at throat c. Propellant flow and specific impulse d. thrust e. Mach number at throat | CO1 | 20 |
| 5. |  | What are the different methods of cooling an rocket engine? Explain each of its types with the help of a neat sketch. | CO1 | 20 |
| (OR) | | | | |
| 6. | a. | With neat sketch explain the working of ion rocket propulsion. | CO2 | 15 |
|  | b. | Write short notes on staging of rockets. | CO2 | 5 |
| 7. |  | Discuss in detail about Arc Jet thrusters with a neat sketch. | CO2 | 20 |
| (OR) | | | | |
| 8. | a. | What are hybrid rockets? | CO2 | 4 |
|  | b. | Explain the construction of Integral ram rocket, States its advantages and disadvantages. | CO1 | 16 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Explain in detail the different types of tests carried out in testing a rocket engine? | CO1 | 14 |
|  | b. | Draw a simplified sketch of a typical static test stand. | CO1 | 6 |