B.TECH. (AEROSPACE)

00133

Term-End Examination

December, 2012

BASE-002 : ROCKET PROPULSION

Time : 3 hours *Maximum Marks : 70*

Note : *Each question carries equal marks. Answer* ***any seven*** *questions. Use of calculator is permitted. Assume data suitably.*

1. How is rocket propulsion classified ? Explain each type in brief. **10**

2. What are Sub-systems in a solid propellant rocket ? Write a brief note on each. **10**

3. What is the role of a nozzle in rocket propulsion ? Discuss its characteristics in short. **10**

4. What are assumptions for thermochemical calculations in combustion of propellants ? Explain each assumption in brief. **10**

5. What are basic inputs for design of a solid Propellant rocket ? How they influence the design ? **10**

6. How is equilibrium pressure derived in a rocket ? What is the importance of equilibrium pressure ? **10**

7. What is the meaning of cross-sectional loading ? Find it for 250 mm outer diameter multi-perforated. Propellant grain with 10 holes of 20 mm diameter each. **10**

8. How much pressure is generated in a 600 mm diameter solid sustainer propellant grain fired in a rocket motor with throat diameter of 70 mm ? Take density of Propellant = 1750 kg/m^3, Burning Rate = 10 mm/s, $C^* = 1540$ m/s. **10**

9. Explain in brief the features of a liquid Propellant rocket propulsion. **10**

10. Write short notes on ***any two*** of the following : **5x2=10**

    (a) Throat diameter

    (b) Flame temperature

    (c) Specific Impulse