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BASE-002

00585

B.TECH. (AEROSPACE)

Term-End Examination

June, 2013

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.*

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1. Explain operation of solid propellant rocket motor with a neat sketch. 10

2. What are the roles of propellant & igniters in rocket propulsion ? Explain in brief. 10

3. Explain parametrically, how rocket propulsion is different from air-breathing propulsion ? 10

4. What are the assumptions for flow through an ideal nozzle ? Discuss each assumption. 10

5. Explain in brief the role of water-gas equation in calculation of equillibrium product of combustion. 10

6. Explain the following internal ballistic parameters ; **3+3+4=10**

   (a) Thrust Coefficient,

   (b) Characteristic Velocity, and

   (c) Specific impulse

7. A solid propellant gives burning rate of 10 mm/s at 7 MPa with pressure index of 0.32 find it's burning rate at 10 Mpa. **10**

8. Replace a 600 mm outer diameter, 500 mm inner diameter, 700 mm long Tubular grain by 7- tubular propellant grains, in same cross-section. Assume ends are inhibited. **10**

9. Discuss the advantages of hybrid propulsion over solid & liquid propellant rocket motors. **10**

10. Give reasons for **any two** of the following : **5x2=10**

    (a) Velocity of flow increases in divergent section of the nozzle.

    (b) Role of gamma (γ) is not observed on exit plane velocity.

    (c) Solid propellant rockets are preferred for missile applications.