B.TECH. (AEROSPACE)

Term-End Examination

December, 2013

00911

BASE-002 : ROCKET PROPULSION

Time : 3 hours   *Maximum Marks : 70*

Note : *Answer any **seven questions**. All questions carry **equal** marks. Use of scientific calculator is **permitted** .*

1. Discuss in detail the Sub-Systems in a solid   **10**
    propellant rocket ?

2. Explain basic inputs for design of a solid   **10**
    propellant rocket ?

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

4. A solid propellant gives burning rate of 10 mm/s   **10**
    at 7MPa with pressure index of 3.2. Find its
    burning rate at 10MPa.

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

6. (a) Explain the different types of classifying   **5**
         rockets and missiles
    (b) Explain rocket dispersion   **5**

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

8. (a) Explain the various methods of stagings for   **5**
         a multi - stage rocket.
    (b) Derive the expression for the burn-out   **5**
         velocity of a multi - stage rocket of ' n' stages
         in vertical flight in homogenous gravity
         field.

9. Give reasons for following :
    (a) Velocity of flow increases in divergent   **3**
         section of the nozzle.
    (b) Role of gamma(r) is not observed on exit   **3**
         plane velocity.
    (c) Solid propellant rockets are preferred for   **4**
         missile applications.

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