BAS-024

B.Tech. (AEROSPACE ENGINEERING) (BTAE)

Term-End Examination

December, 2013

BAS-024 : INTRODUCTION TO ROCKET AND MISSILES

Time : 3 hours   *Maximum Marks : 70*

Note :   *Answer **any seven** questions. Use of scientific calculator is permitted. Assume data suitably.*

1.   What is a rocket ? Classify it on the basis of sources   **10** of energy.

2.   (a)   Which are the desired physical properties   **5** of liquid propellant ?

   (b)   Explain liquid propellant combustion   **5** Process and different zones of it.

3.   (a)   Derive equation of range for short range   **5** ballistic missile considering flat earth rectilinear co-ordinate system.

   (b)   What is launch boundary in air launch of   **5** missile ? Explain launch aircraft trajectory and missile trajectory and discuss how launch boundaries are determined from them.

4. What is area ratio for a rocket nozzle ? Derive **10** expressions for area ratio of a rocket nozzle.

5. (a) Explain altitude control. **5**

   (b) What are the differences in altitude control **5** of solid rockets and altitude control of liquid rocket ? Explain clearly using neat sketches.

6. (a) Describe the criteria for selecting materials **4** for fabricating rockets and missiles.

   (b) List out the different materials used to **3** fabricate the parts of a rocket identifying the materials used for each part.

   (c) Do you use composites for rockets. If Yes, **3** what are the parts ? What is the advantage ?

7. (a) Write a short note on optimum bias. **5**

   (b) What is geysering ? Explain sequence of **5** events for geysering cycle.

8. What is Velocity gain in a stage of rocket , if **10** exhaust velocity is 2350m/s and mass ratio is 5 ?

9. (a) Write solid propellant characteristics. **5**

   (b) Discuss importance of the various in **5** gradient of solid propellant.

10. Write short notes on the following :

    (a) Agni Missile **3**

    (b) Specific Impulse **3**

    (c) Static Stability **4**

———