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BASE-002

B.Tech. AEROSPACE ENGINEERING (BTAE)

Term-End Examination

00058

June, 2016

BASE-002 : ROCKET PROPULSION

Time : 3 hours *Maximum Marks : 70*

Note :

(i) *Attempt any **five** questions.*

(ii) *Each question carries equal marks.*

(iii) *Use of scientific calculator is permitted.*

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1. (a) Describe the concept of nozzleless propulsion with its merits and demerits.

(b) What are the important factors that influence the burning rate of a solid propellant ? *7+7=14*

2. (a) Describe the salient features of a chemical rocket. Obtain an expression for its heat of reaction.

(b) Define combustion efficiency. How can it be increased ? *7+7=14*

3. Describe three important applications of rocket propulsion in brief. *14*

4. Explain the following terms used in solid propellant rocket : $4 \times 3\frac{1}{2} = 14$

   (a) Linear burning rate

   (b) Combustion rate

   (c) Propulsion area ratio

   (d) Equilibrium combustion pressure

5. (a) Explain physical or chemical reasons for maximum value of specific impulse at a particular mixture ratio of oxidizer to fuel.

   (b) Derive an expression for ideal velocity of a rocket. *7+7=14*

6. What are the important factors to be considered for the designing of a solid propellant rocket ? *14*

7. Write short notes on any ***two*** of the following : *7+7=14*

   (a) Aero-thermo Chemistry

   (b) Hybrid Propellant Rocket

   (c) Propellants