Code: 9A21709 **R09**

B.Tech IV Year I Semester (R09) Regular & Supplementary Examinations December 2015

ROCKETS & MISSILES

(Aeronautical Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

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1 Describe in detail, the combustion process in solid motors. Draw neat sketches.

2 Explain in the context of a liquid rocket:
(a) Propellant slosh.
(b) Propellant hammer.
(c) Gaysering effect in cryogenic rocket engines.
(d) Injectors.

3 (a) Describe all the forces and moments acting on a single stage rocket. Draw neat sketches and explain in detail.
(b) How do you classify them into longitudinal and lateral forces/moments? Explain longitudinal stability.

4 (a) Write the equations of rocket and explain all the terms involved.
(b) Explain what do you meant by a homogenous gravitational field.

5 Explain using neat sketches:
(a) Why stating is required for rocket?
(b) Various ways of multi-staging a rocket.
(c) Forces acting on a rocket in vertical ascent.
(d) Constant specific force.

6 (a) What is thrust vector control? Why does a rocket designer look for thrust vector control?
(b) Explain the different methods of thrust vector control for a liquid rocket.

7 (a) Explain why separation of system is required in a multi stage rocket.
(b) What are different systems that used in stage separation?

8 (a) Explain in detail, the criteria for selecting materials for rockets and missiles.
(b) What are the materials satisfying these criteria? List out the criteria satisfied by each of the materials used.

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