

R09**Code: 9A21709**

B.Tech IV Year I Semester (R09) Supplementary Examinations June 2017

ROCKETS & MISSILES

(Aeronautical Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

- 1 (a) Enumerate performance characteristics associated with solid propellants.
(b) Exemplify the importance of propellant grain and its desirable properties and nomenclature associated with it.
- 2 (a) Write short note on:
(i) Gas pressure feed system.
(ii) Turbo pump feed system.
(b) Describe the advantages and disadvantages of a liquid propellant rocket, over solid propellant rocket.
- 3 (a) Describe the methods of obtaining:
(i) Damping moment.
(ii) Longitudinal moment a rocket with necessary correlations.
(b) With a schematic obtain and enumerate longitudinal forces acting on a missile constant pitch angle.
- 4 Deduce rocket equation for a rocket launched with an inclined motion and flight path at constant pitch angle.
- 5 Explain concept of multi-staging and give preliminary weight estimation for a multistage rocket with necessary equations for velocity increment requirements.
- 6 (a) Explain the TVC mechanism with ball and socket type arrangement with suitable sketch.
(b) Categorize the various thrust vector control methods and explain with a schematic hinge/gimbel scheme.
- 7 (a) List and describe/emphasize on the stage separation dynamical events involved in space launch vehicles.
(b) Explain the working architecture of lateral separation characteristics techniques used in SLV separation.
- 8 (a) Enumerate requirements of materials supporting thermal shielding of space shuttles.
(b) Describe state-of-the-art involved with materials to support large pressure vessels of space launch vehicles.
