Code No: R05412112 **R05** **Set No. 2**

IV B.Tech I Semester Examinations,NOVEMBER 2010
ROCKETS AND MISSILES
Aeronautical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. What are the various components of the rockets and missiles made by MMC (Metal matrix Composites) and FRP (Fiber Reinforced Plastics), and mention their relative merits ? [16]

2. (a) Explain about mass ratio, payload ratio, propellant ratio and structural efficiency of multi - stage rocket system.
   (b) Explain various methods of staging for a multi - stage rocket. [8+8]

3. Explain with neat sketches attitude control of solid and liquid propellant rockets. Mention the problems encountered in each of them. [16]

4. (a) Describe various features of long range cruise trajectory and their relation.
   (b) Why ramjet powered missiles prefer wing control ? [8+8]

5. (a) Compare the motion of rockets in free space and gravitational fields.
   (b) Derive equation of motion for the static longitudinal stability of rocket having a translational and rotational motion. [8+8]

6. Derive an expression for 2 stage rocket and a vertical ascent for culmination altitude and also show that it decreases with increase in coast time between burn out of stage 1 and ignition of stage 2. [16]

7. (a) What are the various factors to be considered in deciding the amount of charge in an igniter?
   (b) What problems will be developed, if correct quantity of charge is not used in the igniter ? [8+8]

8. (a) What are the various types of injectors used and explain about parallel injectors ?
   (b) Differentiate between co-axial and parallel injectors used in liquid propellant engines. [8+8]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: R05412112 **R05** **Set No. 4**

IV B.Tech I Semester Examinations,NOVEMBER 2010
ROCKETS AND MISSILES
Aeronautical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. Derive an expression for 2 stage rocket and a vertical ascent for culmination altitude and also show that it decreases with increase in coast time between burn out of stage 1 and ignition of stage 2. [16]

2. (a) What are the various factors to be considered in deciding the amount of charge in an igniter?
   (b) What problems will be developed, if correct quantity of charge is not used in the igniter ? [8+8]

3. What are the various components of the rockets and missiles made by MMC (Metal matrix Composites) and FRP (Fiber Reinforced Plastics), and mention their relative merits ? [16]

4. (a) Explain about mass ratio, payload ratio, propellant ratio and structural efficiency of multi - stage rocket system.
   (b) Explain various methods of staging for a multi - stage rocket. [8+8]

5. (a) Describe various features of long range cruise trajectory and their relation.
   (b) Why ramjet powered missiles prefer wing control ? [8+8]

6. (a) Compare the motion of rockets in free space and gravitational fields.
   (b) Derive equation of motion for the static longitudinal stability of rocket having a translational and rotational motion. [8+8]

7. (a) What are the various types of injectors used and explain about parallel injectors ?
   (b) Differentiate between co-axial and parallel injectors used in liquid propellant engines. [8+8]

8. Explain with neat sketches attitude control of solid and liquid propellant rockets. Mention the problems encountered in each of them. [16]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: R05412112 **R05** **Set No. 1**

IV B.Tech I Semester Examinations,NOVEMBER 2010
ROCKETS AND MISSILES
Aeronautical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain about mass ratio, payload ratio, propellant ratio and structural efficiency of multi - stage rocket system.
   (b) Explain various methods of staging for a multi - stage rocket. [8+8]
2. Explain with neat sketches attitude control of solid and liquid propellant rockets. Mention the problems encountered in each of them. [16]
3. What are the various components of the rockets and missiles made by MMC (Metal matrix Composites) and FRP (Fiber Reinforced Plastics), and mention their relative merits ? [16]
4. Derive an expression for 2 stage rocket and a vertical ascent for culmination altitude and also show that it decreases with increase in coast time between burn out of stage 1 and ignition of stage 2. [16]
5. (a) Describe various features of long range cruise trajectory and their relation.
   (b) Why ramjet powered missiles prefer wing control ? [8+8]
6. (a) Compare the motion of rockets in free space and gravitational fields.
   (b) Derive equation of motion for the static longitudinal stability of rocket having a translational and rotational motion. [8+8]
7. (a) What are the various types of injectors used and explain about parallel injectors ?
   (b) Differentiate between co-axial and parallel injectors used in liquid propellant engines. [8+8]
8. (a) What are the various factors to be considered in deciding the amount of charge in an igniter?
   (b) What problems will be developed, if correct quantity of charge is not used in the igniter ? [8+8]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: R05412112 **R05** **Set No. 3**

IV B.Tech I Semester Examinations,NOVEMBER 2010
ROCKETS AND MISSILES
Aeronautical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Compare the motion of rockets in free space and gravitational fields.
   (b) Derive equation of motion for the static longitudinal stability of rocket having a translational and rotational motion. [8+8]
2. (a) What are the various factors to be considered in deciding the amount of charge in an igniter?
   (b) What problems will be developed, if correct quantity of charge is not used in the igniter ? [8+8]
3. (a) What are the various types of injectors used and explain about parallel injectors ?
   (b) Differentiate between co-axial and parallel injectors used in liquid propellant engines. [8+8]
4. (a) Explain about mass ratio, payload ratio, propellant ratio and structural efficiency of multi - stage rocket system.
   (b) Explain various methods of staging for a multi - stage rocket. [8+8]
5. What are the various components of the rockets and missiles made by MMC (Metal matrix Composites) and FRP (Fiber Reinforced Plastics), and mention their relative merits ? [16]
6. Explain with neat sketches attitude control of solid and liquid propellant rockets. Mention the problems encountered in each of them. [16]
7. (a) Describe various features of long range cruise trajectory and their relation.
   (b) Why ramjet powered missiles prefer wing control ? [8+8]
8. Derive an expression for 2 stage rocket and a vertical ascent for culmination altitude and also show that it decreases with increase in coast time between burn out of stage 1 and ignition of stage 2. [16]

⋆ ⋆ ⋆ ⋆ ⋆