

Code No: RR322106

RR

Set No. 2

III B.Tech II Semester Examinations, December 2010
ROCKETS AND MISSILES
Aeronautical Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. A Rocket had identical stages in the sense that $C_i = C$, $\delta_i = \delta$ and $\lambda_i = \lambda = [\lambda_0]^{1/N}$
There is no gravitational and drag force
If $\lambda_0 = 0.05$, $\delta_i = 0.1$
What is the optimum number of stages
 λ =Pay load Ratio δ =Dead Weight Ratio C =Effective Exhaust Velocity. [16]
2. (a) Find the expression of coefficient of drag due to the normal force on the missile wing.
(b) Derive the equations for the contribution of wing for the directional stability of a missile with forward control. [6+10]
3. Discuss the suitability of the Tungsten, Tantalum and Molybdenum metals for the structures at very high temperatures in case of missile and rockets. [16]
4. Compare the movable nozzle (ball socket bearing) and movable nozzle (flexible bearing) for use as a thrust vector control. What are the properties of the liquids used for controlling thrust vector of rockets? [16]
5. What is the ratio of burning area to the nozzle area for a solid propellant unit with the characteristics as given below:
Specific gravity=1.71
Chamber pressure=14MPa
Burning Rate=38mm/sec
Temperature sensitivity= $0.007(^{\circ}K)^{-1}$
Specific Heat Ratio=1.27
Chamber Gas Pressure=2220⁰K
Molecular Mass=23Kg/mole [16]
6. (a) Find the coordinates of burn out point for 2-D rocket motion with constant pitch angle in homogeneous gravitational field.
(b) Explain the method of solving equations of gravity turn motion of a rocket in homogeneous gravitational field. [10+6]
7. What are the effects of atmosphere on the performance of the rocket? Describe the structural and aerodynamic effects of wind on the rocket. [16]
8. How the rockets are ignited, explain the different types of ignition systems used in the rocket engines. [16]

Code No: RR322106

RR

Set No. 2

FIRSTRANKER

Code No: RR322106

RR

Set No. 4

III B.Tech II Semester Examinations, December 2010
ROCKETS AND MISSILES
Aeronautical Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) Find the coordinates of burn out point for 2-D rocket motion with constant pitch angle in homogeneous gravitational field.
 (b) Explain the method of solving equations of gravity turn motion of a rocket in homogeneous gravitational field. [10+6]
2. Discuss the suitability of the Tungsten, Tantalum and Molybdenum metals for the structures at very high temperatures in case of missile and rockets. [16]
3. A Rocket had identical stages in the sense that $C_i = C$, $\delta_i = \delta$ and $\lambda_i = \lambda = [\lambda_0]^{1/N}$
 There is no gravitational and drag force
 If $\lambda_0 = 0.05$, $\delta_i = 0.1$
 What is the optimum number of stages
 λ = Pay load Ratio δ = Dead Weight Ratio C = Effective Exhaust Velocity. [16]
4. What is the ratio of burning area to the nozzle area for a solid propellant unit with the characteristics as given below:
 Specific gravity = 1.71
 Chamber pressure = 14 MPa
 Burning Rate = 38 mm/sec
 Temperature sensitivity = $0.007(^{\circ}K)^{-1}$
 Specific Heat Ratio = 1.27
 Chamber Gas Pressure = 2220°K
 Molecular Mass = 23 Kg/mole [16]
5. What are the effects of atmosphere on the performance of the rocket? Describe the structural and aerodynamic effects of wind on the rocket. [16]
6. Compare the movable nozzle (ball socket bearing) and movable nozzle (flexible bearing) for use as a thrust vector control. What are the properties of the liquids used for controlling thrust vector of rockets? [16]
7. (a) Find the expression of coefficient of drag due to the normal force on the missile wing.
 (b) Derive the equations for the contribution of wing for the directional stability of a missile with forward control. [6+10]
8. How the rockets are ignited, explain the different types of ignition systems used in the rocket engines. [16]

Code No: RR322106

RR

Set No. 4

FIRSTRANKER

Code No: RR322106

RR

Set No. 1

III B.Tech II Semester Examinations, December 2010
ROCKETS AND MISSILES
 Aeronautical Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) Find the coordinates of burn out point for 2-D rocket motion with constant pitch angle in homogeneous gravitational field.
 (b) Explain the method of solving equations of gravity turn motion of a rocket in homogeneous gravitational field. [10+6]
2. Compare the movable nozzle (ball socket bearing) and movable nozzle (flexible bearing) for use as a thrust vector control. What are the properties of the liquids used for controlling thrust vector of rockets? [16]
3. (a) Find the expression of coefficient of drag due to the normal force on the missile wing.
 (b) Derive the equations for the contribution of wing for the directional stability of a missile with forward control. [6+10]
4. How the rockets are ignited, explain the different types of ignition systems used in the rocket engines. [16]
5. Discuss the suitability of the Tungsten, Tantalum and Molybdenum metals for the structures at very high temperatures in case of missile and rockets. [16]
6. What is the ratio of burning area to the nozzle area for a solid propellant unit with the characteristics as given below:
 Specific gravity=1.71
 Chamber pressure=14MPa
 Burning Rate=38mm/sec
 Temperature sensitivity= $0.007(^{\circ}K)^{-1}$
 Specific Heat Ratio=1.27
 Chamber Gas Pressure=2220⁰K
 Molecular Mass=23Kg/mole [16]
7. A Rocket had identical stages in the sense that $C_i = C$, $\delta_i = \delta$ and $\lambda_i = \lambda = [\lambda_0]^{1/N}$
 There is no gravitational and drag force
 If $\lambda_0 = 0.05$, $\delta_i = 0.1$
 What is the optimum number of stages
 λ =Pay load Ratio δ =Dead Weight Ratio C =Effective Exhaust Velocity. [16]
8. What are the effects of atmosphere on the performance of the rocket? Describe the structural and aerodynamic effects of wind on the rocket. [16]

Code No: RR322106

RR

Set No. 1

FIRSTRANKER

Code No: RR322106

RR

Set No. 3

III B.Tech II Semester Examinations, December 2010
ROCKETS AND MISSILES
Aeronautical Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. A Rocket had identical stages in the sense that $C_i = C$, $\delta_i = \delta$ and $\lambda_i = \lambda = [\lambda_0]^{1/N}$
There is no gravitational and drag force
If $\lambda_0 = 0.05$, $\delta_i = 0.1$
What is the optimum number of stages
 λ =Pay load Ratio δ =Dead Weight Ratio C =Effective Exhaust Velocity. [16]
2. What are the effects of atmosphere on the performance of the rocket? Describe the structural and aerodynamic effects of wind on the rocket. [16]
3. Discuss the suitability of the Tungsten, Tantalum and Molybdenum metals for the structures at very high temperatures in case of missile and rockets. [16]
4. How the rockets are ignited, explain the different types of ignition systems used in the rocket engines. [16]
5. (a) Find the expression of coefficient of drag due to the normal force on the missile wing.
(b) Derive the equations for the contribution of wing for the directional stability of a missile with forward control. [6+10]
6. (a) Find the coordinates of burn out point for 2-D rocket motion with constant pitch angle in homogeneous gravitational field.
(b) Explain the method of solving equations of gravity turn motion of a rocket in homogeneous gravitational field. [10+6]
7. Compare the movable nozzle (ball socket bearing) and movable nozzle (flexible bearing) for use as a thrust vector control. What are the properties of the liquids used for controlling thrust vector of rockets? [16]
8. What is the ratio of burning area to the nozzle area for a solid propellant unit with the characteristics as given below:
Specific gravity=1.71
Chamber pressure=14MPa
Burning Rate=38mm/sec
Temperature sensitivity= $0.007(^{\circ}K)^{-1}$
Specific Heat Ratio=1.27
Chamber Gas Pressure=2220°K
Molecular Mass=23Kg/mole [16]

Code No: RR322106

RR

Set No. 3

FIRSTRANKER