

Hall Ticket No

Question Paper Code: AAE518



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER

B.Tech VIII Semester End Examinations, April- 2020

Regulations: R16

ROCKET AND MISSILES

(AERONAUTICAL ENGINEERING)

Time: 3 hours

Max. Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE- I

1. a) Draw with neat diagram and explain the functions of all the major components of Rocket. [7M]
- b) Draw a flow chart on how missiles can be classified generally. Elucidate briefly how missiles are classified on the basis of launch mode? [7M]
2. a) A Rocket Projectile has following characteristics: Initial mass =300kg, Mass after rocket propulsion=200kg. Payload, Non propulsive structure = 110 kg. Rocket operation duration=3 sec, Average Isp of propellant=240 sec. Determine Vehicle mass ratio, Propellant mass fraction, flow rate Thrust and Thrust to Weight ratio. [7M]
- b) Elucidate briefly various Rocket performance parameters with equations? [7M]

MODULE – II

3. a) Illustrate with proper labelling the parts of a Solid Rocket motor and explain the functions of all the components. [7M]
- b) What are different types of igniters in solid rocket motor and explain briefly any one of them? [7M]
4. a) Explain the working principle of pyrotechnic igniters with simple sketch. [7M]
- b) Explain the terminology of grain configuration. Classify Solid Rocket motor based on grain configuration. [7M]

MODULE – III

5. a) Elucidate briefly the design considerations of Bi-propellants. [7M]
- b) Draw with a neat diagram and explain various Engine cycles in Liquid propellant systems. [7M]
6. a) Elucidate briefly how Liquid Rocket engine are classified on the basis of propellants? [7M]
- b) Write short notes on: [7M]
1. Pogo Oscillation
 2. Sloshing Instability

MODULE – IV

7. a) Elucidate briefly different guidance phases of flight [7M]
- b) Describe briefly different classifications of guidance systems used in missiles? [7M]
8. a) Write short notes on principle of Canard and tail wing control of missile. [7M]
- b) What is meant by parallel staging? Explain its advantages over other staging techniques. [7M]

MODULE – V

9. a) Elucidate a brief note on the physical material constituents in rocket casing. [7M]
- b) What is the need of testing of the rocket engine? Write about one testing method for rocket testing. [7M]
10. a) Summarize the difference between super alloy and composite materials. How these two types of materials are used in the solid rocket engine? [7M]
- b) Briefly illustrate about the performance evaluation techniques used for the missile system. [7M]