

Dec - 2018  
①

# CBCS Scheme

USN

I A N 1 4 A J 0 4 5

15AE564

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018

## Basic of Rockets and Missiles

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

### Module-1

- 1 a. Name the two Indian space launch vehicles and mark their orbit. (04 Marks)
- b. Draw and plot the different type of the space propulsion system. (08 Marks)
- c. Name two solid propellants used in the launch vehicles. (04 Marks)

OR

- 2 a. Name atleast one Ballistic Missile and cruising missile of India. (04 Marks)
- b. Draw a thrust profile of a typical solid propellant motor and explain all the terms involved. (08 Marks)
- c. Name two liquid propellants used in the launch vehicles. (04 Marks)

### Module-2

- 3 a. Explain the grain configuration for solid propellants. (10 Marks)
- b. List the solid propellant characteristics. (06 Marks)

OR

- 4 a. Define, explain and compare the mono propellant and bipropellant and cold gas propellant of liquid propellant. (06 Marks)
- b. Explain the working of a pressure feed liquid propellant rocket motor. (10 Marks)

### Module-3

- 5 a. Draw a neat sketch and mark what are the forces acting on missiles while passing through the atmospheric. (10 Marks)
- b. From the above drawing write the two dimensional equation of motion of a missile with aerodynamic Thrust and Gravity forces. (06 Marks)

OR

- 6 a. Show how the missiles are classified based on launch mode range, propulsion, warhead, control etc. (10 Marks)
- b. What is Rocket dispersion? Explain various sources of rocket dispersion and list the method of estimation. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

**Module-4**

- 7 a. List the separations events usually occur in the launch vehicle trajectory. (04 Marks)  
b. Compare the tail control, Canard control and wing control of missiles. (04 Marks)  
c. Explain various methods of trust vector control with neat sketch. (08 Marks)

OR

- 8 a. Derive the equation motion in one dimension and from the derive and explain Tsiloskiosy's Ideal rocket equation. (08 Marks)  
b. Draw and analyze the various phases of a missile trajectory with a neat sketch. (08 Marks)

**Module-5**

- 9 a. List the type of rocket testing. (06 Marks)  
b. Sketch liquid propellant testing set up. (10 Marks)

OR

- 10 a. Criteria for a selection of materials for rockets and missiles. (10 Marks)  
b. Short notes on reusable launch vehicle. (06 Marks)

\*\*\*\*\*