

R09

Code No: 56072

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, December - 2018

AEROSPACE PROPULSION-II

(Aeronautical Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

1. List out various high speed propulsion systems based on sources of energy and explain in details any one of the propulsion system with a neat schematic layout. [15]
- 2.a) Explain the working principle of Ejector Ramjet and explain how it differs from turbo ramjet.
b) Explain the thermodynamics and Aerodynamics of Ramjet engine with the help of (T-S) and (P-V) diagrams. [7+8]
3. A certain rocket has an effective exhaust velocity of 7000 ft/sec. It consumes 280 lb/sec of propellant, each of which liberates 2400 Btu/lb. The unit operates for 65 sec. Construct a set of curves plotting the propulsive, internal and overall efficiencies versus the velocity ratio v/c ($0 < v/c < 1$). The flight velocity equals 5000 ft/sec. Calculate
 - a) The specific impulse,
 - b) The total impulse,
 - c) The weight of propellants required and
 - d) The volume that the propellants occupy if their average specific gravity is 0.925. [15]
4. Explain the following feed systems in liquid rocket engines:
 - a) Pressurized feed system
 - b) Turbo-pump feed system. [7+8]
- 5.a) Explain the constructional features of solid rocket motor with the help of neat sketch.
b) Define the following related to solid propellant rocket:
 - i) Neutral burning
 - ii) Progressive burning
 - iii) Regressive burning. [7+8]
- 6.a) What do you understand by electrostatic thrusters? Explain the working principle and various types with the help of suitable diagrams.
b) Compare the performances of chemical, Nuclear and electro dynamic rockets and discuss their application. [7+8]
7. Explain the working principle of nuclear thermal propulsion. Brief about the operational issues with the nuclear engine. Use sketches and plots to justify your answer. [15]
- 8.a) Explain the concept of Anti-matter propulsion system.
b) Distinguish between Fusion propulsion and fission Fragment propulsion. [8+7]