



Reg. No. :

Name :

**Eighth Semester B.Tech. Degree Examination, April 2014
(2008 Scheme)**

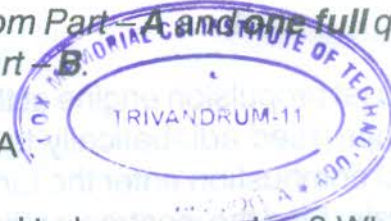
08.806.1 PROPULSION ENGINEERING (MPU)

Time : 3 Hours

Max. Marks : 100

Instructions: Answer **all** questions from Part - A and **one full** question from **each** Module in Part - B.

PART - A



1. What is the difference between airscrew and turboprop engine ? Why airscrew has become obsolete ?
2. Explain scramjet engine.
3. Why turbofan engines are preferred to turbojet engine in passenger aircrafts ?
4. What are the advantages of axial flow compressors over centrifugal compressors used in turbojet engines ?
5. What is thrust augmentation ? Why is it done ?
6. How does a solar rocket work ?
7. Define mass ratio of a rocket vehicle. What is the mass ratio of a vehicle that weighs one-fifth its original takeoff weight at the time of the completion of rocket operation ?
8. What are the advantages of SPR over LPR ?
9. Sketch and explain the working of any one type of liquid propellant injector.
10. Explain what is meant by flight testing. (10×4=40 Marks)



PART – B
Module – I

11. a) With suitable sketches describe the working of a pulse jet engine. 10
- b) A turbojet engine at standard sea level has a fuel consumption rate of 2000 kg/hr. with an effective speed ratio of 0.5. The lower heating value of the fuel is 41800 KJ/Kg and the overall efficiency is 20%. Assuming the pressure thrust is zero, calculate the thrust power, propulsive power and thermal efficiency. 10

OR

12. Air enters a jet propulsion engine at the rate of 2000 kg/min at 15° C and 10^5 N/m² and is compressed adiabatically to 182° C and 4 times the entering pressure. Products of combustion enter the turbine at 815° C and leave it at 650° C to enter the tail nozzle. Find the isentropic efficiency of the compressor, the power required to drive the compressor, the exit speed of the gases and the thrust created when flying at 800 kmph. Assume isentropic efficiency of turbine same as that of the compressor and the nozzle efficiency 90%. For air $\gamma = 1.4$ and $C_p = 1$ kJ/Kg K. 20

Module – II

13. a) Describe the different types of turbojet combustors. 10
- b) Discuss about the turbines used in turbojet engines. 10

OR

14. a) How does reheat affect the performance of a turbojet engine ? Explain the process using T-S diagram. 10
- b) Explain equilibrium running condition of a turbojet engine. 10

Module – III

15. a) Explain with neat sketches the two types of igniters used in SPR. 10
- b) Discuss about the test facilities and safeguards to be provided in rocket testing. 10

OR

16. a) Describe the working of a pump fed LPR with the help of neat sketch. 10
- b) Discuss the various methods of cooling LPR motors. 10