

**SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2016**

**(2013 SCHEME)**

**13.706 PROPULSION –II (S)**

Time: 3 Hours

Max.Marks:100

*N.B: Answer all questions from PART- A and any one question from each module in PART-B.*

**PART – A**

- 1) Define degree of reaction for a Turbo machine Stage
- 2) What are the different methods of blade cooling
- 3) What are the advantages of Ramjet Engine
- 4) Explain the principle of Ion Propulsion
- 5) What is a Solar Sail
- 6) What are the factors to be considered in design of a turbine
- 7) Explain blade spacing
- 8) What are the factors affecting combustion process in a Ramjet
- 9) What are the advantages of solid propellant rocket
- 10) Draw the velocity diagram for Axial flow compressor (2\*10=20)

**PART-B**

**MODULE-1**

11. a) Explain the need for cooling turbine blades with neat sketches. Explain any two turbine blade cooling methods (10)
- b) Define degree of reaction for various cases in an axial flow compressor (10)

**OR**

12. a) Derive Euler's Turbo machinery equation (10)
- b) Explain principle of operations of centrifugal compressor. (10)

## MODULE-2

13. a) Discuss the limiting factors in turbine design (10)  
b) What are the cooling methods adopted in turbine blades. Explain (10)

OR

14. a) Derive stage Temperature ratio and Pressure ratio for a turbine (15)  
b) Explain the stage parameters of a turbine (5)

## MODULE- 3

15. a) Explain the performance of Ramjet engine (12)  
b) Explain the principle of operation of subcritical Ramjet (8)

OR

16. a) What is critical and supercritical operations in a Ramjet engine. Explain (12)  
b) Briefly explain Scramjet Engine. What are the preliminary concepts in Supersonic combustion (8)

## MODULE-4

17. a) What are the limitations of an electrical rocket propulsion system . (6)  
b) What are the various types of Electrical propulsion system. Explain any one system with a neat sketch (14)

OR

**18. Compare the performance of solid and liquid propulsion system with chemical rocket propulsion system (20)**