

R09**Code: 9A21603**

B.Tech III Year II Semester (R09) Supplementary Examinations December/January 2015/2016

AEROSPACE PROPULSION - II

(Aeronautical Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 Explain velocity compounding and pressure compounding of a multi-stage impulse turbine.
- 2 Discuss the matching of compressor and turbine for a turbojet engine.
- 3 Describe with sketches film cooling, transpiration cooling, convection cooling and impingement cooling adopted for cooling of the blades.
- 4 (a) Draw the sketch of ramjet propulsion system and describe its parts and working.
(b) Draw the thermodynamic cycle of ramjet and explain. Discuss the applications of ramjets.
- 5 Explain thrust augmentation and thrust vector control and briefly explain some of the methods used for aircrafts to achieve them.
- 6 (a) Define for a rocket motor total impulse, specific impulse, and effective exhaust velocity.
(b) Consider a rocket motor with a combustion chamber (reservoir) temperature of 3517 K, a pressure of 20 atm, a throat area of 0.11 m^2 , and an exit pressure equal to the pressure at a standard day altitude of 18 km. Determine exit velocity, mass flow, specific impulse (assume $\gamma = 1.22$, $C_p = 2879 \text{ J/kg}$, $R = 519.1 \text{ J/kg K}$).
- 7 (a) Write about different types of liquid propellants used in rockets with examples.
(b) Explain double-base and composite propellants used in solid propulsion motors along with examples.
- 8 Write short notes on the following:
 - (a) Ion thrusters.
 - (b) Nozzle-less propulsion.
