Code: 9A21505

R9

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2012

AEROSPACE PROPULSION I

(Aeronautical Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

1 What are various methods available for improving the thrust output from a turbojet engine? Explain any two of these with all details including sketches and T-s plots.

2 Explain external flow over subsonic inlet in different flight conditions.

3 Explain the importance of following terms in deciding the performance of a combustion chamber:
(a) Combustion efficiency
(b) Pressure loss
(c) Combustion intensity
(d) Stability limits.

4 Write notes on:
(a) Oswatitsch type oblique shock diffuser,
(b) Starting of an oblique shock inlet.

5 Explain the flame stabilization techniques.

6 Briefly explain the following:
(a) Cascade blocker type thrust reverser,
(b) Clam shell type thrust reverser,
(c) Exhaust nozzles of Concorde and
(d) Thrust vectoring nozzle of VTOL.

7 A single-sided straight vaned centrifugal compressor is required to deliver 10kg/s of air with a total pressure ratio of 4:1 when operating at a speed of 16500 rpm. The air inlet pressure and temperature are 1.013 bar and 300 K respectively. Calculate:
(a) Tip speed of the impeller.
(b) Actual rise in stagnation temperature.
(c) Tip diameter.
(d) Inlet eye annulus area.
(e) Theoretical power required to drive the compressor. The air enters the eye axially with a velocity of 150 m/s.

8 (a) What are the basic requirements of compressors for aircraft applications? Do axial flow compressors meet them? Explain.
(b) With a suitable sketch explain the working principles of an axial flow compressor.

*****