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JAYA GROUP OF INSTITUTIONS-THIRUNINRAVUR
4th SEM- B.E. / B.Tech
INTERNAL ASSESSMENT-1(MODEL EXAM-1)

Sub. Name: Propulsion -I
 Sub. Code: AE6404
 Duration: 180 minutes

Date: 02-02-2015
 Branch: Aeronautical
 Max.Marks: 100

PART-A (10 x 2 =20)

1. What are the methods of thrust augmentation?
2. Define by-pass ratio.
3. Define propulsive efficiency.
4. Write the thrust equation of a gas turbine engine.
5. Draw the T-S diagram of gas turbine engine and the two important parameter of the cycle identity.
6. Draw the variation of thrust with Mach number for different altitudes.
7. What are the types of thrust? List out the methods of thrust augmentation.
8. List out the prime requirements of a combustion chamber.
9. Name the flow losses in combustion chamber.
10. What is the prime requirement of an inlet? List out the characteristics of supersonic and subsonic inlets.

PART-B (5x16=80)

11. (a) i)What are the important factors affecting combustor design?(8)
 (ii)Write down the methods of flame stabilization and explain with sketch. (8)
 Or
 (b) i)What are the three types of combustion chamber? Compare its advantages and disadvantages. (8)
 ii) Name the material used for combustion chamber and discuss the special qualities of the material used for combustion chamber? (8)
12. (a) i)What are the factors affecting combustion chamber? Explain briefly? (8)
 ii)With the aid of a simplified picture explain the operation of a flame holder. (8)
 (or)
 b) What are the different modes of inlet operation? Explain with suitable sketches. (16)
- 13.a) A turbojet engine is traveling at 270 m/s at an altitude of 5000m. The compressor pressure ratio is 8:1 and maximum cycle temperature is 1200K. By assuming the following data, Ram efficiency 93% , Isentropic efficiency of compressor 87%, Pressure loss in combustion chamber 4%of compressor delivery pressure, Calorific value of fuel 43,100 kJ/kg ,Combustion efficiency 98%, Mechanical transmission efficiency 99%, Isentropic efficiency of turbine 90%, Propelling nozzle efficiency 95%,Ambient conditions at 5000 m are 0.5405 bar and 255.7 K. Calculate the
 (i) Specific thrust and (ii) TSFC
 (Or)
 b) An ideal turbojet flies at sea level at a Mach number of 0.75. It ingests 74.83 kg/s of air, and the compressor operates with a total pressure ratio of 15. The fuel has a heating value of 41,000 kJ/kg, and the burner exit total temperature is 1389 K. Find the thrust developed and the TSFC. Assume that the specific heat ratio is 1.4.
- 14.a) . (i) Define thrust of an engine and derive the thrust equation for a general propulsion system. (8)
 (ii) Discuss the typical RamJet cycle performance with suitable sketches. (8)

(Or)

b) Compare the characteristics, advantages & disadvantages of turbojet, turbofan and turboprop engine. (16)

15.a) (i) Discuss the different methods of thrust augmentation. Draw T-S diagram for turbojet engine with thrust augmentation. (8)

(ii) Discuss the typical turbojet cycle performance with suitable sketches. (8)

(Or)

b). i) Explain with neat sketch operating principles of turbofan engine (8)

ii) Explain the factors affecting thrust in brief (8)

Model - P

Aeronautical

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