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10AE74

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Gas Turbine Technology

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART – A

- 1
 - a. Describe energy distribution of turboprop engine and write its characteristics. (06 Marks)
 - b. Show that turbofan engine is more efficient than turbojet engine, with suitable curves. (06 Marks)
 - c. Draw and explain pressure and velocity changes across a turbojet engine without after burner. (08 Marks)
- 2
 - a. List and explain the effect of operating variables on burner performance. (12 Marks)
 - b. What is meant by thrust reverser and its type? Also write function of a good thrust reverser design and systems. (08 Marks)
- 3
 - a. What are the three characteristics, that must be considered in the selection of material in Gas turbine engine and briefly explain it. (06 Marks)
 - b. List and explain the six methods of casting. (10 Marks)
 - c. Briefly explain the heat ranges of :
 - i) Nickel base alloys
 - ii) Cobalt base alloys. (04 Marks)
- 4
 - a. Explain the general electric CJ610 lubricating oil system with sketch. (10 Marks)
 - b. Draw and explain typical starting characteristics of starting system. (05 Marks)
 - c. Explain about Air turbine starter with sketch. (05 Marks)

PART – B

- 5
 - a. What are the design point performance parameters that are involved in Gas turbine engine? (10 Marks)
 - b. Write the steps involved in starting of jet engine. (03 Marks)
 - c. Draw and explain a typical restart envelope for a civil turbofan engine. (07 Marks)
- 6
 - a. Explain about rotating stall and locked stall with sketch. (10 Marks)
 - b. Draw and explain the combustor rig test. (07 Marks)
 - c. Define Ram pressure recovery factor for inlet duct. (03 Marks)
- 7
 - a. Explain about altitude test facility (ATF) and write its uses. (07 Marks)
 - b. A turbo jet engine performance data is given below :
 RPM : 9500 , EGT = 450°C , W_f (fuel consumption) = 1800 kg/hr ,
 W_a (air consumption) = 91 kg/sec , TSFC = 0.5.
 The test is carried out at a pressure of 102.6 KPa and ambient temperature of 30°C. Correct the test data for ISA conditions (Pressure 101.3 KPa and temperature 15°C).
 Take F_n (Net thrust) = 4510 kg. (10 Marks)
 - c. Define Engine trimming. (03 Marks)
- 8
 - a. What is meant by test bed calibration? Write the steps involved in it. (06 Marks)
 - b. Explain about the measurement of Thrust and Shaft speed. (10 Marks)
 - c. Why do you want to measure pressure? List various pressures measuring device. (04 Marks)
