ACHARYA INSTITUTE OF TECHNOLOGY
Bangalore - 560090

USN | | | | | | | | | | |

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 turboprob 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 = 450^0C , 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 30^0C. Correct the test data for ISA conditions (Pressure 101.3 KPa and temperature 15^0C).
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)**

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