

CBCS SCHEME

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18AE644

Sixth Semester B.E. Degree Examination, Dec.2023/Jan.2024

Gas Turbine Technology

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- With neat sketch explain working principle of turboprop engine along with advantages and disadvantages. (10 Marks)
 - Explain the differences between turbojet and turbofan engine. Write down the energy distribution of these engines with neat sketch and related graph. (10 Marks)

OR

- List three types of burner systems. Give the advantages and disadvantages of each type. (10 Marks)
 - Explain the methods of thrust augmentation. (06 Marks)
 - What is thrust reversal? (04 Marks)

Module-2

- What are the characteristics that must be considered in selection of any metal used in gas turbine engine? (10 Marks)
 - Briefly explain the heat range of the following allow :
 - Aluminum alloys
 - Titanium alloys
 - Steel alloys
 - Nickel based alloys
 - Cobalt based alloys.(10 Marks)

OR

- Explain the interface of FADEC on an aircraft jet engine. (10 Marks)
 - List the various gas turbine starters and explain any one starter. (10 Marks)

Module-3

- What are the design point performance parameters that are involved in gas turbine engine? (10 Marks)
 - Explain the transient performance phenomena of engine. (10 Marks)

OR

- Describe the steps involved in starting of gas turbine engine. (10 Marks)
 - A turbo jet engine performance data is given below :
RPM = 9465, EGT = 510°C, W_f (fuel consumption) is 1814.4kg/w, w_a (air consumption) = 90.7kg/sec, TSFC = 0.4. The test is carried out a pressure of 102.6KPa and ambient temperature of correct the test data for ISA conditions. Pressure 101.3KPa and temperature 15°C. Take f_n (Net thrust) = 4536kg. (10 Marks)

Module-4

- 7 a. What do you mean by compressor MAP? What results can be obtained from it. (10 Marks)
b. Describe surge, rotating stall and locked stall of a compressor with suitable sketches. (10 Marks)

OR

- 8 a. Draw and explain the combustor rig test. (10 Marks)
b. Define ram pressure recovery factor for inlet duct. (04 Marks)
c. Explain the turbine testing and performance evaluation. (06 Marks)

Module-5

- 9 a. Discuss the testing of engine based on performance and quality validation. (10 Marks)
b. What do you mean by test bed? Give their classification based on their configuration. Write the steps involved in test bed calibration. (10 Marks)

OR

- 10 a. Write short notes on the following : (08 Marks)
i) Pressure measurements
ii) Temperature measurements. (06 Marks)
b. Explain typical data acquisition system (06 Marks)
c. Explain the typical MASS and CUSUM plots of engine testing. (06 Marks)
