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15AE62

Sixth Semester B.E. Degree Examination, Feb./Mar. 2022
Gas Turbine Technology

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. With a neat sketch, explain working of turbojet engine with after burner. Also mentioned the characteristics of Turbojet engine. (07 Marks)
b. Describe energy distribution of Turboprop engine with neat sketch and write its characteristics. (06 Marks)
c. Draw the pressure, temperature and velocity changes across a turboprop engine. (03 Marks)

OR

- 2 a. Describe with neat sketch different types of burner system. (07 Marks)
b. Explain with neat sketch, different methods of thrust augmentation. (06 Marks)
c. Explain sound suppression (reduction) techniques in aircraft engine. (03 Marks)

Module-2

- 3 a. Briefly explain some commonly used terms and characterization considered in the selection of material in the gas turbine engine of aircraft. (08 Marks)
b. Explain briefly the heat range of the following alloy:
(i) Alluminium alloys (ii) Titanium alloys
(iii) Steel alloys (iv) Cobalt based alloy (06 Marks)
c. Briefly explain the use of composites and ceramics in gas turbine engines. (02 Marks)

OR

- 4 a. What are the components required for atypical fuel system? (05 Marks)
b. Explain interface of FADEC on an Aircraft Jet Engine. (06 Marks)
c. Explain starting system of gas turbine engine/ (05 Marks)

Module-3

- 5 a. What do you mean by design and off design and transient performance? What are the different parameters in design point performance? (08 Marks)
b. What is wind milling? Explain the turboprop wind milling process. (08 Marks)

OR

- 6 a. Mention the steps involved in starting of gas turbine engine. (06 Marks)
b. A turbojet engine performance data is given below:
RPM 9465, EGT 510°C, W_f 1814.4 kg/hour, W_a 90.7 kg/sec, F_n 4536 kg, TSFC 0.400, Barometric Reading 102.3 kPa, Ambient temperature 27°C. Correct the engine performance to standard day condition of 101.3 kPa and 15°C. (10 Marks)

Module-4

- 7 a. Draw and explain with neat sketch compressor map of axial flow compressor. (08 Marks)
b. Explain the testing of inlet distortion with gas turbine engine and surge test. (08 Marks)

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OR

- 8 a. Draw and explain the combustor testing. (08 Marks)
b. Draw neat sketch and explain Turbine Map. (08 Marks)

Module-5

- 9 a. What are the various preliminary flight rating test? Explain. (08 Marks)
b. What do you mean by structural integrity in gas turbine engine? (08 Marks)

OR

- 10 a. Explain with neat sketch attitude testing. (06 Marks)
b. Explain with neat sketch indoor sea level test bed. (06 Marks)
c. Briefly discuss the Mass and CUSUM plots. (04 Marks)
