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18AE644

Sixth Semester B.E. Degree Examination, June/July 2023

Gas Turbine Technology

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Explain the difference between turbojet and turbofan engines. Draw the energy distribution of turbojet engine with the help of neat sketch. (10 Marks)
- b. Draw the pressure, temperature and velocity changes across a turboprop engine. (10 Marks)

OR

- 2 a. What are the various types of burners? Why after burners are used? Explain. (10 Marks)
- b. With a neat graph, explain variation of thrust against velocity of aircraft. (10 Marks)

Module-2

- 3 a. What are the characteristics that must be considered in the selection of any metal for use in the gas turbine engines? Explain. (10 Marks)
- b. Explain any 5 surface finishing processes. (10 Marks)

OR

- 4 a. Explain the starting mechanism of an aircraft engine. (10 Marks)
- b. With a neat sketch explain working of a general FADEC system along with its interface. (10 Marks)

Module-3

- 5 a. What is wind milling of engines? Explain briefly turbojet wind milling process. (10 Marks)
- b. What is transient performance? Explain. (10 Marks)

OR

- 6 a. Mention the steps involved in starting of gas turbine engine. (10 Marks)
- b. What are the parameters monitored for engine performance. (10 Marks)

Module-4

- 7 a. Write a short note on :
 - i) Surge margin requirements
 - ii) Surge margin stack up (10 Marks)
- b. With a schematic diagram, explain the compressor map of axial flow compressor. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 8 The observed measurements of a running engine in a case study are :
rpm = 9465, EGT = 510°C, $w_f = 1814.4 \text{ Kg/h}$, $w_a = 90.7 \text{ Kg/s}$, $F_n = 4536 \text{ Kg}$, TSFC = 0.4,
Barometer reading = 102.6KPa, Ambient temperature = 27°C, Correct the engine
performance to the standard day condition of 101.3KPa and 15°C. (20 Marks)

Module-5

- 9 a. Briefly discuss the MASS and CUSUM plots. (10 Marks)
b. Explain a typical data acquisition system. (10 Marks)

OR

- 10 a. What are the various preliminary flight rating tests? Explain. (10 Marks)
b. Explain the following engine testings
i) Altitude Test Facility (ATF)
ii) Flying Test Bed (10 Marks)
