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Sixth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 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. Illustrate and describe the comparison of operating parameters of Turbojet, Turboprop and Turbofan engines. (10 Marks)
- b. Draw and explain the working principle, advantages and disadvantages of following engines:
 - (i) Turbojet engines.
 - (ii) Turbofan engines. (10 Marks)

OR

- 2 a. List the basic types of burners system used in gas turbine engines and discuss the importance of each type with a neat sketch. (10 Marks)
- b. How do you understand the term 'Thrust Augmentation'? How it helps the aircraft and discuss its methods. (10 Marks)

Module-2

- 3 a. Why Gas Turbine engine needs special care in selecting materials for its manufacturing? Discuss the characteristics for selection of metal for Gas Turbine engine. (10 Marks)
- b. Discuss the importance and methods used for surface Finishing Techniques in Gas Turbine engine components. (10 Marks)

OR

- 4 a. Draw and explain the components of Typical Fuel systems used in gas turbine engine. (10 Marks)
- b. Discuss the steps involved in starting process of Jet engine with necessary sketch and explain various form of Gas Turbine starters. (10 Marks)

Module-3

- 5 a. What is Wind milling? Explain the effects of Wind milling in gas turbine engines. (10 Marks)
- b. Elaborate about engine performance monitoring and its importance in aviation industry. Discuss the latest techniques used in engine performance monitoring. (10 Marks)

OR

- 6 a. The following datas are observed in a flight for a Turbojet engine :
 RPM = 9465, EGT = 510 °C, TSFC = 0.4, $W_a = 90.7 \text{ kg/s}$, $W_f = 1814.4 \text{ kg/h}$, $F_n = 4536 \text{ kg}$,
 Barometric pressure = 102.6 kPa, Ambient Temp = 27 °C. Correct the engine performance to the standard day conditions of 101.3 KPa and 15 °C. (10 Marks)
- b. Discuss in detail about design point performance parameters for a gas turbine engine. (10 Marks)

Module-4

- 7 a. Draw and explain the Compressor MAP. Also, explain the working of Compressor Rig Test. (10 Marks)
b. Discuss the Importance parameters for combustor-off design performance. (10 Marks)

OR

- 8 a. Draw and explain the Turbine MAP and its Impact. (10 Marks)
b. Discuss the After burners operation and its off-design performance. (10 Marks)

Module-5

- 9 a. Discuss the following Engine Testing methods:
(i) Preliminary Flight Rasing Test.
(ii) Qualification Test
(iii) Acceptance Test.. (12 Marks)
b. Draw and explain MASS and CUSUM plots and its applications in Gas Turbine Testing. (08 Marks)

OR

- 10 a. Draw and explain the process of Data acquisition system and its uses. (10 Marks)
b. Discuss the following test methods :
(i) Altitude Test Facility
(ii) Flying Test Bed. (10 Marks)
