

CBCS Scheme

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15AE43

Fourth Semester B.E. Degree Examination, Dec.2017/Jan.2018 Aircraft Propulsion

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Explain types of aircraft power plant with neat sketch. (10 Marks)
b. Write difference between four stroke engine and two stroke engine. (06 Marks)

OR

- 2 a. Write advantage of gas turbine engine over reciprocating engine. (08 Marks)
b. Define the following:
(i) Diffuser efficiency (ii) Compressor efficiency (iii) Combustion efficiency
(iv) Turbine efficiency (08 Marks)

Module-2

- 3 a. Write short notes on:
(i) Variable pitch propeller. (06 Marks)
(ii) Constant speed propeller. (10 Marks)
b. Explain momentum theory of propeller. (10 Marks)

OR

- 4 a. Explain performance of turbojet engine with neat sketch. (06 Marks)
b. Air enters a turbojet engine at a rate of 120000 kg/hr at 15°C and 1.03 bar and is compressed adiabatically to 182°C and four times the pressure. Products of combustion enter the turbine at 815°C and leave it at 650°C to enter the nozzle. Calculate the isentropic efficiency of the compressor, power required to drive the compressor, and exit speed of gases when flying at 800 km/hr. Assume the isentropic efficiency of turbine is same as that of compressor and the nozzle efficiency is 90%. (10 Marks)

Module-3

- 5 a. Derive a relation for minimum area ratio $\left(\frac{A_{max}}{A_1}\right)$ in term of external deceleration and co-efficient of pressure. (12 Marks)
b. Write characteristics of supersonic inlet. (04 Marks)

OR

- 6 a. Write short notes on:
(i) Nozzle choking. (08 Marks)
(ii) Nozzle throat condition. (08 Marks)
b. Explain types of thrust reverser. (08 Marks)

Module-4

- 7 a. List and explain performance characteristics of centrifugal compressor. (10 Marks)
b. Explain rotating stall with sketch. (06 Marks)

OR

- 8 a. Define and derive expression for degree of reaction of axial flow compressor. (10 Marks)
b. Difference between axial flow compressor and centrifugal compressor. (06 Marks)

Module-5

- 9 a. Write advantage and disadvantage of annular combustor. (06 Marks)
b. Explain about flame tube cooling. (06 Marks)
c. Define combustion intensity. (04 Marks)

OR

- 10 a. Explain turbine blade cooling with sketch. (12 Marks)
b. Define: (i) Loading coefficient (ii) Flow coefficient. (04 Marks)

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