CBCS Scheme

USN 1AH14AE037 **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.
(ii) Constant speed propeller. **(06 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 $\left(\frac{A_{max}}{A_i}\right)$ 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.
(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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