CBCS Scheme

USN | | | | | | | | | | |

15AE62

Sixth Semester B.E. Degree Examination, June/July 2018
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 the help of the energy distribution diagram, explain the performance characteristics of a Turbo prop engine. List its advantages and disadvantages. **(10 Marks)**

b. Illustrate and describe the comparison of operating parameters of Turbojet, Turboprop and Turbofan engines. **(06 Marks)**

OR

2 a. List the three basic types of burner systems and explain with its advantages and disadvantages. **(08 Marks)**

b. Write short notes with relevant sketches on :
i) Thrust Reversers ii) Methods of Thrust augmentation. **(08 Marks)**

Module-2

3 a. Illustrate the different manufacturing techniques used for engine parts. **(08 Marks)**

b. Write in detail about the heat ranges of metals for aero – engine application. **(08 Marks)**

OR

4 a. Describe FADEC interface with aero – engine, with suitable sketches. **(08 Marks)**

b. Write short notes on :
i) Typical oil system of a Gas turbine engine.
ii) Starting systems of a aero – engine. **(08 Marks)**

Module-3

5 a. Explain Transient performance of a Aero gas turbine engine with relevant sketches. **(08 Marks)**

b. Define Windmilling and describe the process of windmilling in a turbojet engine. **(08 Marks)**

OR

6 a. Write short notes on : **(10 Marks)**
i) Thrust engine start envelope.
ii) Engine performance parameters with related equations.

b. Calculate surge for the following data :
New production engine to engine working line variation = 0 ± 1.5%.
Engine to engine surge line variation for production engines = 0 ± 4.0%.
In service working line deterioration = 2.0%.
In service surge – line deterioration = 4.0%.
Control system fuel metering VIG v position etc = 0 ± 1.0%.
Reynold number effect = 1.0% .
Intake distortion = 1.0%.
Transient allowance = 12.0%. **(06 Marks)**

Module-4

7 a. Discuss the three off – design performance characteristics of compression used in gas turbine engine. **(08 Marks)**

b. Explain the various tests to which a jet engine combustor will be subjected to during its performance evolution. **(08 Marks)**

OR

8 a. Explain the Turbine testing and its performance evolution. **(08 Marks)**

b. Write short notes on :

i) Ram pressure recovery of inlets and propelling nozzles.

ii) Testing and performance evolution of ducts. **(08 Marks)**

Module-5

9 a. List the proof of concepts used in the process of engine testing. Explain preliminary flight rating test in detail. **(08 Marks)**

b. Explain : i) Estimating engine operating limits.

ii) Methods of displacing equilibrium tests. **(08 Marks)**

OR

10 a. Briefly explain the instruments used in Test cell for measurement of various parameters. **(08 Marks)**

b. Explain with relevant sketches :

i) Mass and CUSUM plots.

ii) Uncertainty in measurements and its analysis. **(08 Marks)**

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