DIPLOMA IN AERONAUTICAL ENGINEERING

GAS TURBINES (MODULE 3)

EXAM

DURATION - 2 HOURS

INSTRUCTION – Attempt ALL Questions in Section A

-Attempt any THREE questions in Section B

SECTION A:

1)

a. With the aid of a graph compare the propulsive efficiencies of the following gas turbine engines: (3 marks)
   i. Turbo-prop
   ii. Pure-Jet
   iii. By-pass

b. A 13 stage compressor has a pressure ratio across each stage of 1.2 and an ambient inlet pressure of 14.7 psi (101.4kPa). Compute the Final Pressure and the Pressure Ratio. (7 marks)

2)

a. What are the three speed zones in which the supersonic inlet duct must operate. Give a brief description of the inlet duct flow under these three conditions. (10 marks)

SECTION B:

1) With the aid of a diagram, describe the construction and operation of the combustion chamber. (10 marks)

2) With the aid of a sketch, explain the operation of the following types of gas turbine engine compressors: (10 marks)

   a. Centrifugal
   b. Axial

3)

a. Outline SIX factors that would be considered to prevent front end stalling in axial flow compressors (6 Marks)

b. Outline any FOUR requirements of combustion chambers. (4 marks)

4)

a. Illustrate the design features of the following types of combustion chambers: (6 marks)

   i. Can
   ii. Annular
   iii. Can-annular

b. Outline any FOUR basic requirements of Gas Turbine Engines (4 marks)

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