EAST AFRICAN SCHOOL OF AVIATION EXAMINATION

ENGINEERING SECTION

DIPLOMA IN AERONAUTICAL ENGINEERING

GAS TURBINES

TREAM: MODULE 3 (AE) **Duration: 3 Hrs.**

DATE: 10/4/2017 **TIME: 2.00 – 5.00 PM**

INSTRUCTIONS TO CANDIDATE:

1. *This paper consists of **TWO (2)** printed pages.*
2. *Answer **ALL** questions in **Section A** and **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:
   i. Turbo-prop
   ii. Pure-Jet
   iii. By-pass **(3 marks)**

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:
   a. Centrifugal
   b. Axial **(10 marks)**

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:

   i. Can
   ii. Annular
   iii. Can-annular **(6 marks)**

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