MASENO SCHOOL

Kenya Certificate of Secondary Education 2020

451/1- AVIATION TECHNOLOGY -Paper 1

(THEORY)

DEC. 2020 - 2 ½ hours

THE MASENO SCHOOL MOCK

Name …… **Index Number**……..

Candidate's Signature ……..…….. **Date** ……

Instructions to candidates

(i) Write your name and index number in spaces provided

(ii) Sign and write the date of examination in spaces provided above

(iii) Ensure you have the following for this examination:

- *Drawing instruments and A3 drawing paper*

(iv) This paper consist of two sections: A and B

(v) Answer all questions in section A and choose four questions in section B

(vi) All measurements are in millimetres unless stated otherwise.

Candidates should check and confirm that all pages are well printed and no question is missing as indicated . **For Examiners Use Only**

Section	Question	Maximum score	Candidates score
A	1-10	44	
B	11	14	
	12	14	
	13	14	
	14	14	
	15	14	
	TOTAL	100	

SECTION A (44MARKS)

1. (a) State three principles of extinguishing fire. (1 ½ marks)

(b) Outline three factors that can be considered as hazard in aircraft refueling. (1½ marks)

2. (a) State two methods used when filling metals. (1mark)

(b) Sketch the following tools used in the workshop.
(i) Diamond chisels (1mark)

(ii) Hand snips (1mark)

(iii) Hand pump (1mark)

3. Define the following terms as applied in aircraft instruments.
   (i) Rigidity (1mark)

   (ii) Precession (1mark)

   (iii) Wavelength (1mark)

   (iv) Modulation (1mark)

4. State four safety precautions to be observed when handling high compressed gas cylinders in aviation industry. (2marks)

5. Sketch the following aircraft hardware and fittings:
   (i) Torque tube (1mark)

   (ii) (ii) bell crank (1mark)

   (iii) Quadrant (1mark)

   (iv) Turnbuckle (1mark)

6. State the importance of the following activities in aero piston engines:
   (i) Spark plug setting (1mark)

   (ii) Valve seat grinding (1mark)

   (iii) Cylinder honing (1mark)

7. State two major applications of RADAR. (2marks)

8. (a) Identify 2 defects that can render a carburetor inefficient during operation in aircraft engine. (1mark)

(b) Sketch a well labeled diagram of a float type carburetor. (4marks)

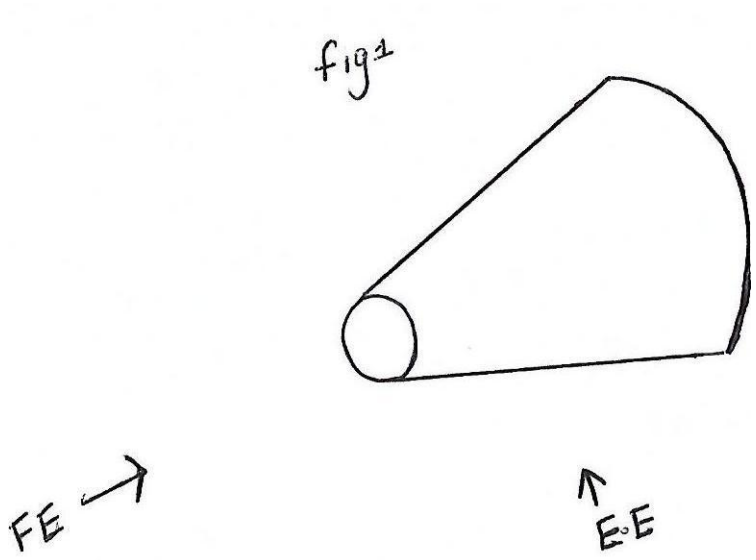
9 (a) State the function of the following features:

i) Vortex generator. (1mark)

ii) Slats (1mark)

iii) Spoilers (1mark)

(b) Figure I show isometric views of a truncated cone.



Draw the front elevation and end elevation of the cone in:

(i) First angle orthographic projection

(ii) Third angle orthographic projection

10 (i) Explain two design features which promote lateral stability. (2marks)

(ii) With aid of a labeled sketch describe the basic members of an aircraft empennage. (3marks)

(iii) State three requirements of aircraft structures. (3marks)

SECTION B (56 MARKS)

Instructions

Choose four questions to answer in this section

11. (a) Describe each of the following maintenance tasks:

(i) Destructive testing (1mark)

(ii) On condition monitoring (1mark)

(iii) Random testing (1mark)

(iv) Non-destructive testing (1mark)

(b) Explain 4 properties that make aluminum based alloy most suited for the construction of an aircraft fuselage. (4marks)

(c) Outline the procedure of carrying out dye penetrant testing method (5marks)

(d) List two advantages of the method named in "c" above. (2marks)

12. (a) Differentiate between the terms anti icing and deicing. (2marks)

(b) With an aid of labeled diagram describe the construction of aircraft pneumatic system. (8marks)

(c) Explain color markings on aircraft instrument. (2marks)

i) White strip

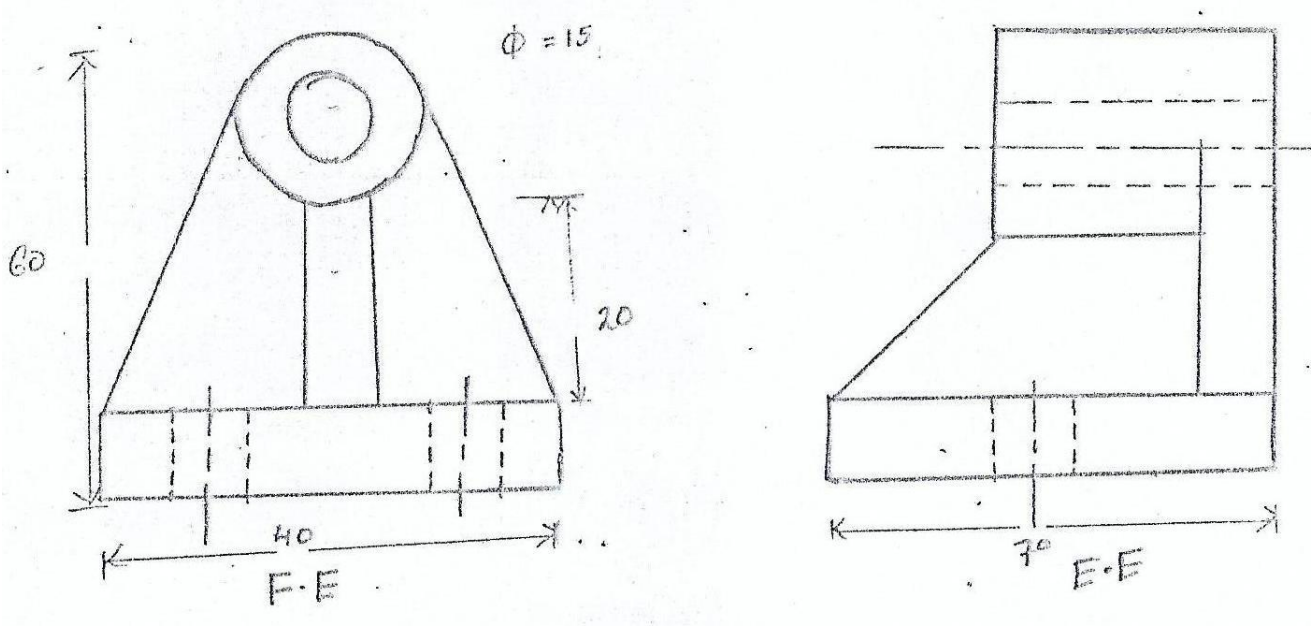
ii) Red

iii) Yellow

iv) Green

(d) State one reason for using color markings on aircraft instrument. (2marks)

13. (a) Figure 1 shows two views of an aircraft bracket. Sketch in good proportion an isometric drawing of the bracket. (12marks)



(b) Construct line PQ and divide with angle QPR=30^0 into five equal divisions of 20mm each. (2marks)

14. (a) List three checks done on magnetic compass prior to engine start. (3marks)

(b) Explain why a magnetic compass is considered as a standby instrument on most modern aircrafts. (1mark)

(c) Explain the function of VHF Omni range system. (2marks)

(d) Present a simple block diagram of a VOR system. (3marks)

(e) Draw the basic T instruments in space provided below. (3marks)

(f) State two functions of course deviation indicator. (2marks)

15. (a) List three categories of compressors used on an aircraft engine. (1 ½ marks)

(b) State how compression is achieved in the following types of compressors:
(i) Centrifugal flow (1mark)

(ii) Axial flow (1mark)

(c) With the aid of a pressure volume diagram explain the Otto cycle process of aircraft engine (7 ½ marks)

(d) Explain the following types of efficiencies as applied in aircraft engine.

(i) Volumetric efficiency (1mark)

(ii) Thermal efficiency (1mark)

(iii) Mechanical efficiency (1mark)

iv) Propulsive efficiency (1mark)