**BUNAMFAN CLUSTER EXAMINATION - 2022**

**Kenya Certificate of Secondary Education**

**450/2 – AVIATION TECHNOLOGY(PRACTICAL) – Paper 2**

**June 2022 - 2 ½ hours**

**Name**………………………………………**Adm No**……

**Class**…………… **Date**……………………………

**INSTRUCTIONS TO CANDIDATES**

There are **TEN** stations in this examination.

Candidates are allowed **15 MINUTES** at each station.

Candidates are **NOT** allowed to either review the previous station’s work or read instructions for other stations.

Write your **NAME** and **INDEX NUMBER** on all projects.

Attempt **ALL** exercises in each station.

All dimensions are in millimeters unless otherwise stated

**For Examiner’s Use Only**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Questions** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | **TOTAL** |
| **Marks** |  |  |  |  |  |  |  |  |  |  |  |

**This paper consists of 5 printed papers.**

**Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.**

**STATION 1**

**INSTRUCTIONS**

The figure below shows parts of a valve operating mechanism of aeropiston engine. On the drawing paper provided:

(a) Sketch in good proportion an assembled unit vertically.

(b) Name at least **FIVE** parts on the assembled units. [10 marks]

**STATION 2**

**INSTRUCTIONS**

Using the tools, equipment and material provides, make the exhaust Cone as shown in the drawing below. [10 marks]

**STATION 3**

**INSTRUCTIONS**

Identify each of the aircraft hardware numbered and state one use for each. [10 marks]

**HARDWARE USE**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**STATION 4**

**INSTRUCTIONS**

Study the two aircraft models carefully and answer the questions that follow:-

(a) Classify the two types of aircraft represented by the models and in each case give an example of such an aircraft. [4 marks]

|  |  |  |
| --- | --- | --- |
| **MODEL** | **TYPE** | **EXAMPLE OF REAL AIRCRAFT** |
| A |  |  |
| B |  |  |

(b) State the operational difference of the two types of aircraft with regards to the following:- [4marks]

(i) Landing

A …………………………………………………………………………………………….

B ……………………………………………………………………………………………..

(ii) Take-off

A …………………………………………………………………………………………...

B …………………………………………………………………………………………..

(iii) Parking Configuration

A …………………………………………………………………………………………..

B …………………………………………………………………………………………..

(iv) Main undercarriage

A ……………………………………………………………………………………………

B ……………………………………………………………………………………………

(c) Explain why design A is not commonly used. [2 marks]

…………………………………………………………………………………………………….

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

**Turn over**

**STATION 5**

**INSTRUCTIONS**

(a) Place the spring provided between the vice jaws endwise.

Tighten the vice and observe what happens to the spring.

(i) State the type of load the spring is subjected to:

…………………………………………………………………………………………….

………………………………………………………………………………………….

(ii) State the loading effect on the spring.

…………………………………………………………………………………………….

……………………………………………………………………………………….

(iii) Relate this loading to an aircraft structure. [4 marks]

…………………………………………………………………………………………….

………………………………………………………………………………………….

(b) Clamp the marked end of the metal plate provided between the vice jaws. Push the

plate at the point marked **A** and observe what happens.

(i) State the two types of load the metal plate is subjected to.

…………………………………………………………………………………………….

………………………………………………………………………………………….

(ii) State the loading effect on the metal plate.

…………………………………………………………………………………………….

………………………………………………………………………………………….

(iii) Relate these loadings to aircraft primary control surface. [6 marks]

…………………………………………………………………………………………….

…………………………………………………………………………………………….

**STATION 6**

**INSTRUCTIONS**

(a) Roll the ball from the bottom of the concave surface of the basin provided.

(i) State what happens to the ball. [1 mark]

……………………………………………………………………………………..

………………………………………………………………………………………

(ii) Explain the relevance of this experiment to an aeroplane in flight. [2 marks]

……………………………………………………………………………………………

……………………………………………………………………………………………..

(b) Roll the ball from the top of the convex surface of the basin

(i) State what happens to the ball. [1mark]

……………………………………………………………………………………………

…………………………………………………………………………………………..

(ii) Explain the relevance of the experiment to an aeroplane in flight. [2 marks]

……………………………………………………………………………………………

……………………………………………………………………………………………

(c) Roll the ball on the flat surface provided (table)

(i) State what happens to the ball. [1 mark]

……………………………………………………………………………………………

…………………………………………………………………………………………….

(ii) Explain the relevance of this experiment to an aeroplane in flight. [2 marks]

……………………………………………………………………………………………….

……………………………………………………………………………………………….

(d) State which of the above situations (a), (b) and (c) is best suited for an aeroplane in flight. [1 mark]

……………………………………………………………………………………………………………………………………………………………………………………………………….

**STATION 7**

**INSTRUCTIONS**

(a) Replace the turn buckle provided and wire lock. Let the examiner check your work.

(b) Name the tool (s) suitable for use the exercise. [10 marks]

**STATION 8**

**INSTRUCTIONS**

Connect the components provided as shown in the circuit diagram below. Let the examiner check your work. [4 ½ marks]

(a) Select switch S1 to the ON position and measure the value of the current flowing through bulb B,

Current: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [1 mark]

(b) With switch S1 in OFF position, measure the value of resistor R1. [1 mark]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(c ) Select switch S1 and S2 to the ON position and explain what happens to bulbs B1 and B2.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[2 marks]

(d) Measure the total circuit resistance.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[1 mark]

(e) State one application of the circuit in an aircraft. [½ mark]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**STATION 9**

**INSTRUCTIONS**

* Mask the paper on the table in horizontal position.

Let it flap down on the other end.

* Blow air over the paper.

(a) Make your observation [2 marks]

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

(b) State the principle behind this experiment. [2 marks]

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

(c) Relate the principle (b) above to an aircraft.

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

[6 marks]

**STATION 10**

**INSTRUCTIONS**

Study the set up below and answer the questions that follow:

(a) (i) State the observation made before and after the fire cracker is lit.

Observation:-

Before ……………………………………………………………………………………..

After……………………………………………………………………………………..

[2 marks]

(ii) State the scientific law that is associated with the observation made in a (i) above.

[2 marks]

………………………………………………………………………………….

(b) (i) State why the experiment can only be successful in the innermost and not in the outer

space. [1 mark]

…………………………………………………………………………………………..

(ii) Name a type of an aircraft that has a mechanism to overcome the condition in b (i) above. [1 mark]

…………………………………………………………………………………………

(c) Outline two safety measures you would take to ensure the experiment is successful. [2 marks]

(i) ……………………………………………………………………………………….

(ii) ……………………………………………………………………………………….

(d) What is the relevance of this experiment in aviation? [2 marks]

………………………………………………………………………………………………………………………………………………………………………………………………………………………………