

## 4.8 AVIATION TECHNOLOGY (450)

### 4.8.1 Aviation Technology Paper 1 (450/1)

#### SECTION A (44 marks)

*Answer all the questions in this section.*

1. (a) State **two** safety precautions to be observed with respect to dressing when operating a grinding machine. (1 mark)
- (b) Give the classes of fire likely to occur in each of the following areas: (1 mark)
- (i) Aircraft technical records
- (ii) Paint store
- (c) Outline **two** mandatory safety equipment to be carried by an aircraft flying over water. (1 mark)
2. (a) State **four** ways of preventing accidents in an aviation environment. (2 marks)
- (b) Highlight **two** roles of a flight dispatcher. (1 mark)
3. (a) Outline **three** reasons for abnormal moods and poor decision-making in aviation industry. (3 marks)
- (b) Outline **three** adverse effects of cumulonimbus clouds on an aircraft in flight. (3 marks)
4. (a) Sketch and label the following aircraft hardware: (4 marks)
- (i) Countersunk rivet
- (ii) Raised head screw
- (b) Outline the procedure of annealing steel. (2 marks)
5. State the use of each of the following tools: (1 mark)
- (a) Odd leg callipers
- (b) Flat screw driver
6. (a) Differentiate between propeller driven and pure jet engine methods of thrust generation. (2 marks)
- (b) Explain why propeller blades are twisted. (1 mark)

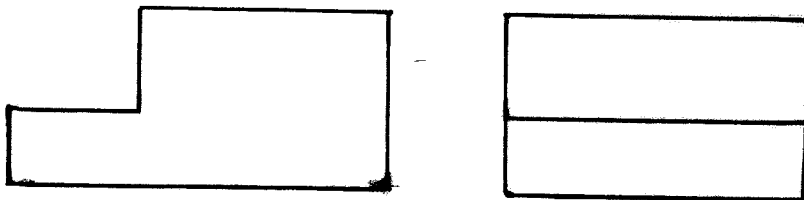
7. (a) Explain the functions of each of the main structural member of the semi-monocoque aircraft construction. (5 marks)
- (b) Name **four** methods of non destructive testing used in aircraft inspection. (2 marks)
8. (a) State **four** methods used in aircraft navigation. (2 marks)
- (b) With regards to aircraft systems, complete **Table 1**.

Part	System	Function
Pump		
Transformer		
Thermocouple		
Actuator		

(4 marks)

**Table 1**

9. With the aid of labelled sketches, show the airflow over each of the following body shapes:
- (a) Flat plate (2 marks)
- (b) Stationary sphere (2 marks)
- (c) Asymmetrical airflow at 0 angle of attack (2 marks)
10. (a) Draw the following types of lines used in engineering drawings:
- (i) Centre line
- (ii) Hidden detail line (1 mark)
- (b) Figure 1 shows two views of an aircraft part drawn in first angle orthographic projection. Draw the plan



**Figure 1**

**SECTION B (56 marks)**

*Answer any **four** questions from this section in the space provided.*

11. (a) Name **four** aircraft systems that use pneumatic power. (2 marks)
- (b) With the aid of sketches, describe the following types of landing gear configuration: (6 marks)
- (i) Tri-cycle
  - (ii) Conventional
- (c) Explain how steering is achieved in each of the gear configuration in 11(b). (6 marks)
- (i) Tri-cycle
  - (ii) Conventional
12. (a) Describe each of the following business ventures in aviation, stating **two** merits and **two** demerits for each. (6 marks)
- (i) Cargo and courier services
  - (ii) Aircraft maintenance shop
- (b) Outline **three** effects on the human body due to high altitude flights. (3 marks)
- (c) (i) State **six** functions of the Kenya Civil Aviation Authority (KCAA). (3 marks)
- (ii) Identify any **two** categories of airports in Kenya and explain the kind of inspection carried out in each category. (2 marks)
13. (a) With regards to the **six** basic flight instruments: (12 marks)
- (i) show the typical layout
  - (ii) state the functions of each of the flight instruments

(b) Explain the meaning of each of the following terms as applied to aviation:

(i) VFR

(ii) IFR

(2 marks)

14. (a) Sketch each of the following aircraft wing forms:

(i) Anhedral

(ii) Gull wing

(3 marks)

(b) With the aid of a sketch, describe the formation of induced drag.

(9 marks)

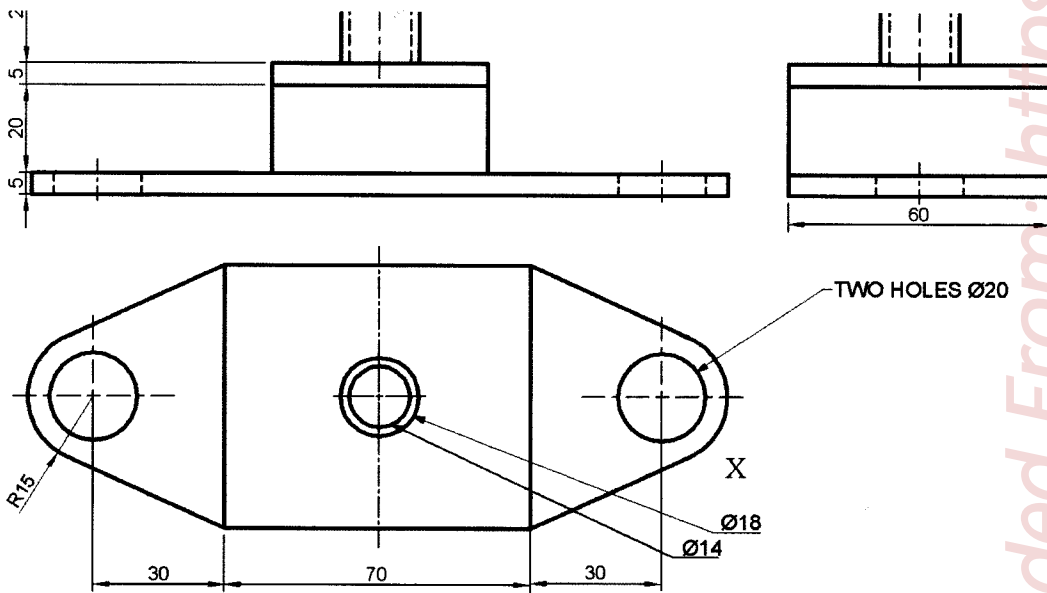
(c) Illustrate each of the following types of flaps:

(i) Single slotted flap

(ii) Split flap

(2 marks)

15. **Figure 2** shows three orthographic views of an engine mounting bracket. Draw the mounting bracket **full size** in isometric projection taking X to be the lowest point. (14 marks)



**Figure 2**