



EXAMINATIONS COUNCIL OF ESWATINI
Junior Certificate Examination

CANDIDATE
NAME

CENTRE
NUMBER

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NUMBER

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DESIGN AND TECHNOLOGY

537/01

Paper 1

October/November 2023

2 hours

Candidates answer on the Question Paper.

Additional Materials: Standard Drawing Equipment

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name in the spaces provided.
Write in dark blue or black pen in the spaces provided on the Question Paper
You may use a pencil/pen for any sketches, drawings, or rough working.
Do **not** use staples, paper clips, highlighters, glue, or correction fluid.

This paper consists of **two** (2) sections, Section **A** and Section **B**.
Answer **all** questions.

The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's use	
Section A	
Section B1	
Section B2	
Section B3	
Total marks	

Section A [40 Marks]

Answer **all** questions

1 Figure 1 shows a 3D drawing of a step block.

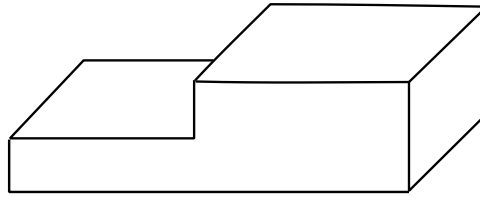


Fig. 1

Name the type of projection used to produce the drawing in Figure 1.

..... [1]

2 Figure 3 shows part of a joint marked out on a piece of wood.

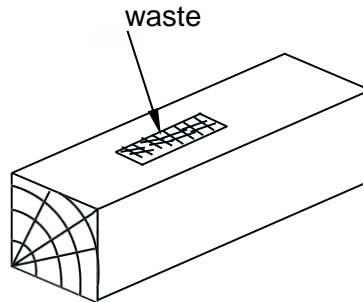


Fig. 3

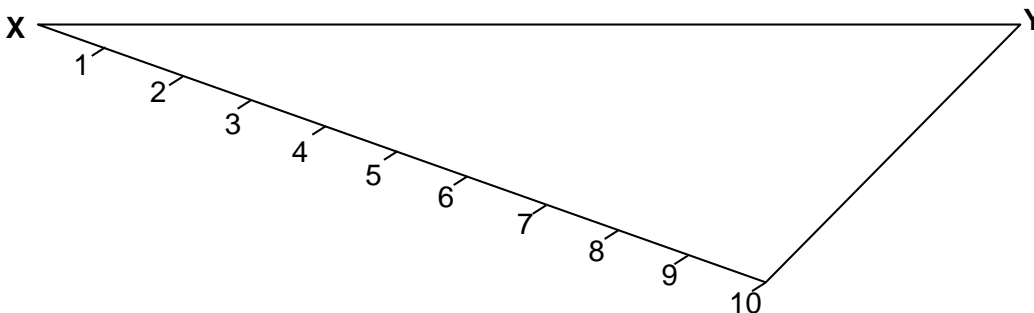
(a) Name **one** tool that can be used to mark out the parallel lines along the grains.

..... [1]

(b) Name **one** specific tool that can be used to remove the waste.

..... [1]

3 The line **XY** drawn below is to be divided into a ratio 3:2:5.



Complete the division of the line according to the given ratio.

[2]

- 4 The Drawing in Figure 2 is an orthographic projection of a solid object.
From the given isometric drawings (A, B and C, circle the correct one that represents the drawn orthographic projection views.

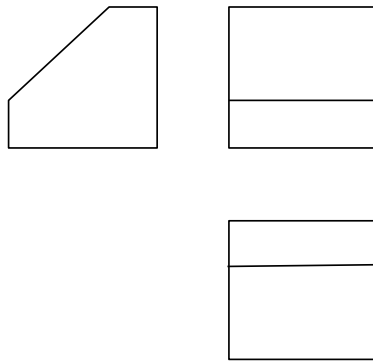
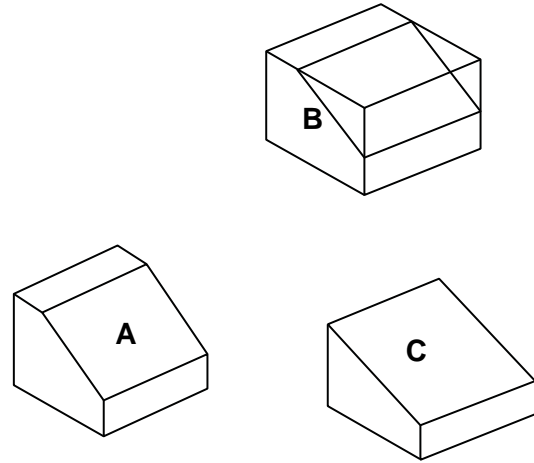


Fig. 2



[1]

- 5 Explain why it is important to use a marking knife where there will be a saw cut on wood.

..... [1]

- 6 Figure 4 shows a drawing of two pieces of 4 mm thick mild steel.

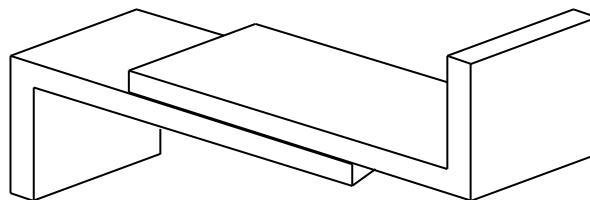
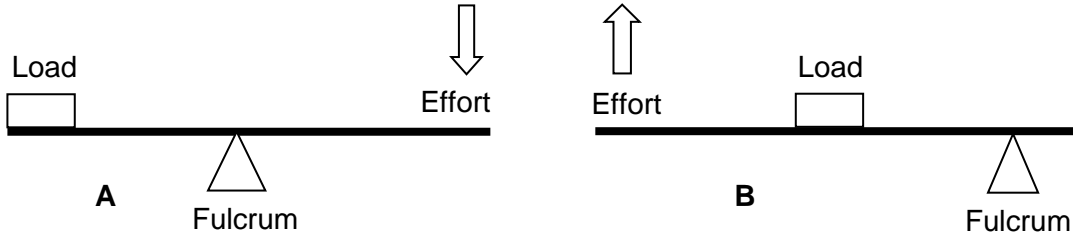


Fig. 4

Name **one** temporary method that can be used to join the two pieces of metals together.

..... [1]

7 The drawings below show two classes of levers.

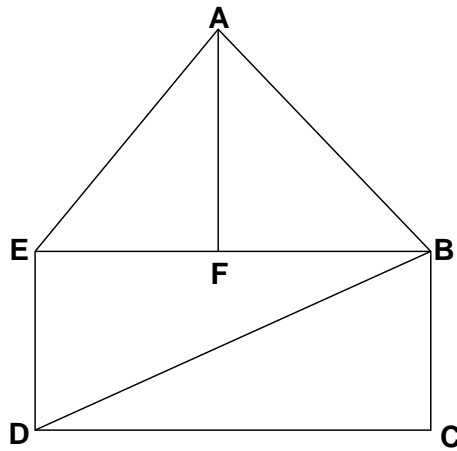


Name the **two** classes of levers labelled **A** and **B**.

A.....[1]

B.....[1]

8 The drawing below represents a small structure.



Identify and name a redundant (not needed) structural member from those given.

.....[1]

9 Figure 5 shows two pieces of wood to be joined by an angle bride joint.

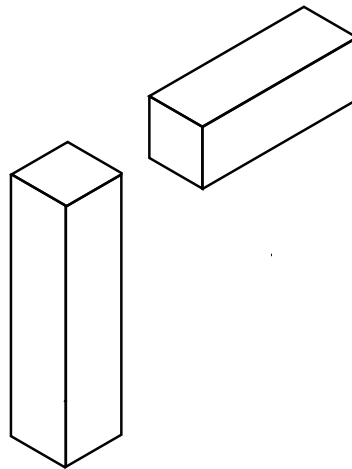


Fig. 5

Show the marking out of the joint on the two members.

[4]

- 10 The table below shows a classification of wood.
Complete the table by writing the specific name of the wood.

Classification	Wood
Softwood	
Hardwood	

[2]

- 11 Plastics are classified into two major types, thermoplastics and thermosetting.

Explain the difference between thermoplastic and thermosetting.

.....

..... [2]

- 12 An image of a centre gauge is shown in Figure 6. The part shown by arrow **A** is drawn tangentially to the circular part of the centre gauge.

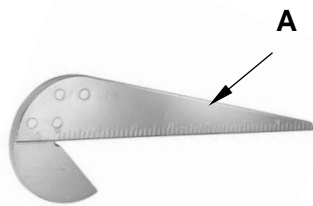
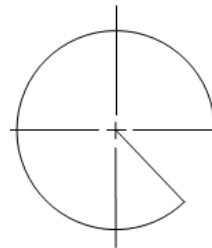


Fig. 6



P

Construct a tangential line from point **P** to the top of the circular part.

[4]

- 13 Given below is an image of a plastic fitting used in plumbing.



- (a) Name the type of plastic used to make the fitting.

.....[1]

- (b) Which property of plastic makes it suitable for the fitting?

..... [1]

14 The product shown below is a pot used in a home kitchen.



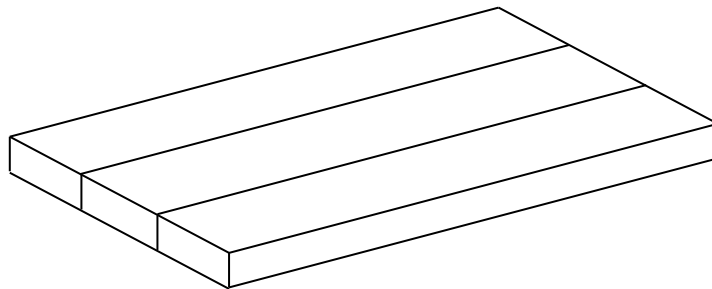
(a) Name **one** suitable material to be used for the manufacture of such a product.

.....[1]

(b) Give **one** reason why the material in (a) is used.

..... [1]

15 Joining solid timber edge to edge is done to achieve a wider surface in table tops. The drawing below shows pieces of pine as used to widen a table top.



(a) Name **one** type of glue suitable for joining the three pieces together.

..... [1]

(b) Show how three sash cramps can be arranged to hold the pieces together while the glue sets.

[3]

16 Figure 7A and Figure 7B show two types of gear systems.

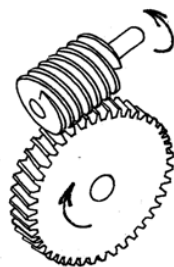


Fig. 7A

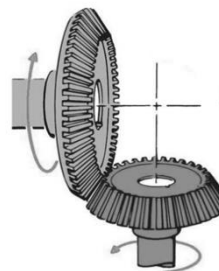


Fig. 7B

(a) Name each gear system.

A.....[1]

B.....[1]

(b) Give **one** example where each gear system can be used.

A.....[1]

B.....[1]

17 Figure 8 represents a boundary of a piece of a land. The land owner intends building a hexagonal structure on his land.

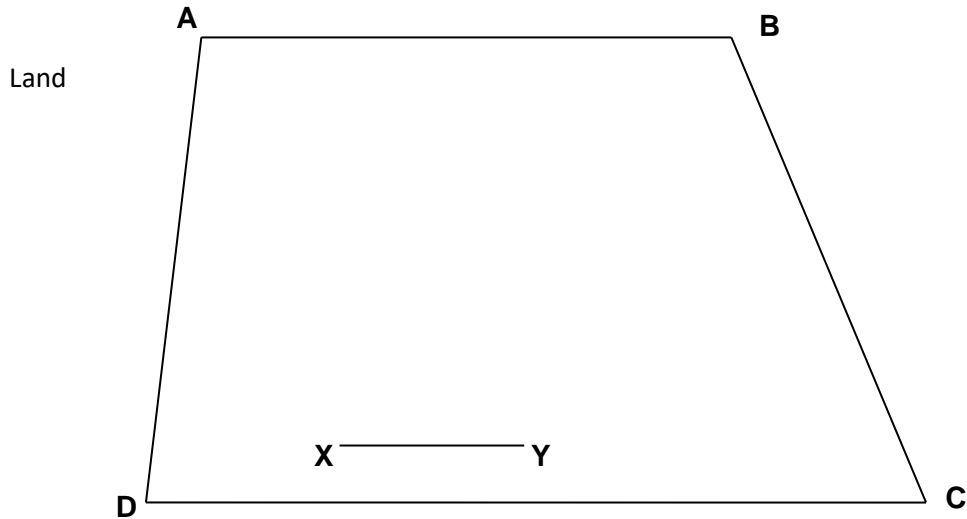


Fig. 8

(a) What is the name of the shape ABCD?

..... [1]

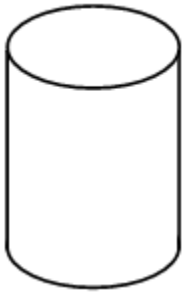
(b) Using geometrical construction draw a regular hexagonal with side **XY** to represent the structure. [4]

SECTION B [60 Marks]

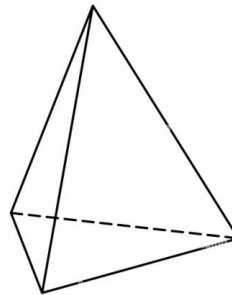
Answer **all** questions

Question B1 [20 Marks]

1 Given below are two geometrical solids.



A



B

State the correct name of each solid shown.

A.....[1]

B.....[1]

2 Figure 1 shows an isometric drawing of a bracket reinforced with a web to be cut in the middle.

Figure 2 shows an incomplete 1st angle orthographic projection of the bracket.

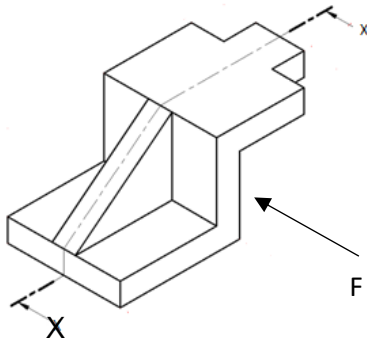
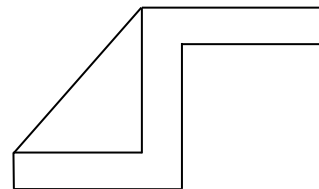


Fig. 1



Section X-X

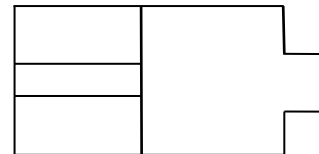


Fig. 2

Complete the sectional front X-X in Figure 2. [3]

3 In design a model allows a designer to test how a product will look and perform.

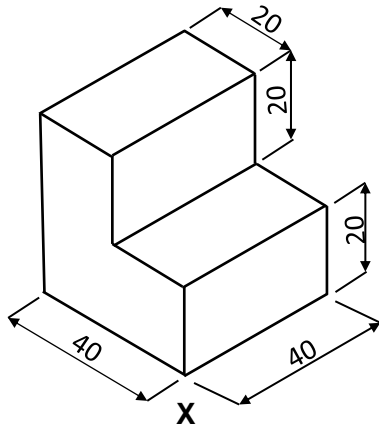
Name **two** materials used for modelling.

Material 1..... [1]

Material 2..... [1]

4 Drawn below is an isometric block.

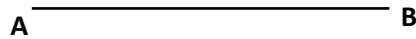
Using a two-point perspective drawing method, draw the block with corner **X** at the front.



•
X

[5]

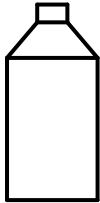
5 Line AB represents one side of an equilateral triangular garden plot.



Use geometrical constructions to complete the triangle.

[3]

6 Shown below is a water bottle used by athletes.



Use geometrical construction to enlarge the water bottle to a ratio 1:2 [5]

Question B2 [20 Marks]

1 Safety is very important in a school workshop

State **two** safety rules which should always be followed when using a chisel.

Rule 1..... [1]

Rule 2..... [1]

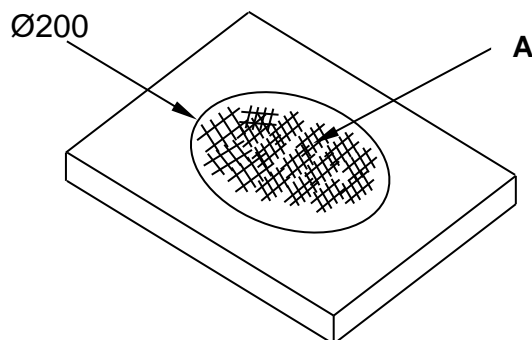
2 A **design brief** has for important elements which needs mentioning.

Name any **two** elements of a design brief.

Element 1..... [1]

Element 2..... [1]

3 The drawing below shows a piece of a MDF that needs to have a circular hole cut from it.



(a) Name a tool that could be used to mark the circular hole.

..... [1]

(b) Explain how the waste marked **A** can be removed and finished.

.....

 [3]

4 Figure 1 shows a partly exploded pencil holder made of plastic and wood.

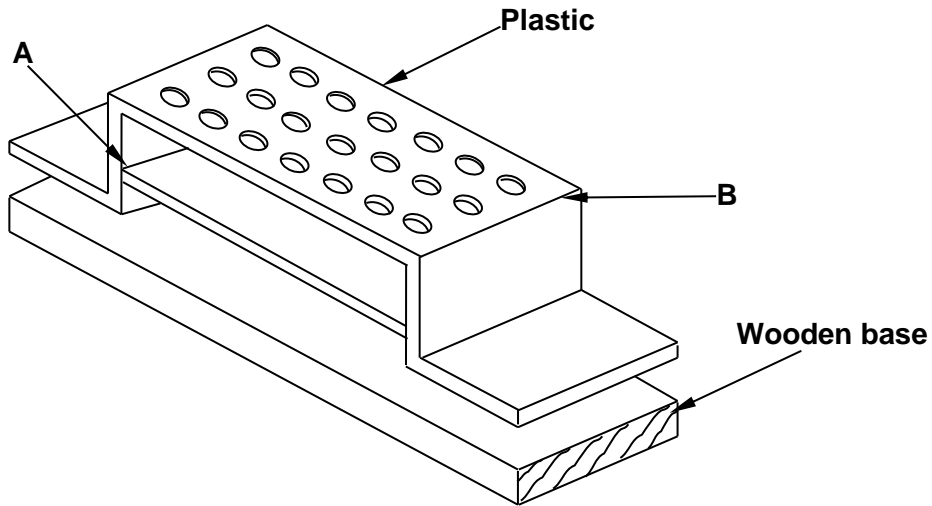


Fig. 1

(a) Name **one** suitable type of plastic that can be used for making the pencil holder.

..... [1]

(b) State an appropriate adhesive for joining the plastic at **A**.

..... [1]

(c) Briefly explain the process of producing the bend at **B**.

.....

 [3]

(d) Explain briefly how the plastic part of the holder can be joined to the wooden base using fasteners.

.....
 [2]

5 Figure 2 shows a piece of 5 mm thick mild steel.

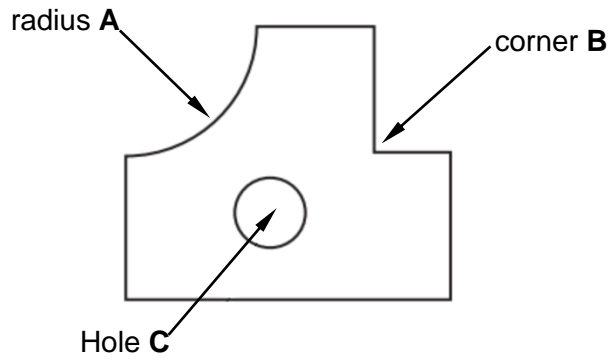


Fig. 2

(a) Name the tools used for marking the following.

Radius **A**..... [1]

The centre for hole **C** before drilling..... [1]

(b) Name the specific type of files used to shape:

Radius **A**.....[1]

Corner **B**.....[1]

(c) Explain why it is dangerous to use a file without a handle.

..... [1]

Question B3 [20 Marks]

1 Figure 1 shows a rotary clothes hanger.

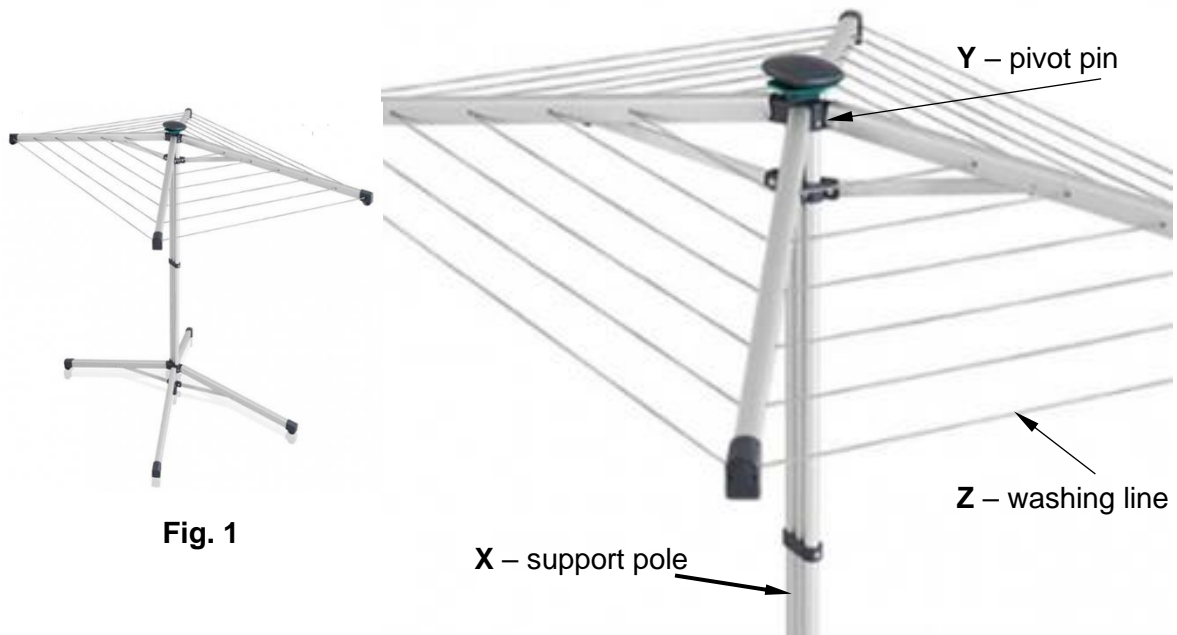


Fig. 1

Name the force that will be applied to the parts labelled **X**, **Y** and **Z** of the structure when the rotary clothes drier is in use.

X..... [1]

Y..... [1]

Z..... [1]

2 Mechanisms play an important role in moving parts.

Name a mechanism that converts rotary movement to reciprocating movement.

..... [2]

3 Figure 2 shows a bracket made from square steel tube.

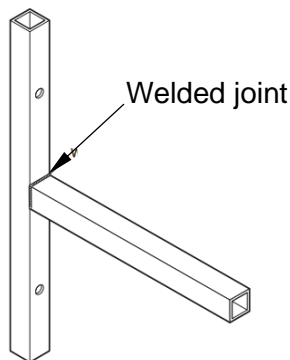


Fig. 2

(a) By means of a sketch show on Figure 2 how the welded joint can be reinforced. [1]

(b) Name the method of reinforcing

..... [1]

4 Figure 3 shows a variety of pulley systems.

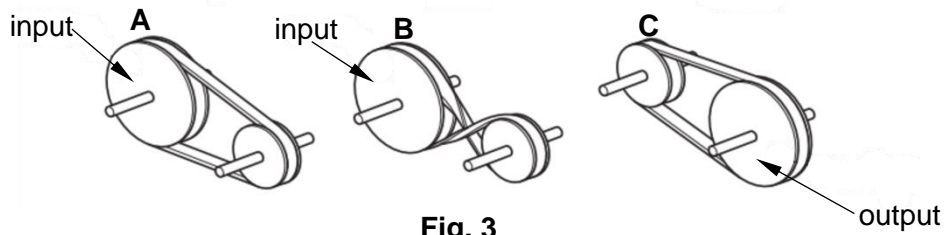


Fig. 3

(a) Complete the table below to describe the motion transmission for each pulley system shown in Figure 3.

Pulley system	Input	Output direction	Output speed
A	Clockwise		Increased
B	Clockwise		
C		Clockwise	

[5]

(b) Sprocket and chain mechanisms are used to transmit motion.

Describe **one** advantage that sprocket and chain mechanisms have over belt and pulley systems.

..... [2]

(c) Give an example where a chain and sprocket mechanism is used.

..... [1]

5 Figure 4 shows a picture of a model plane.

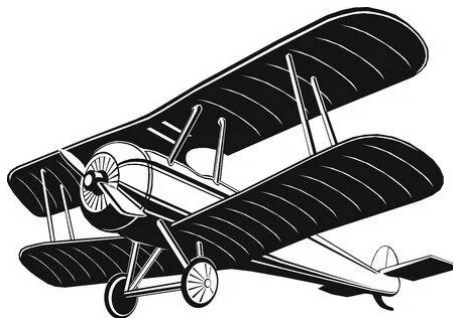


Fig. 4

(a) On Figure 4 label a strut and a shell structure.

[2]

(b) The wings of the model plane are made from ribs and spars as shown in Figure. 5

For
Examiner's
Use

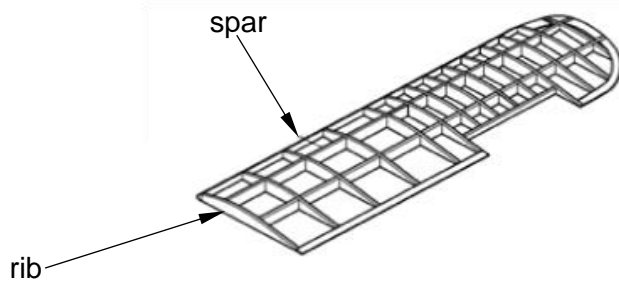


Fig. 5

State the name for this type of structure.

..... [1]

(c) Name the force resisted by a strut.

..... [1]

(d) Name the force resisted by a tie.

..... [1]

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