Centre Number	Candidate Number	Candidate Name

NAMIBIA SENIOR SECONDARY CERTIFICATE

DESIGN AND TECHNOLOGY HIGHER LEVEL   **8340/1**

PAPER 1   2 hours

Marks 100   **2019**

Additional Materials   A3 drawing paper for Question 11 only
                                    Non-programmable calculator
                                    Standard drawing equipment

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Write your Centre Number, Candidate Number and Name in the spaces at the top of this page and on all separate answer sheets used.
- Write in dark blue or black pen.
- You may use a soft pencil for any rough work, diagrams or graphs.
- Do not use correction fluid.
- Do not write in the margin *For Examiner's Use*.
- You may use a non-programmable calculator.
- The number of marks is given in brackets [ ] at the end of each question or part question.

Part A

- Answer **all** questions.
- Write your answers in the spaces provided on the Question Paper.
- You should spend about 30 minutes on **Part A**.

Part B

- Answer **one** question.
- **Question 11** should be answered on the separate A3 drawing paper.
- At the end of the examination staple your A3 work to this Question Paper.
- **Questions 12** and **13** should be answered in the spaces provided on the Question Paper.

For Examiner's Use	
Part A	
Part B 11	....
12	....
13	....
TOTAL	

Marker	
Checker	

This document consists of **25** printed pages and **3** blank pages.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

Part A

Answer **all** questions from **Part A** in the spaces provided.

1 After a product is made, it should be tested and evaluated. Give **four** questions to ask yourself which will help you to do a proper evaluation.

1 ....

2 ....

3 ....

4 .... [4]

2 **(a)** Name a common metal from which an aircraft is mainly manufactured.

.... [1]

(b) Give **two** properties of the metal mentioned in **2 (a)**.

1 ....

2 .... [2]

3 Fig. 1 shows a kindergarden table.

Fig. 1

(a) Suggest a suitable plastic to manufacture the table in Fig. 1.

.... [1]

(b) Give a reason for your choice in **(a)**.

....

.... [2]

(c) Give **two** reasons why the table is considered safe to be used by young children.

1 ....

....

2 ....

.... [4]

[Turn over

4   Fig.2 shows a wooden coffee table produced from very expensive wood.

Fig. 2

(a) State a suitable method that could be used to make the centre post.

    ....   [1]

(b) The joint between the top and the centre post is important.

   Suggest and sketch a joint that is suitable for this situation.

[4]

(c) Suggest a suitable method to produce the mould on the rim of the table.

....

.... [1]

5 Fig. 3 shows a diagram of a structure.
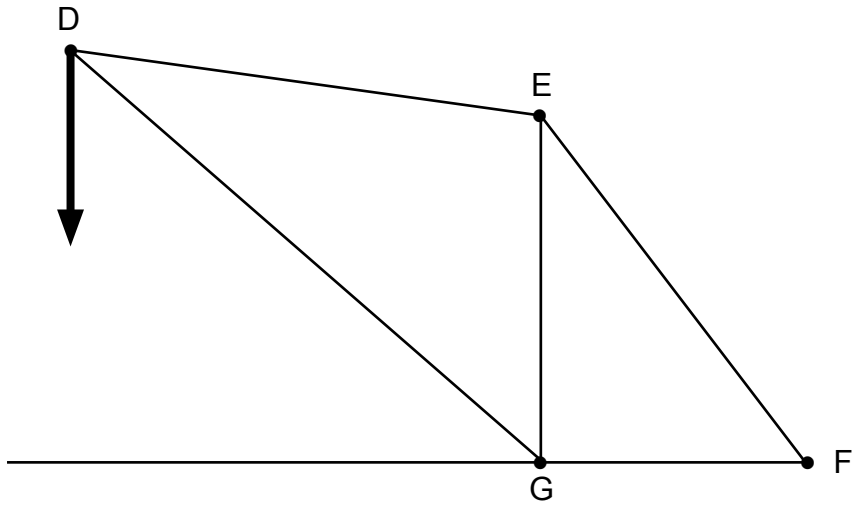
Fig. 3

Describe

(a) a strut

....

.... [1]

(b) a tie

....

.... [1]

(c) Identify a strut and a tie in Fig. 3.

Strut: .... [1]

Tie: .... [1]

[Turn over

6 Fig. 4 shows a see-saw with forces acting on it.

600 N   400 N   A

| 4 m | 2 m | 6 m |
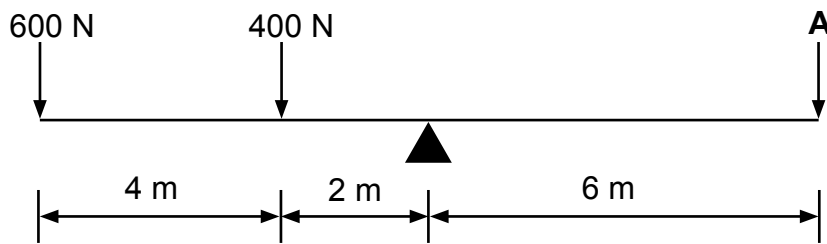
Fig. 4

Calculate the force at **A** to balance the see-saw.

....

....

....

....

....

....

....

.... [4]

7 Chain and sprocket transmission system is used in many machines.

  (a) What is the main advantage of this system?

    ....

    .... [1]

  (b) Give **three** disadvantages of this system.

    ....

    ....

    ....

    ....

    ....

    .... [3]

8 What is understood by the following terms?

  (a) *Ergonomics*

    ....

    .... [1]

  (b) *Aesthetics*

    ....

    .... [1]

  (c) *Anthropometrics*

    ....

    .... [1]

[Turn over

9 Energy is life. Without it we cannot exist.

(a) State the primary source of energy.

.... [1]

(b) Name **one** example of a fossil fuel.

.... [1]

(c) Give **one** example of a non-fossil fuel.

.... [1]

10 What are the **two** units in which mechanical energy is measured?

....

....

....

.... [2]

[40]

Part B

Answer **one** question from Part B.

11 Design Communication

Answer the whole question on a separate A3 drawing paper provided.

Fig. 5 shows an isometric view of a "SHAFT SUPPORT"

Ø38 × 25 DEEP HOLE
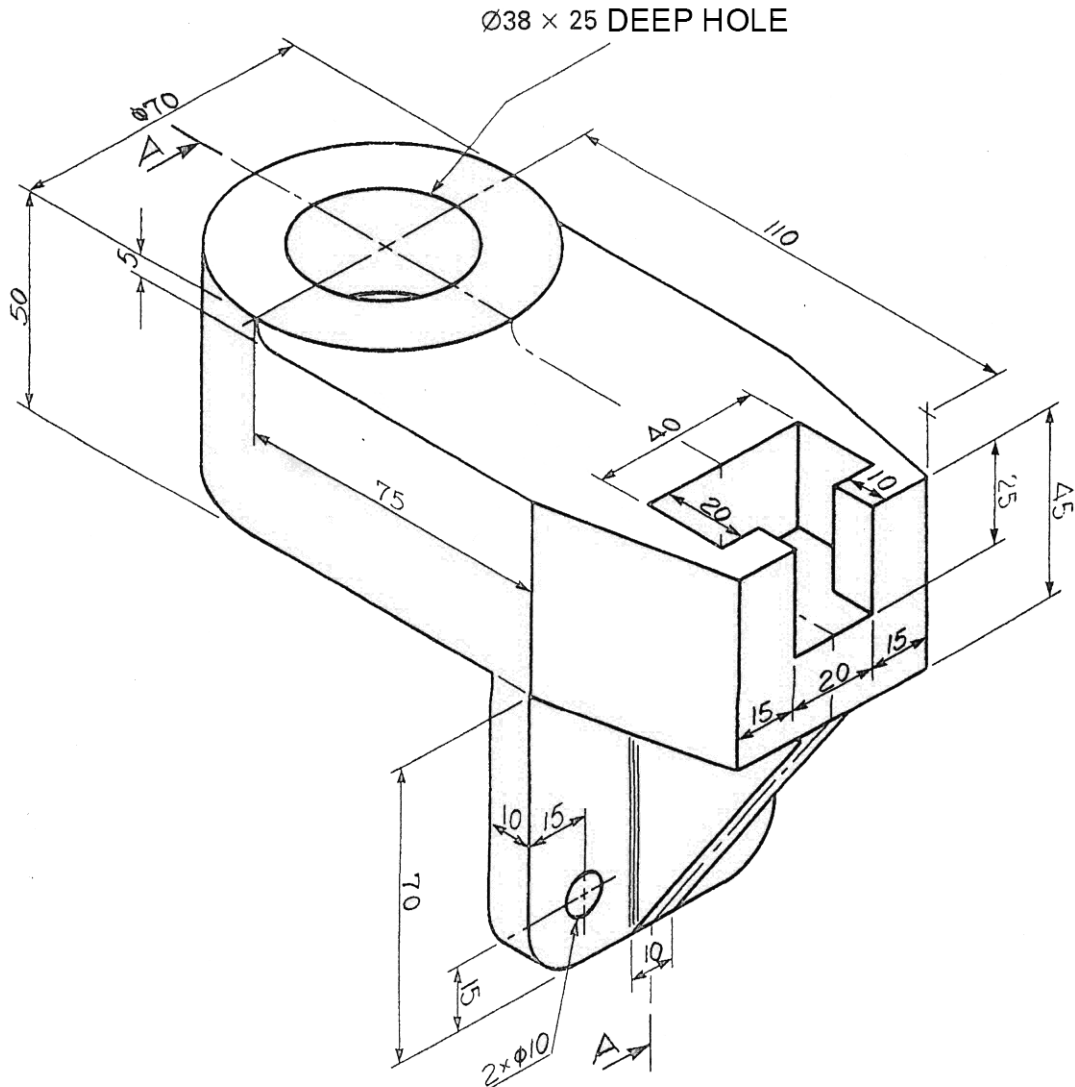
Fig. 5

Use the information in fig. 5 to draw and project in third angle orthographic projection to a scale 1:1.

(a) (i)   A full sectional front view on AA.   [10]

    (ii)   An outside right view, showing all hidden detail.   [10]

   (iii)   A top view, not showing hidden detail.   [10]

   (iv)   Insert 6 dimensions on your drawing.   [6]

    (v)   Print write the title and scale in the centre beneath your drawing.   [2]

   (vi)   Show the projection symbol in the bottom right corner of your drawing paper.   [2]

[Turn over

(b) Fig. 6 shows a front and top view of a building.
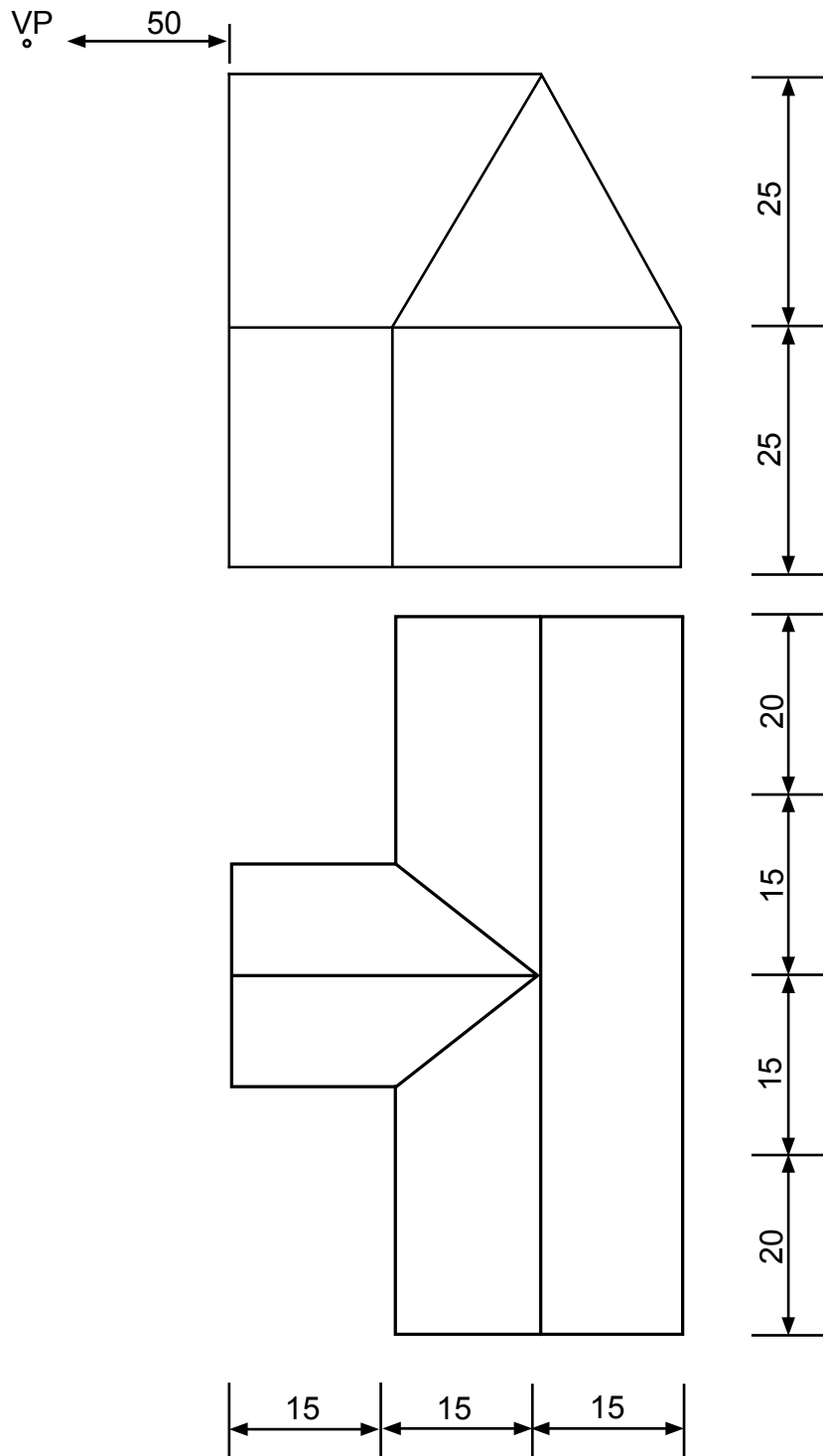
Fig. 6

Draw and project a single point perspective view of the building using the additional information:

- SP is 60 from the PP

- PP is 140 from the GG

- HL is 20 from the PP   [12]

(c) Fig. 7 shows a first angle orthographic view of a metal block. Draw free-hand by estimation and proportion an isometric view of the metal block and show by enhancement that the block is made from metal.

Fig. 7

[8]

[60]

[Turn over
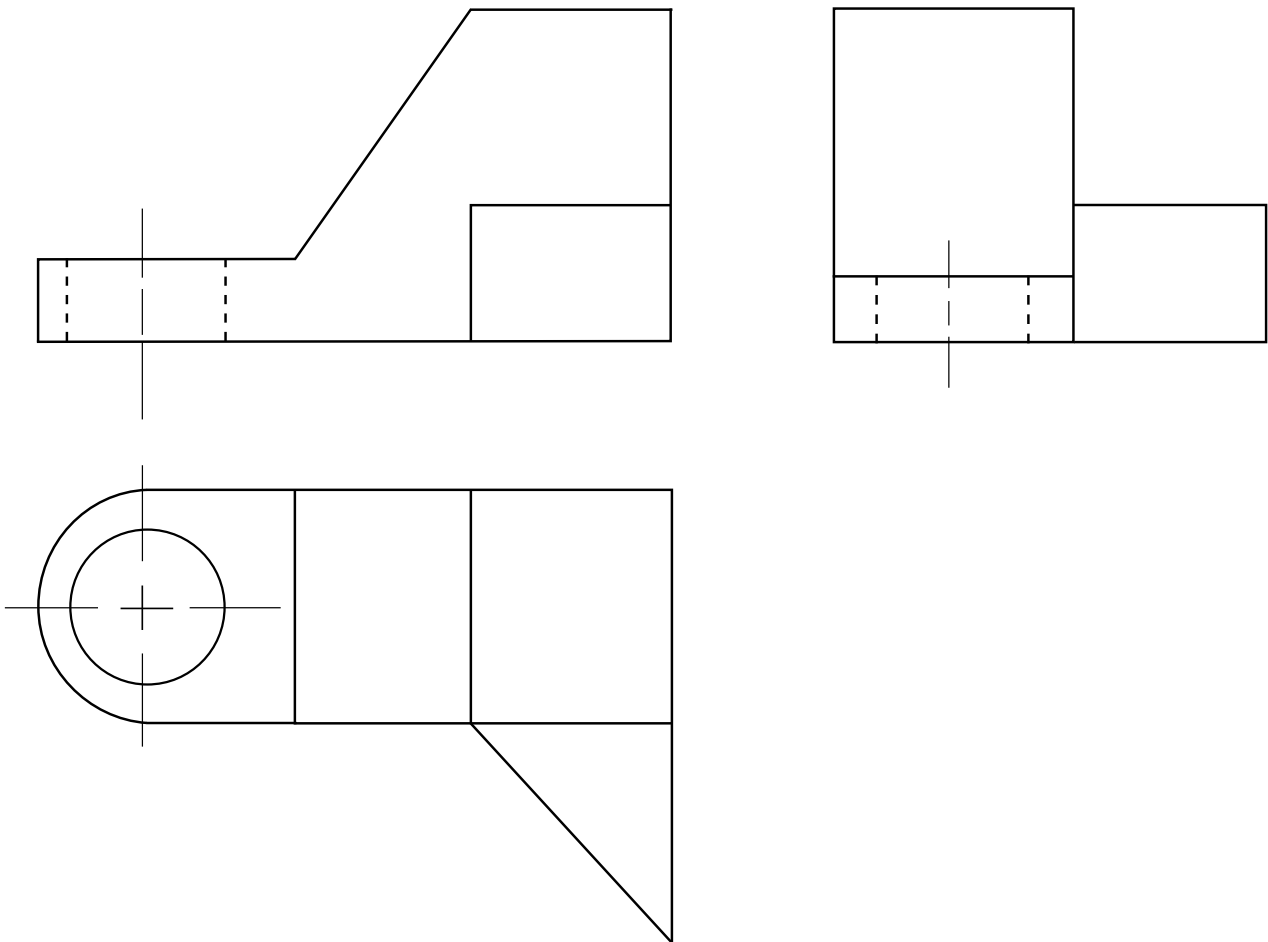
12 Resistant Materials

Answer all the questions in the spaces provided.

(a) Fig. 8 shows three methods of timber conversion.

| A | B | C |
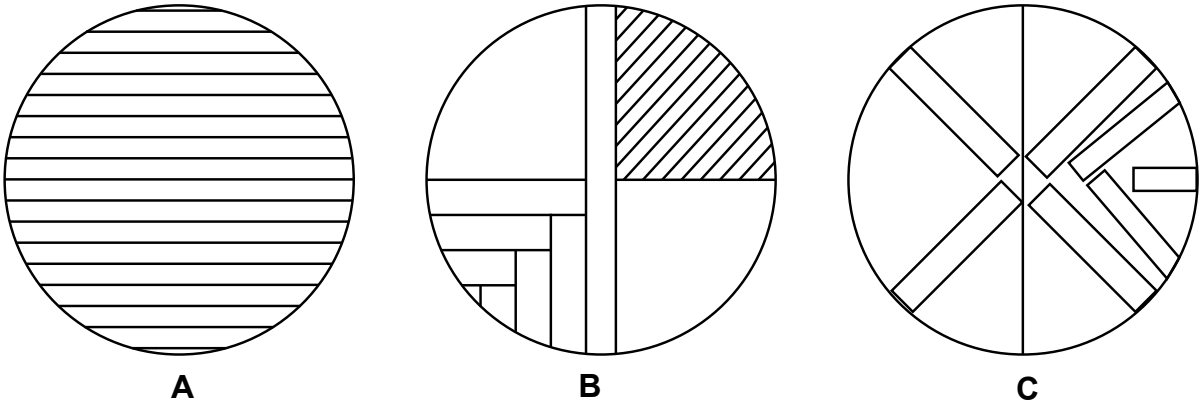
Fig. 8

(i) Identify the **three** methods in Fig. 8.

A ....

B ....

C .... [3]

(ii) List the methods that are most economical.

....

.... [2]

(iii) State the advantage of method **B** over method **A**. Give a reason for your answer.

Advantage: ....

....

Reason: ....

.... [2]

(iv) Explain the main reason for using method **C** and give a reason why it is not a popular method in the timber industry.

....

....

....

....

.... [3]

(b) Fig. 9 shows a jewellery box made of imbuia.

Fig. 9

(i) Name **two** properties of imbuia.

1. ....

2. .... [2]

(ii) Since the jewellery box is an ornamental piece of furniture, suggest a
type of joint for the sides of the jewellery box in Fig. 9.

....

.... [1]

(iii) Use sketches and notes to make a neat freehand sketch of the joint
suggested in **b (ii)**.

[3]

(iv) Name a suitable polish for the jewellery box and describe the correct
procedure for applying it.

Polish: ....

Procedure..

....

....

.... [4]

[Turn over

(c) After the stainless steel blade of a garden fork has been shaped and sharpened, it must undergo three heat treatment processes before it can be used.

List **three** heat treatment processes in order. State the purpose of each heat treatment process.

Process 1: .... [1]

....

Purpose:.. [1]

....

Process 2: .... [1]

....

Purpose:.. [2]

....

Process 3: .... [1]

....

Purpose:..

.... [2]

(d) Fig. 10 shows a utility storage stand suitable for an entertainment area at home. The removable trays are made of corrosion resistant metal while the frame is made from mild steel square tubing.

Fig. 10

(i) Suggest a suitable metal for the trays and give a reason for your choice.

Suitable metal: ....

Reason: ....

.... [2]

(ii) Name **one** property of mild steel.

.... [1]

(iii) Describe **one** method of joining mild steel permanently.

....

....

.... [2]

(iv) Describe **one** forming process to make trays.

....

....

.... [3]

(v) Describe how the frame could be made attractive as well as the procedure to get the suitable effect.

Method: ....

....

Procedure: ....

.... [4]

(e) The wheels of the frame in Fig. 10 are made of plastic.

  (i) Suggest a suitable plastic for the wheels.

....

.... [1]

  (ii) State if the suggested plastic in **(i)** is a thermo or thermosetting plastic.

....

.... [1]

  (iii) Explain the difference between thermo and thermosetting plastic.

....

....

....

.... [2]

  (iv) Name a suitable forming process for the wheels.

....

.... [1]

  (v) Describe the forming process in **(iv)**.

....

....

....

....

....

....

....

.... [4]

(vi) Give **two** properties of the plastic used in **e (i)**.

....

....

....

.... [2]

(f) Electrical cables are made by extruding plastic coat onto copper wire.

   (i) Name **two** plastics used for this purpose.

....

.... [2]

  (ii) In the space provided below make a simple, but clear sketch of how the coating takes place by extrusion. Show the following components:

- coated wire,
- die,
- copper wire,
- polymer chamber.

[7]

[60]

[Turn over

13 Technology

Answer **all** the questions in the spaces provided.

(a) Structures play a very important role in daily lives.

    (i) Name **two** examples of shell structures.

        1 ....

        ....

        2 ....

        .... [2]

    (ii) Name **two** examples of frame structures.

        1 ....

        ....

        2 ....

        .... [2]

    (iii) Describe the **two** main functions of structures.

        1 ....

        ....

        2 ....

        .... [2]

    (iv) Give **two** reasons why structures fail.

        1 ....

        ....

        2 ....

        .... [2]

    (v) Describe **two** forces responsible for structure failure.

        1 ....

        ....

        2 ....

        .... [4]

(b) Fig. 11 shows a crane in operation. Study the diagram and answer the questions.

50 m   10 m

10 000 N
COUNTER BALANCE
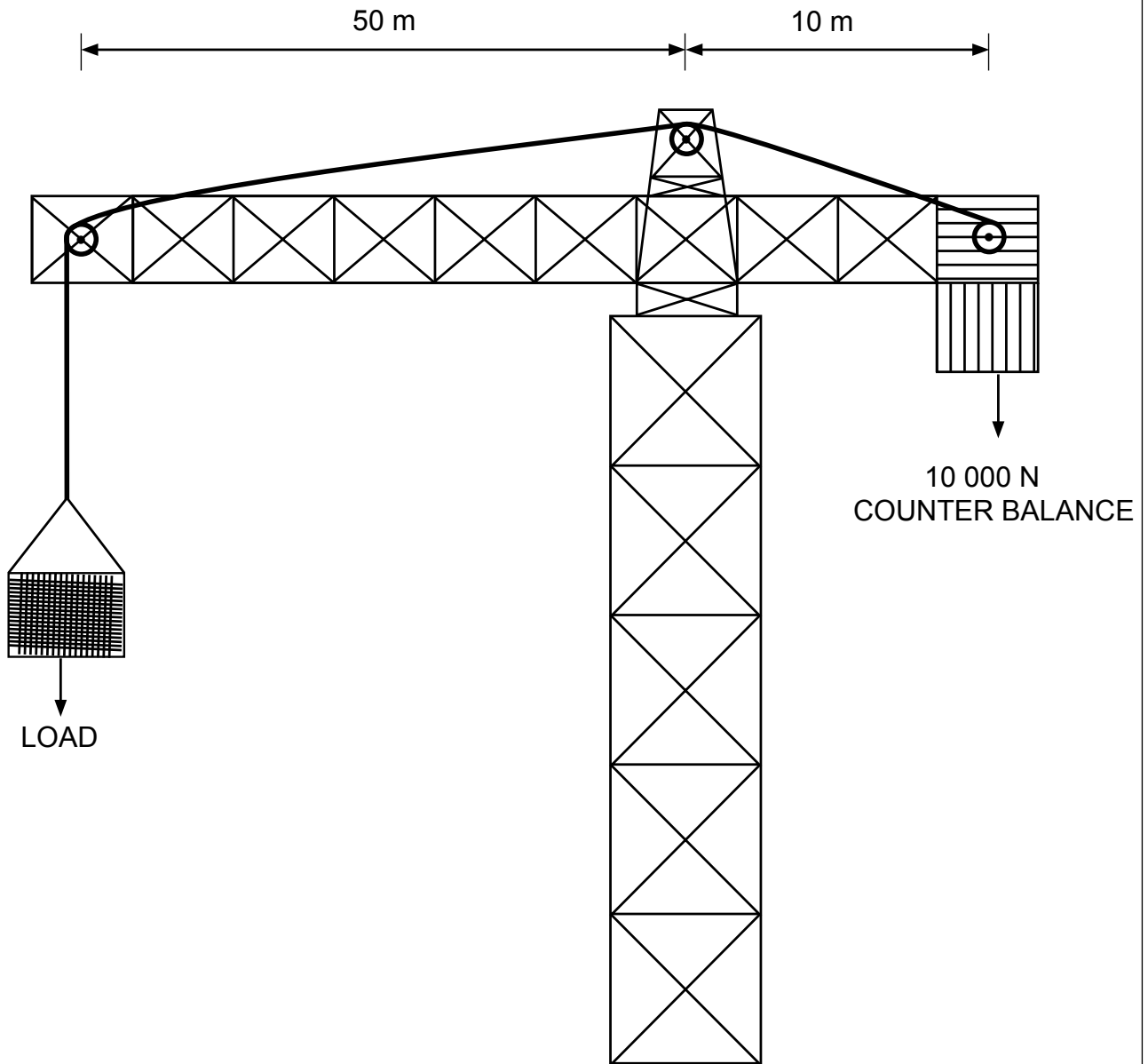
LOAD

Fig. 11

(i) The crane is used to lift the maximum load as shown.

Calculate the weight of the load.

....

....

....

....

....

....

....

.... [4]

[Turn over

(ii) If the position of the load was moved along the jip, the crane could become unstable and topple over.

Explain this and how it could be prevented (keep the gravitational force in mind).

....

....

....

....

....

....

....

....

....

....

....

.... [6]

(c) (i) The properties for the steel frame of the crane in Fig. 11 include conductivity, ductility and tensile strength.

Describe what is meant by the term:

1. *conductivity*: ....

.... [2]

2. *ductility*: ....

.... [2]

3. *tensile strength*:...

.... [2]

(ii) Illustrate a class 3 lever by means of a line diagram.

[3]

(iii) Fig. 12 shows a wheel barrow.

EFFORT

1000 N

0.5 m

1.5 m
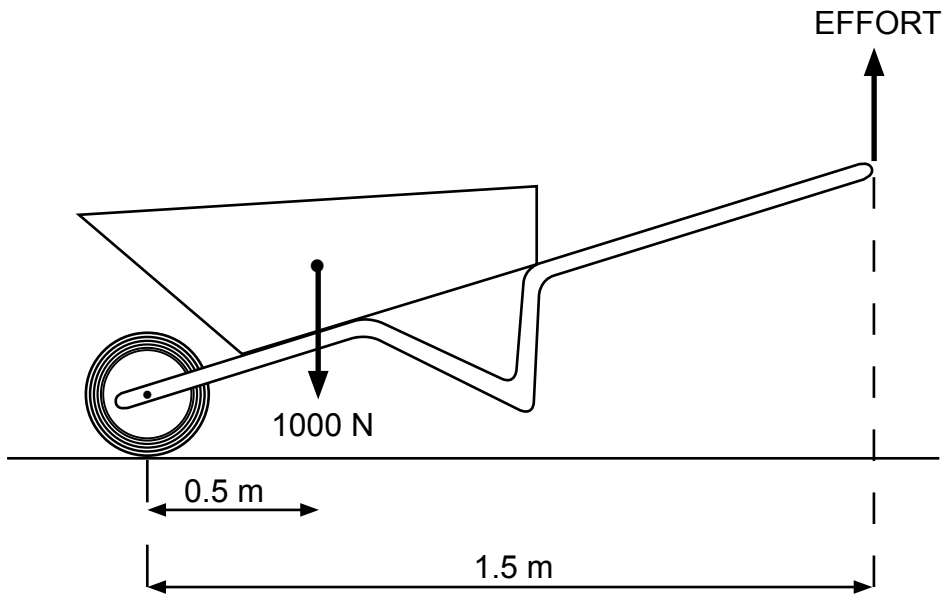
Fig. 12

Calculate the effort/force required to support the wheel barrow.

....

....

....

....

....

....

....

.... [4]

[Turn over

(d) Fig. 13 shows a stepped cone pulley system used in some pillar drills. Three different shaft speeds can be obtained by changing the V-belt.
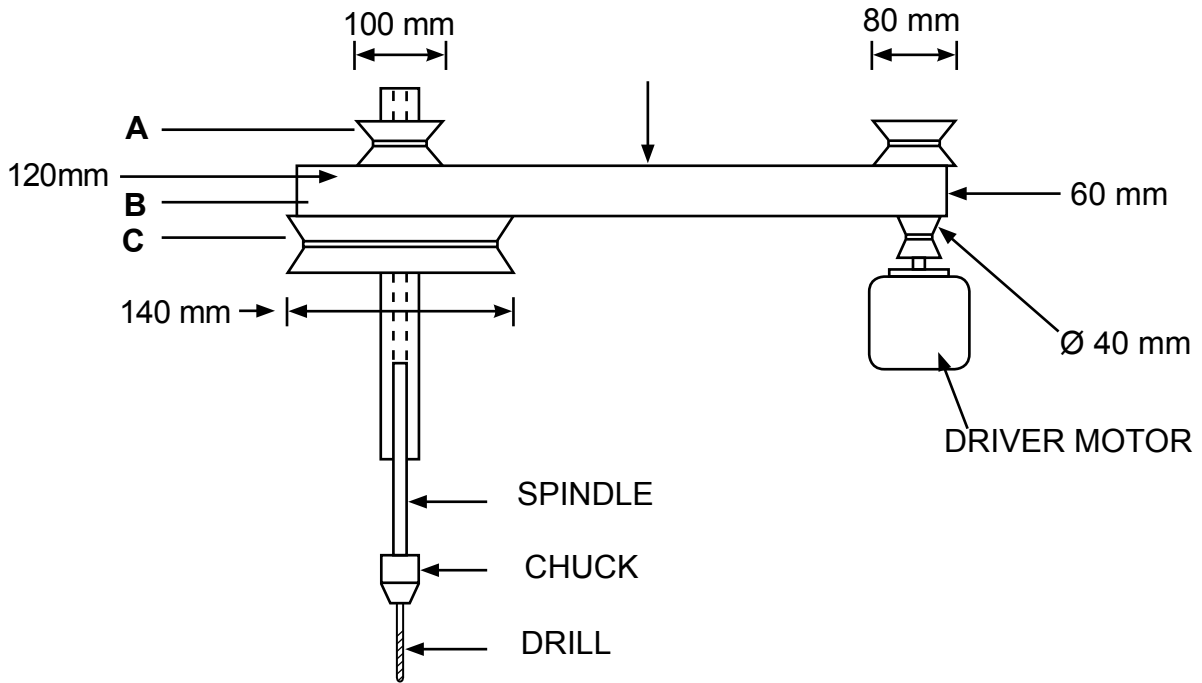
Fig. 13

(i) Calculate the velocity ratio of the pulley system in position **B**.

....

....

....

....

....

.... [3]

(ii) What is meant by the *torque* of the shafts?

.... [1]

(e) The motor runs at 400rpm.

(i) Calculate the highest drill speed.

....

....

....

....

....

....

....

....

....

.... [5]

(ii) Calculate the lowest drill speed.

....

....

....

....

....

....

....

.... [4]

[Turn over

(f) Fig. 14 shows an electric circuit that uses a light sensor to count the number of packets that pass along a production line.
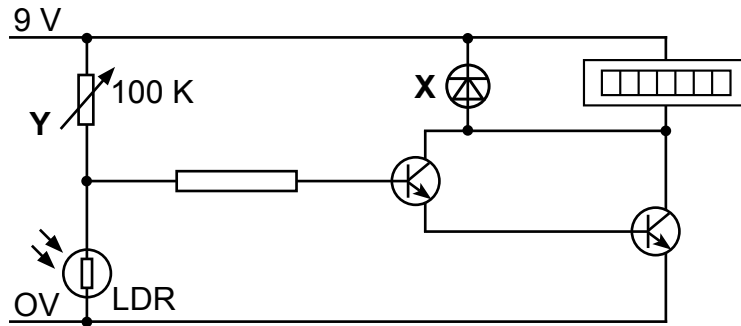

Fig. 14

(i) Name the type of resistor **Y** used in the circuit in Fig. 14.

....

....

....

.... [2]

(ii) Describe the operation of the circuit in Fig. 14.

....

....

....

....

....

....

....

....

....

....

.... [5]

(iii) Identify component **X** in the circuit in Fig. 14.

....

.... [1]

(iv) Explain the function of component **X** in the circuit.

....

....

....

....

....

....

....

.... [4]

[60]

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