



Province of the  
**EASTERN CAPE**  
EDUCATION

**SENIOR PHASE**

**GRADE 9**

**NOVEMBER 2016**

**TECHNOLOGY**

**MARKS: 120**

**TIME: 2 hours**



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This question paper consists of 17 pages including 2 pages of annexures.

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**INSTRUCTIONS AND INFORMATION**

1. This question paper consists of SIX SECTIONS: SECTIONS A, B, C, D, E and F.
2. You are required to answer ALL questions.
3. Read ALL the questions carefully before you write the answers.
4. Number your questions exactly as they appear in the question paper.
5. Write neatly and legibly.
6. Sketches must be clear, neat and done in pencil.

<b>ALLOCATION OF MARKS</b>		
SECTION A	QUESTION 1	
	MULTIPLE-CHOICE QUESTIONS	10
SECTION B	QUESTION 2	
	STRUCTURES	12
SECTION C	QUESTION 3	
	DESIGN AND GRAPHIC COMMUNICATION	50
SECTION D	QUESTION 4	
	MECHANICAL SYSTEMS	23
SECTION E	QUESTION 5	
	ELECTRICAL AND ELECTRONIC SYSTEMS	15
SECTION F	QUESTION 6	10
	PROCESSING	
<b>GRAND TOTAL:</b>		<b>120</b>

**SECTION A: MULTIPLE-CHOICE QUESTIONS****QUESTION 1**

Choose the correct answer and write only the letter (A–D) next to the question number (1.1–1.10) in your ANSWER BOOK, for example 1.12 C.

1.1 The type of line shown below represents an/a ...



- A hidden detail line.
- B construction line.
- C out-line.
- D dimension line. (1)

1.2 Which of the following will be used to guide a designer in the completion of a drawing?

- A Centre lines
- B Dashed lines
- C Outlines
- D Construction lines (1)

1.3 The main purpose of dimensioning in graphic communication is to make sure that the drawing ...

- A is neat.
- B is accurate.
- C informs the reader of its size.
- D is complete. (1)

1.4 ... slows the forward motion and stops a bicycle.

- A Brake lever
- B Brake cable
- C Brake callipers
- D All of the above. (1)

1.5 ... states that PRESSURE exerted on one part of a HYDRAULIC SYSTEM, will be transferred equally in all directions to other parts of the system without any loss.

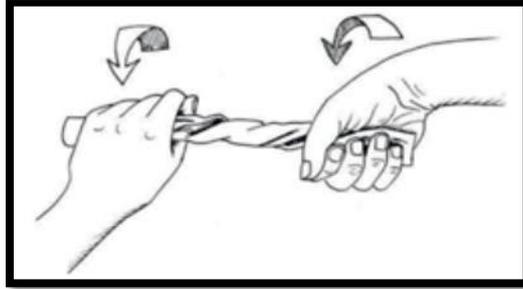
- A Pressure
- B Pascal's principle/law
- C Hydraulic system
- D Closed system (1)

1.6 A measure of the amount of the mass of an object compared to its size.

- A Hardness
- B Density
- C Flexibility
- D Stiffness

(1)

1.7 The type of force applied in the picture below is a ... force.



- A dynamic
- B static
- C torsion
- D even

(1)

1.8 A process whereby metal and wood could be given the same coating to keep out moisture and/or oxygen that could cause wood to rot or metal to rust.

- A Electroplating
- B Varnishing
- C Painting
- D Galvanising

(1)

1.9 An ammeter is used to measure the ... in a circuit.

- A energy
- B resistance
- C voltage
- D current

(1)

1.10 Which of the following would NOT be regarded as an output device?

- A Bulb
- B Motor
- C Light-dependent resistor
- D Buzzer

(1)

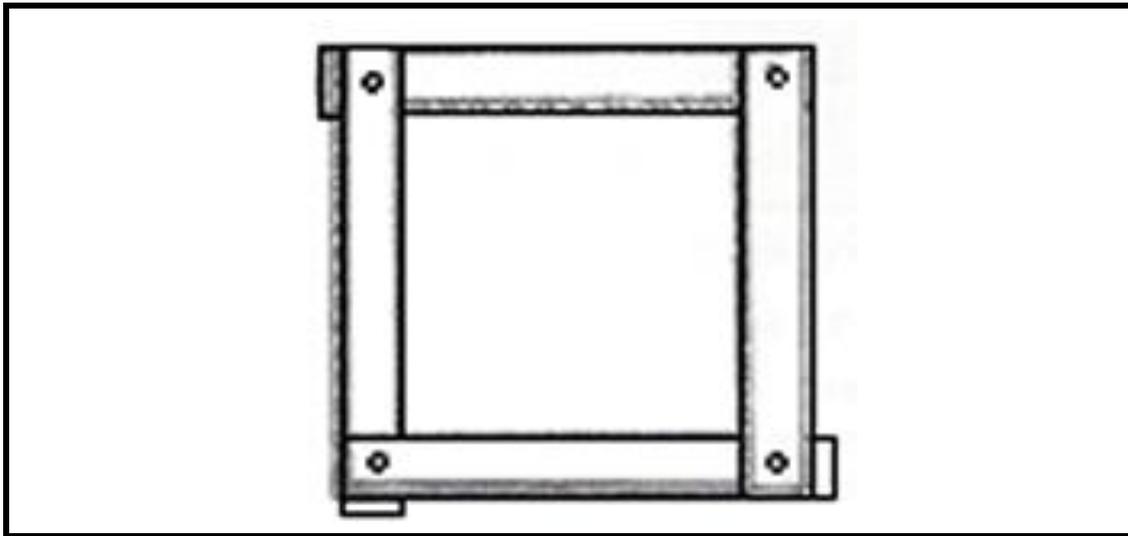
**TOTAL SECTION A: 10**

**SECTION B: STRUCTURES**

**QUESTION 2**

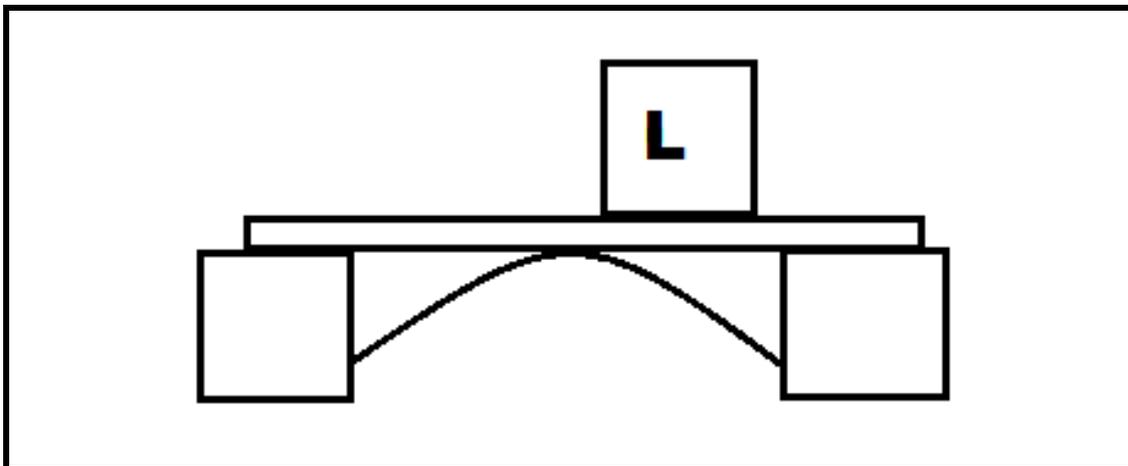
2.1 Cross-bracing is used to distribute forces that act on structures evenly so that twisting and bending do not occur.

Redraw the object shown below, and draw in the cross-bracing where it is needed.



(2)

2.2 Does the picture below show an even or an uneven load? Explain your answer.



(2)

2.3 Read the following paragraph and answer the questions that follow.

**NORTHERN UKHAHLAMBA LOCAL AUTHORITY**

**REQUEST FOR TENDER:** Access bridge for the community of Dabulamanzi

You are hereby invited to submit a tender for the requirements of Northern Ukhahlamba Local Authority.

**TENDER NUMBER – NU O25**

The successful tender must provide a safe, cost effective solution for the villagers to cross the local river. The river is 100 m wide at the crossing point. It rises during summer rains and there are crocodiles in the river all year round.

Construction must commence within 30 days of approval being granted and completed within 6 months.

Closing date – 25 February

**Enquiries:** Head of Community Council, Mr Nkululeko Mbonambi  
(054 258 9870)

- 2.3.1 Explain what a *tender* is. (2)
- 2.3.2 What is a suitable solution to the problem listed in the tender advert? (2)
- 2.3.3 List any TWO important aspects that the applicants need to consider in their solution to the problem. (2)
- 2.3.4 Why is it necessary that the commencement and completion of the construction be specified in the tender advert? (2)

**TOTAL SECTION B: 12**

**SECTION C: DESIGN AND GRAPHIC COMMUNICATION**

**QUESTION 3**

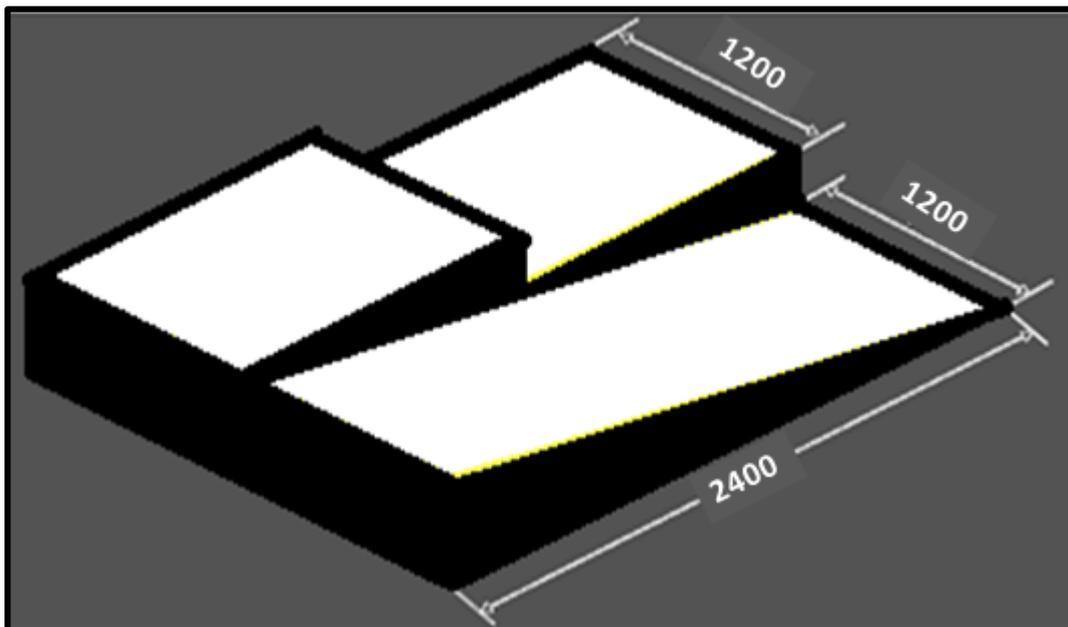
Read the scenario below and answer the questions that follow.

**SCENARIO**

Nelson Mandela High school has a new community hall. A staircase and wheelchair ramp is needed for the stage in the hall. The principal made a list of specifications that should be kept in mind when designing the staircase and the wheelchair ramp. The specifications are as follows:

- The stairs and ramp must be made in two units that are movable.
- The unit should fit in front of the stage so that people can walk onto the stage and a wheelchair can go up and down the ramp.
- The stage is 600 mm high.
- The stairs should be wide enough for two people to move side by side at the same time; 1 000 mm.
- There should be 3 steps of 200 mm high each.
- The flat part (riser) of each step is 600 mm long.
- The ramp should be wide enough for one wheelchair, 1 000 mm.
- The base of the ramp should be 1 800 mm long.

- 3.1 Write down a design brief for a solution to the problem identified in the scenario above. (2)
- 3.2 Neatly draw a free hand, three-dimensional sketch of the combined staircase and ramp. (Include dimensions in the correct places on your drawing.) (9)
- 3.3 The drawing below shows another design which was submitted for the above scenario and specifications.



- Compare the drawing with the specifications for the ramp. List at least THREE specifications that were not met in the above drawing. (3)

3.4 Draw an isometric projection of the stair only, to a scale of 1 : 20.  
 (The ramp must not be included.)  
 (The hidden detail, must be shown in your drawing.)  
 Use the isometric grid provided in ANNEXURE A. (8)

3.5 Draw a first angle orthographic projection of your required design for the stair only, according to the specifications given in the above scenario.

Take note of the following aspects that you would need to consider:

- Use the grid provided in ANNEXURE B.  
 (NOTE. Remember to place the page in the landscape position.)
- In reality if you draw it the full size it will not fit on ANNEXURE B.
- Draw only the FRONT VIEW, TOP VIEW AND LEFT VIEW to a scale of 1 : 20.
- Include the dimensioning of all the sides. (14)

3.6 Draw a flow diagram/chart of at least FIVE steps you will follow if you were asked to make the stair and ramp. (5)

3.7 Formulate FIVE questions on how the final product will be evaluated according to the specifications listed in the scenario. (5)

3.8 Study the table below and match the types of lines in COLUMN A with their uses in COLUMN B. Write down only the letter(A–D) and the question number (3.8.1–3.8.5), for example 3.8.5 E.

COLUMN A Type of line		COLUMN B Where would it be used	
3.8.1	Chain lines	A	Construction lines
3.8.2	Dark lines	B	Show symmetry
3.8.3	Dashed lines	C	Outlines
3.8.4	Feint lines	D	Hidden detail lines

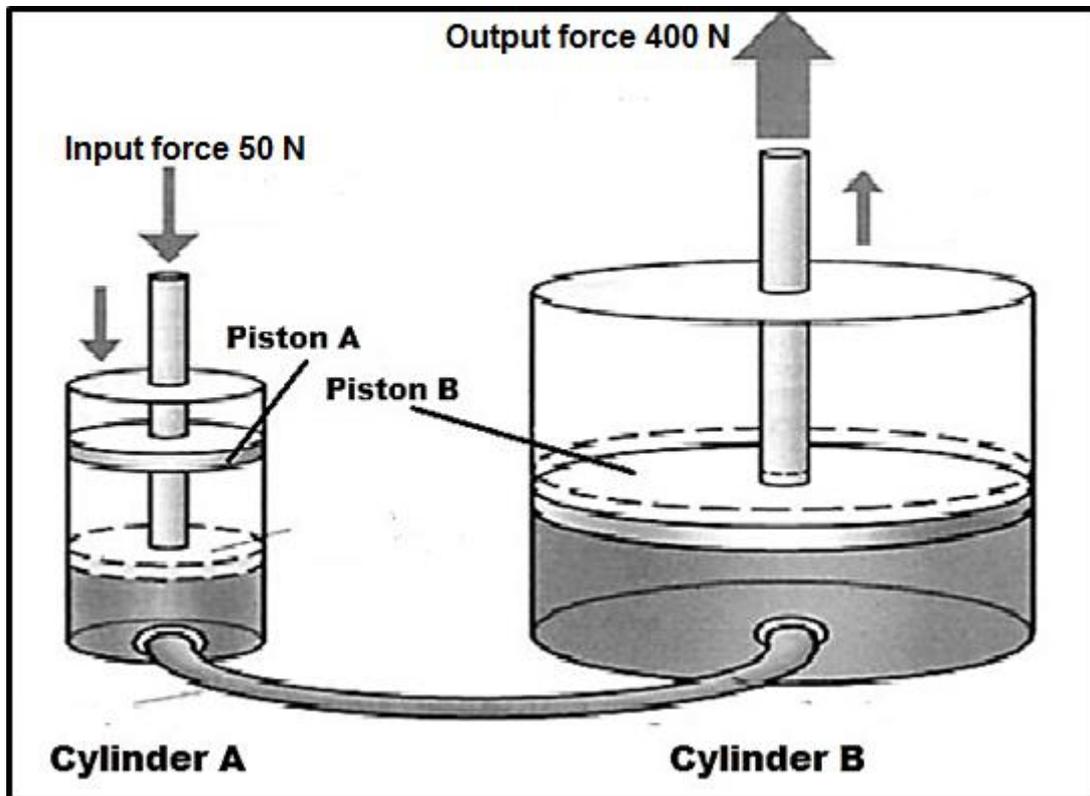
(4 x 1) (4)

**TOTAL SECTION C: 50**

**SECTION D: SYSTEMS AND CONTROL (MECHANICAL)**

**QUESTION 4**

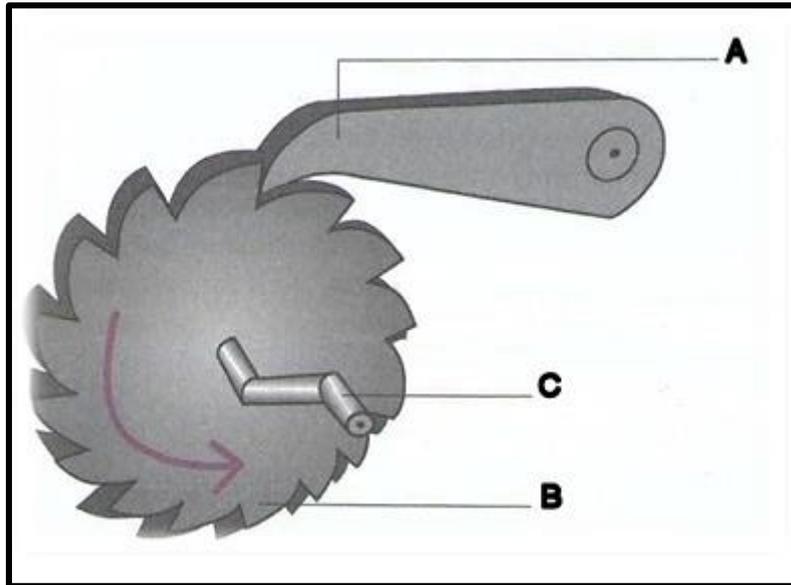
4.1 Study the diagram below and answer the questions that follow.



In the above hydraulic system the input force is 50 N and the output force is 400 N.

- 4.1.1 If piston **A** is compressed, what happens to piston **B**? (1)
- 4.1.2 When piston **A** is compressed by 80 mm, how far will piston **B** move? (1)
- 4.1.3 Calculate the mechanical advantage of this hydraulic system. (3)
- 4.2 What is the main function of disc brakes on a vehicle? (1)
- 4.3 Most bicycles use rim brakes, where a braking force is applied to the rim of the wheel.  
  
Give TWO advantages of using rim brakes rather than disc brakes on a bicycle. (2)

4.4 The mechanism below is an important control device used in many systems.

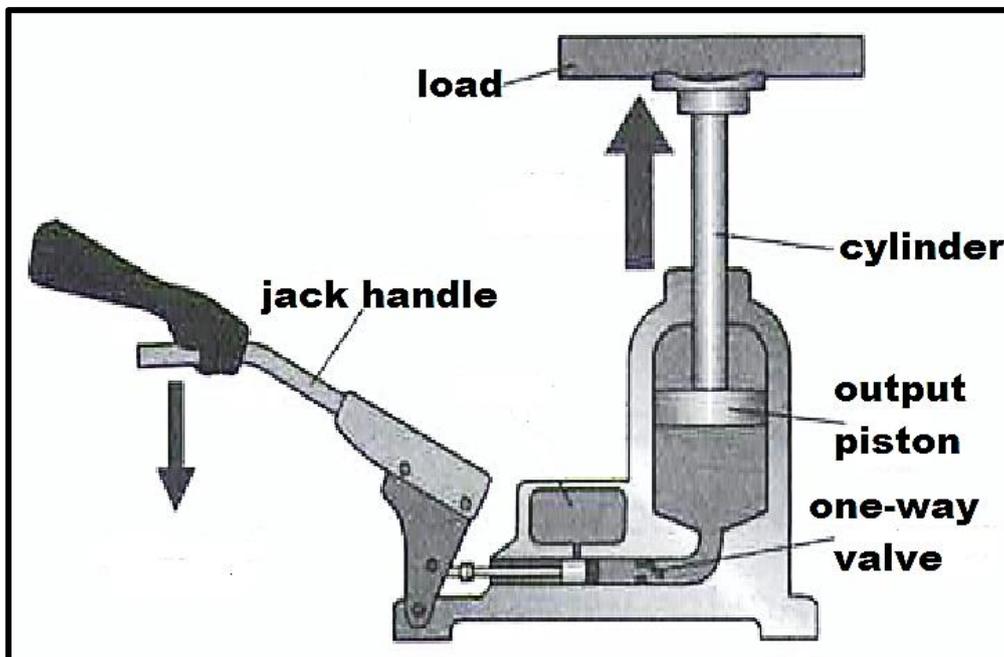


4.4.1 Name the parts labelled **A**, **B** and **C**. (3)

4.4.2 Give ONE example of a device that uses this locking system. (1)

4.5 Name TWO different types of gears (other than the one shown above).

4.6 Below is a drawing of a hydraulic jack. Draw a SYSTEMS DIAGRAM for the hydraulic jack.



(3)

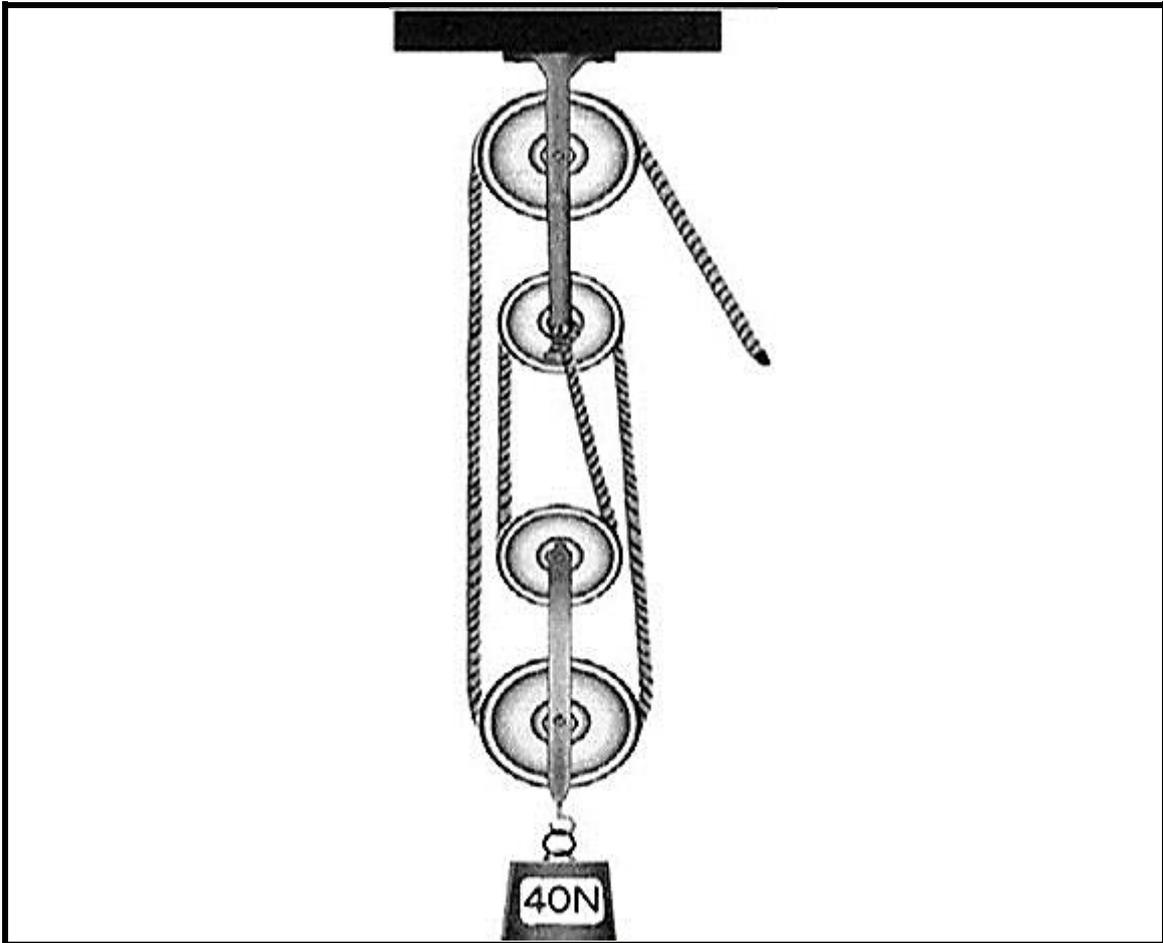
4.7 Give an example of where each of the following components is used in real life.

4.7.1 Cleat (1)

4.7.2 One-way valve (1)

4.8 Study the sketch below and answer the questions that follow.

In the lifting pulley system below a force of 40 N is lifted over a distance of 1 m.



4.8.1 Calculate the force needed to lift the load. (2)

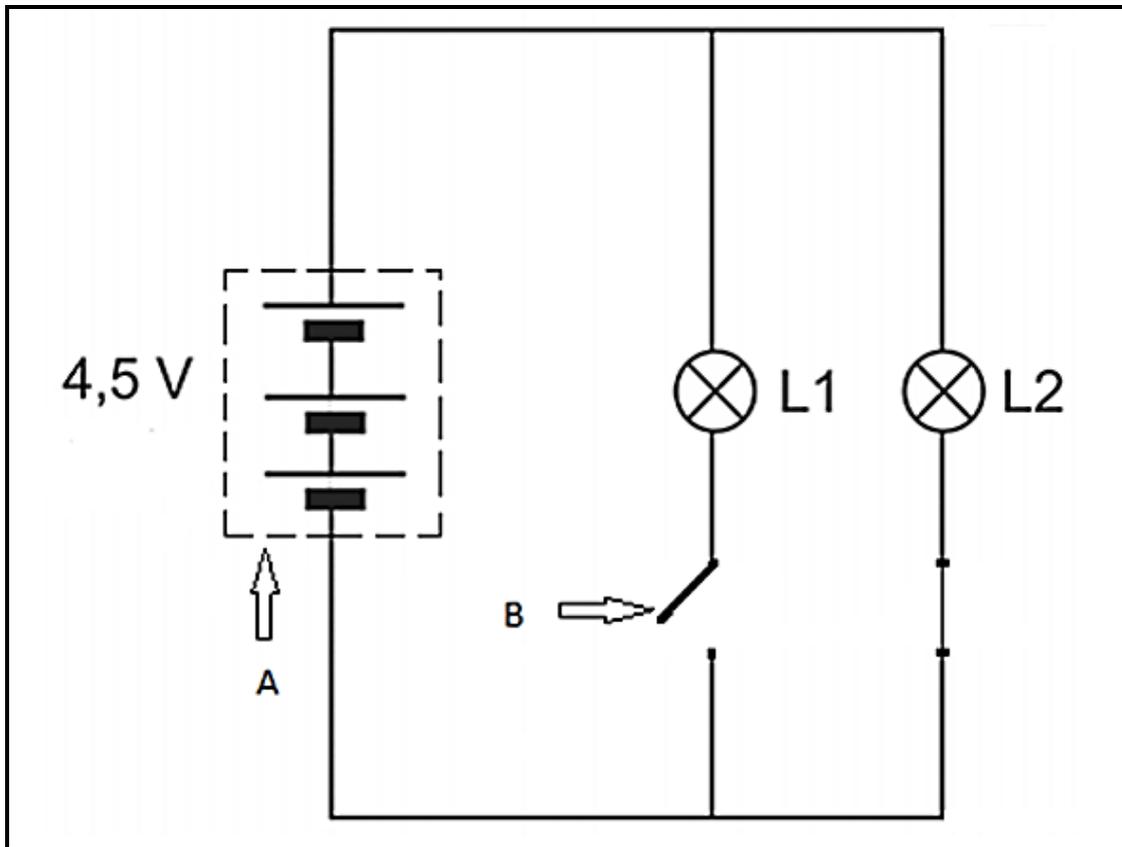
4.8.2 What is the mechanical advantage of this complex pulley system (block and tackle)? (1)

**TOTAL SECTION D: 23**

## SECTION E: SYSTEMS AND CONTROL (ELECTRICAL)

## QUESTION 5

5.1 Study the electronic circuit below and answer the questions that follow.



- 5.1.1 Are the lamps in the above electric circuit connected in series, or parallel? (1)
- 5.1.2 If current is allowed to flow in this circuit, which lamp, **L1** or **L2**, will glow? (1)
- 5.1.3 Identify the electrical components marked **A** and **B**. (2)

5.2 A generator has a resistance of  $15 \Omega$  and it generates a current of  $2 \text{ A}$ . Calculate the voltage that it will supply.

Formula: ( $V = I \times R$ )

(Show ALL calculations.)

(3)

5.3 Classify the following into INPUT, PROCESS or OUTPUT device:

- 5.3.1 Touch or moisture detector (1)
- 5.3.2 LED (1)
- 5.3.3 Photovoltaic panel/cell (1)

5.4 The picture below shows an example of a processing device that is used in many different circuits.



5.4.1 Name this device. (1)

5.4.2 Give at least ONE basic function performed by this device. (1)

5.4.3 Identify the THREE different terminals marked **e**, **b** and **c**. (3)

**TOTAL SECTION E: 16**

**SECTION F: PROCESSING****QUESTION 6: PROCESSING**

- 6.1 Read the following passage about food preservation and answer the questions that follow.

Food begins to spoil the moment it is harvested. Food preservation has been part of all cultures throughout history. It has enabled some groups to live in one place and form a community. The discovery of food preservation methods meant that humans no longer had to consume hunted animals or harvests immediately. They could preserve some of their food to eat at a later time.

It is interesting that different cultures preserved their local food sources using some basic methods of preservation such as heating, pickling, salting, refrigerating, drying, freezing and fermenting.

- 6.1.1 Name THREE methods of preserving food that was used in the olden days, as indicated in the passage above. (3)
- 6.1.2 Write down TWO advantages of preserving food listed above. (2)
- 6.2 The picture below shows plastic containers that have been collected at a recycling depot. These have been sorted by hand and they are all made of HDPE.



- 6.2.1 Why must all the plastics collected in recycle sorting bins be the same kind of plastic? (1)
- 6.2.2 Write down the full name for HDPE. (1)
- 6.3 Name ONE recycled plastic product that can be produced using HDPE. (1)
- 6.4 How does the work of the depot shown above have a positive impact on society and the environment? (2)

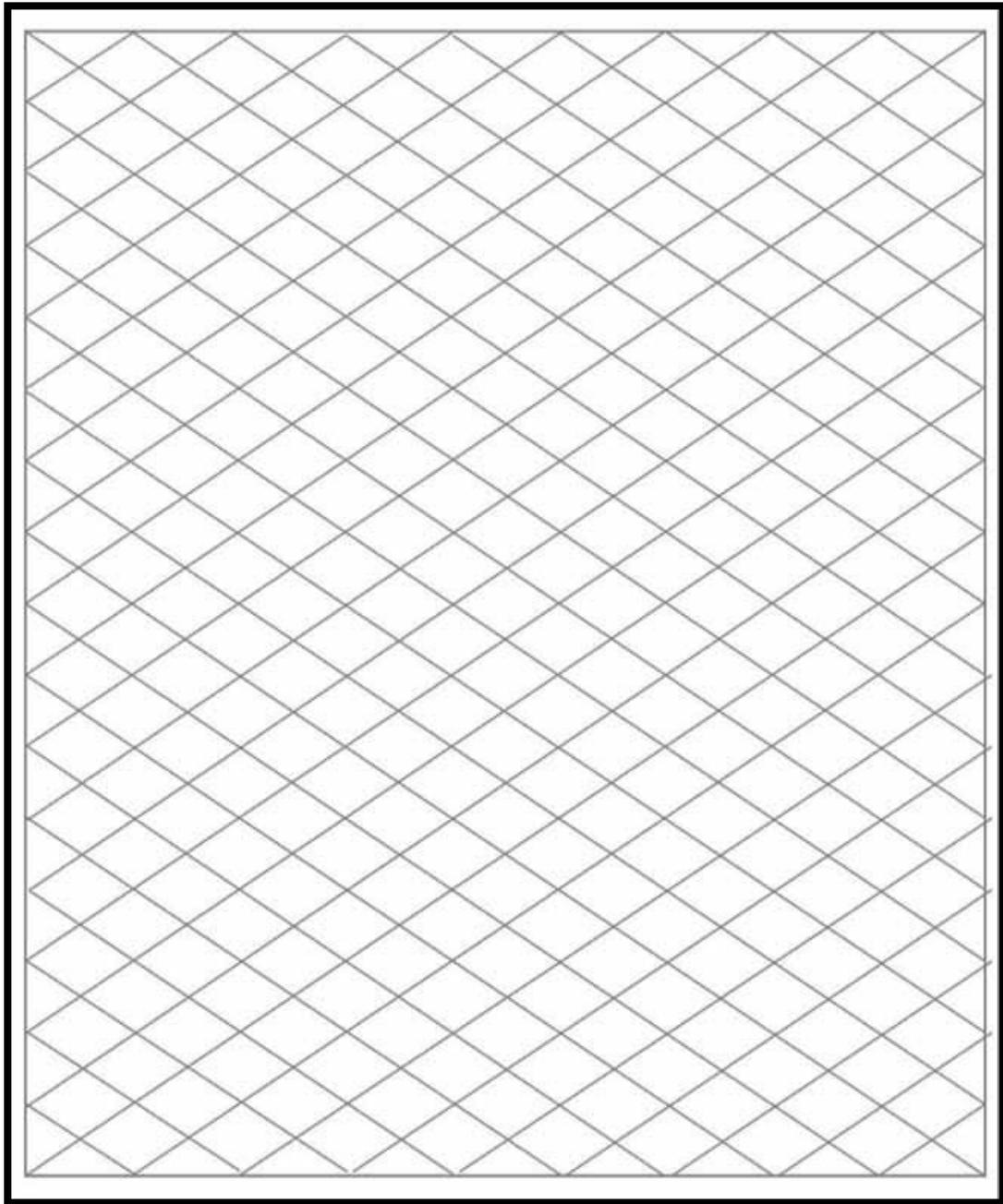
**TOTAL SECTION F: 10**  
**GRAND TOTAL: 120**



**ANNEXURE A (Isometric grid)**

**NAME:** .....

3.4





**ANNEXURE B**

**NAME:** .....

3.5

