higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ENGINEERING FABRICATION – SHEET METAL WORK
NQF LEVEL 3

(6031023)

17 November 2023
09:00–12:00

This question paper consists of 11 pages and 2 diagram sheets.

131Q1N2317

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
ENGINEERING FABRICATION – SHEET METAL WORK
NQF LEVEL 3
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Use only a black or blue pen.
5. Ensure to attach DIAGRAM SHEET 1 & 2 to your ANSWER BOOK.
6. Drawing instruments to be used.
7. Write neatly and legibly.

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SECTION A

QUESTION 1

Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1–1.8) in the ANSWER BOOK.

1.1 Which ONE of the following is not classified as a hand tool?

A Tin snips
B Bench vice
C Angle grinder
D Work bench

1.2 Which ONE of the following materials is classified as an alloy steel?

A Tool steel
B High carbon steel
C Medium carbon steel
D High-speed steel

1.3 Which ONE of the following pliers can only be used to cut wires?

A General pliers
B Vice-grip pliers
C Wire strippers
D Side cutters

1.4 Which ONE of the following uses does not apply to the specific use of a combination set?

A Measuring internal square corners
B Scribing lines square to the edge of a work piece
C Determine the centre of a round work piece
D Determine the diameter of a round work piece accurately

1.5 Which ONE of the following is not a safety precaution regards the transportation and handling of gas cylinders?

A Never allow cylinders to come into contact with sharp edges
B Never allow cylinders to overhang the sides of a vehicle
C Cylinders can be used as rollers if the load is not too heavy
D Never use cylinders as job supports

1.6 The following description describe a type of welding joint. Identify the type of joint.

"*Two pieces of metal join each other in the same plane*".

A Fillet joint
B Butt joint
C Lap joint
D Corner joint

1.7 The following description describe the cause of a certain welding defect. Identify the defect as described.

"*The bead is well fused, smooth and even at the top, but the weld did not reached the bottom edges of the joint*".

A Penetration with insufficient fusion
B Fusion with insufficient penetration
C Porosity
D Slag inclusions

1.8 Which ONE of the following <u>is not</u> a safety precaution with regards to caring and storing procedures of gas cylinders?

A Pipes must be rolled up
B Cylinders may be left open if torches are closed
C Regular maintenance checks must be done
D All damaged tools and equipment must be repaired before use

(8 × 1) **[8]**

QUESTION 2

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (2.1–2.6) in the ANSWER BOOK.

2.1 The plasma cutting process use a laser to cut materials.

2.2 Bolting is classified as a permanent method of fixing components together.

2.3 Grease and oil can be removed from the welding area by means of an angle grinder.

2.4 Valves of empty cylinders must always be firmly closed to prevent breathing.

2.5 A 1:20 scale means that 1 mm on the job represents 20 mm on the drawing.

2.6 Good housekeeping is desirable because it safes time spent in finding tools.

(6 × 1) **[6]**

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QUESTION 3

Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–T) next to the question number (3.1–3.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
3.1	Used to check the flatness over a distance of 2 metre	A	do not kink easily
3.2	Used to check a vertical surface for plumb.	B	neutral flame
3.3	The type of flame to weld brass	C	engineering square
3.4	The fastest method of welding in a vertical position	D	straight edge
3.5	The determination of a slope	E	vertical up
3.6	When accidents like cutting hands on nails, splinters and wire is caused by poor housekeeping	F	longs lay rope
3.7	With the forearm vertical, making small horizontal circles during rigging	G	scale
3.8	The type of rope when the wires in the strands, and the strands are laid in the same direction regard steel ropes	H	measuring tape
3.9	Longs lay rope	I	derricking jib up
3.10	This information must be stamped onto the body of a crane hook	J	spirit level
		K	unsafe handling
		L	oxidising flame
		M	WLL
		N	vertical down
		O	SWL.
		P	hoist
		Q	gradient
		R	cross-lay rope
		S	unsafe condition
		T	kinks easily

(10 × 1) **[10]**

QUESTION 4

Complete the following sentences by choosing a word or words from the list below. Write only the answer next to the question number (4.1–4.6) in the ANSWER BOOK

move slowly; workers tripping over objects; shrink; fume extractors; temperature; rotating; locked-out; sags; somebody that put a scriber in his/her pocket; thickness; roof fans; travel.

4.1 When measuring over long distances it must be remember that the tape …, which can effect an accurate reading.

4.2 Never use marking-off instruments on … machinery.

4.3 The pressure regulated by the regulator required varies in accordance with the … of the material.

4.4 Forced ventilation such as … must be used when welding metals containing elements like zinc that give off dangerous fumes.

4.5 … can be considered as poor housekeeping.

4.6 With your arm extended, hand open, wave fore arm in direction of motion, indicate the … hand signal.

(6 × 1) **[6]**

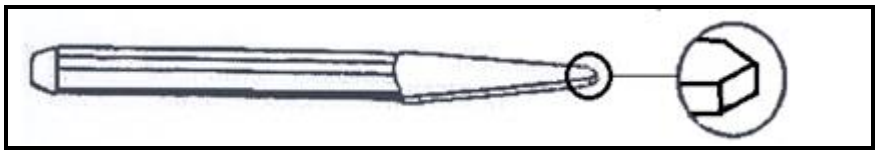
TOTAL SECTION A: 30

SECTION B

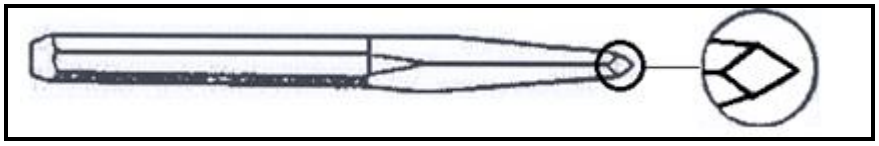
QUESTION 5

5.1 Identify the following tools and give ONE use of each.

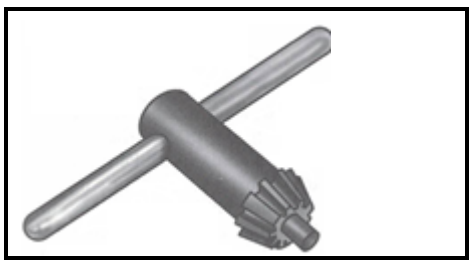
5.1.1



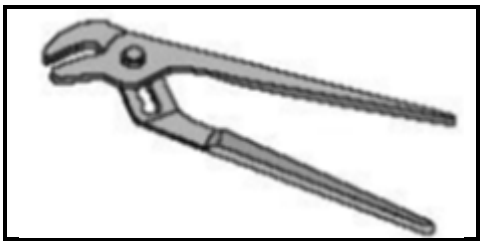
5.1.2



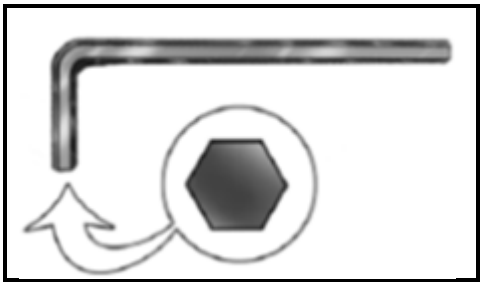
5.1.3



5.1.4



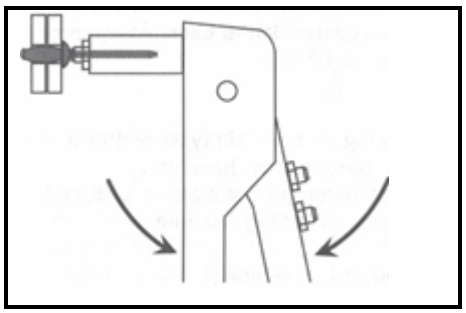
5.1.5



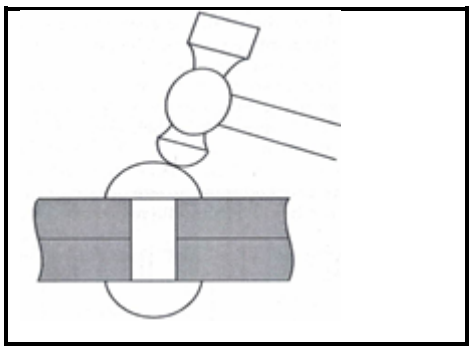
(5 × 2) (10)

5.2 Fully describe the process executed, as illustrated by each of the following indicated *hand tool* drawings.

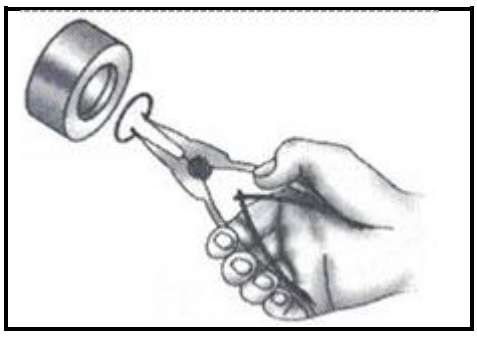
5.2.1



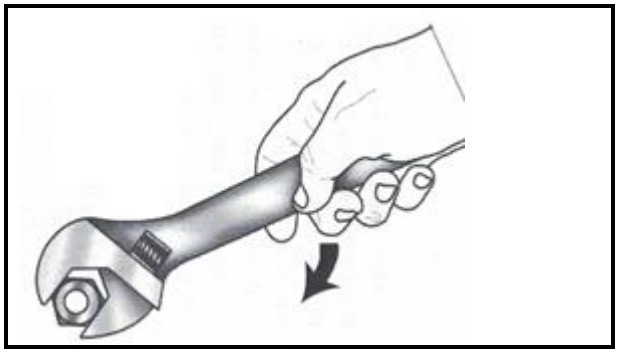
5.2.2



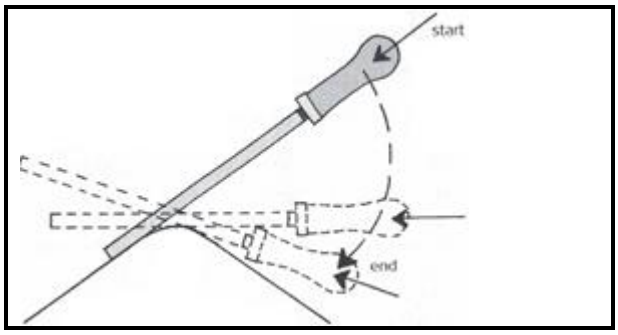
5.2.3



5.2.4



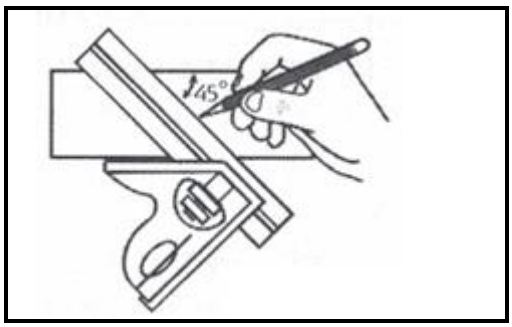
5.2.5



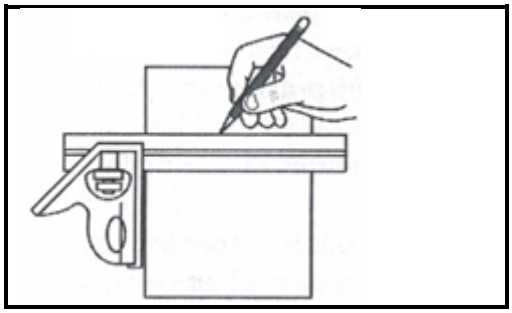
(5 × 2) (10)

5.3 Fully describe the process executed, as illustrated by each of the following indicated *measuring instrument* drawings.

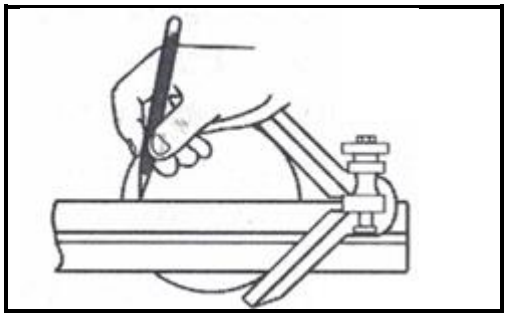
5.3.1



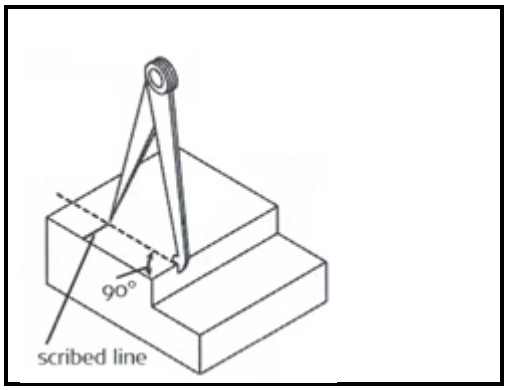
5.3.2



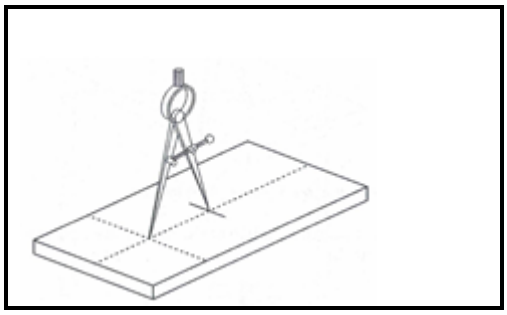
5.3.3



5.3.4



5.3.5



(5 × 2) (10)

5.4 Construct an acute angle (any degrees) with the same leg length. Bisect the angle using drawing instruments. All construction lines must be indicated.

(4 × 1) (4)

5.5 FIGURE 1, DIAGRAM SHEET 1, (attached), indicate an Oblique Pipe connection. Construct the true sectional shape (cutting plane 'A-A') of the pipe by making use of the given constructions to complete the drawing. Ensure to make use of drawing instruments. All construction lines must be indicated.

NOTE: After completion of the drawing, remove the DIAGRAM SHEET and attach it to your ANSWER BOOK. Ensure candidate information. (10)

5.6 FIGURE 2, DIAGRAM SHEET 2, (attached), indicate a Square Pipe T-piece connection with an incomplete main pipe development. Construct the shape of the hole in the main pipe development, by making use of the given constructions to complete the drawing. Ensure to make use of drawing instruments. All construction lines must be indicated.

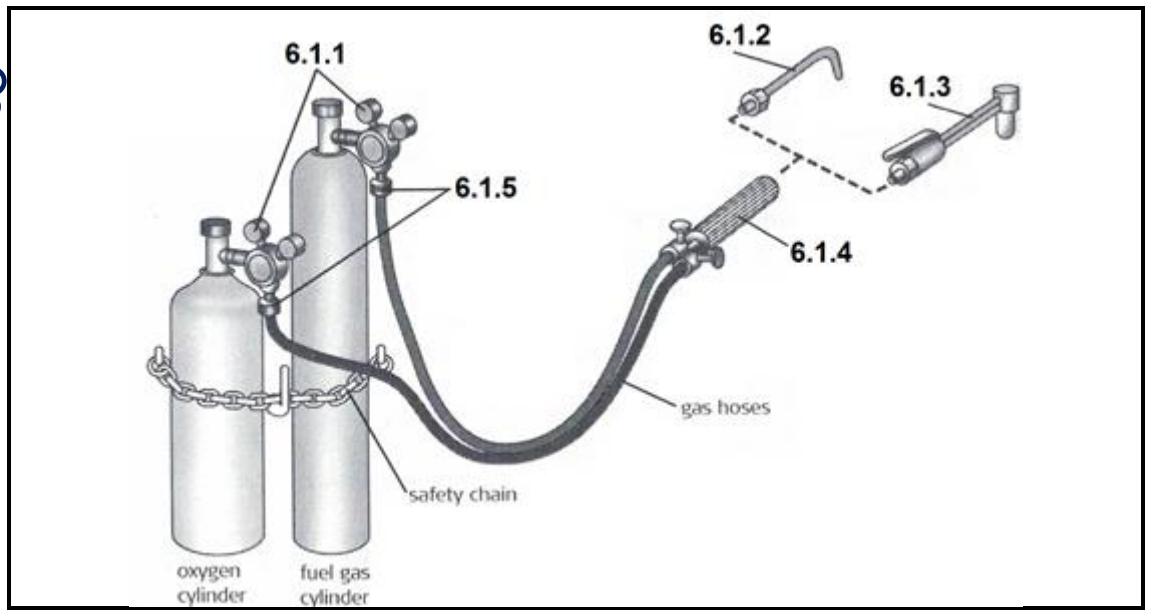
NOTE: After completion of the drawing, remove the DIAGRAM SHEET and attach it to your ANSWER BOOK. Ensure candidate information. (6)

[50]

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QUESTION 6

6.1 The following diagram illustrate an oxy-acetylene system. Identify the labelled components, by writing only the answers next to the question number (6.1.1–6.1.5) in the ANSWER BOOK.



(5 × 1) (5)

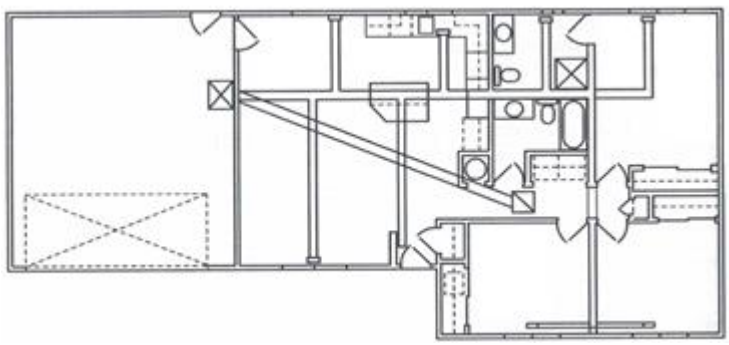
6.2 List FIVE causes of backfiring that might occur during the oxy-acetylene welding process. (5)

[10]

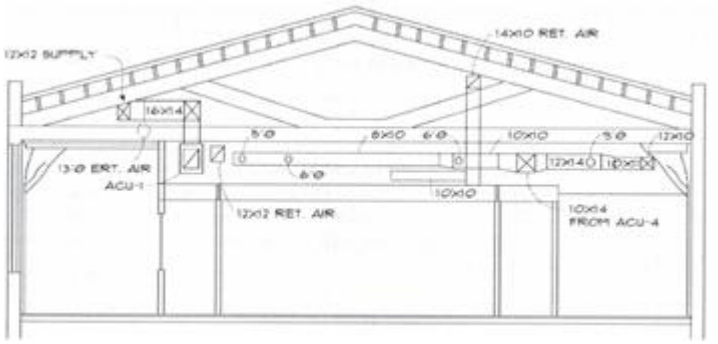
QUESTION 7

7.1 Analyse and classify what type of drawings are indicated in the following figures. Identify the drawings by writing only the answers next to the question numbers (7.1.1–7.1.3) in the ANSWER BOOK.

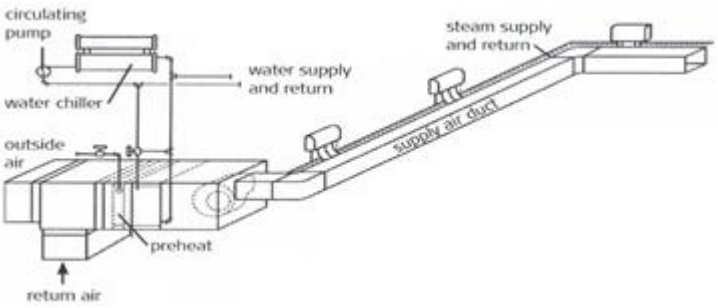
7.1.1



7.1.2



7.1.3



(3 × 2) (6)

7.2 List FOUR lifting equipment that will be used during rigging work. (4)
[10]

TOTAL SECTION B: 70
GRAND TOTAL: 100

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DIAGRAM SHEET 1

QUESTION 5.5

CENTRE NUMBER:													
EXAM NUMBER:													

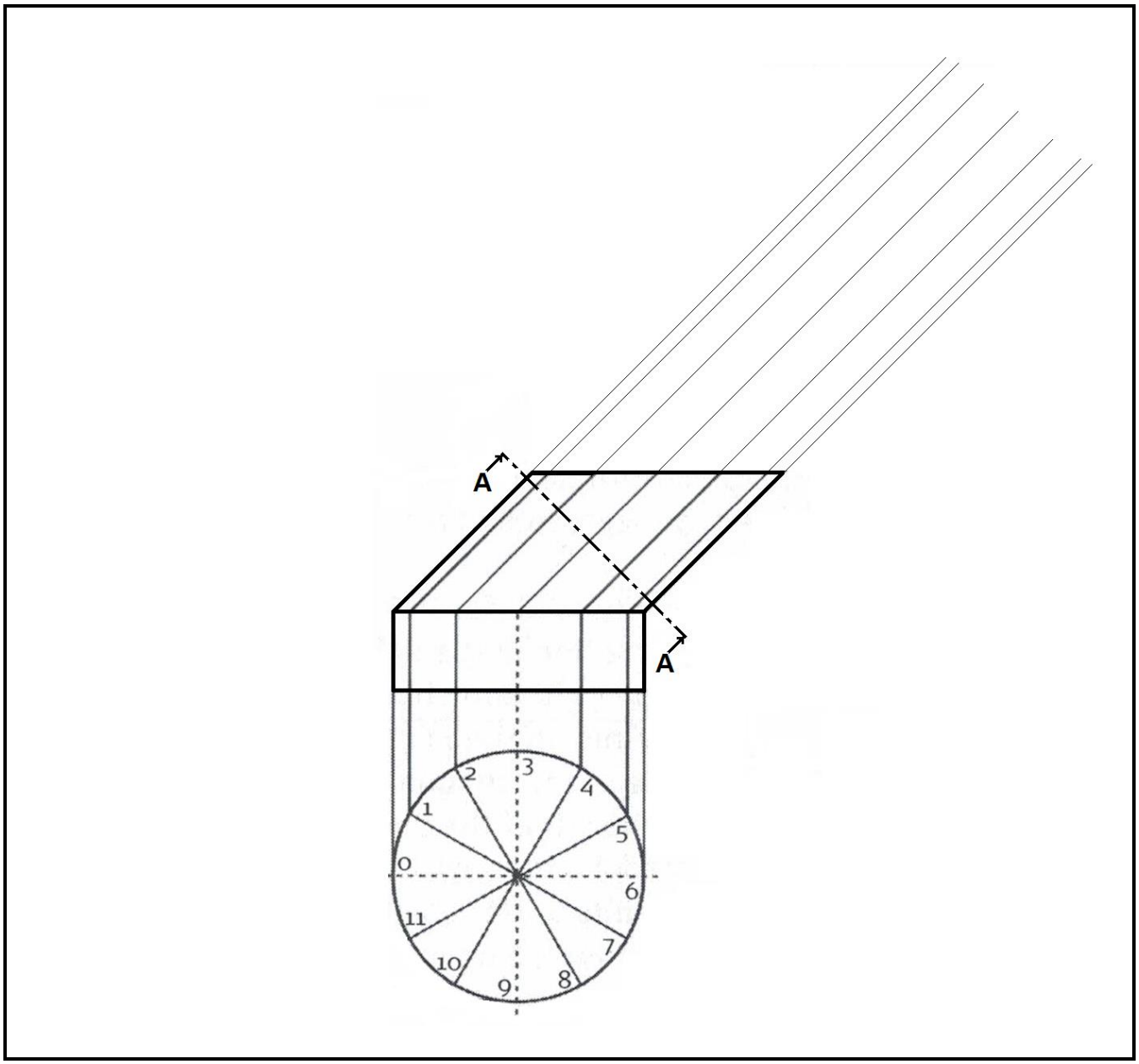


FIGURE 1

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DIAGRAM SHEET 2

QUESTION 5.6

CENTRE NUMBER:													
EXAM NUMBER:													

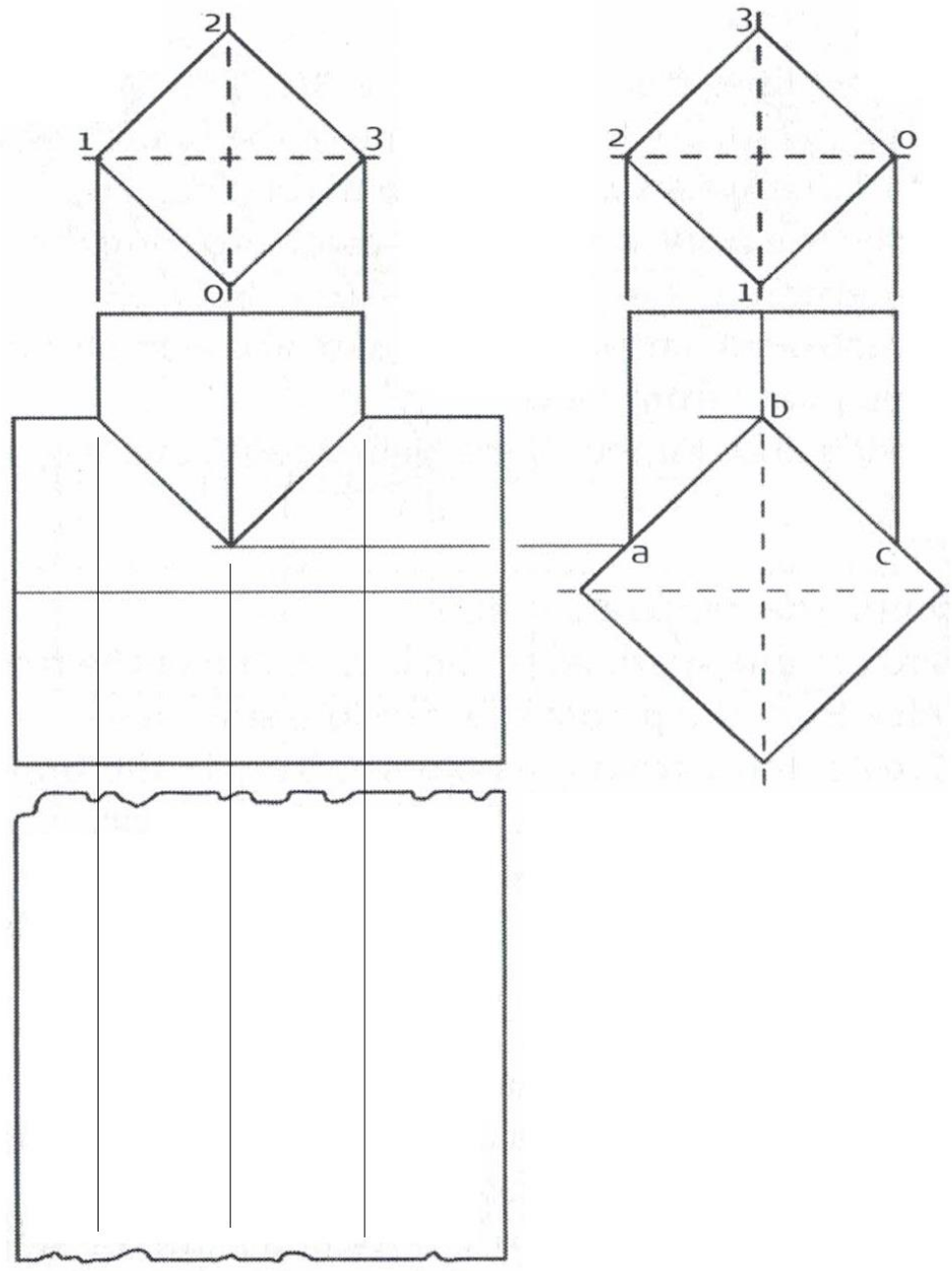


FIGURE 2

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