higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ENGINEERING TECHNOLOGY
NQF LEVEL 2

(6021012)

16 November 2023 (Y-paper)
13:00–16:00

REQUIREMENTS: A4 drawing sheet

This question paper consists of 9 pages and 1 diagram sheet.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
ENGINEERING TECHNOLOGY
NQF LEVEL 2
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. Start each question on a new page.
5. Make all drawings on the given A4 DRAWING SHEET.
6. All drawings must be neat, clear and in proportion, and drawn in pencil.
7. Use only a black or blue pen.
8. Write neatly and legibly.

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QUESTION 1

1.1 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 (1.1.1–1.1.6) in the ANSWER BOOK.

1.1.1 A semi-accurate tool used to quickly check the size of a gap:

A Screw-pitch gauge
B Taper gauge
C Feeler gauge
D Drill-angle gauge

1.1.2 A marking tool with one straight leg ending in a sharp point and one curved leg:

A Spring divider
B Trammels
C Jenny calliper
D Surface gauge

1.1.3 $\frac{1}{273{,}16}$ of the difference between absolute zero and the triple point of water:

A Kelvin
B Candela
C Celsius
D Mole

1.1.4 A punch used to make a dimple that helps to guide a drill bit to the correct position:

A Hook scriber
B Centre punch
C Plain scriber
D Prick punch

1.1.5 Used to transfer the measurement of the inside of holes and bores:

A Digital calliper
B Dial gauge
C Telescopic gauge
D Digital micrometer

1.1.6 Used to mark a straight line on a flat surface, over longer distances:

A Steel ruler
B Straight edge
C Chalk line
D Surface plate

(6 × 1) (6)

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1.2 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.2.1–1.2.7) in the ANSWER BOOK.

1.2.1 Inside callipers are used to measure the inside and outside dimensions of holes.

1.2.2 A drill bit with a parallel shank does not slip.

1.2.3 Laser is a type of light that can be produced by exciting certain gases.

1.2.4 A combination set consists of a rigid ruler together with three different heads that allow for versatile measurements.

1.2.5 Torque can be defined as an applied force that causes something to rotate.

1.2.6 An angle plate is used to hold cylindrical workpieces so that their axes are parallel to the datum surface.

1.2.7 Watt is the unit of power that equals one joule of work or energy per second.

(7 × 1) (7)

1.3 Choose a description from COLUMN B that matches a term in COLUMN A. Write only the letter (A–I) next to the question number (1.3.1–1.3.6) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.3.1	Nylon	A	small metal piece used to check and adjust the datum mark on a micrometer
1.3.2	Descaler	B	indispensable in steel fabrication work for lining up subassemblies
1.3.3	Test piece	C	commonly used for various measurements, for example, in acoustics and electronics
1.3.4	Plumb bob	D	the long side is used in hard-to-reach places
1.3.5	Decibel	E	mainly used by welders and boilermakers to remove scale from surfaces
1.3.6	Pipe wrench	F	used for loosening and securing pipes and fittings
		G	durable synthetic material with a low friction factor that can absorb shock
		H	used typically to assist in drilling by creating guide holes
		I	used to measure working components for excessive wear where accuracy is important

(6 × 1) (6)
[19]

QUESTION 2

2.1

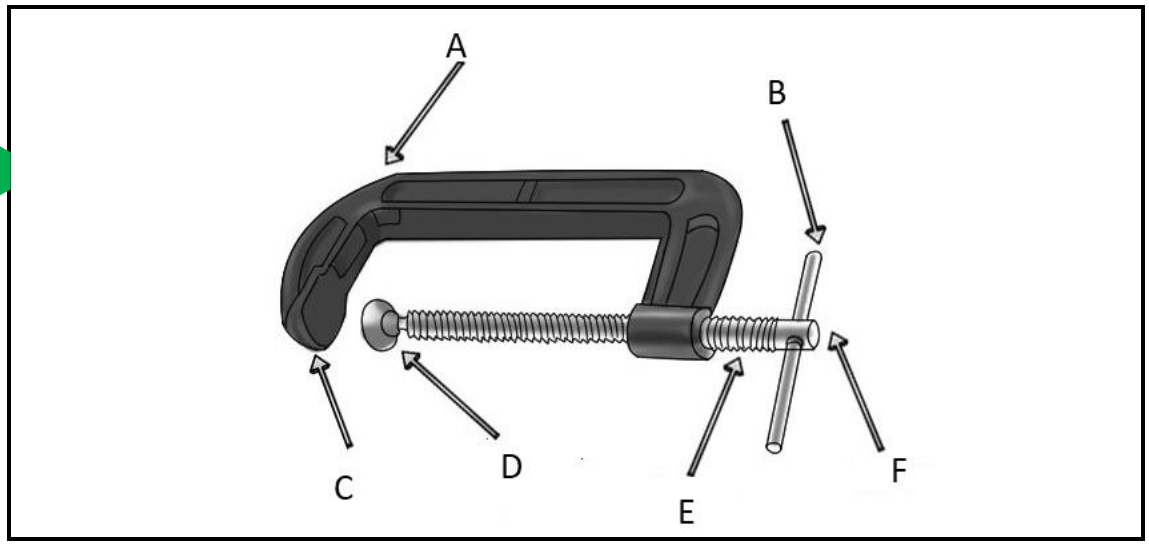


FIGURE 1

Name the parts of the G-clamp shown in FIGURE 1 by writing only the answer next to the letter (A–F) in the ANSWER BOOK. (6 × 1) (6)

2.2 List THREE methods to use a G-clamp in a workshop. (3 × 2) (6)

2.3 Name FOUR pneumatic power tools and their functions.
Tabulate your answer as shown in the example.

EXAMPLE:

POWER TOOL	FUNCTION
Pneumatic Pencil Grinder	To grind bores and remove small amounts of material

(4 × 2) (8)

2.4 Make a neat sketch of a scriber. Label the bent point, straight point and hand grip. (3)

[23]

QUESTION 3

3.1 FIGURE 2 shows a worker performing a task.

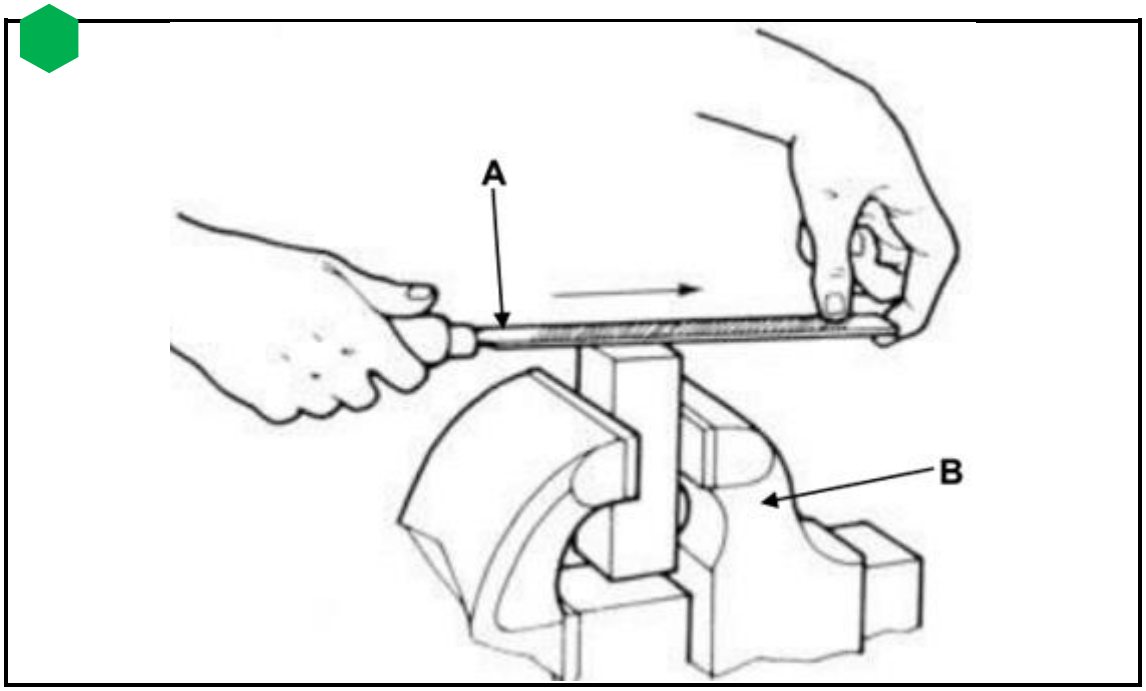


FIGURE 2

3.1.1 Name the tools marked A and B. (2)

3.1.2 Describe the task being performed in FIGURE 1. (2)

3.1.3 State the safety procedure to follow when using tool A. (1)

3.2 Name THREE guidelines to be observed when storing an Engineer's Square (3)

3.3 Name the cutting tool used for enlarging previously drilled holes. (1)

3.4 State the function of each of the following controls on a compressor:

3.4.1 Safety valve

3.4.2 Pressure switch

3.4.3 Regulator

(3 × 2) (6)

3.5 State FOUR guidelines for the safe use, maintenance and storage of a pneumatic impact wrench. (4)

3.6 Convert 313,5 K to Celsius.

HINT: °C = K – 273,15 (3)

3.7 Write the full name of the symbol, of the SI units:

3.7.1 cd

3.7.2 A

3.7.3 mol

(3 × 1) (3)
[25]

QUESTION 4

4.1 State the purpose or function of each of the following hand tools:

4.1.1 Hand riveters

4.1.2 Files

4.1.3 Screwdrivers

4.1.4 Radius gauge

(4 × 1) (4)

4.2 FIGURE 3 shows a measuring instrument.

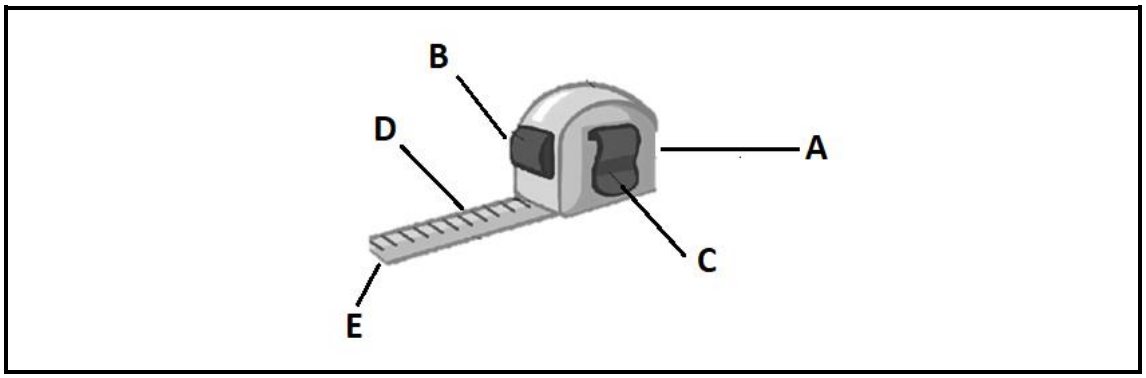


FIGURE 3

4.2.1 Name the measuring instrument shown in FIGURE 3. (1)

4.2.2 Name the parts of the measuring instrument by writing only the answer next to the letter (A–E) in the ANSWER BOOK. (5 × 1) (5)

4.3 State FIVE important guidelines for the maintenance and storage of a micrometer. (5)

4.4 FIGURE 4 shows micrometer scale readings.

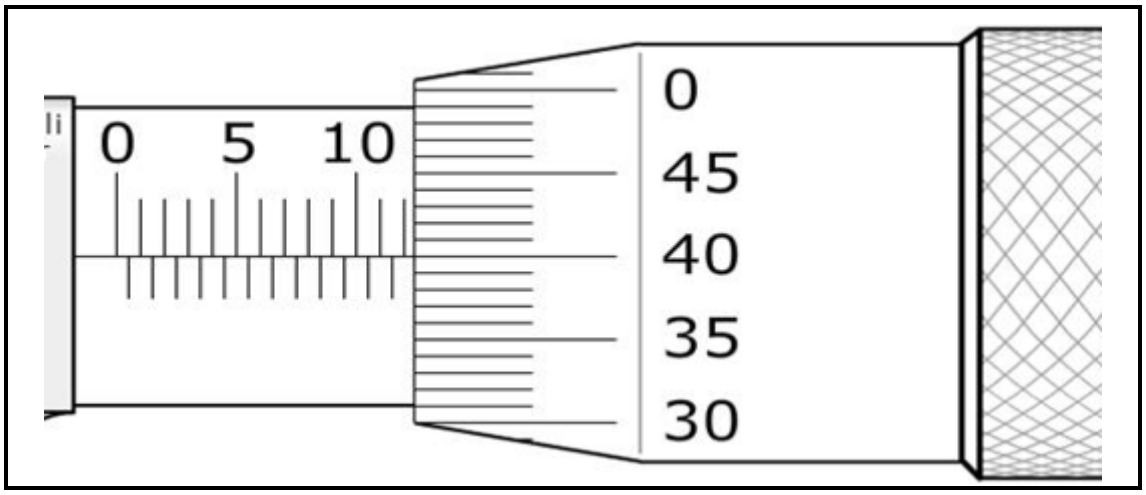


FIGURE 4

Give the reading on the micrometer. (3)
[18]

QUESTION 5

The DIAGRAM SHEET (attached) shows an isometric view of a machine part.

Use scale 1:1, and draw each of the following views in third-angle orthographic projection:

5.1 Front view (3)

5.2 Top view (4)

5.3 Right view (3)

5.4 Insert ONE dimension on each view (3)

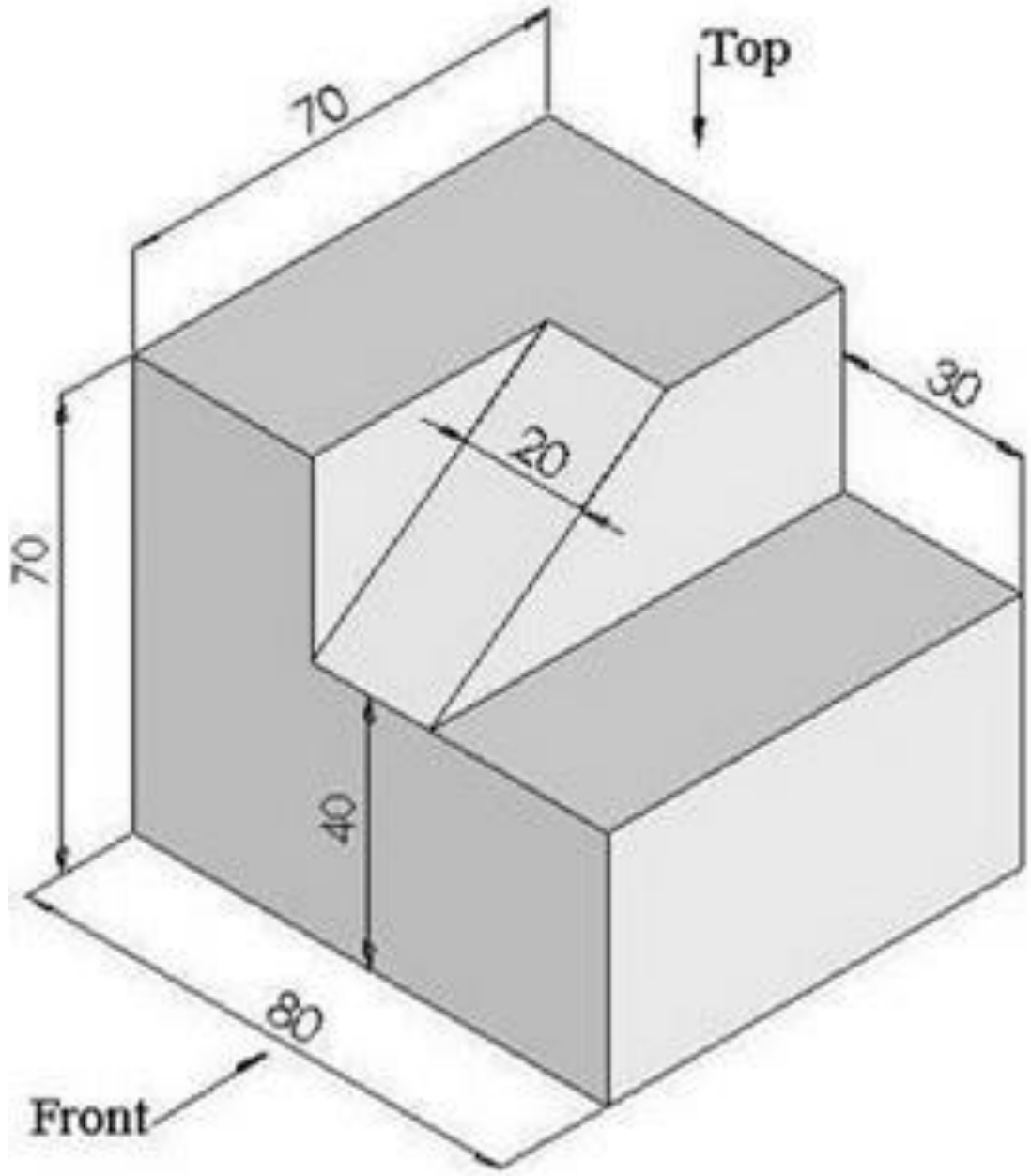
5.5 Draw the projection symbol below the drawing (2)
[15]

TOTAL: 100

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DIAGRAM SHEET



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