higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ENGINEERING TECHNOLOGY
NQF LEVEL 2

(6021012)

07 November 2022 (Y-paper)
13:00–16:00

REQUIREMENTS: A4 drawing sheet

This question paper consists of 9 pages and 1 addendum.

083Q1N2207

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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 section on a new page.
5. Use only a blue or black pen.
6. All sketches must be neat, clear and in proportion.
7. Drawings must be done on the A4 drawing sheet provided.
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 correct 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 … is an SI unit measurement for energy.

A Kg (Kilogram)
B N (Newton)
C J (joules)
D Rpm (revolutions per minute)

1.1.2 The most appropriate instrument for scribing large circles.

A Multimeter
B Vernier height gauge
C Trammels
D Centre punch

1.1.3 … is the flow of electrons in a circuit.

A Electric current
B Potential difference
C Datum
D Ohm's law

1.1.4 An external micrometer is used to measure …

A inside measurement of a component.
B outside measurement only.
C perpendicular lines
D amount of air delivered by a compressor

1.1.5 Which ONE of the following instruments is used for marking off an engineering work piece?

A Steel ruler.
B Tape measure.
C Surface gauge
D Vernier calliper

1.1.6 Three heads for combination set are …

A big head, small head and hexagon head.
B parallelogram head, static head and moving head
C square head, centre head and protractor head
D scale head, trapezoidal head and fixed head

(6 × 1) (6)

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

1.2.1 It is not safe to use an angle grinder with a loose cutting disc.

1.2.2 A chuck key is used to tighten or loosen the blade of an angle grinder.

1.2.3 A filler gauge is used to set the gap on a spark plug.

1.2.4 A centre punch is used to indent the centre of holes that have to be drilled.

1.2.5 Torque is defined as a turning moment produced by a force.

1.2.6 It is safe to use a file without a file handle.

1.2.7 Tolerance is not a variation of a nominal dimension.

(7 × 1) (7)

1.3 Choose a description from COLUMN B to match an item in COLUMN A. Write only the letter (A–I) next to the question number (1.3.1–1.3.7) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.3.1	Allen keys	A	used to measure length, depth and inside and outside measurements
1.3.2	Compressor	B	used to mark a line with a series of dots drawn with a scriber
1.3.3	Vernier calliper	C	is the amount of light emitted by a source and is measured in candela
1.3.4	Dotting punch	D	the long side is used in hard-to-reach places
1.3.5	Luminous intensity	E	used to pump tyres, power air tools and for spray painting
1.3.6	Hydraulic jack	F	a lifting device also to adjust and move heavy objects
1.3.7	Screw thread gauge	G	used to measure thread pitch
		H	used to measure working components for excessive wear
		I	holds a work piece to be measured in the depth of jaws

(7 × 1) (7)

[20]

QUESTION 2

2.1 State the name and function or purpose of each of the following tools (equipment) numbered 2.1.1–2.1.5 below.



2.1.1



2.1.2



2.1.3



2.1.4



2.1.5

(5 × 2) (10)

2.2 Make a neat sketch of a hacksaw. Insert the labels frame, handle, blade and wing/lock nut in your sketch. (5)

2.3 List FIVE marking-off tools (equipment) used in an engineering workshop. (5)

2.4 Name the best tool to perform the following tasks:

2.4.1 Tighten or loosen bolts or nuts.

2.4.2 Tighten bolts and nuts to a correct tension according to specifications.

2.4.3 Drill vertical holes accurately.

(3 × 1) (3)

[23]

QUESTION 3

3.1 State FIVE ways to store and care for or maintain a scriber. (5)

3.2 You are instructed to mount a bench vice on a steel bench. The vice must be bolted by 4 x M10 bolts and nuts. Answer the questions that follow.

3.2.1 Which power tool would you use to make the holes for the M10 bolts? (1)

3.2.2 State TWO safety precautions to consider while using the power tool mentioned in QUESTION 3.2.1. (2)

3.2.3 Name the hand tools you would use to tighten the bolts and nuts. (1)

3.2.4 State THREE aspects to consider in caring for the power tool after it has been used. (3)

3.3 List FOUR safety precautions when a measuring tape is used. (4)

3.4 Calculate the weight of an electric motor with a mass of 68 kg.

Hint: W = m × g (3)

3.5 Answer 'yes' or 'no': Will you operate a bench grinder without a wheel guard? State the reason for your answer. (2)

3.6 Write out in full the abbreviation of the following SI units of measurement.

3.6.1 s

3.6.2 mm

(2 × 1) (2)

[23]

QUESTION 4

4.1 State the purpose or function of the following measuring instruments:

4.1.1 Outside calliper

4.1.2 Steel ruler

4.1.3 Straight edge

4.1.4 Telescopic gauge

4.1.5 Thread pitch gauge

4.1.6 Filler gauge

4.1.7 Multimeter

4.1.8 Engineer's square

4.1.9 Tape measure

(9 × 1) (9)

4.2 FIGURE 2 below shows a power tool. Name the parts indicated in the diagram by writing only the answer next to the letter (A–F) in the ANSWER BOOK.

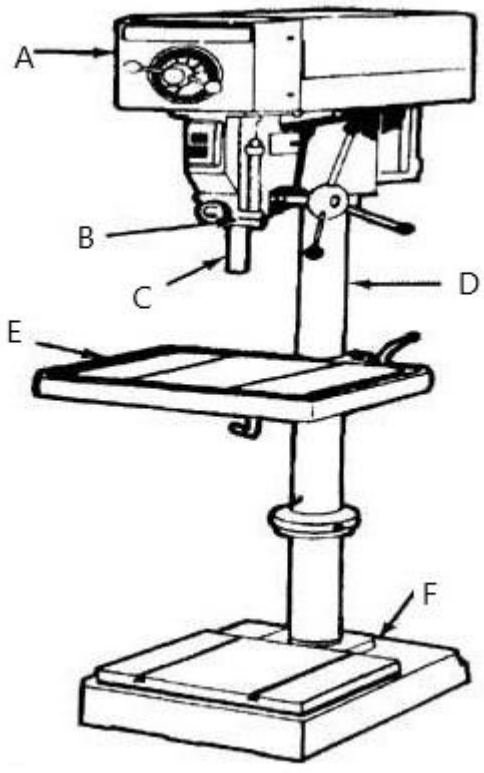


FIGURE 2

(6 × 1) (6)

4.3 Name the power tool in FIGURE 2 above. (1)

4.4 FIGURE 3 below shows micrometer scale readings. Give a reading from the micrometer below.

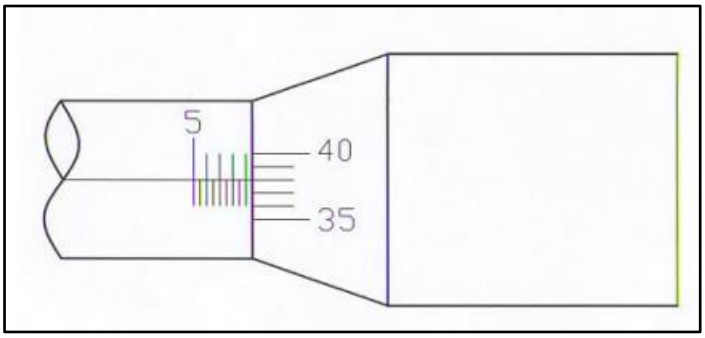


FIGURE 3

(3)
[19]

QUESTION 5

FIGURE 4 in the addendum (attached) shows an isometric view of a machine part. Draw the following to a scale of 1:1 in first-angle orthographic projection:

5.1 Front view (A) (3)

5.2 Top view (B) (4)

5.3 Left view (C) (3)

5.4 Insert one dimension per view (3)

5.5 Insert the projection symbol below the left view. (2)
[15]

TOTAL: 100

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ADDENDUM

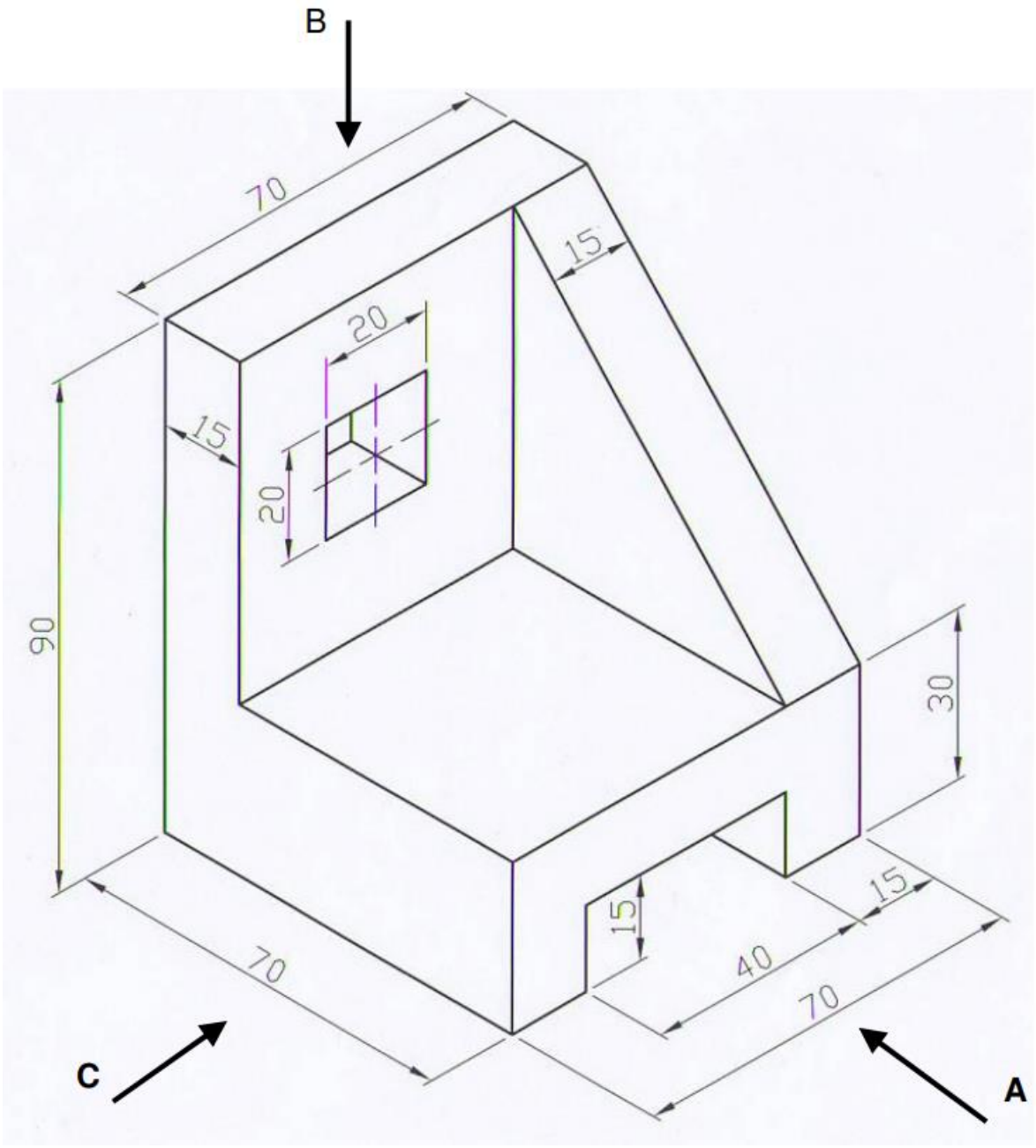


FIGURE 4

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