higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ENGINEERING TECHNOLOGY
NQF LEVEL 2

(6021012)

1 March 2018 (X-Paper)
09:00–12:00

REQUIREMENTS: **A4 drawing paper**

This question paper consists of 10 pages.

NCV

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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. Drawings must be done on the A4 drawing paper provided.
5. Write neatly and legibly.

NC(V)

QUESTION 1

1.1 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.

1.1.1 The diameter is half the radius.

1.1.2 Screwdrivers have three parts: a handle, a shank and a blade.

1.1.3 When a large diameter is to be drilled, the drill is set at a low speed.

1.1.4 Outside micrometers are used for the accurate measurements of deep, small holes.

1.1.5 It is necessary to use safety goggles when using a bench grinder.

(5 × 1) (5)

1.2 Complete the following sentences by using the words provided in the list below. Write only the missing word or words next to the question number (1.2.1–1.2.5) in the ANSWER BOOK.

mega; hammer; shape; pin; torque; giga; rapid; prick punch; centre punch; angle

1.2.1 The … action switch of a drilling machine is only used when drilling into concrete, brick or other similar materials.

1.2.2 Chisels are categorised according to the … of the cutting edge.

1.2.3 ..... punches are used to drive out dowel pins.

1.2.4 A torque wrench is used to tighten nuts and bolts to a specific …

1.2.5 The word … means a million.

(5 × 1) (5)

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1.3 Give ONE word or a term for each of the following descriptions. Write only the word or term next to the question number (1.3.1–1.3.5) in the ANSWER BOOK.

1.3.1 A tool that is used to cut internal threads in a drilled hole

1.3.2 An instrument that is used to draw circles on a metal plate

1.3.3 A precision instrument that is used to measure the diameter of a piston

1.3.4 Has a sharp point, looks like an L and is used to draw lines on metal

1.3.5 Used to hold small work and to bend, twist and cut wire

(5 × 1) (5)

1.4 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–C) next to the question number (1.4.1–1.4.5) in the ANSWER BOOK.

1.4.1 When starting a bench or pedestal grinder, you must stand …

A to the side of the grinder.
B in front of the machine.
C close to the grinder.

1.4.2 A pencil grinder is used for …

A heavy grinding and sharpening.
B machining.
C light grinding and sharpening.

1.4.3 How many centimetres are in a metre?

A 1 000
B 100
C 10

1.4.4 The instrument used to measure internal measurements of components directly:

A Telescopic gauge
B Vernier calliper
C Outside calliper

1.4.5 The correct parts of an angle grinder:

A Table and base
B Chuck and trigger
C Guard and disk

(5 × 1) (5)
[20]

QUESTION 2: ENGINEERING HAND TOOLS

2.1 Name each of the following hand tools:

2.1.1

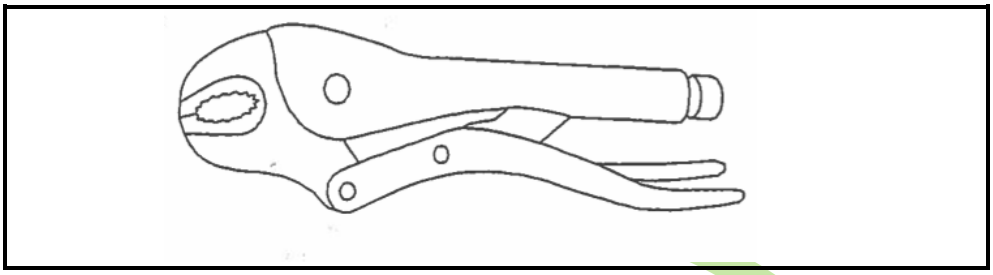


FIGURE 1

2.1.2

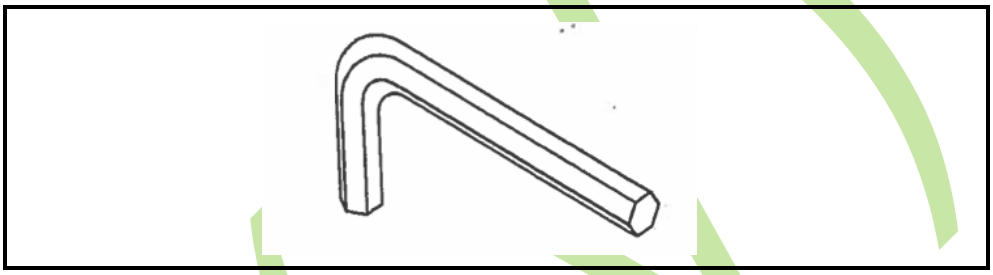


FIGURE 2

(2 × 1) (2)

2.2 Name part A and part B of the hacksaw below. Write the answer next to the question number (2.2) in the ANSWER BOOK.

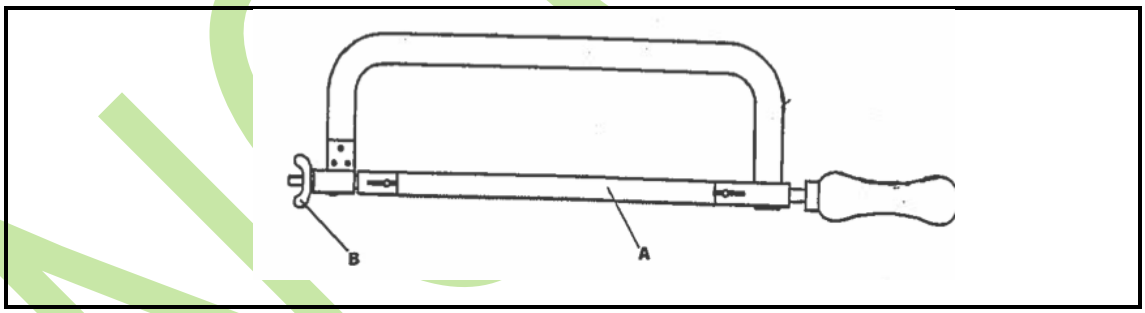


FIGURE 3

(2 × 1) (2)

2.3 State the function of each of the following hand tools:

2.3.1 Crosscut chisel

2.3.2 Pin punch

(2 × 1) (2)

2.4 State which hand tool you will select to do each of the following:

2.4.1 Riveting, shaping and forming

2.4.2 Clamping a work piece

(2 × 1) (2)

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2.5 Describe step by step and in sequence how you would tap an internal thread in a work piece. (7)

2.6 State TWO care and maintenance rules that apply to a G-clamp. (2)
[17]

QUESTION 3: ENGINEERING POWER TOOLS

3.1 Identify the parts of the pencil grinder below. Write the answer next to the question number (3.1.1–3.1.2) in the ANSWER BOOK.

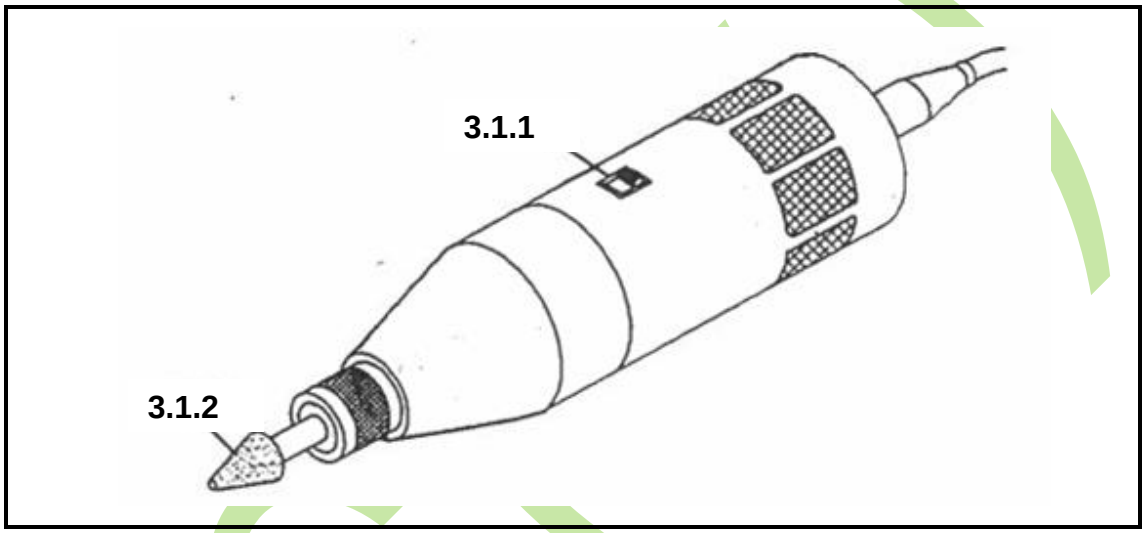


FIGURE 4 (2)

3.2 Name each of the following power tools:

3.2.1

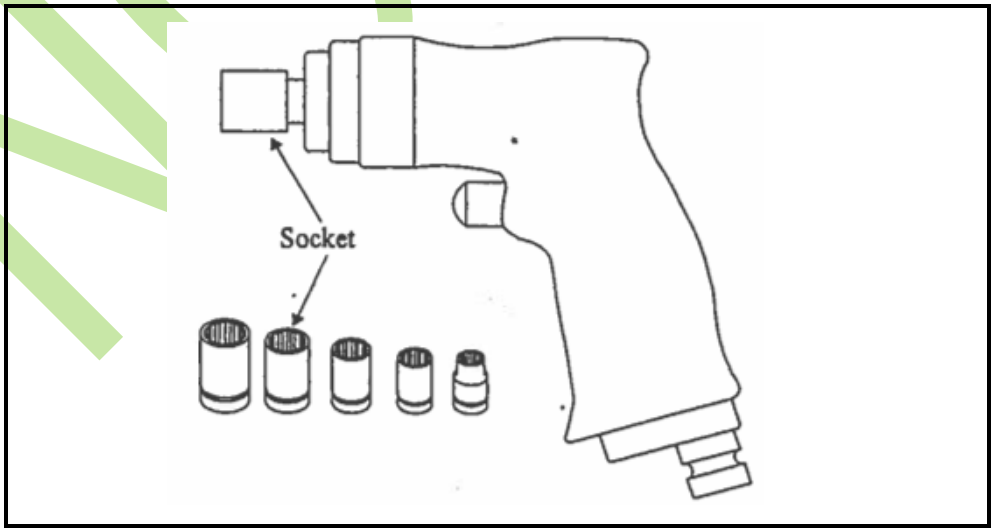


FIGURE 5

3.2.2

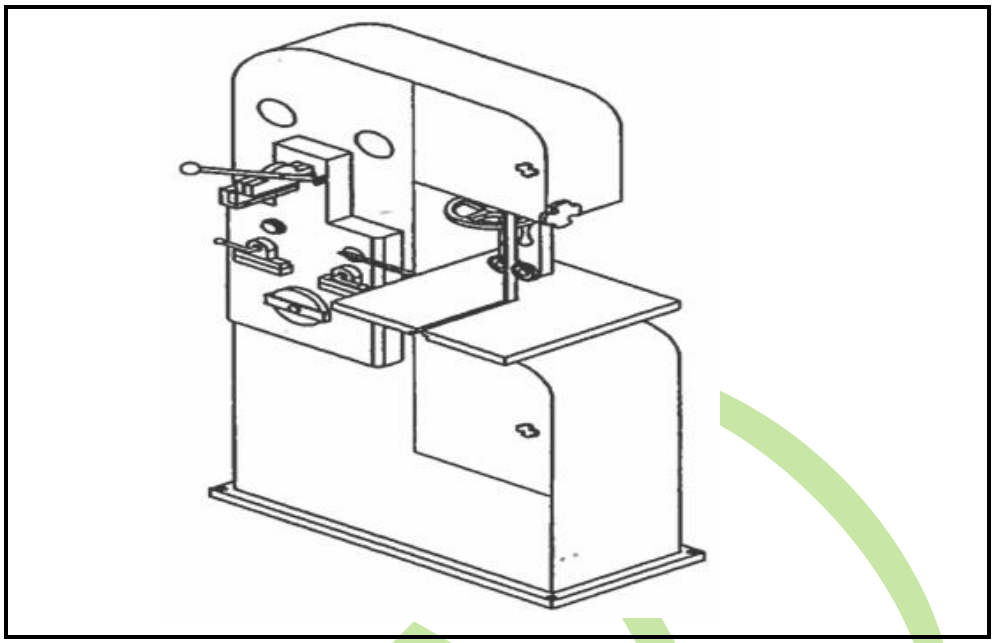


FIGURE 6

(2 × 1) (2)

3.3 State THREE factors to consider for the safe use of an air compressor. (3)

3.4 You must remove a bearing that fits on a 50 mm shaft.

3.4.1 Which power tool will you use? (1)

3.4.2 State TWO safety precautions to be taken when using the power tool in QUESTION 3.4.1. (2)

3.4.3 State TWO elements to be considered when caring for the power tool in QUESTION 3.4.1. (2)

3.4.4 State THREE checks to determine the condition of the power tool in QUESTION 3.4.1. (3)

3.5 What is the clearance (distance) between the tool rest and the grinding wheel of a pedestal/bench grinder? (1)

3.6 Which tool will you use to clean the grinding wheel if it becomes clogged? (1)

[17]

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QUESTION 4: ENGINEERING MEASURING AND PRECISION EQUIPMENT

4.1 State which measuring tool you will use to measure each of the following:

4.1.1 The dimensions of your classroom

4.1.2 Taking transfer measurements of an external diameter

(2 × 1) (2)

4.2 Give TWO advantages of gauges over measuring instruments. (2)

4.3 State SIX ways of caring for and maintaining callipers and dividers. (6)

4.4 What is the benefit of an external micrometer in comparison with a vernier calliper? (1)

4.5 You must obtain a precise measurement between TWO components in a confined space. You cannot use a vernier calliper or a micrometer.

4.5.1 Which precision measuring instrument will you use? (1)

4.5.2 Give THREE steps you will follow when using the instrument in QUESTION 4.5.1 to obtain the correct measurement. (3)

4.6 State TWO aspects to consider in the care, maintenance and storage of clock gauges. (2)

[17]

QUESTION 5: SI UNITS OF MEASUREMENT

5.1 In which units of measurement (SI) are the following quantities (base units) measured?

5.1.1 Current

5.1.2 Luminous intensity

(2 × 1) (2)

5.2 What do the symbols of the following SI units represent?

5.2.1 K

5.2.2 m

(2 × 1) (2)

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5.3 Convert the following quantities:

5.3.1 9 375 mm to m

5.3.2 315,5 kPa to P

5.3.3 87,5 kW to Nm/s

(3 × 1) (3)

HINT: 1 watt = 1 Nm/s

5.4 Calculate the weight of a piece of steel plate with a mass of 25,5 kg and a gravitational acceleration of 9,81 m/s/s.

HINT: W = m × g (1)

5.5 Name ONE marking-off medium. (1)

5.6 What is a stirrup clamp used in conjunction with? (1)

5.7 Explain the function of each of the following:

5.7.1 Centre punch

5.7.2 Trammel

(2 × 1) (2)

5.8 State TWO consequences of improper care and storage of a vernier height gauge. (2)

[14]

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QUESTION 6: BASIC ENGINEERING DRAWING

6.1 FIGURE 7 below shows an isometric view of a machine part.

Draw, to a scale of 1 : 1 and in first-angle orthographic projection, the following views indicated by the arrows:

6.1.1 Front view (3)

6.1.2 Top view (3)

6.1.3 Left view (4)

6.2 Insert the dimensions in the three views. (3)

6.3 Insert the projection symbol in the space below the left view. (2)

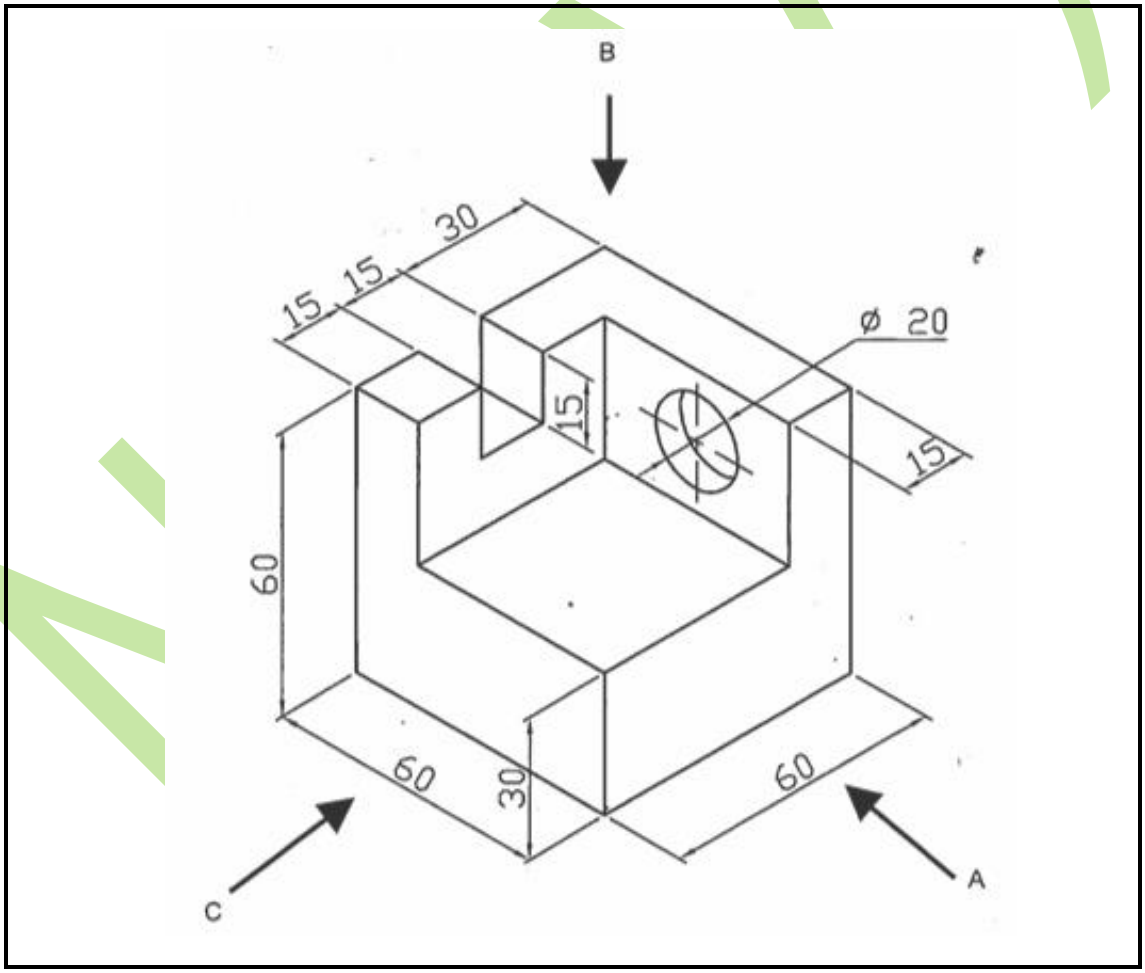


FIGURE 7 **[15]**

TOTAL: 100

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