

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE
EXAMINATIONS BOARD**SECONDARY EDUCATION CERTIFICATE LEVEL
2024 SUPPLEMENTARY SESSION**

SUBJECT: **Engineering Technology**
PAPER NUMBER: Synoptic – Unit 1
DATE: 1st November 2024
TIME: 8:30 a.m. to 10:35 a.m.

**THIS PAPER SHOULD BE RETURNED TO THE INVIGILATOR
AFTER THE EXAMINATION.**

For examiners' use only:

Question	1	2	3	4	5	6	7	8	Total
Score									
Maximum	6	8	8	8	8	8	12	12	70

Answer **ALL** questions in the space provided.

Scenario

- A manufacturing plant is in the process of recruiting a number of junior technicians to join different engineering teams responsible for the correct and efficient operation of the plant.
- To assess the knowledge of the prospective future technicians the following set of questions that deal with PPE, material properties and safe tool usage were prepared.

Question 1

K-2 (6 marks)




a. Draw a line to match the purpose of each safety sign with its respective colour.



Danger	Green
Mandatory	Blue
Warning	Yellow
First aid	Red

(2)

b. Name each of the given safety signs shown in Table 1.

Table 1: Safety signs

	Safety Sign	Name
i.		_____ _____ (0.4)
ii.		_____ _____ (0.4)
iii.		_____ _____ (0.4)

	Safety Sign	Name
iv.		_____ _____ (0.4)
v.		_____ _____ (0.4)

(Source: <https://www.vectorstock.com>)

c. Figure 1 shows a technician working on a Computer Numerical Control (CNC) machine in a heavy manufacturing plant. Identify **FOUR** suitable safety signs that shall be used to protect technicians working in this environment.



Figure 1: Technician working on a Computer Numerical Control (CNC) machine
(Source: www.careers.govt.nz)

6

(2)





Please turn the page.

Question 2

K-4 (8 marks)

a. Identify the different forms of supply of metal shown in Table 2 below.

Table 2: Forms of Metal Supply

	Forms of Supply	Name
i.	 <p>(Source: https://www.austenknappman.co.uk)</p>	<p>_____</p> <p>(0.5)</p>
ii.	 <p>(Source: https://www.amazon.co.uk)</p>	<p>_____</p> <p>(0.5)</p>
iii.	 <p>(Source: https://www.tfgusa.com/)</p>	<p>_____</p> <p>(0.5)</p>
iv.	 <p>(Source: https://www.dahlstromrollform.com/)</p>	<p>_____</p> <p>(0.5)</p>

b. Outline **TWO** different properties for the following **TWO** different metals.

Type of metal: Lead

Property 1: _____
_____ (0.5)

Property 2: _____
_____ (0.5)

Type of metal: Cast Iron

Property 1: _____
_____ (0.5)

Property 2: _____
_____ (0.5)

c. Figure 2 below shows a glazed metallic door for a photocopy room.



Figure 2: Glazed metallic door
(Source: <https://www.diy.com>)

This question continues on next page.

i. Describe the type of metal used in the construction of the glazed metallic door shown in Figure 2. Your description must include **ONE** reason why this metal type is ideal.

_____ (2)

ii. Describe the form of metal supplied to construct the glazed metallic door shown in Figure 2. Your description must include **ONE** reason why this form of metal is ideal.

_____ (2)

8

Question 3

K-6 (8 marks)

a. List **FOUR** different forms of supply of polymers.

Form of supply 1: _____ (0.5)

Form of supply 2: _____ (0.5)

Form of supply 3: _____ (0.5)

Form of supply 4: _____ (0.5)

b. Outline **FOUR** properties of different polymers.

Property 1: _____ (0.5)

_____ (0.5)

Property 2: _____ (0.5)

_____ (0.5)

Property 3: _____ (0.5)

_____ (0.5)

Property 4: _____
_____ (0.5)

c. Figure 3 shows a polymer-based chair used as part of a set of garden furniture.



Figure 3: Polymer-based chair for outdoor use
(Source: <https://www.sunbritefurniture.com>)

i. Describe the form of supply required to manufacture this chair. Your description must include **ONE** reason why this polymer form was ideal.

_____ (2)

This question continues on next page.

ii. Describe the type of polymer required to manufacture this chair. Your description must include **ONE** reason why this type of polymer was ideal in this case.

_____ (2)



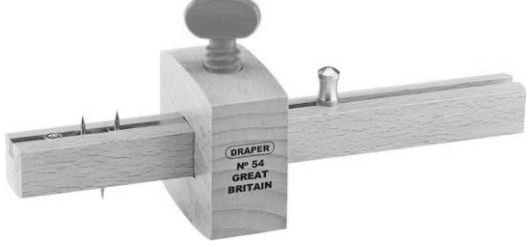
8






Question 4

K-7 (8 marks)

a. Identify the measuring and marking out tools given in Table 3 below.

Table 3: Measuring and marking out tools.

	Measuring and marking out tools	Name
i.	 (Source: https://www.aytools.com/)	_____ (0.25)
ii.	 (Source: https://www.kbctools.ca/)	_____ (0.25)
iii.	 (Source: https://www.amazon.com.au/)	_____ (0.25)

<p>iv.</p>	 <p>(Source: https:// www.hroberts-di.com/)</p>	<p>_____</p> <p>(0.25)</p>
<p>v.</p>	 <p>(Source: https://www.amazon.com/)</p>	<p>_____</p> <p>(0.25)</p>
<p>vi.</p>	 <p>(Source: https://www.amazon.com/)</p>	<p>_____</p> <p>(0.25)</p>
<p>vii.</p>	 <p>(Source: https://www.fairfulltools.com/)</p>	<p>_____</p> <p>(0.25)</p>
<p>viii.</p>	 <p>(Source: https://www.jacksonsart.com/)</p>	<p>_____</p> <p>(0.25)</p>

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b. Outline **ONE** function of **each** of the following measuring and marking out tools:

Vernier Caliper: _____

_____ (1)

Chalk Line: _____

_____ (1)

c. For **each** of the following tasks, choose the appropriate measuring and marking out tools:

i. To precisely measure the height of the saw from table top of a table saw.
_____ (1)

ii. To mark out on a vertical metal piece.
_____ (1)

iii. To identify and mark out rough parts on a surface.
_____ (1)

iv. To set and transfer angle.
_____ (1)

8

Question 5

K-8 (8 marks)

a. Name **FOUR** different cutting and drilling tools.

Tool 1: _____ (0.5)

Tool 2: _____ (0.5)

Tool 3: _____ (0.5)

Tool 4: _____ (0.5)

b. Relate the appropriate cutting or drilling tool required to perform the below tasks:

i. Machine a shaft to a particular diameter from a metal square solid bar.
_____ (1)

ii. To precisely cut a metal circular hollow section to a particular length.
_____ (1)

Question 6






K-10 (8 marks)

In Table 4 below:

a. Identify the assembly and finishing tools. (2)

b. Relate each tool to **ONE** specific task that the tool can be used for. (2)

Table 4: Assembly and finishing tools

	Assembly and Finishing Tools	a. Name	b. Specific task for which tool can be used
i.	 <p>(Source: https://www.cchircopmalta.com/)</p>	_____	_____ _____ _____ _____
ii.	 <p>(Source: https://www.fruugonorge.com/)</p>	_____	_____ _____ _____ _____
iii.	 <p>(Source: https://www.faithfulltools.com/)</p>	_____	_____ _____ _____ _____
iv.	 <p>(Source: https://www.bosch-professional.com/)</p>	_____	_____ _____ _____ _____
v.	 <p>(Source: https://www.parktool.com/)</p>	_____	_____ _____ _____ _____

Question 7

C-2 (12 marks)

a. Outline the following **TWO** tests that can be carried out on materials:

Compression Test

(2)

Torque Test

(2)

b. Explain the test needed to examine the tensile strength of mild steel.

(4)

c. A new batch of iron sheets shipment will be used to construct the hull of a ship. Justify a test which can quantify the toughness of the iron sheets.

(4)

12

Question 8

C-4 (12 marks)

a. Describe the following **TWO** methods of joining materials together.

Wood joints: _____

_____ (2)

Plastic adhesives: _____

_____ (2)

b. Select the ideal joining method for the following scenarios.

i. Temporary joining two wooden sheets perpendicular to each other.
_____ (2)

ii. Permanently joining two metal sheets without heating and with an access from only one side.
_____ (2)

This question continues on next page.

