SEC37/c1.25m

L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

SECONDARY EDUCATION CERTIFICATE LEVEL
2025 MAIN SESSION

SUBJECT:	**Engineering Technology**
PAPER NUMBER:	Controlled – Unit 1
DATE:	11th May 2023
TIME:	10:00 a.m. to 11:35 a.m.

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

Name of candidate _____

I.D. number _____

School _____

Class _____

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

Scenario

- XYZ is a manufacturing plant that produces a wide range of tyres.
- The facility employees a wide range of employees engaged in different parts of the manufacturing and managing roles.
- This plant is considered high-risk and therefore Health and Safety is given top priority.

Question 1 **K-2 (4 marks)**

Throughout the manufacturing plant, safety signs are present to keep employees aware of potential hazards and to promote a safe working environment.

a) Match the purpose of each safety sign with its respective colour by drawing a line between them.

Danger sign	Blue
Mandatory sign	Yellow
Warning sign	Green
First aid sign	Red

(1)

b) Name each of the given safety signs by filling in Table 1 below.

Table 1: Safety signs

	Safety Sign	Name
i)		_____ (0.2)
ii)		_____ (0.2)
iii)		_____ (0.2)

	Safety Sign	Name
iv)		_____ (0.2)
v)		_____ (0.2)

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

c) Figure 1 below shows a technician working on a tyre machine in a tyre manufacturing plant. Identify **FOUR** suitable safety signs which can be used in this scenario.

Figure 1: Technician working on a tyre making machine
(Source: https://www.rubbernews.com)

Safety sign 1: _____ (0.5)

Safety sign 2: _____ (0.5)

Safety sign 3: _____ (0.5)

Safety sign 4: _____ (0.5)

Question 2 **K-4 (4 marks)**

Metals can be supplied to a manufacturing plant in different forms.

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

Table 2: Forms of Metal Supply

	Form of Supply	**Name**
i)	 *(Source: https://www.arku.com)*	_____ (0.25)
ii)	 *(Source: https://www.wasatchsteel.com/)*	_____ (0.25)
iii)	 *(Source: https://www.metalsupplies.com/products/)*	_____ (0.25)
iv)	 *(Source: https://www.indiamart.com/)*	_____ (0.25)

b) Outline **TWO** different properties for each of the metals given below.

Type of metal: Aluminium

Property 1: _____

_____ (0.25)

Property 2: _____

_____ (0.25)

Type of metal: Mild steel

Property 1: _____

_____ (0.25)

Property 2: _____

_____ (0.25)

c) The metallic kitchen table shown in Figure 2 below will be used in an industrial kitchen environment.

Figure 2: Metallic kitchen table
(Source: https://www.made-in-china.com)

i) Describe the type of metal used to construct the metallic top of the table shown in Figure 2. In your description, include **ONE** reason why this type of metal is chosen.

_____

_____

_____

_____

_____ (1)

ii) Describe the form of supply used for manufacturing the legs of the metallic table shown in Figure 2. In your description, include **ONE** reason for using this form of supply.

_____

_____

_____

_____

_____ (1)

Question 3 **K-5 (4 marks)**

- Wood is used in several applications such as fuel, furniture, paper, building structures and tools.
- Different applications require different wood types having different properties.
- These types are supplied in various forms.

a) List **FOUR** different forms of supply of wood.

Form of Supply 1: _____ (0.25)

Form of Supply 2: _____ (0.25)

Form of Supply 3: _____ (0.25)

Form of Supply 4: _____ (0.25)

b) Outline **TWO** different properties for each of the following types of wood:

Type of wood: Walnut

Property 1: _____

_____ (0.25)

Property 2: _____

_____ (0.25)

Type of wood: Oak

Property 1: _____

_____ (0.25)

Property 2: _____

_____ (0.25)

c)

Figure 3: Wooden Table Top.
(Source: https://www.leaderjoyusa.com/)

i) Describe the type of wood needed to construct a wooden table top as shown in Figure 3. In your answer, include **ONE** reason for using such type of wood.

_____

_____

_____

_____

_____ (1)

ii) Describe the form of supply needed to construct a wooden table top as shown in Figure 3. In your answer, include **ONE** reason for using such form of supply.

_____

_____

_____

_____

_____ (1)

Please turn the page.

Question 4 **C-2 (6 marks)**

Different tests are carried out on different materials to assess their suitability for different applications.

a) Outline the following **TWO** tests:

Torque Test

_____

_____

_____

_____ (1)

Compression Test

_____

_____

_____

_____ (1)

b) Explain the test needed to examine the toughness/strength of metal during impact.

_____

_____

_____

_____

_____

_____

_____ (2)

c) • The tyre manufacturing facility is testing the steel cords used in the tyre construction.
• Such steel cords wires are incorporated inside the tyre to achieve the required strength.
Justify a test required to ensure that steel wires can withstand the stress during the tyre operation.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ (2)

Question 5 **C-3 (6 marks)**

During different manufacturing processes a number of raw materials are used.

a) i) Identify **TWO** wood manufacturing processes. Underline the appropriate answers.

finishing	moulding	galvanising	bending

(1)

ii) Identify **TWO** metal manufacturing processes. Underline the appropriate answers.

casting	annealing	electroplating	seasoning

(1)

b) Describe the **FOUR** steps involved in hardening a steel shaft required for the tyre manufacturing process in the correct order.

Step 1: _____

_____ (0.5)

Step 2: _____

_____ (0.5)

Step 3: _____

_____ (0.5)

Step 4: _____

_____ (0.5)

c) Explain the reason behind the following processes when manufacturing polymers.

i) Vacuum forming: _____

_____

_____

_____

_____

_____

_____ (1)

ii) Moulding: _____

_____

_____

_____

_____

_____

_____ (1)

Question 6 **K-7 (4 marks)**

Different measuring and marking tools are used during the manufacturing process of tyres.

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

Table 3: Measuring and marking out tools.

Measuring and Marking Out Tool	Name
 *(Source: https://vectorstock.com/)*	_____ (0.2)

Measuring and Marking Out Tool	Name
 *(Source: https://vectorstock.com/)*	_____ (0.2)
 *(Source: https://vectorstock.com/)*	_____ (0.2)
 *(Source: https://shutterstock.com/)*	_____ (0.2)
 *(Source: https://vectorstock.com/)*	_____ (0.2)

b) Outline the functions of the following measuring and marking out tools.

Vernier Calliper: _____

_____

_____ (0.5)

Chalk line: _____

_____

_____ (0.5)

This question continues on next page.

c) Choose **TWO** appropriate measuring tools and **TWO** marking out tools to construct the wooden shelf shown in Figure 4.

Figure 4: Wooden Shelves
(Source: https://www.indiamart.com/)

_____

_____

_____

_____ (2)

Question 7 **C-4 (6 marks)**

Different materials can be joined using different joining methods.

a) Describe the following methods of joining materials together.

Wood joints: _____

_____

_____

_____

_____ (1)

Self-tapping screws: _____

_____

_____

_____

_____ (1)

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

i) Permanently join two sheet metal together with access only from one side.

_____ (1)

ii) Permanently join two plastic pipes together that are used to transfer low pressure fluid in a car.

_____ (1)

c) Justify the ideal joining method for each of the following scenarios:

Scenario 1: Joining two wooden sheets perpendicular to each other to form a cabinet.

_____

_____

_____

_____

_____

_____

_____ (1)

Scenario 2: Join a winch perpendicular with a metal I-beam.

_____

_____

_____

_____

_____

_____

_____ (1)

Question 8 **K-10 (4 marks)**

Different tools are available to assemble and finish off different products to a given specification.

a) Identify the assembly and finishing tools given in Table 4 below. (1)
b) Relate each tool to a specific task. (1)

Table 4: Assembly and finishing tools

Assembly and Finishing Tools	(a) Name	(b) Specific task for which tool can be used
 *(Source: https://www.harborfreight.com/)*		_____ _____ _____ _____
 *(Source: https://mt.rsdelivers.com/)*		_____ _____ _____ _____
 *(Source: https://www.homedepot.com/)*		_____ _____ _____ _____
 *(Source: https://malta.desertcart.com/)*		_____ _____ _____ _____
 *(Source: https://www.metabo.com/)*		_____ _____ _____ _____

c) Describe **FOUR** preventive measures when using assembly and finishing tools and equipment.

_____

_____

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_____ (2)

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