



L-Università  
ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE  
EXAMINATIONS BOARD

**SECONDARY EDUCATION CERTIFICATE LEVEL  
2023 SUPPLEMENTARY SESSION**

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SUBJECT: **Engineering Technology**  
PAPER NUMBER: Synoptic – Unit 1  
DATE: 2<sup>nd</sup> November 2023  
TIME: 2:30 p.m. to 4:35 p.m.

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**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**

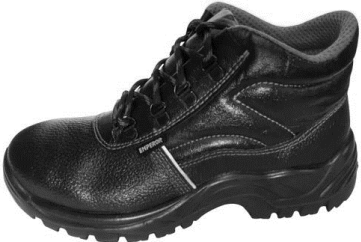



- A group of apprentice technicians working in a leading manufacturing company are given the opportunity to start permanent employment as junior technicians.
- The following questions regarding PPE, different material properties and safe tool usage will be used to assess the technical qualities of these apprentices.

**Question 1**

**K-1 (6 marks)**

a. Identify the personal protective equipment illustrated in Table 1 below.

Table 1: Personal Protective Equipment.

	<b>PPE</b>	<b>Name</b>
i.	 <p>(Source: <a href="https://www.indiamart.com/">https://www.indiamart.com/</a>)</p>	<p>_____</p> <p>(0.5)</p>
ii.	 <p>(Source: <a href="https://no.rs-online.com/">https://no.rs-online.com/</a>)</p>	<p>_____</p> <p>(0.5)</p>
iii.	 <p>(Source: <a href="https://eshop.wuerth.com.mt/">https://eshop.wuerth.com.mt/</a>)</p>	<p>_____</p> <p>(0.5)</p>
iv.	 <p>(Source: <a href="https://eshop.wuerth.com.mt/">https://eshop.wuerth.com.mt/</a>)</p>	<p>_____</p> <p>(0.5)</p>

b. List **TWO** personal protective equipment (PPE) that should be worn when cutting a sheet of metal using an angle grinder as shown in Figure 1.



Figure 1: Cutting a metal sheet using an angle grinder  
(Source: <https://drilly.com/>)

PPE 1: \_\_\_\_\_ (1)

PPE 2: \_\_\_\_\_ (1)

- c. • An electrical technician is required to repair a fault on the electrical distribution system supplying a factory. The worker uses a cherry picker to work safely.  
• In addition, this technician is required to wear hand protection and a harness besides others, as shown in Figure 2.

Describe the function of **both** the hand protection and the harness in this scenario.



Figure 2: Electrical worker working on distribution lines  
(Source: <https://wallpapercrafter.com/>)

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**Question 2**

**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 a different property of each of the following polymers:

Polymer 1: Bakelite

Outline: \_\_\_\_\_  
\_\_\_\_\_ (1)

Property 2: Polythylene

Outline: \_\_\_\_\_  
\_\_\_\_\_ (1)

- c. • Polymers are used in a wide range of applications.
- Some polymers are used in the beverage industry for example to manufacture the plastic of water bottles as shown in Figure 3.

Describe the form of supply and type of polymer required for this scenario.



Figure 3: Water Bottles  
 (Source: <https://www.greenpak.com.mt/>)

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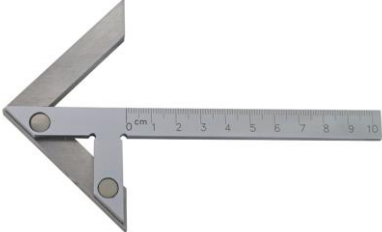



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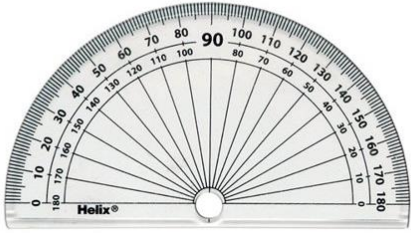


**Question 3**

**K-7 (8 marks)**

a. Identify the measuring and marking out tools given in Table 2 below.

Table 2: Measuring and marking out tools.

	<b>Measuring and marking out tools</b>	<b>Name</b>
i.	 <p>(Source: <a href="https://www.fairfulltools.com/">https://www.fairfulltools.com/</a>)</p>	<p>_____</p> <p>(0.25)</p>
ii.	 <p>(Source: <a href="https://www.shop.santool.de/">https://www.shop.santool.de/</a>)</p>	<p>_____</p> <p>(0.25)</p>
iii.	 <p>(Source: <a href="https://www.misterworker.com/">https://www.misterworker.com/</a>)</p>	<p>_____</p> <p>(0.25)</p>
iv.	 <p>(Source: <a href="https://www.vigor-equipment.com/">https://www.vigor-equipment.com/</a>)</p>	<p>_____</p> <p>(0.25)</p>
v.	 <p>(Source: <a href="https://www.smeshops.com/">https://www.smeshops.com/</a>)</p>	<p>_____</p> <p>(0.25)</p>

<p>vi.</p>	 <p>(Source: <a href="https://www.caleygroup.com/">https://www.caleygroup.com/</a>)</p>	<p>_____</p> <p>(0.25)</p>
<p>vii.</p>	 <p>(Source: <a href="https://www.hoffmann-group.com/">https://www.hoffmann-group.com/</a>)</p>	<p>_____</p> <p>(0.25)</p>
<p>viii.</p>	 <p>(Source: <a href="https://www.fairfulltools.com/">https://www.fairfulltools.com/</a>)</p>	<p>_____</p> <p>(0.25)</p>

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

i. Micrometre: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ (1)

ii. Mortise Gauge: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ (1)

***This question continues on next page.***

c. Choose the appropriate measuring and marking out tools for **each** of the given tasks:

i. To precisely measure the internal diameter of a pipe.

\_\_\_\_\_ (1)

ii. To mark out and inspect on a horizontal surface.

\_\_\_\_\_ (1)

iii. To measure the length of a flat bar into 50cm pieces.

\_\_\_\_\_ (1)

iv. To mark the point of drilling of a piece of sheet metal.

\_\_\_\_\_ (1)

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**Question 4**

**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 for each of the following tasks:

i. Cut a thread in a solid metal engine block.

\_\_\_\_\_ (1)

ii. Machine the gear teeth of a gear by drilling.

\_\_\_\_\_ (1)









**Question 5**

**K-9 (8 marks)**

a. Identify the different bending and forming tools given in Table 3 below.

Table 4: Bending and forming tools.

	<b>Bending and forming tools</b>	<b>Name</b>
i.	 <p>(Source: <a href="https://eshop.wuerth.com.mt/">https://eshop.wuerth.com.mt/</a>)</p>	<p>_____</p> <p>(0.5)</p>
ii.	 <p>(Source: <a href="https://www.walmart.com/">https://www.walmart.com/</a>)</p>	<p>_____</p> <p>(0.5)</p>
iii.	 <p>(Source: <a href="https://eshop.wuerth.com.mt/">https://eshop.wuerth.com.mt/</a>)</p>	<p>_____</p> <p>(0.5)</p>
iv.	 <p>(Source: <a href="https://www.techsoft.co.uk/">https://www.techsoft.co.uk/</a>)</p>	<p>_____</p> <p>(0.5)</p>








**Question 6**

**K-10 (8 marks)**

Assembly and finishing tools are required to finish off different products to a given specification.

- a. Identify the assembly and finishing tools given in Table 5 below. (2)
- b. Relate each tool to **ONE** specific task for which it can be used. (2)

Table 5: Assembly and finishing tools

	<b>Assembly and Finishing Tools</b>	<b>Name</b>	<b>Specific task for which tool can be used</b>
i.	 <p>(Source: <a href="https://www.bhphotovideo.com/">https://www.bhphotovideo.com/</a>)</p>		
ii.	 <p>(Source: <a href="https://mt.rsdelivers.com/">https://mt.rsdelivers.com/</a>)</p>		
iii.	 <p>(Source: <a href="https://mt.rsdelivers.com/">https://mt.rsdelivers.com/</a>)</p>		
iv.	 <p>(Source: <a href="https://malta.desertcart.com/">https://malta.desertcart.com/</a>)</p>		
v.	 <p>(Source: <a href="https://www.metabo.com/">https://www.metabo.com/</a>)</p>		





Functional design: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

Material/s: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

c. Explain the choice of **TWO** PPE with specific design and material to be used for handling of hazardous chemicals as shown in Figure 6.



Figure 6: Handling of hazardous chemicals  
(Source: <https://www.hughes-safety.com/>)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (4)





c. Explain the reason behind the annealing process in the metal manufacturing process.

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