Index Number: _____ SEC37/s1.23s



MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

SECONDARY EDUCATION CERTIFICATE LEVEL 2023 SUPPLEMENTARY SESSION

SUBJECT: Engineering Technology

PAPER NUMBER: Synoptic – Unit 1
DATE: 2nd November 2023
TIME: 2:30 p.m. to 4:35 p.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 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.

	Table 1: Personal Protective Equipment.					
	PPE	Name				
i.	(Source: https://www.indiamart.com/)	(0.5)				
ii.		(0.5)				
iii.	(Source: https://no.rs-online.com/) (Source: https://eshop.wuerth.com.mt/)	(0.5)				
iv.	(Source: https://eshop.wuerth.com.mt/)	(0.5)				

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://drillly.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 harneess in this scenario.



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

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)
o. Outline a different property of each of the following polymers:	
Polymer 1: Bakalite	
Outline:	
Property 2: Polythyrene	(1)
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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(4)	_
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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.

	Measuring and marking out tools	Name
	M 2	
i.		(0.25)
	(Source: https://www.faithfulltools.com/)	
ii.	0 4 2 3 4 5 6 7 8 9 10	(0.25)
	(Source: https://www.shop.santool.de/)	
iii.	(Source: https://www.misterworker.com/)	(0.25)
iv.	(Source: https://www.vigor-equipment.com/)	(0.25)
v.	(Source: https://www.smeshops.com/)	(0.25)

vi.	(Source: https://www.caleygroup.com/)	(0.25)
vii.	(Source: https://www.hoffmann-group.com/)	(0.25)
viii.	(Source: https://www.faithfulltools.com/)	(0.25)

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				
	in Toward, the maint of drilling of a miner of the standard	(1)				
	iv. To mark the point of drilling of a piece of sheet metal.	(1)				
		(1)(
Qı	uestion 4	K-8 (8 marks)				
a.	Name FOUR different cutting and drilling tools.					
	Tool 1:	(0.5)				
	Tool 2:	(0.5)				
	Tool 3:					
	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)				

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remove loose clothing	

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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.

	Table 4: Bending and forming tools.					
	Bending and forming tools	Name				
i.	(Source: https://eshop.wuerth.com.mt/)	(0.5)				
ii.	(Source: https://www.walmart.com/)	(0.5)				
iii.	(Source: https://eshop.wuerth.com.mt/)	(0.5)				
iv.	(Source: https://www.techsoft.co.uk/)	(0.5)				

	pipe bender vacuum former	
i.	Form a 3D model of the face of a soccer player.	
	((1)
ii.	Bend to 90° a piece of metal conduit to house electrical wires and to install at a factory.	
	((1)
	escribe the following TWO preventive measures to be taken when using bending and formiols.	ng
	use suitable tools for the proper job remove sharp edges	
		_

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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

	Table 5. As	ssembly and finishing tools	
	Assembly and Finishing Tools	Name	Specific task for which tool can be used
i.	(Source: https://www.bhphotovideo.com/)		
ii.	(Course https://pat.vado/ij.gara.gogs/)		
	(Source: https://mt.rsdelivers.com/)		
iii.	(Source: https://mt.rsdelivers.com/)		
iv.	(Source: https://malta.desertcart.com/)		
v.	(Source: https://www.metabo.com/)		

vi.		
	(Source: https://www.bahco.com/)	
vii.	(Source: https://www.amazon.com/)	
viii.	(Source: https://bax.tools.com/)	

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

Visual inspection of tool	Work to laid down procedures
Use suitable tool for the proper job	Remove long hair and jewellery

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	(4)	8
Qι	uestion 7 C-1 (12 marks)	
	A worker is using a welding set to weld two metal sheets together using disposable plastic gloves.	

_____(2)

b. Explain the purpose of the different functional design and materials of the welding gloves shown in Figure 5.



Figure 5: Welding two metal sheets (Source: https://www.millerwelds.com/)

	Functional design:
	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/)

Question 8

C-3 (12 marks)

a.	i. Identify the TWO	wood	manufacturing pro	ocesses. Circle the	appropriate answers.	
	seasoning		casting	moulding	finishing	
•	ii. Identify the TWO	polym	er manufacturing	processes. Circle	the appropriate answers.	(2)
	electroplati	ng	line bending	hardening	rotational forming	
L						(2)
b.	Describe the FOUR outdoors.	steps	involved in hot o	lip galvanising a r	metal hand rail to be ins	talled
						(4)

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c.	Explain the reason behind the annealing process in the metal manufacturing process.	
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	(4)	

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