

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE
EXAMINATIONS BOARD**SECONDARY EDUCATION CERTIFICATE LEVEL
2025 SUPPLEMENTARY SESSION**

SUBJECT: **Engineering Technology**
PAPER NUMBER: Synoptic – Unit 3
DATE: 4th November 2025
TIME: 11:30 a.m. to 1:35 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. The use of non-programmable electronic calculators is allowed.

Scenario

- A new vacancy is being promoted at an engineering company.
- To assess the knowledge and competence of each candidate, the following set of questions related to the use of power tools and the operation and maintainability of different electro-mechanical systems were prepared.

Question 1**K-1 (6 marks)**

a. Name **FOUR** different types of electrical power generation plants. One type is given as an example.

Type 1: Solar powered generating plant

Type 2: _____ (0.5)

Type 3: _____ (0.5)

Type 4: _____ (0.5)

Type 5: _____ (0.5)

b. Define the following terms in relation to electrical power:

Generation of electrical power.

(1)

Distribution of electrical power.

(1)

c. The final stage of electrical power distribution is when it reaches the consumer unit. Describe the previous **FOUR** stages required for electricity to be consumed in the correct order.

6

(2)

Question 2**K-2 (8 marks)**

a. List **ONE** application for each of the electromagnetic devices listed in Table 1.

Table 1: Electromagnetic devices

	Electromagnetic Devices	Application
i.	 <p>Loudspeaker (Source: https://www.vecteezy.com/)</p>	<hr/> <hr/> <hr/>
ii.	 <p>Motors and Generators (Source: https://wedoall.co.za/)</p>	<hr/> <hr/> <hr/>

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	Electromagnetic Devices	Application
iii.	 Solenoid <i>(Source: https://tameson.com/)</i>	<hr/> <hr/> <hr/>
iv.	 Relay <i>(Source: https://ph.rs-online.com/)</i>	<hr/> <hr/> <hr/>

b. Outline the working principle of an electromagnet.

(2)

c. Describe how a relay achieves its function through the following components:

- i. Movable armature
- ii. Spring
- iii. Electromagnet
- iv. Normally open pin and normally closed pin.

8

(4)

Question 3**K-5 (8 marks)**

a. List **TWO** different types of motors, besides stepper motors and servo motors.

Type 1: _____ (1)

Type 2: _____ (1)

b. Match stepper motors and servo motors with their typical application in Table 2 below.

Table 2: Motor Applications

Typical Application	Type of Motor
Conveyor belts	_____ (1)
CNC machines	_____ (1)

c. Describe the working principles of the stepper and servo motors.

Stepper Motor: _____

(2)

Servo Motor: _____

8

(2)

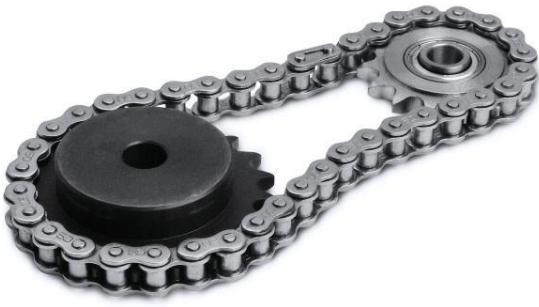
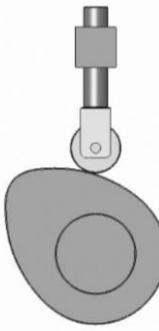
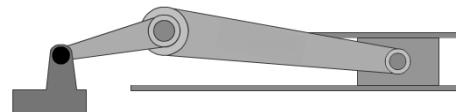
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Question 4**K-7 (8 marks)**

a. Identify **FOUR** different mechanical systems tabulated in Table 3 from the ones provided below.

chain and sprocket	pulleys	crank and slider	cam and follower	gears
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Table 3: Different mechanical systems

	
(Source: https://www.rainbowprecisionproducts.com/)	(Source: https://www.indiamart.com/)
i. _____ (0.5)	ii. _____ (0.5)
	
(Source: https://www.youtube.com/)	(Source: https://technologystudent.com/)
iii. _____ (0.5)	iv. _____ (0.5)

b. Describe **TWO** functions of mechanical systems.

Function 1: _____

(1)

Function 2: _____

(1)

c. List **ONE** advantage and **ONE** disadvantage of gears and pulleys.

Advantage of gears: _____

(1)

Disadvantage of gears: _____

(1)

Advantage of pulleys: _____

(1)

Disadvantage of pulleys: _____

(1)

8

(1)

Please turn the page.

Question 5**K-9 (8 marks)**

a. In Table 4 below, list the **FIVE** main classes of fire against their corresponding type.

Table 4: Classes of fire

Type of Fire	Class of Fire
Fires involving gases	
Fires with flammable or combustible liquids as the fuel source	
Fires involving cooking oils	
Fires with trash, wood, paper, or other combustible materials as the fuel source	
Fires involving electrical equipment	

(2)

b. Identify the proper fire extinguisher for each of the fires described below.

i. A fire in the classroom's waste paper basket.

(0.5)

ii. A fire emerging from the gas tank in a balcony.

(0.5)

iii. A fire from the back of a TV.

(0.5)

iv. A fire in the kitchen caused by a frying pan that is filled with cooking oil.

(0.5)

c. Describe **TWO** important practices to adopt when a fire emergency occurs.

8

(4)

Question 6**K-10 (8 marks)**

a. Define the following **TWO** terms.

Copyright: _____ (1)

Plagiarism: _____ (1)

b. List **TWO** different types of documentation that a technician may use apart from the risk assessment and data sheets.

Type 1: _____ (1)

Type 2: _____ (1)

c. Describe the function of the following **TWO** types of documentation.

Risk assessment: _____

_____ (2)

Data sheet: _____

_____ (2)

8

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Question 7**C-3 (12 marks)**

a. Describe **TWO** preventive measures which should be taken before using a power tool.

Preventive Measure 1: _____

_____ (2)

Preventive Measure 2: _____

_____ (2)

b. Describe **TWO** safety measures while using a power tool.

Safety Measure 1: _____

_____ (2)

Safety Measure 2: _____

_____ (2)

c. Explain **TWO** measures needed for the maintenance and care of power tools and machinery.

Question 8

C-4 (12 marks)

a. State **FIVE** important points of information needed when reporting an emergency situation.

- i. _____ (0.8)
- ii. _____ (0.8)
- iii. _____ (0.8)
- iv. _____ (0.8)
- v. _____ (0.8)

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b. Describe the necessary procedure to perform when the following **TWO** incidents may occur in a workshop.

Cuts:

Penetration of foreign body:

(2)

c. Justify the procedures adopted when the following incident occurs in a workshop.

Falling from height: