SEC37/c3.25m

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 3
DATE:	4th April 2025
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. The use of non-programmable electronic calculators is allowed.

Scenario

- The main power station in Delimara is powered by fossil-fuel.
- A team of engineers is tasked to identify other possible types of power generating plants.

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

a. Name **FOUR** alternative types of electrical power generation plants, besides fossil-fuel power generating plants.

Type 1: _____ (0.25)

Type 2: _____ (0.25)

Type 3: _____ (0.25)

Type 4: _____ (0.25)

b. Define the terms 'electrical power generation' and 'electrical power distribution'.

Electrical power generation: _____

_____

_____ (0.5)

Electrical power distribution: _____

_____

_____ (0.5)

c. Describe the **FIVE** main stages required for electrical power to reach consumers from an electrical generation plant.

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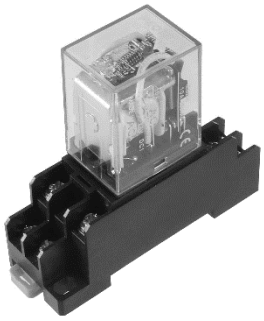
_____ (2)

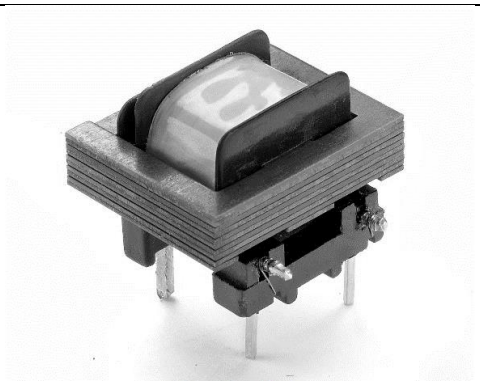
Question 2 **K-2 (4 marks)**

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

Table 1: Electromagnetic devices

	Electromagnetic Devices	**Application**
i.	 Microphone *(Source: https://www.bhphotovideo.com)*	_____ _____ _____ (0.25)
ii.	 Loudspeaker *(Source: https://www. fruugo.kr/)*	_____ _____ _____ (0.25)
iii.	 Relay *(Source: https://www.amazon.co.uk)*	_____ _____ _____ (0.25)

This question continues on next page.

	Electromagnetic Devices	Application
iv.	 Transformer *(Source: https://www.directindustry.com/)*	_____ _____ _____ (0.25)

b. Outline the working principle of an electromagnet.

_____

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_____

_____ (1)

c. Describe how a relay achieves its function, by referring to all parts labelled in Figure 1.

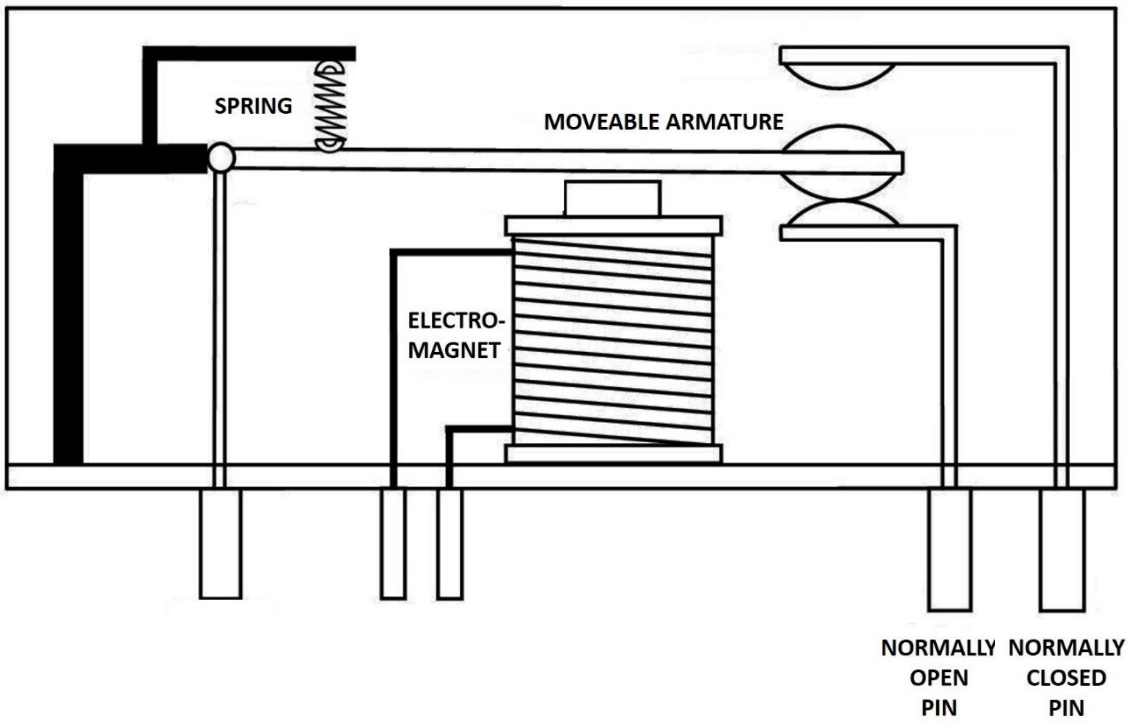

Figure 1: Relay
(Adapted from source: https://electrosome.com/)

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_____ (2)

Question 3 **C-1 (6 marks)**

a. Outline the importance of selecting a fuse with the appropriate current rating in terms of:

Function: _____

_____

_____

_____ (1)

Hazard that might arise when selecting an inappropriate fuse: _____

_____

_____

_____ (1)

b. Calculate, by showing all your workings, the appropriate BS1361 fuse rating required to protect an air fryer with the following specifications:

1800 W; 230 V

_____

_____

_____

_____ (2)

This question continues on next page.

c. Two key advantages of an MCB over a fuse are the ease of reset and no need for replacement following a current overload event.
Discuss **TWO** other differences between an MCB and a fuse.

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_____ (2)

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

a. List **FOUR** different types of bearings, apart from ball bearing.

Type 1: _____ (0.25)

Type 2: _____ (0.25)

Type 3: _____ (0.25)

Type 4: _____ (0.25)

b. Bearings can fail prematurely when forced to handle heavier loads than designed for.
Identify another **TWO** factors that may cause a bearing to fail prematurely from the ones provided below.

Bearing operating at low speed	Shaft misalignment
Inadequate lubrication	Bearing operating a low temperatures

Failing Factor 1: _____ (0.5)

Failing Factor 2: _____ (0.5)

c. Bearings can be replaced using a press.
Outline **TWO** other methods that can be used to replace a bearing.

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_____ (2)

Question 5 **K-9 (4 marks)**

a. List the **FIVE** main classes of fire against their type in Table 2.

Table 2: Classes and types of fires

Class of Fire	**Type of Fire**	
	Fires involving electrical equipment	(0.2)
	Fires involving gases	(0.2)
	Fires with trash, wood, paper, or other combustible materials as the fuel source	(0.2)
	Fires with flammable or combustible liquids as the fuel source	(0.2)
	Fires involving cooking oils	(0.2)

This question continues on next page.

b. From the list given below, identify **ONE** fire extinguisher that should be used in each of the circumstances described in Table 3. One type of extinguisher may be used in different circumstances.

Fire Blanket	Foam	CO2	Wet Chemical	Powder

Table 3: Fire extinguisher for different classes of fire

	Fire	**Fire Extinguisher**
i.	Fire from a computer	
ii.	Fire in a waste paper basket	
iii.	Small fire in a kitchen	
iv.	Fire in a petrol container	

(1)

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

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_____ (2)