



**L-Università
ta' Malta**

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE
EXAMINATIONS BOARD

**SECONDARY EDUCATION CERTIFICATE LEVEL
2023 MAIN SESSION**

SUBJECT:	Engineering Technology
PAPER NUMBER:	Controlled – Unit 3
DATE:	25 th April 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

- George is an engineer responsible for the correct operation of the local electrical power generating plant.
- George is asked to prepare a report.
- Help George by answering the following questions.

Question 1

K-1 (4 marks)

- a. George is working on a hydroelectric powered electrical generating plant.

Name **FOUR** other different types of electrical power generation plants.

Type 1: _____ (0.25)

Type 2: _____ (0.25)

Type 3: _____ (0.25)

Type 4: _____ (0.25)

- b. Define the term 'electrical power generation' and 'electrical power distribution'.

Electrical power generation: _____

_____ (0.5)

Electrical power distribution: _____

_____ (0.5)

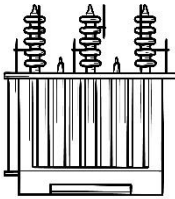
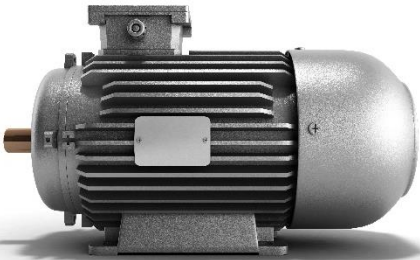
- c. Describe the **FIVE** main stages required for electrical power to reach consumers from an electrical generation plant.

(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.	 Transformer	(0.25)
ii.	 Relays	(0.25)
iii.	 Motors and Generators	(0.25)

This question continues on next page.

	Electromagnetic Devices	Application
iv.	 Microphone	(0.25)

(Source: <https://www.shutterstock.com>)

- b. The electromagnetic devices listed in Question 2a work on the same electromagnetic principle. Outline the working principle of an electromagnet.

(1)

- c. A relay is constructed through a number of parts, mainly: electromagnet, movable armature, spring, normally open and normally closed contacts. Using these terms, describe how a relay achieves its function by referring to Figure 1.

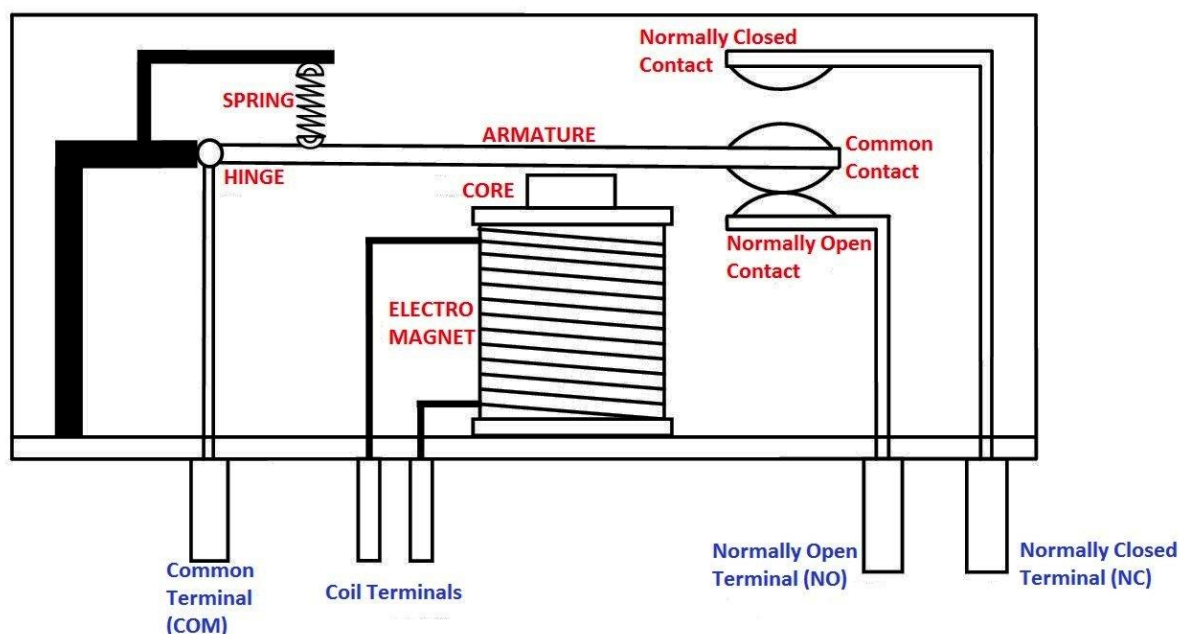


Figure 1: Relay

(Source: <https://electrosome.com/electromagnetic-relay/>)

(2)

Question 3

C-1 (6 marks)

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

Potential Hazards: _____

_____ (1)

Function: _____

_____ (1)

- b. Calculate, by showing all workings, the appropriate rating of the fuse to be used with an electric toaster having the following specifications:

750 W; 230 V

(2)

- c. Discuss the main differences between an MCB and a fuse in terms of the following characteristics:

Cost: _____

_____ (0.5)

Ease to resume supply: _____

 _____ (0.5)

Sensitivity to current overload: _____

 _____ (0.5)

Sacrificial vs. reset: _____

 _____ (0.5)

Question 4

K-6 (4 marks)

a. List **FOUR** different types of bearings.

Type 1: _____ (0.25)

Type 2: _____ (0.25)

Type 3: _____ (0.25)

Type 4: _____ (0.25)

b. A bearing can fail prematurely when fitted incorrectly.

Identify another **TWO** different factors that may cause a bearing to fail prematurely.

shaft misalignment	different bearing and shaft materials heavier loads than designed for	thread misalignment
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Failing Factor 1: _____ (0.5)

Failing Factor 2: _____ (0.5)

c. Outline **TWO** methods by which a bearing can be replaced.

(2)

Question 5

K-9 (4 marks)

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

Table 2

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

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

Water	Foam	Dry Powder	CO2	Wet chemical
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Table 3: Fire extinguisher for different classes of fire

	Fire	Fire Extinguisher
i.	Fire involving petrol	
ii.	Fire involving cooking oils	
iii.	Fire involving wood	
iv.	Fire involving electrical apparatus	

(1)

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

[illegible]