



L-Università
ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE
EXAMINATIONS BOARD

**SECONDARY EDUCATION CERTIFICATE LEVEL
2023 SUPPLEMENTARY SESSION**

SUBJECT: **Engineering Technology**
PAPER NUMBER: Synoptic – Unit 3
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 technician employed with a mechanical and electrical engineering company is required to answer the following questions.
- These questions relate to the technical information required to safely construct, use and maintain electro-mechanical systems using a range of power tools.

Question 1

K-1 (6 marks)

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

- Type 1: _____ (0.5)
- Type 2: _____ (0.5)
- Type 3: _____ (0.5)
- Type 4: _____ (0.5)

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

Generation of electrical power

_____ (1)

Distribution of electrical power

_____ (1)

c. Describe the **FIVE** stages how electrical power transit from the generation plant until it reaches the consumer.

.....

_____ (2)

Servo Motor: _____

_____ (2)

8

Question 3

K-6 (8 marks)

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

Type 1: _____ (0.5)

Type 2: _____ (0.5)

Type 3: _____ (0.5)

Type 4: _____ (0.5)

b. A bearing can fail prematurely due to a number of factors including an incorrect fit. Identify another **TWO** different factors that may cause a bearing to fail prematurely from the ones provided below.

lighter load than designed for	ineffective bearing sealing	inadequate lubrication
	low operating temperature	

Failing Factor 1: _____ (1)

Failing Factor 2: _____ (1)

c. Outline **TWO** methods how different bearings can be replaced.

Method 1: _____

 _____ (2)

Method 2: _____

 _____ (2)


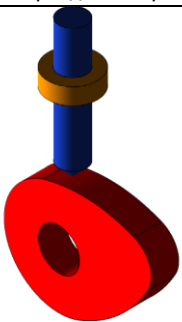
8

Question 4

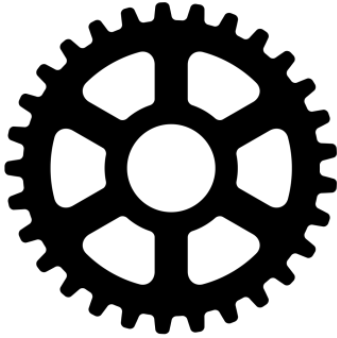
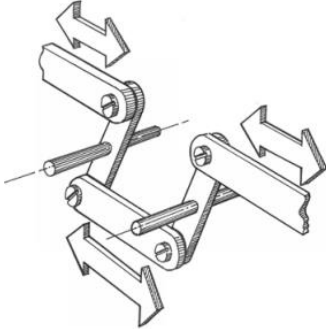
K-7 (8 marks)

a. Identify the mechanical systems given in Table 2.

Table 2: Mechanical Systems.

	Mechanical system	Name
i.	 <small>(Source: https://istockphoto.com)</small>	_____ (0.5)
ii.	 <small>(Source: https://grabcad.com)</small>	_____ (0.5)

This question continues on next page.

<p>iii.</p>	 <p>(Source: https://www.freeiconspng.com/)</p>	<p>_____</p> <p>(0.5)</p>
<p>iv.</p>	 <p>(Source: http://resource.download.wjec.co.uk.s3.amazonaws.com/)</p>	<p>_____</p> <p>(0.5)</p>

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

Function 1: _____

_____ (1)

Function 2: _____

_____ (1)

c. i. List **ONE** advantage and **ONE** disadvantage of gears:

Gears Advantage: _____

_____ (1)

Gears Disadvantage: _____

 _____ (1)

ii. List **ONE** advantage and **ONE** disadvantage of pulleys:

Pulleys Advantage: _____

 _____ (1)

Pulleys Disadvantage: _____

 _____ (1)

8

Question 5

K-9 (8 marks)

a. List the **FIVE** main classes of fire against their type in Table 3.

Table 3

	Type of Fire	Class of Fire	
i.	Fires with flammable or combustible liquids as the fuel source		(0.4)
ii.	Fires involving gases		(0.4)
iii.	Fires involving cooking oils		(0.4)
iv.	Fires with trash, wood, paper, or other combustible materials as the fuel source		(0.4)
v.	Fires involving electrical equipment		(0.4)

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

a. A fire in the back side of a fridge.
 _____ (0.5)

b. A fire in a car’s fuel tank.
 _____ (0.5)

c. A fire in a bedroom caused by the burning of clothes inside a wooden cabinet.
 _____ (0.5)

d. Fire in a kitchen caused by the burning of cooking oil.
 _____ (0.5)

b. Calculate and choose the appropriate fuse rating for a toaster that has a maximum power consumption of 2,500 W, and the supplied voltage is 230 V. Show all your workings.

(4)

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

Sensitivity to current overload: _____

(2)

Ease to resume supply: _____

(2)

12

Question 8

C-3 (12 marks)

a. Describe the following preventative measures one should take before using a power tool.

Ensure that you have been properly trained to use the tool:

(2)

Ensure that the power tool has the correct guard:

(2)

b. Describe the following safety measures one should take while using a power tool.

Keep power cords clear of tools and the path that the cutting tool will take:

(2)

This question continues on next page.

