L-Università ta' Malta

MATSEC
Examinations Board

Marking Scheme

SEC Engineering Technology Unit 2

Main Session 2026

6th May 2025

Marking schemes published by the MATSEC Examination Board are not intended to be standalone documents. They are an essential resource for markers who are subsequently monitored through a verification process to ensure consistent and accurate application of the marking scheme.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with the MATSEC Examinations Board when in doubt.

<table>
<tr><th>Criteria Reference</th><th>The candidate should be able to:</th><th>Question Number</th><th>Maximum marks that can be achieved</th><th>Allocation of marks NOT to be subdivided any further than indicated below</th><th>Examples of expected answer

Other valid answers are to be accepted unless stated otherwise</th></tr>
<tr><td rowspan="4">K-1</td><td></td><td>Q1</td><td>4</td><td></td><td></td></tr>
<tr><td>MQF 1: Categorise different materials as insulators, conductors.</td><td>1a</td><td>1</td><td>0.25 marks for each correct answer.</td><td><table><tr><th>Conductor</th><th>Insulator</th></tr><tr><td>Iron</td><td>Paper</td></tr><tr><td>Brass</td><td>Rubber</td></tr></table>
Other answers should not be accepted.</td></tr>
<tr><td>MQF 2: Define the term semi-conductor.</td><td>1b</td><td>1</td><td>1 mark for a correct definition.</td><td>Example of a correct answer:

The conductivity of semiconductors falls between that of insulators and conductors. By introducing small amounts of impurities, a process known as doping, the conductivity of pure semiconductors can be increased.</td></tr>
<tr><td>MQF 3: State the parameters affecting resistance of a material.</td><td>1c</td><td>2</td><td>1 mark for stating each correct parameter.</td><td>Candidates are expected to state any of the following TWO parameters affecting resistance:

- Cross-sectional area
- Length
- Resistivity

Example of a good statement:
Length: The wire’s resistance is directly proportional with length.</td></tr>
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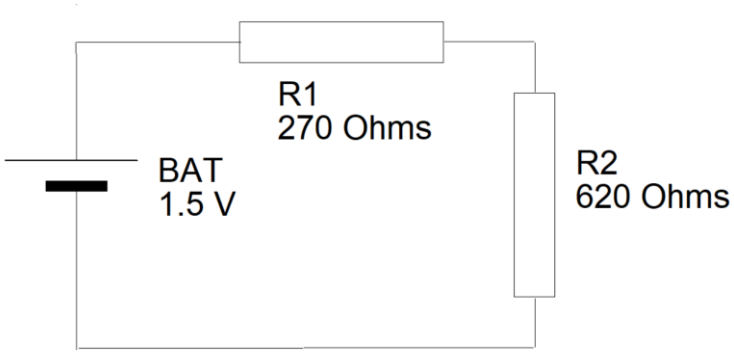
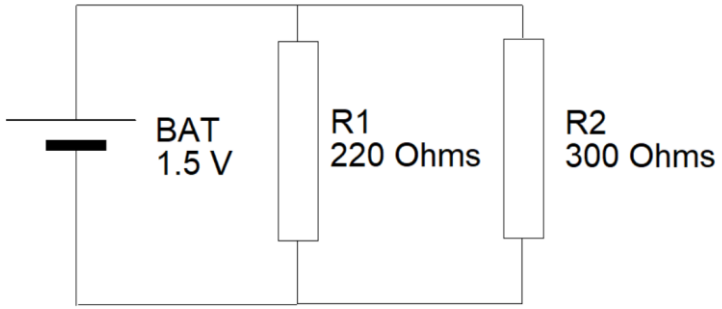
Criteria Reference	The candidate should be able to:	Question Number	Maximum marks that can be achieved	Allocation of marks NOT to be subdivided any further than indicated below	Examples of expected answer Other valid answers are to be accepted unless stated otherwise
		Q2	**4**		
K-3	MQF 1: Differentiate between open and closed circuit.	2a	1	1 mark for the correct answer.	An open circuit has a gap that prevents current flow, while a closed circuit provides a complete path, enabling continuous current flow through the electrical components connected within the circuit.
	MQF 2: Draw series and parallel circuits.	2b	1	0.5 marks for series circuit. 0.5 marks for parallel circuit.	Examples of correct answers:   If Ω is written instead of Ohms, it is considered as a suitable answer.

Criteria Reference	The candidate should be able to:	Question Number	Maximum marks that can be achieved	Allocation of marks NOT to be subdivided any further than indicated below	Examples of expected answer Other valid answers are to be accepted unless stated otherwise
	MQF 3: Identify parallel and series sub-circuits in a given circuit.	2c	2	1 mark for identifying series sub-circuit. 1 mark for identifying parallel sub-circuit.	Candidates are to identify **ONE** series and **ONE** parallel sub circuit. Series circuit: R2 in series with R3 Parallel circuit: R1 in parallel with (R2 + R3) Other answers should not be accepted.
		Q3	**6**		
C-2	MQF 1: Find the total resistance in a series circuit.	3a	2	1 mark for working. 1 mark for correct answer. No mark for missing or incorrect unit of measurement.	R1 = 890 Ω R2 = 1,500 Ω R3 = 2,200 Ω RT = R1 + R2 + R3 RT = 890 + 1500 + 2200 RT = 4590 Ω = 4.59 kΩ (4.59 kOhms and 4590 Ohms are accepted)
	MQF 2: Find the total resistance in a parallel circuit.	3b	2	1 mark for working. 1 mark for correct answer. No mark for missing or incorrect unit of measurement.	R1 = 1,200 Ω R2 = 890 Ω RT = 1 / (1/R1 + 1/R2) RT = 1 / (1/1200 + 1/890) RT = 1 / 0.0019569 RT = 511 Ω (511 Ohms is accepted)

Criteria Reference	The candidate should be able to:	Question Number	Maximum marks that can be achieved	Allocation of marks NOT to be subdivided any further than indicated below	Examples of expected answer Other valid answers are to be accepted unless stated otherwise
	MQF 3: Find the total resistance of a circuit containing series and parallel subcircuits.	3c	2	1 mark for working. 1 mark for correct answer. No mark for missing or incorrect unit of measurement.	R1 = 890 Ω R2 = 1,000 Ω R3 = 560 Ω R4 = 1,500 Ω R5 = 270 Ω R2 + R3 = 1000 + 560 = 1560 Ω R4 + R5 = 1500 + 270 = 1770 Ω (R2 + R3) || (R4 + R5) = 1560 || 1770 = 829.2Ω RT = R1 + ((R2 + R3) || (R4 + R5)) = 890 + 829.2 = 1719.2 Ω RT = 1.72 kΩ (1.72 kOhms is accepted)
		Q4	**6**		
C-3	MQF 1: Find the total capacitance in a parallel circuit.	4a	2	1 mark for working. 1 mark for correct answer. No mark for missing or incorrect unit of measurement.	C1 = 560 nF = 0.56μF C2 = 1.2 μF CT = C1 + C2 = 1.2 μ + 0.56 μ = 1.76 μF
	MQF 2: Find the total capacitance in a series circuit.	4b	2	1 mark for working. 1 mark for correct answer. No mark for missing or incorrect unit of measurement.	C1 = 1100 nF = 1.1μF C2 = 0.68 μF CT = 1 / ((1/1.1) + (1/0.68)) CT = 1 / 2.3798 CT = 0.42 μF

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	MQF 3: Find the value of a missing parameter in a RC circuit.	4c	2	1 mark for working. 1 mark for a correct answer. No mark for missing or incorrect unit of measurement.	C1 = 2.2 μF = 0.0000022 F T = RC → R = T / C R1 = 5.28 / 0.0000022 R1 = 2,400,000 Ω = 2.4 MΩ
		Q5	**4**		
K-6	MQF 1: Identify different types of signals.	5a	1	0.5 marks for each correct answer.	i. Triangular Wave ii. Saw Tooth Wave Other answers should not be accepted.
	MQF 2: Define parameters of a given signal and their SI units.	5b	1	0.5 marks for each correct answer. Do not award marks if the parameter and the SI Unit do not match.	Any **TWO** of the following parameters: Parameter 1: Amplitude SI Unit of Parameter 1: Volts Parameter 2: Periodic Time SI Unit of Parameter 2: Seconds Parameter 3: Frequency SI Unit of Parameter 3: Hertz Other answers should not be accepted.

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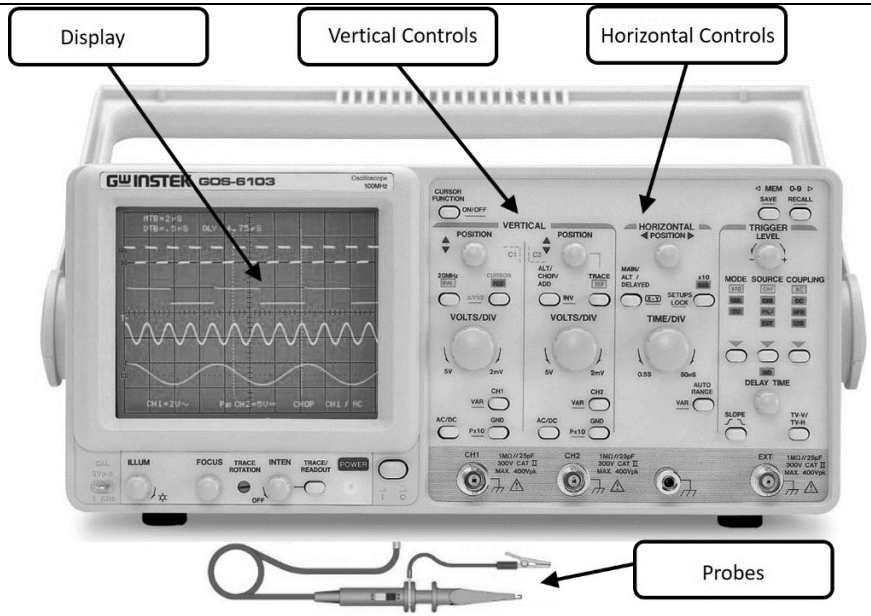
	MQF 3: Label important features of an oscilloscope.	5c	2	0.5 marks for each correct answer.	 Other answers should not be accepted.
		Q6	**4**		
K-9	MQF 1: Identify electronic symbols.	6a	1	0.25 marks for each correct answer.	i. Battery or Cell ii. Transistor iii. Diode iv. LDR Other answers should not be accepted.
	MQF 2: Match SI units to their respective parameters.	6b	1	0.25 marks for each correct answer.	i. Farads – Capacitance ii. Watts – Power iii. Volts – Voltage iv. Ohms – Resistance Other answers should not be accepted.

Criteria Reference	The candidate should be able to:	Question Number	Maximum marks that can be achieved	Allocation of marks NOT to be subdivided any further than indicated below	Examples of expected answer Other valid answers are to be accepted unless stated otherwise
	MQF 3: Identify different packaging of the same electronic components.	6c	2	0.5 marks for each correct answer.	i. Resistor Packaging 1 – Axial Packaging 2 – Radial ii. Capacitor Packaging 1 – Surface mount Packaging 2 – Through hole Other answers should not be accepted.
		Q7	**4**		
K-10	MQF 1: Label different tools used in electronic circuit construction.	7a	1	0.25 marks for each correct answer.	i. Side cutter ii. Long nose plier iii. Solder wick iv. Soldering Iron Other answers should not be accepted.

Criteria Reference	The candidate should be able to:	Question Number	Maximum marks that can be achieved	Allocation of marks NOT to be subdivided any further than indicated below	Examples of expected answer Other valid answers are to be accepted unless stated otherwise
	MQF 2: Identify correct steps to use a soldering iron effectively.	7b	1	0.25 marks for each correct step mentioned.	Candidates are expected to identify the remaining **FOUR** steps. Examples of correct answers: i. Clean the solder iron tip ii. Free board from oxidization iii. Apply the required heat to component pin and copper track iv. Apply the correct amount of solder Steps should be listed in the order as mentioned above.
	MQF 3: Outline the functions of different tools for circuit construction.	7c	2	1 mark for each correct answer.	Candidates are to outline the functions of a de-soldering pump and a track cutter. Example of correct answer: De-soldering pump: A de-soldering pump is used to remove solder from electronic components, allowing for the extraction or rework of parts on a circuit board without damaging the surrounding areas.
		Q8	**6**		
C-5	MQF 1: Identify suitable warning signs for given hazardous scenarios.	8a	2	1 mark for each correct answer.	i.  ii.  Other answers should not be accepted.

Criteria Reference	The candidate should be able to:	Question Number	Maximum marks that can be achieved	Allocation of marks NOT to be subdivided any further than indicated below	Examples of expected answer Other valid answers are to be accepted unless stated otherwise
	MQF 2: Identify hazards that might be present when manufacturing a PCB.	8b	2	0.5 marks for each correct answer.	Candidates are to identify the following: Hazard 1: Inhaling dangerous fumes Hazard 2: Cuts Hazard 3: Chemical spill Hazard 4: Airborne fragments Other answers should not be accepted.
	MQF 3: Identify ways to eliminate or minimize the risks involved when manufacturing a PCB.	8c	2	0.5 marks for each correct answer.	Candidates are to identify the following: i. Safe waste disposal. ii. Safe handling of chemicals. iii. Regular equipment maintenance. iv. Wear appropriate PPE. Other answers should not be accepted.