SEC37/c2.22m

L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

SECONDARY EDUCATION CERTIFICATE LEVEL
2022 MAIN SESSION

SUBJECT:	**Engineering Technology**
PAPER NUMBER:	Controlled – Unit 2
DATE:	20th May 2021
TIME:	10:00 a.m. to 11:35 a.m.

Name of candidate _____

I.D. number _____

School _____

Class _____

Answer **ALL** questions in the space provided.

Scenario

- An electronics technician working in an engineering company is required to read and interpret circuit diagrams.
- The technician is required to assemble, and test simple circuits built on various prototype boards.

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

Materials are normally classified according to their electrical properties as conductors, semi-conductors or insulators.

a) Categorise the following materials as insulators or conductors.

i) Copper: _____ (0.25)

ii) Wood: _____ (0.25)

iii) Ceramic: _____ (0.25)

iv) Iron: _____ (0.25)

b) Define the term semiconductor.

_____

_____

_____

_____

_____

(1)

c) State **TWO** parameters affecting the resistance of a wire.

Parameter 1: _____

_____

_____

Parameter 2: _____

_____

_____

(2)

Question 2 **K-3 (4 marks)**

An electrical circuit provides a path around which electricity can flow.

a) Differentiate between an open circuit and a closed circuit.

(1)

b) **THREE** 1.5V batteries connected in series are used to power **TWO** light bulbs connected in parallel when a switch is closed. Draw the described circuit in the space provided.

(1)

c) Identify (by marking and labelling) **TWO** series and **ONE** parallel sub-circuits on the circuit shown in Figure 2 below.

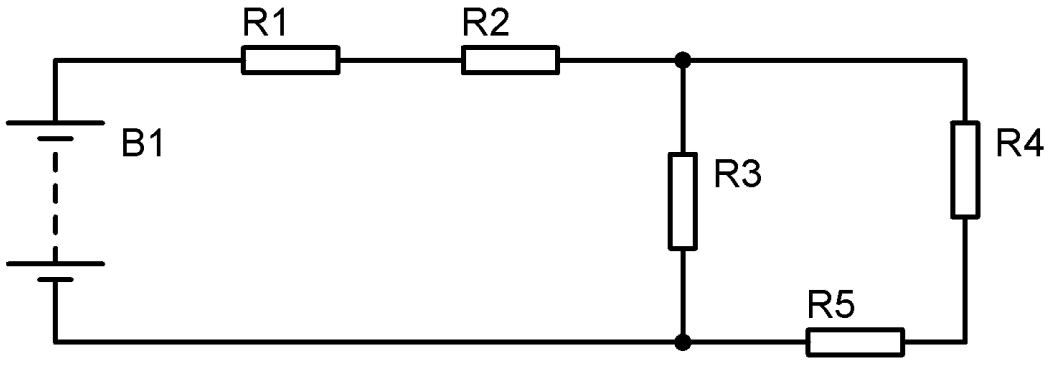

Figure 2 – Series-parallel circuit.

(2)

Please turn the page.

Question 3 **C-2 (6 marks)**

Resistors can be connected in various series and parallel combinations to form resistive circuits.

a) Find the total resistance of the circuit shown in figure 3 below. Show all your working.

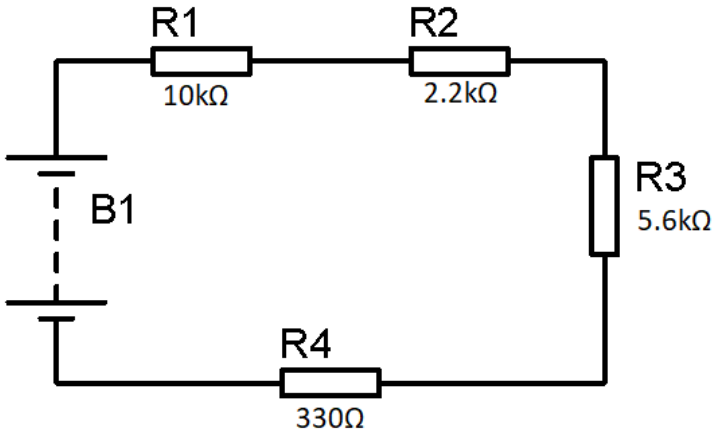

Figure 3 – Circuit 1.

(2)

b) Find the total resistance of the circuit shown in Figure 4 below. Show all your working.

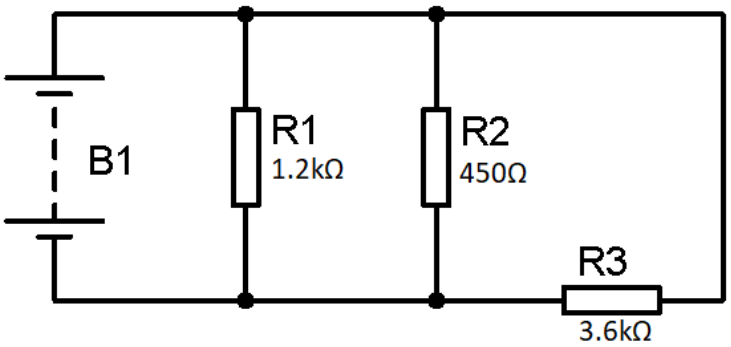

Figure 4 – Circuit 2.

(2)

c) Find the total resistance of the circuit shown in Figure 5 below. Show all your working.

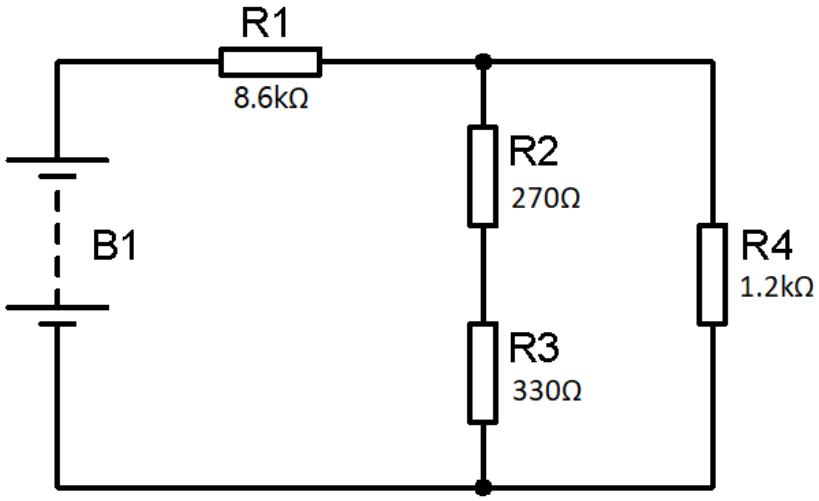

Figure 5 – Circuit 3.

(2)

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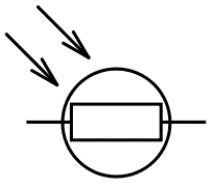
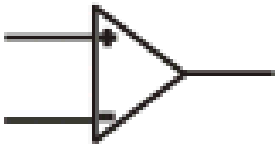
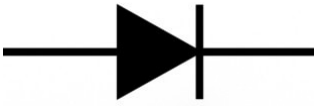
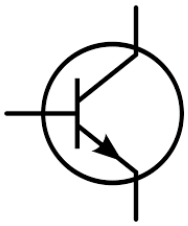
Question 4 **K-9 (4 marks)**

Components are represented in circuit diagrams using standard symbols.

a) Identify the electronic symbols by completing Table 1 below.

Table 1 – Electronic Symbols.

	Electronic Symbol	Name
i)		_____(0.2)
ii)		_____(0.2)
iii)		_____(0.2)
iv)		_____(0.2)
v)		_____(0.2)

(Source: https://www.electrical4u.com/electrical-international-symbol/)

b) Match the following SI units to their respective parameters by drawing a line between them.

i) Volts	Current
ii) Amps	Resistance
iii) Farads	Voltage
iv) Ohms	Capacitance
v) Watts	Power

(1)

c) Table 2 below shows different packaging for capacitors and resistors. Identify each of the given packaging, by underlining the correct answer.

Table 2 – Component Packaging.

	Component	**Packaging 1**	**Packaging 2**
i)	Capacitor	 Radial / Axial	 Radial / Axial
ii)	Resistor	 Through hole / Surface mount	 Through hole / Surface mount

(Source: https://www.antiqueradios.com/)
(Source: http://www.spazztech.net/resistors.html)

(2)

Please turn the page.

Question 5 **K-10 (4 marks)**

Different tools are required to construct electronic circuits.

a) Label the following tools by completing Table 3 below.

Table 3 – Tools.

	Tool	Name
i)		_____ (0.25)
ii)		_____ (0.25)
iii)		_____ (0.25)
iv)		_____ (0.25)

Source: https://makeradvisor.com/how-to-set-up-an-electronics-lab-tools-and-equipment/

b) Identify **FIVE** steps which are required to use a soldering iron effectively.

Step 1: _____

_____

Step 2: _____

_____

Step 3: _____

_____

Step 4: _____

_____

Step 5: _____

_____

(1)

c) Outline the function of each of the following tools used to construct a circuit on a PCB.

De-soldering pump

_____

_____

_____

_____

_____

_____

_____

_____

(1)

This question continues on the next page.

PCB driller

_____

_____

_____

_____

_____

_____

_____

_____

(1)

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