higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

MOTOR ELECTRICAL THEORY N1

2 August 2021

This marking guideline consists of 5 pages.

QUESTION 1

1.1	1.1.1	A
	1.1.2	C
	1.1.3	C
	1.1.4	C
	1.1.5	C
	1.1.6	A
	1.1.7	B
	1.1.8	B
	1.1.9	D
	1.1.10	D

(10 × 1) (10)

1.2	1.2.1	True
	1.2.2	True
	1.2.3	False
	1.2.4	True
	1.2.5	False
	1.2.6	False
	1.2.7	True
	1.2.8	True
	1.2.9	True
	1.2.10	True

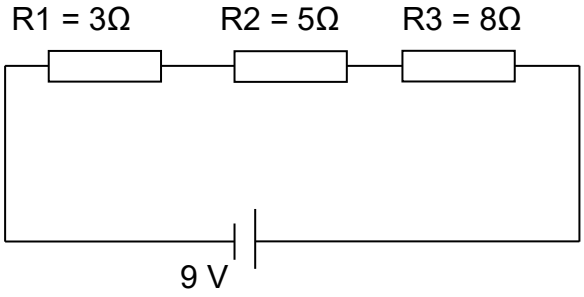
(10 × 1) (10)
[20]

QUESTION 2

2.1 $V_1 + V_2 + V_3 = V_T$
3 + 3 + 3 = 9 V (1)

2.2 $R_1 + R_2 + R_3 = R_T$
3 + 5 + 8 = 16 Ohm (1)

2.3



✓✓✓✓ (4)

2.3.1 $I = V/R$
$= 9/16$
$= 0{,}563$ A✓✓ (2)

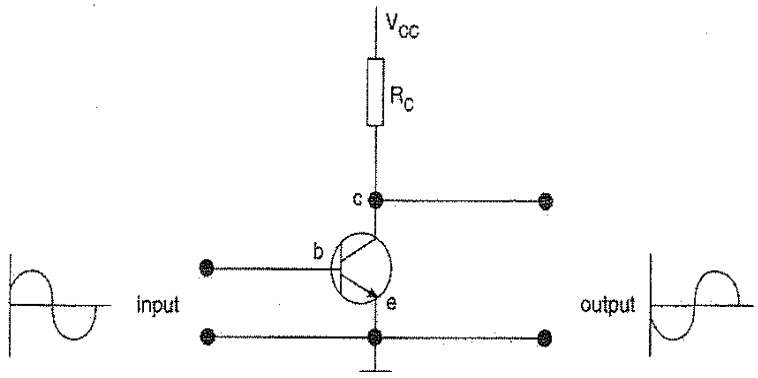
2.3.2 $V_1 = I_1 \times R_1$ $V_2 = I_2 \times R_2$ $V_3 = I_3 \times R_3$
$= 0{,}563 \times 3$ $= 0{,}563 \times 5$ $= 0{,}563 \times 8$
$= 1{,}689$ V✓✓ $= 2{,}815$ V✓✓ $= 4{,}504$ V✓✓ (6)

2.4
- Plastic
- Rubber
- Porcelain (Any 1 × 1) (1)

[15]

QUESTION 3

3.1



(6)

3.2
- Output signal is 180° out of phase
- High current amplification
- High voltage amplification
- High output impedance
- High input impedance (Any 3 × 1) (3)

3.3
1. A
2. C
3. B (3)

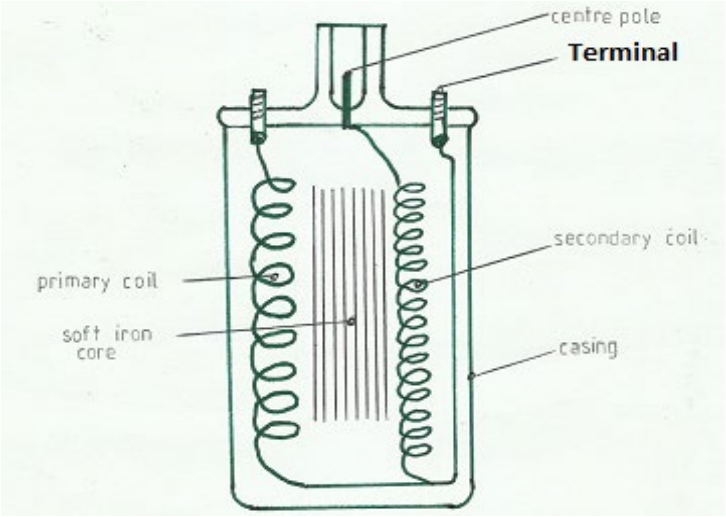
3.4
- Maintenance free batteries
- Low maintenance batteries
- Conventional lead-acid batteries (3)

[15]

QUESTION 4

4.1 The contact point is a high wearing component✓ that needs to be replaced regularly. The arcing over the points delays the interruption of the primary circuit current and the collapse of the magnetic field.✓ This delay results in a weaker spark being produced in the coil.✓ (3)

4.2



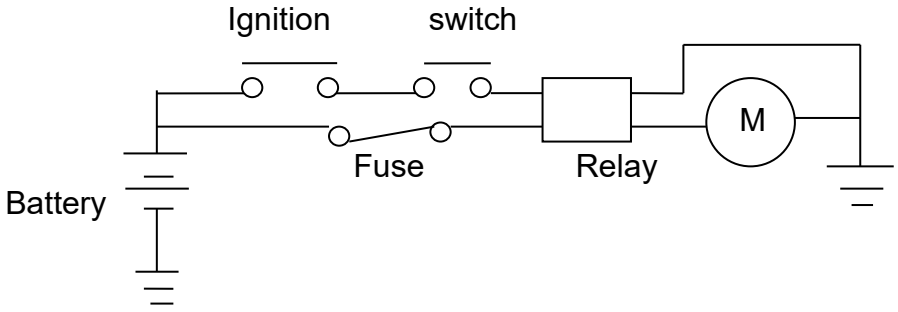
(6 marks for the labels)
(1 mark for the diagram) (7)

4.3 When current flows through the primary windings,✓ a magnetic field is set up in the coil.✓ As soon as the current flow is interrupted,✓ the magnetic field collapses;✓ this collapsing flux induces a high voltage in the secondary winding.✓ (5)
[15]

QUESTION 5

5.1
- Head lights
- Side lights/Park lights
- Brake lights
- Reverse lights
- Direction indicator lights (5)

5.2



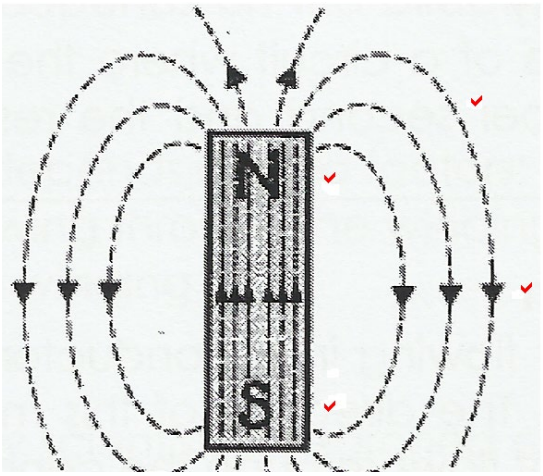
(8)

5.3 It switches on a high current circuit✓ using a low current switch.✓ (2)
[15]

QUESTION 6

6.1 Reluctance is the resistance✓ to the formation of magnetic flux lines. It can be reduced by placing a soft iron✓ in the path of the magnetic flux lines. (2)

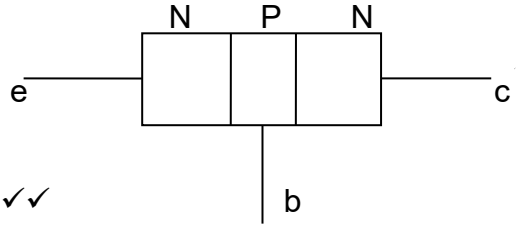
6.2



(4)

6.3 Germanium✓ and silicon✓ (2)

6.4



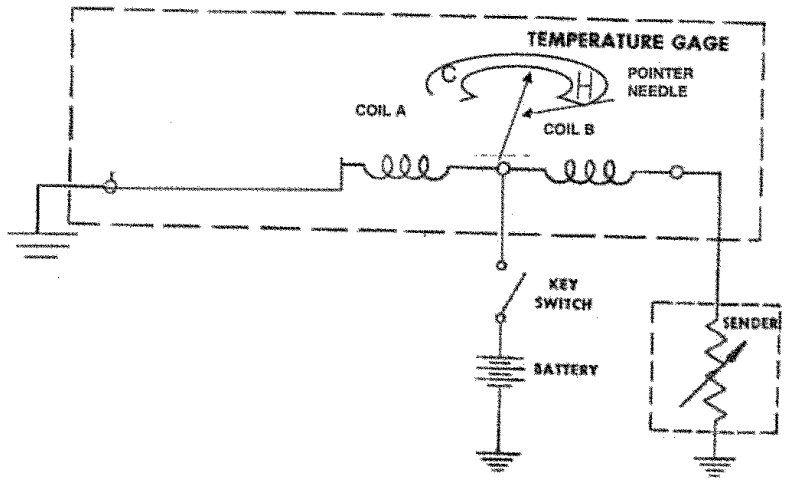
✓✓✓

(3)

6.5 Bellows type✓ and diaphragm type✓ (2)

6.6 Thermal-ribbon type✓ and Electronic type✓ (2)

6.7



(5)
[20]

TOTAL: 100