higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

MOTOR ELECTRICAL THEORY N1

29 November 2023

This marking guideline consists of 6 pages.

QUESTION 1

1.1

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

(10 × 1) (10)

1.2

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

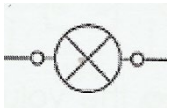
(10 × 1) (10)
[20]

QUESTION 2

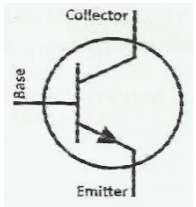
2.1 $R = \frac{V}{I} = \frac{24}{100}$ ✓ = 0,24A ✓ (2)

2.2 2.2.1

2.2.2

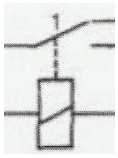


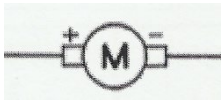
2.2.3

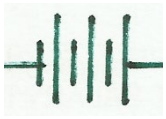


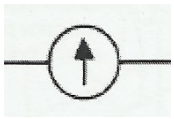
2.2.4

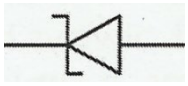
2.2.5 

2.2.6 

2.2.7 

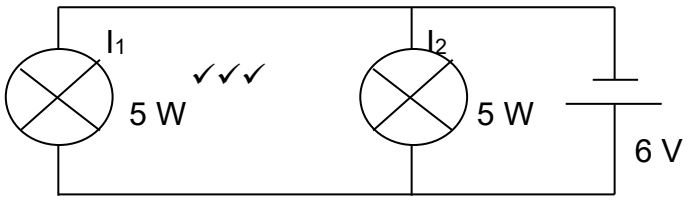
2.2.8 

2.2.9 

2.2.10 

(10 × 1) (10)

2.3 2.3.1



(3)

2.3.2 $I_1 = \frac{P}{V} = \frac{5}{6}$ ✓ = 0,833 A ✔

$R_1 = \frac{V}{I_1}$ ✓

$= \frac{6}{0,833}$ ✓

= 7,203 ohm ✓ (5)

[20]

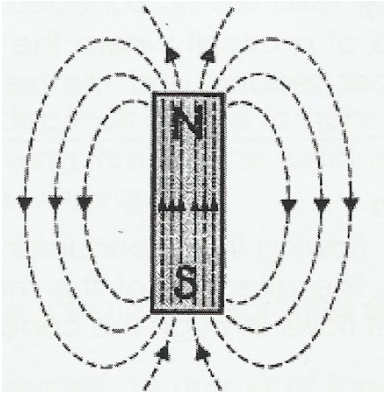
QUESTION 3

3.1 Function: to advance ignition timing in accordance with engine✓ speed. This is necessary to allow complete✓ combustion during the power stroke.
Operation: the distributor shaft consists of 2 sections✓ of which the upper section is free to rotate✓ on the lower section. Balance weights✓ are mounted on the lower section to engage with the formed part of the upper section. The weights are kept in the rest position by counter✓ springs.
As engine speed increases, the weights are flung✓ outwards against the spring tension. This action causes the upper section to be twisted forward✓ in the direction of rotation. The distributor cam now opens✓ the points earlier, advancing the timing. (9)

3.2 With the increase in load,✓ the mass of mixture taken in is also✓ increased. Ignition, therefore, has to take place earlier to allow for complete combustion✓ to ensure maximum✓ delivery of power. (4)

3.3
- Spark plugs
- High tension leads
- Distributor cap
- Coil
- Rotor (Any 3 × 1) (3)

3.4



(4)
[20]

QUESTION 4

4.1 The battery can deliver a current of 1 A for 85 hours or 8,5 A✓ for 10 hours before it will be✓ discharged. (2)

4.2
- The gel cell uses an electrolyte that is a semi-solid gel.
- The lead-acid cell uses an electrolyte that is a liquid. (2)

4.3 Immerse the clamp in a solution of warm water and soda. (1)

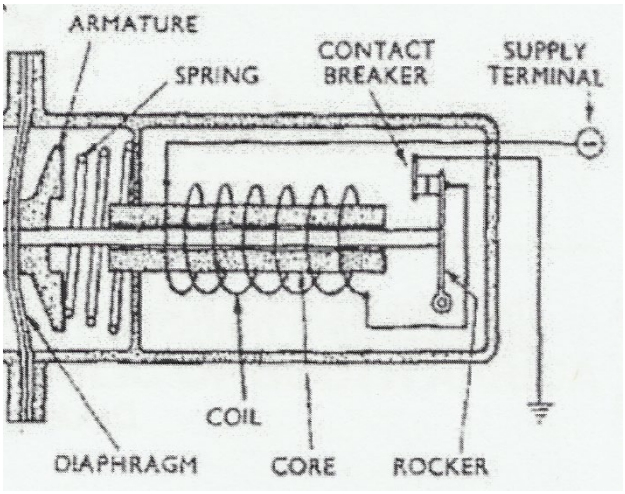
4.4
- Head light circuit
- Indicator light circuit
- Brake light circuit
- Parking light circuit
- Reverse light circuit
- Interior lighting circuit
- Instrument panel lighting circuit (Any 5 × 1) (5)

[10]

QUESTION 5

5.1
- Faulty sender unit
- Break in wiring
- Faulty gauge
- Blown fuse (4)

5.2



(5)

5.3 Hooter (1)

[10]

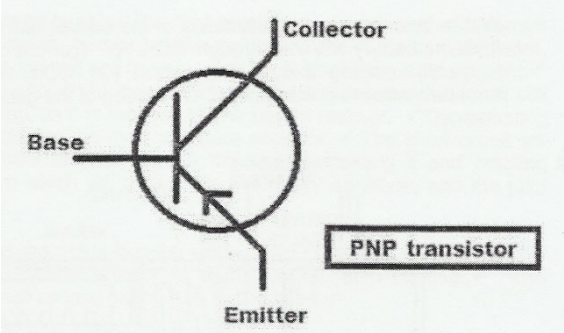
QUESTION 6

6.1
- Switch
- Amplifier (2)

6.2
- Common collector
- Common base
- Common emitter (3)

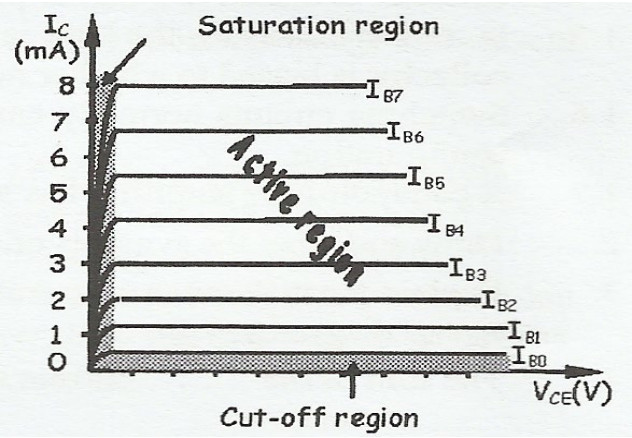
6.3 When connected in forward bias, the anode will become more✓ positive than the cathode. This action decreases the depletion✓ zone and current✓ can now be conducted. (3)

6.4



(3)

6.5



(5)

6.6
- OBDI was mainly developed for emission✓ control. The diagnostic codes were manufacturer-specific✓.
- OBDII included more diagnostic✓ features over and above emission codes. The diagnostic codes were made generic across✓ manufacturers. (4)

[20]

TOTAL: 100