higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

MOTOR ELECTRICAL THEORY N1

22 November 2022

This marking guideline consists of 7 pages.

Copyright reserved

QUESTION 1

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

(10 × 1) (10)

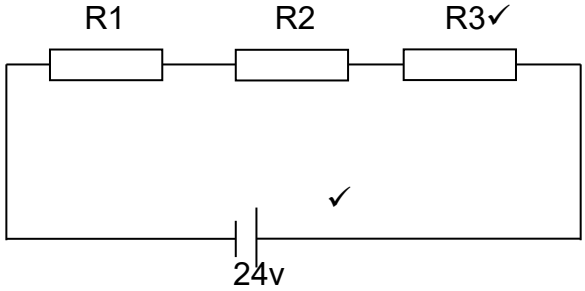
1.2	1.2.1	False
	1.2.2	False
	1.2.3	False
	1.2.4	True
	1.2.5	False
	1.2.6	True
	1.2.7	True
	1.2.8	True
	1.2.9	False
	1.2.10	True

(10 × 1) (10)
[20]

QUESTION 2

2.1
- Engine management
- Starting
- Charging
- Ignition
- Fuel supply (5)

2.2 2.2.1



✓
R1=10Ω R2=15Ω R3=?

(3)

Copyright reserved

2.2.2 $R_T = \frac{V}{I} = \frac{24}{0.4} = 60\Omega$✓

$R_3 = R_T - (R_1 + R_2)$

$= 60 - (10 + 15)$✓

$= 35\Omega$✓ (3)

2.2.3 $P = VI$

$= 24 \times 04$

$= 49.6v$✓ (1)

2.3 2.3.1 $\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

$= \frac{1}{10} + \frac{1}{15} + \frac{1}{5}$✓

$= \frac{3 + 2 + 6}{30}$ ✓

$= \frac{11}{30}$ ✓

$R_T = 2{,}73\Omega$✓ (4)

2.3.2 $I = \frac{V}{R}$

$= \frac{12}{2{,}73}$

$= 4{,}4A$✓ (1)

2.4
- Bakelite
- Rubber
- Plastic
- Glass
- Porcelain

(Any 3 × 1) (3)
[20]

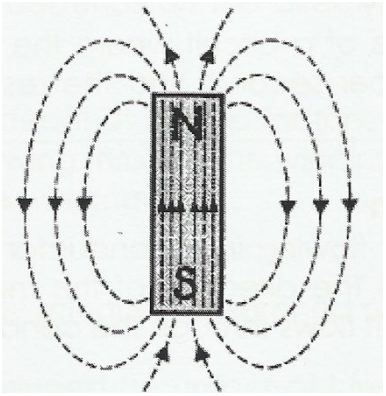
QUESTION 3

3.1 Function: to advance ignition timing in accordance with engine✓ speed. This is necessary to allow for complete✓ combustion during the power stroke.
Operation: the distributor shaft is made into 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 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
- Provides an air gap for the spark to jump
- Seals the cylinder
- Dissipates combustion heat (3)

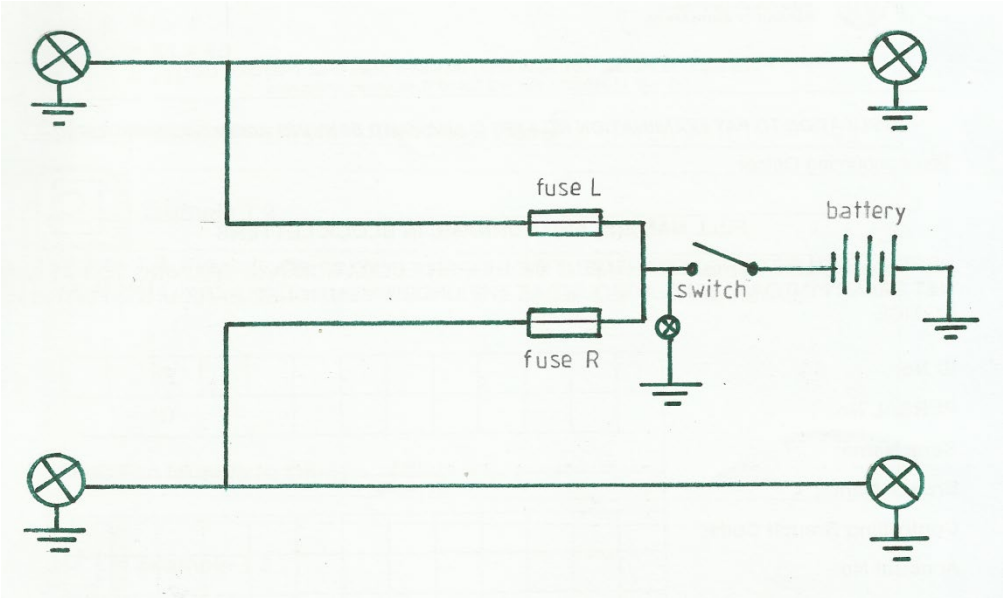
3.4



(4)
[20]

QUESTION 4

4.1



(THREE marks for labels) (7)

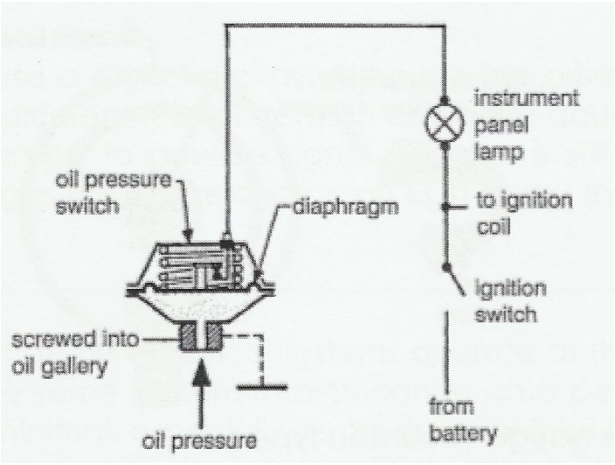
4.2 The relay switches a high✓ current directly from the battery to the head lights. This allows for brighter lights✓ and reduces the current✓ over the headlight switch. (3)

[10]

QUESTION 5

5.1
- A – indicator warning lamp
- B – speedo meter
- C – temperature gauge
- D – revolution counter
- E – oil pressure gauge (5)

5.2



(5)

[10]

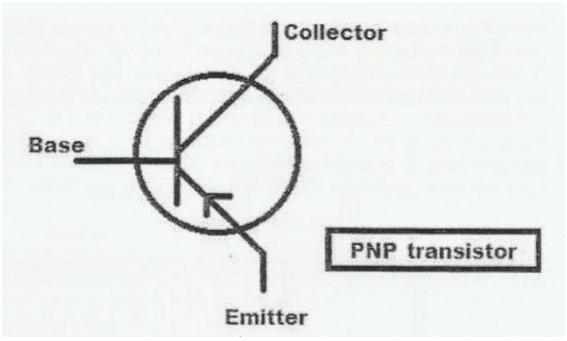
QUESTION 6

6.1
- switch
- amplifier (2)

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

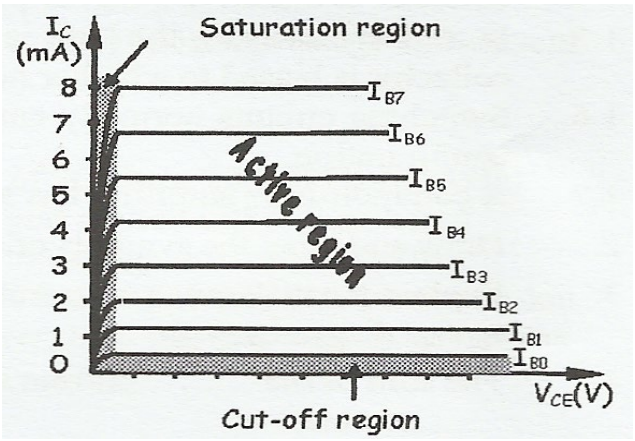
6.3 When connected in reverse bias, the anode will become more✓ negative than the cathode. This action increases the depletion✓ zone forming a buffer. No current✓ can now be conducted. (3)

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

Copyright reserved