



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

FAULT FINDING AND PROTECTIVE DEVICES N4

2 AUGUST 2018

This marking guideline consists of 5 pages.

QUESTION 1

- 1.1
- No power supply or no supply from both ends of the fuse
 - The fuse is blown or one of the fuse is open circuit
 - The circuit breaker is faulty
 - One of both ends of the start button is burned
 - The operational coils is damaged

(5 × 2) (10)

1.2 1.2.1



1.2.2



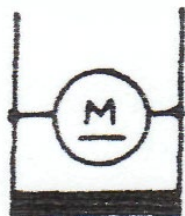
1.2.3



1.2.4



1.2.5

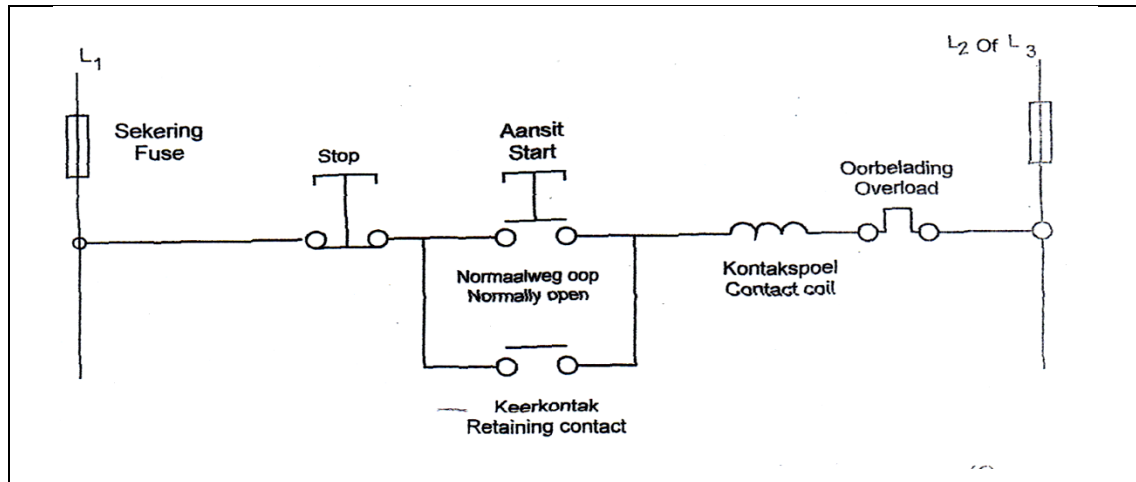


1.2.6

(6 × 1) (6)
[16]

QUESTION 2

- 2.1 When you press the start button, coil A energises. Retaining contact A retains the circuit. Main contactor A closes and the motor starts to rotate.

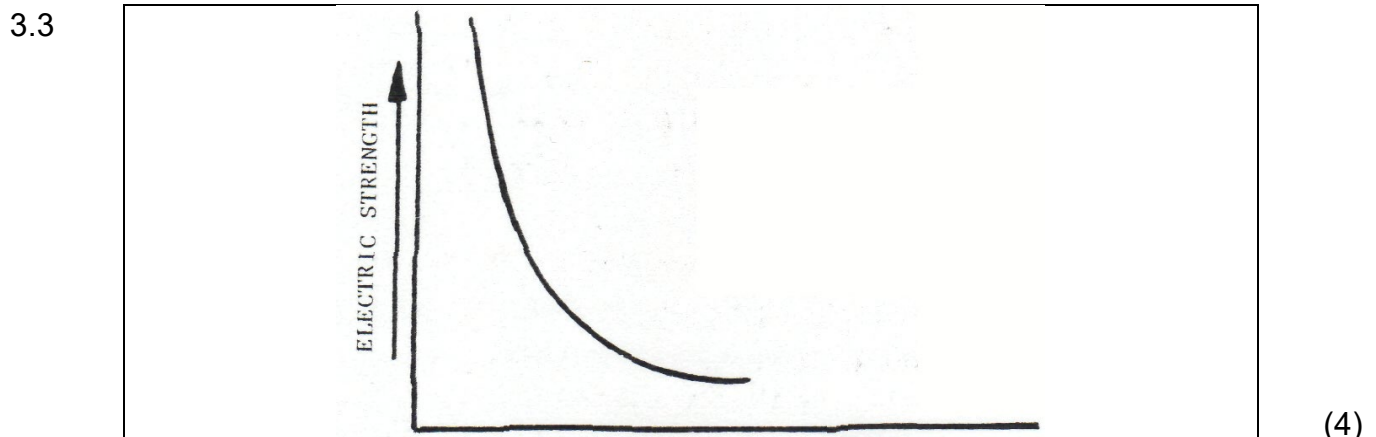


(8)

- 2.2 Forward bias and reserve bias (1 × 2) (2)
- 2.3 To prevent the pointer from oscillating✓ and to retain the pointer back zero.✓ (2)
- [12]**

QUESTION 3

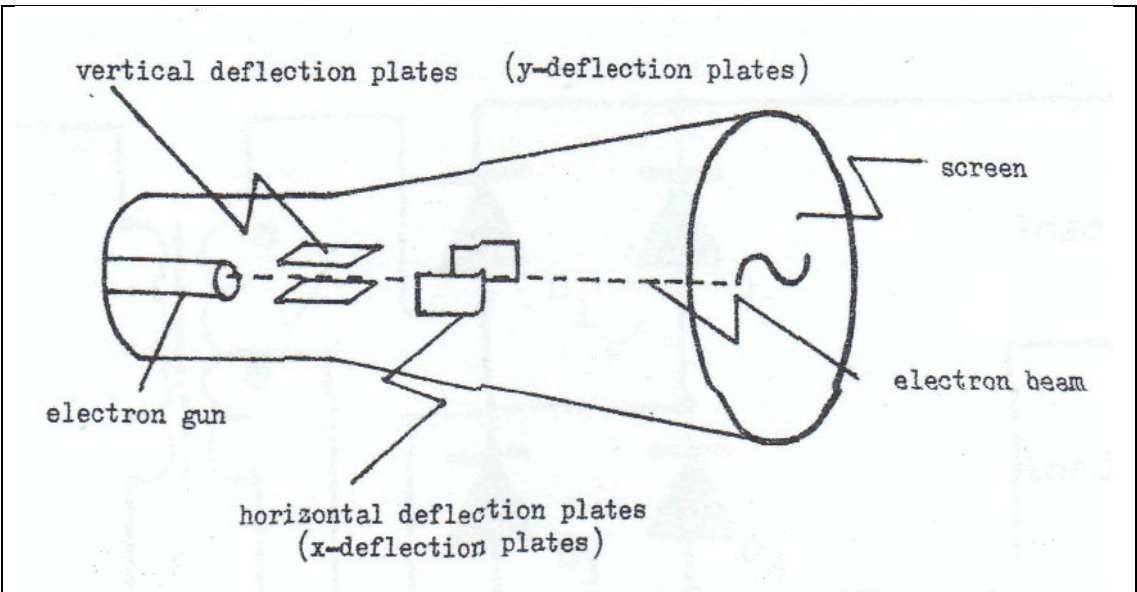
- 3.1
- electromagnetic overload
 - thermal overload
- (2)
- 3.2 When current flows through the coil, the magnetic field is set up and try to life the iron on core or plunger.✓ The thin oil in the dashpot has a suction effect on the plunger✓ and this restrains the movement of the iron core.✓ When current through the coil rises, the magnetic filed increase and become stronger.✓ The filed strength greater than lift up and activate a mechanical device which opens the normally closed contact in the control circuit.✓ The control circuit will switch of and the motor stops.✓ (6)



- 3.4
- Eddy-current losses
 - hysteresis losses
- (2)
- 3.5 A moving coil-type meter measures only direct current quantities (1 × 3) (3)
- 3.6
- functional block diagram
 - test data charts
 - layout diagrams
 - test flow charts
 - symptom analysis charts
 -
- (5 × 1) (5)
- [22]**

QUESTION 4

- 4.1
- By lamination of the coil
 - By varnishing the conductor coil
 - By using terrible core grains as lamination
- (Any 2 × 1) (2)

- 4.2
- 
- (6)

- 4.3
- 4.3.1 It is a device that converts one form of energy to another (1 × 2) (2)
- 4.3.2 It is the number of cycles completed per unit time in hertz (1 × 2) (2)
- 4.4 The luminescent layer converts the electrons✓ from the gun into light to give a picture or share of the quantity to be measured.✓✓ (3)
- 4.5
- $$\begin{aligned}
 LT &= L1 + L2 + L3✓ \\
 &= 12,3\text{mH} + 3,67\text{mH} + 10,8\text{ mH}✓ \\
 &= 26,78\text{mH}✓
 \end{aligned}$$
- (3)
- [18]**

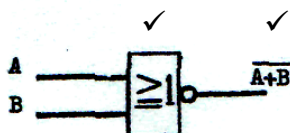
QUESTION 5

- 5.1 5.1.1 Current or voltage
 5.1.2 Current
 5.1.3 Voltage
(3 × 1) (3)
- 5.2 When a diode is suddenly reversed biased in order terminate conduction,✓
 the deflection region✓ and barrier voltage must increase.✓ The increase is
 achieved by a reverse recovery current✓ flowing into the cathode side of the
 device until the conductors stops.✓✓
(6)
- 5.3 Embedded in the stator or probes embedded in the stator windings (1 × 2) (2)
- 5.4 Deflecting plates provided inside CRT✓ which creates an electrostatic field
 which deflects the electron beam✓✓ according to the input signal.✓
(4)
- 5.5 It is a resistor which increases its resistance when temperature decreases.
(1 × 3) (3)
- 5.6 ADVANTAGES
 • A wide range can be produced
 • They are very stable
 DISADVANTAGES
 • Very expensive
 • Unstable at high frequencies because of their inductive effects
(4)
 [22]

QUESTION 6

- 6.1 It is the switching off of an SCR after conduction (1 × 2) (2)
- 6.2 6.2.1 $X + X = X$
 6.2.2 $X + 1 = 1$
 6.2.3 $X \cdot X = X$
 6.2.4 $A + 0 = A$
 6.2.5 $A + AB = A$
(5 × 1) (5)

6.3



A	B	$\overline{A+B}$
0	0	1
0	1	0
1	0	0
1	1	0

✓

(3)
[10]**TOTAL: 100**