



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

FAULT FINDING AND PROTECTIVE DEVICES N4

4 December 2023

This marking guideline consists of 7 pages.

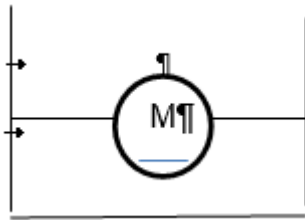
QUESTION 1

1.1 He/She should aim to decrease the down-time of equipment. (2)

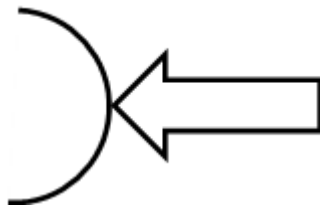
1.2 1.2.1



1.2.2



1.2.3



1.2.4



1.2.5



(5 × 1) (5)

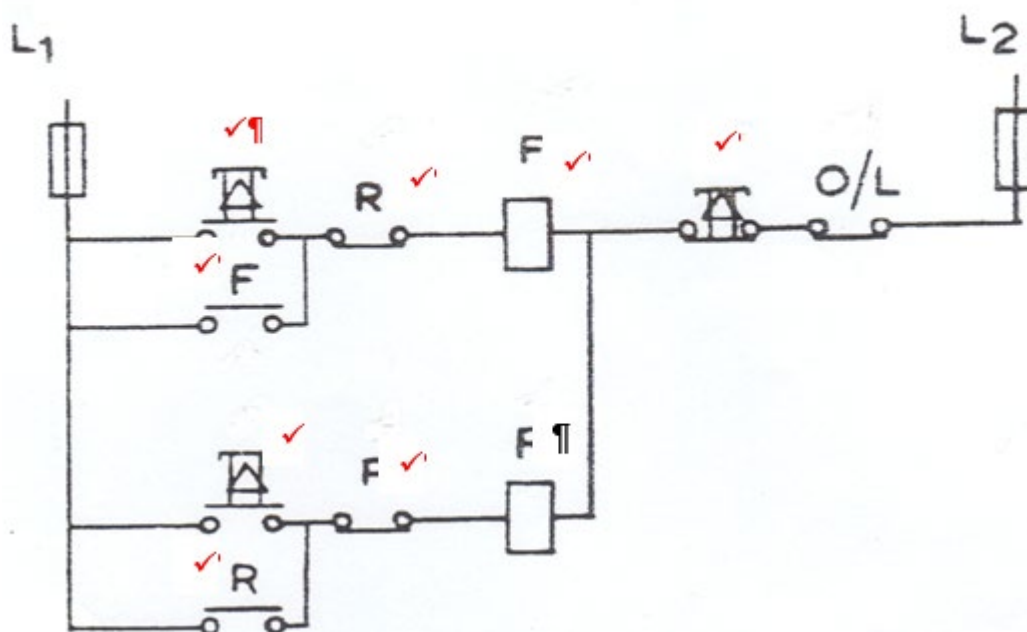
- 1.3
- No power supply or no supply from both ends of the fuse.
 - The fuse is blown or one of the fuses is an open circuit.
 - The circuit breaker is faulty.
 - One or both ends of the start button is burned.
 - The operational coils are damaged.

(5 × 2) (10)
[17]

QUESTION 2

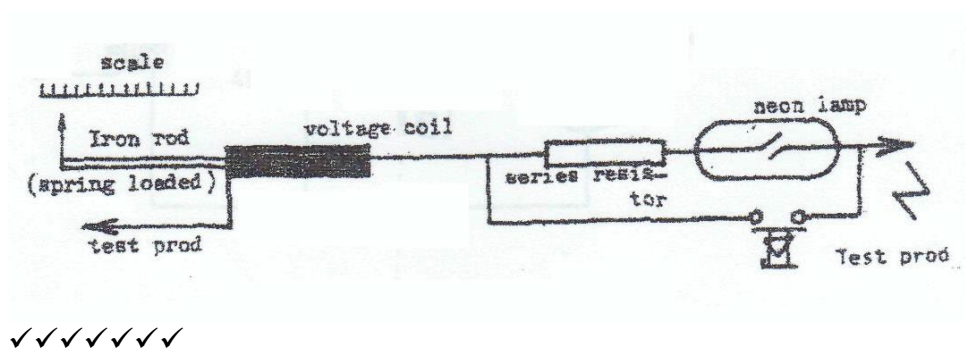
- 2.1 Current will flow through it and the value of this current will depend on the total resistance of the circuit of the voltage tester. ✓ This current is enough to let the neon glow brightly, ✓ but not enough to activate the spring loaded pointer. When the button is pressed, shorting out the neon lamp the current is then strong enough to activate the pointer, ✓ the magnetic field generated in the coil is strong enough to pull the iron armature into the coil against the return spring, ✓ just deep enough for the pointer to indicate 220 V, for example. ✓ (5)

2.2



(8)

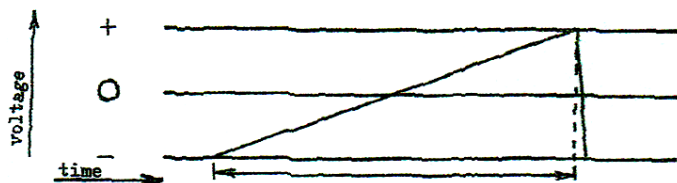
2.3

(7)
[20]

QUESTION 3

- 3.1
- Test kit✓ – milli meter, oscilloscope, logic probe.✓
 - Built-in operating devices✓ – ammeters, voltmeters.✓
 - Built-in test devices✓ – test monitor points, test switches, thyristor neon.✓
- (6)

3.2.



✓✓ (2)

- 3.3.
- Current will flow through the tester✓ and the value of this current will depend on the total resistance of the voltage tester.✓ This current is enough to let the neon lamp glow brightly, but not enough to activate the spring loaded pointer.✓ When the button is pressed,✓ shorting out the neon lamp and its resistance,✓ the current is then strong enough to pull the iron armature into the coil against the return spring.✓ Just deep enough for the pointer to indicate 220 V.✓✓
- (8)

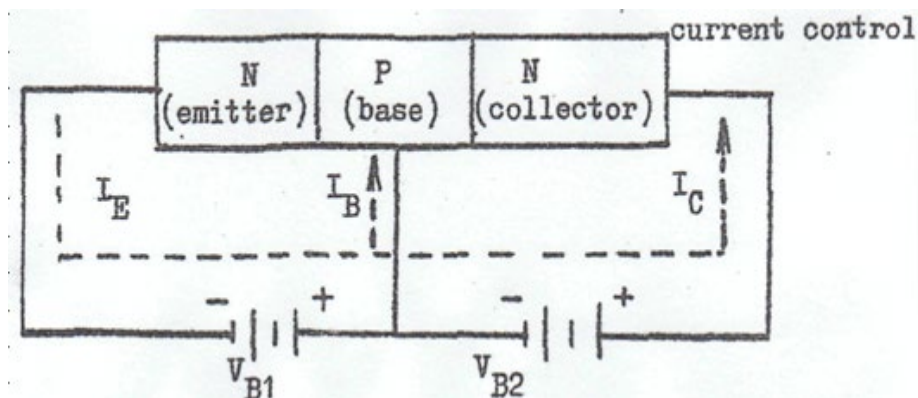
- 3.4.
- Equipment downtime for the period.✓
 - Indication of equipment (and manufacturer's) reliability.✓
 - Equipment/component failure patterns.✓
 - Performance guide/criteria of personnel.✓
 - Maintenance effort/requirement comparison between individual machines/equipment/processes and operators.✓
 - Ratio of preventive work to corrective work.✓
 - The percentage of planned work to corrective work.✓
 - Guide for spares policy regarding stocking and usage trends.✓
 - Indication of possible standardisation policies.✓
- (9)

[25]

QUESTION 4

- 4.1
- A diode has a line on one side which is the cathode or N typed doped.
 - Forward resistance measurement: if the positive probe of an ohmmeter is connected to the anode and the negative probe to the cathode, the resistance should be low.
 - When interchanging, reverse bias and resistance will be high.
 - If a low resistance is obtained for both situations, the diode is short circuited.
- (4)

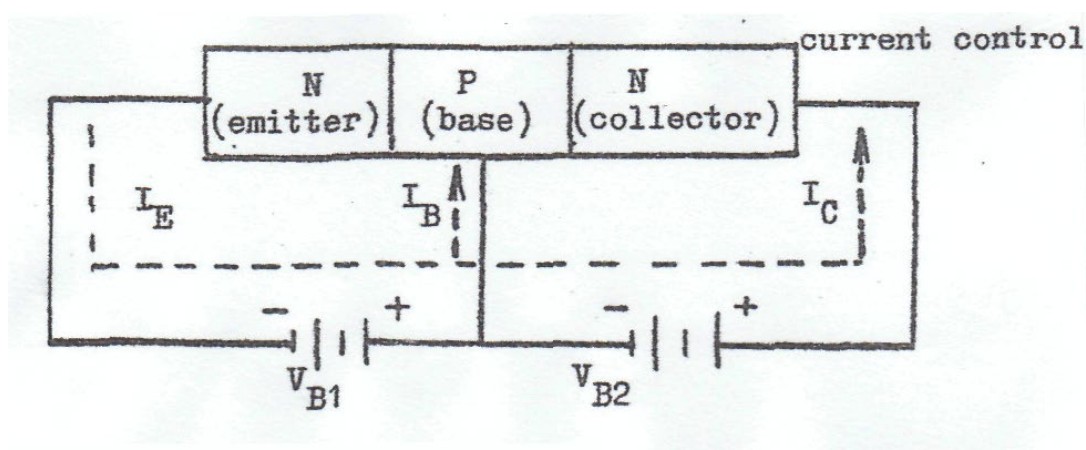
4.2



✓✓✓✓✓

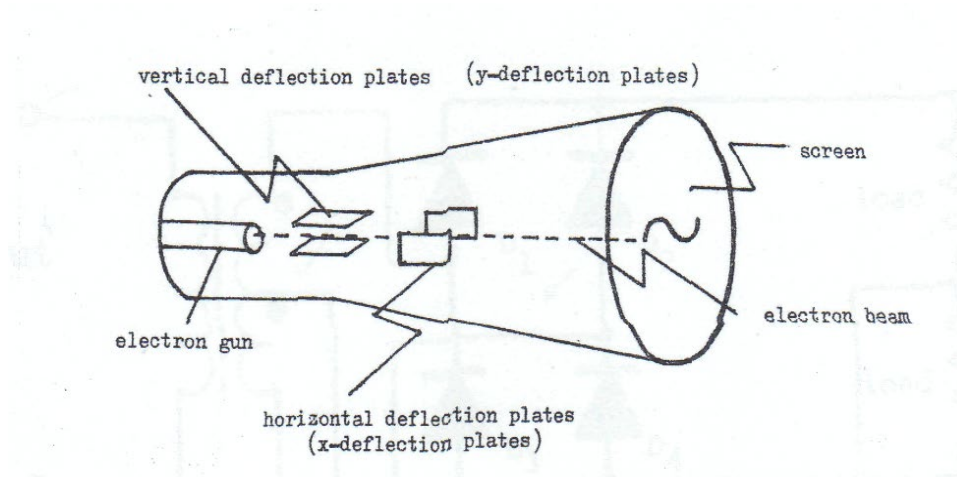
(5)

4.2



- 4.3
- Common emitter amplifier.
 - Common collector amplifier.
 - Common base amplifier.
- (3)
- 4.4
- They are not easily damaged by overheating.✓
 - They have high stability figures.✓
 - Power ratings are high for their physical size.✓
- (3)
- 4.5
- Ohm is the unit of resistance.✓ It is that resistance which produces 1 joule of energy when 1 ampere flows through it for 1 second.✓✓
- (3)

4.6

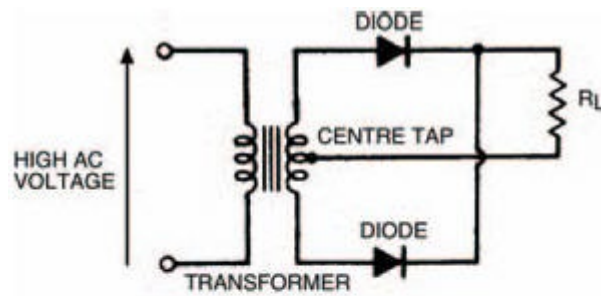


✓✓✓✓✓

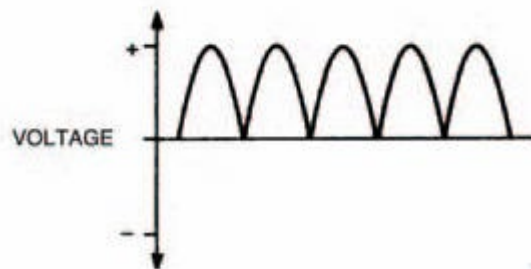
(5)
[23]

QUESTION 5

5.1



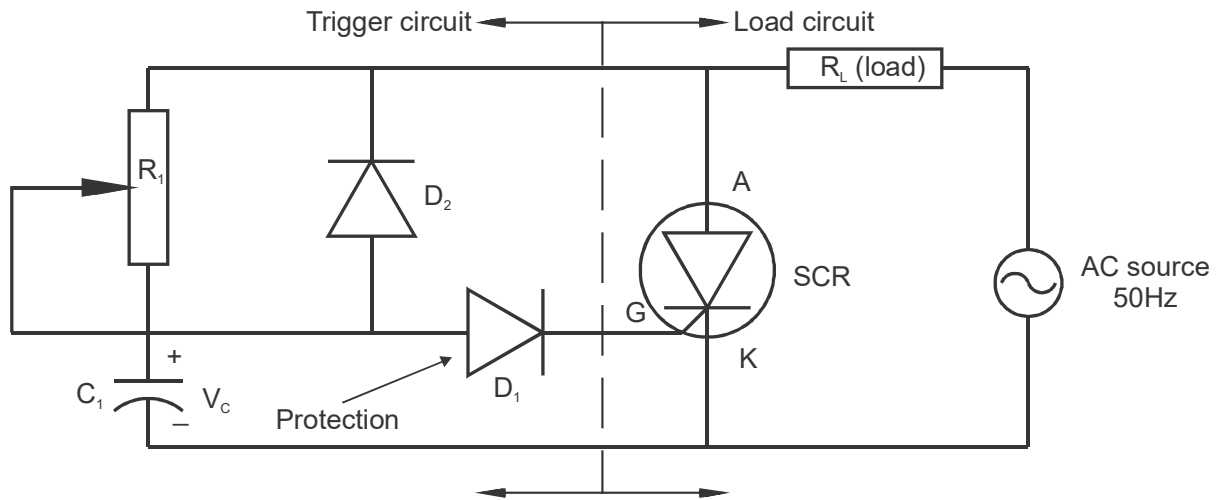
✓✓✓✓



✓

(5)

5.2



✓✓✓✓✓✓

(6)

5.3

5.3.1

When one frequency drifts slightly✓ with respect to the other the pattern will rotate, or barrel from the integral ratio.✓

(2)

5.3.2

Triggering is releasing the time base to sweep when y has reached a certain level.✓✓

(2 × 2)

(4)

[15]**TOTAL:****100**