higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

FAULT FINDING AND PROTECTIVE DEVICES N4

14 April 2020

This marking guideline consists of 7 pages.

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QUESTION 1

1.1
- It is servicing a machine to check that all different components are in a good working condition.✓✓
- Replace damaged, torn and worn components.✓
- 1This service is delivered to shut down the plant or machines.✓ (4)

1.2
- Examine the records.✓

This could give an indication why some things happened to a machine or production process.✓

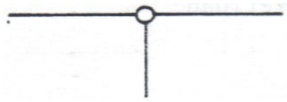
- Determine which rules are applicable.✓

There are always certain rules that apply to the use and handling of a machine, such as care and maintenance, working methods, safety rules, etc. Determine whether these rules were adhered to.✓

- Communicate with the people involved.✓

Different people interpret facts differently and by knowing their individual views, it could contribute to a better understanding of the problem or its cause.✓ (3 × 2) (6)

1.3 1.3.1



1.3.2



1.3.3



1.3.4



1.3.5



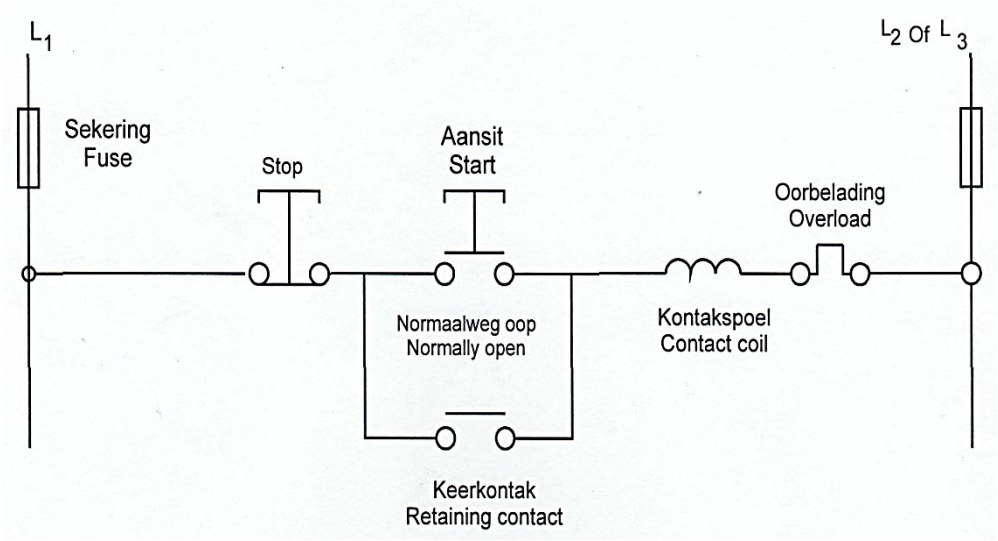
1.3.6



(6 × 1) (6)
[16]

QUESTION 2

2.1



(6)

2.2
- There are basic rules that must be complied with.
- Different fault location methods should be known. (2)

2.3
- Electromagnetic overload
- Thermal overload (2)

2.4
- Insulating material is used to support components of an electrical network and insulate them from each other and from ground.
- It is also used to function as the dielectric of a capacitor. (3)

[13]

QUESTION 3

3.1 Current will flow through it and the value of this current will depend on the total resistance of the voltage tester circuit. 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, 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 read, for example, 220 V. (5)

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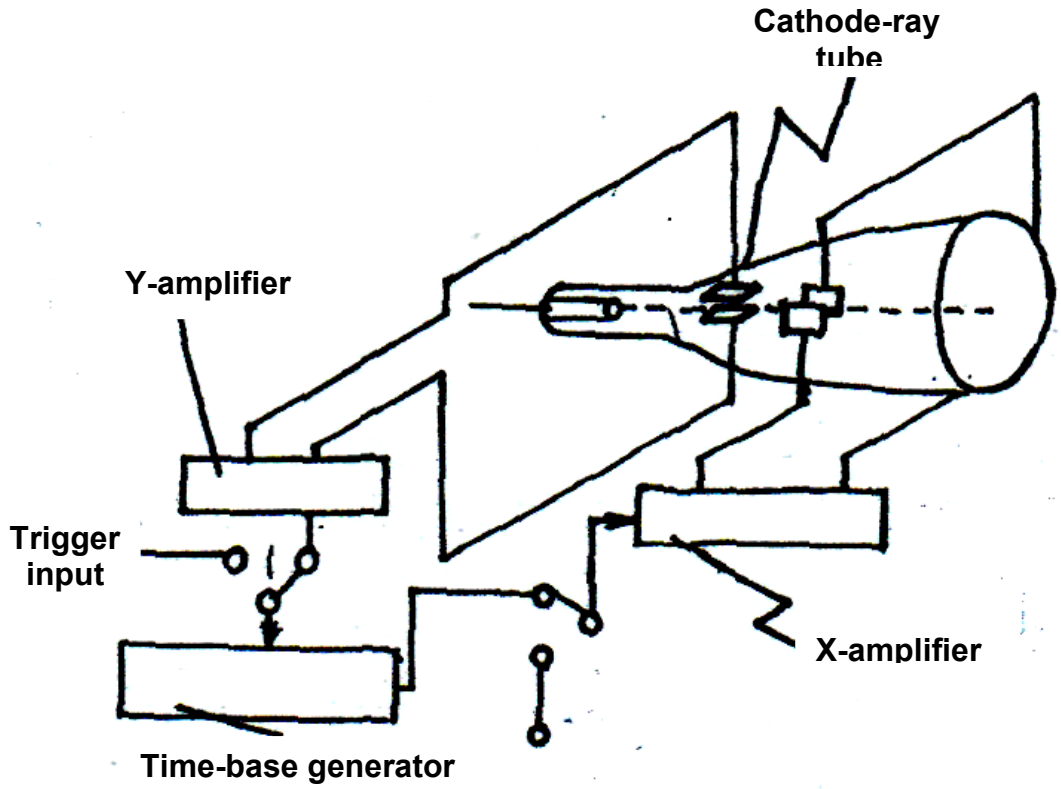
3.2

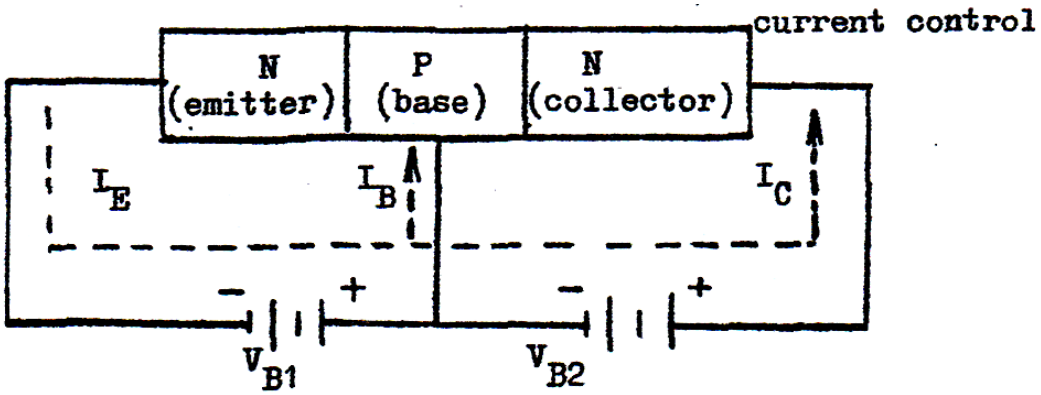


(5)

3.3
- The internal resistance of an ammeter is high and only a very small amount of current can flow through the instrument because of the coil's thin wire.
- A shunt resistor with a low resistance is therefore connected across the instrument to divert the current so that it does not flow through the meter. (3)

3.4 They prevent the core from saturating and losing some of its inductance. (2)

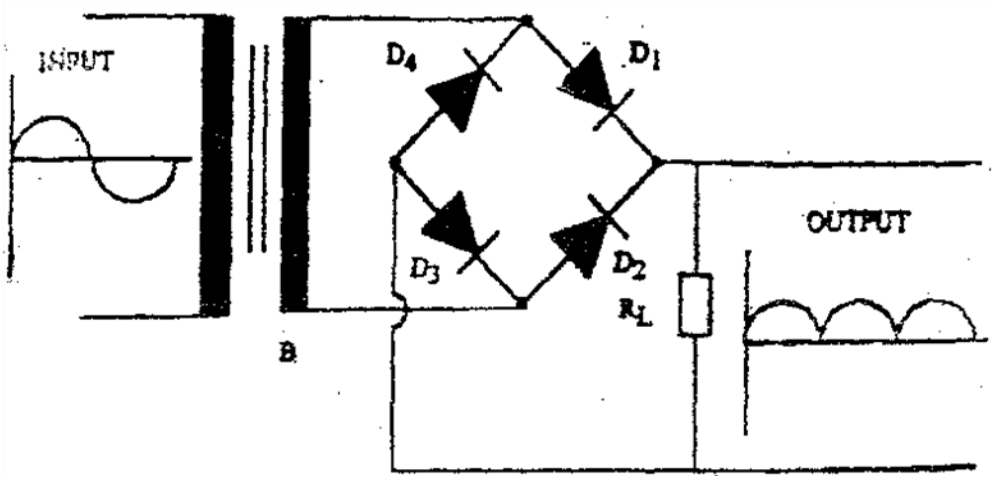
3.5



(4)
[19]

QUESTION 4

4.1



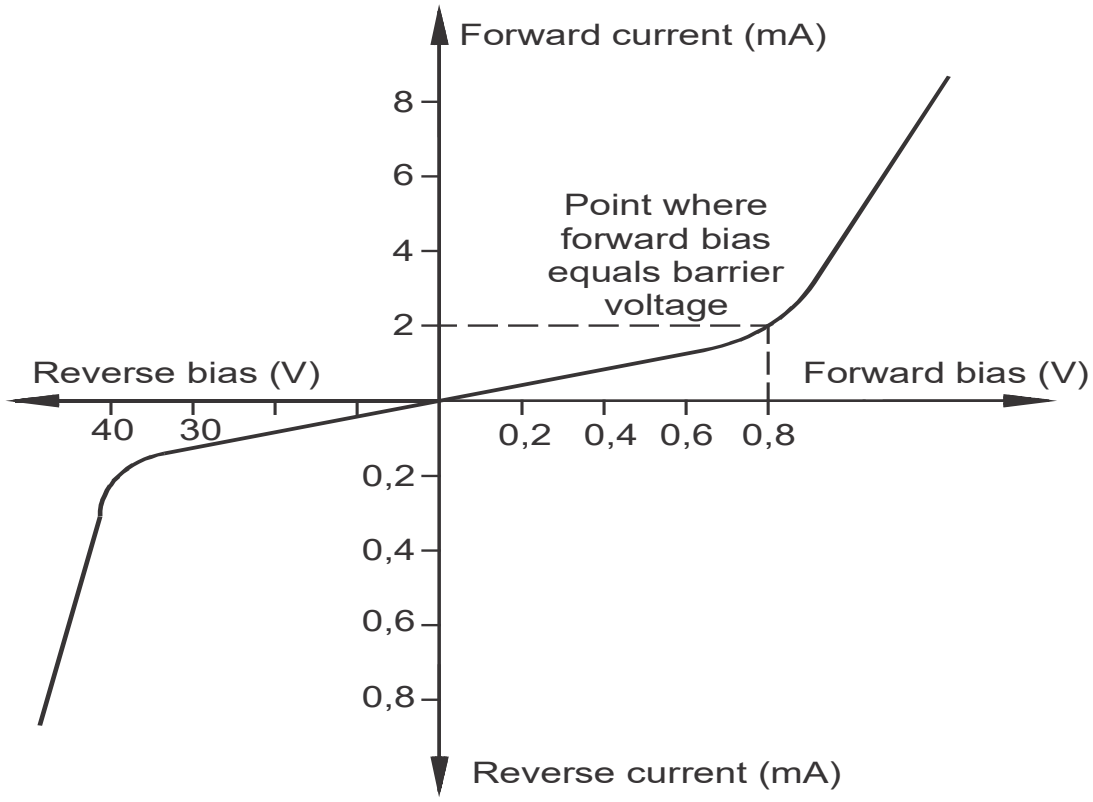
(6)

4.2

- A diode has a line on one side which is the cathode or N-type doped.✓
- Forward resistance measurement: If the positive probe of an ohmmeter is connected to the anode and the negative probe is connected to the cathode, the resistance should be low.✓✓
- When interchanging the probe, it is then reverse biased and resistance will be high.✓
- If a low resistance is obtained for both situations, the diode is short-circuited.✓✓

(6)

4.3



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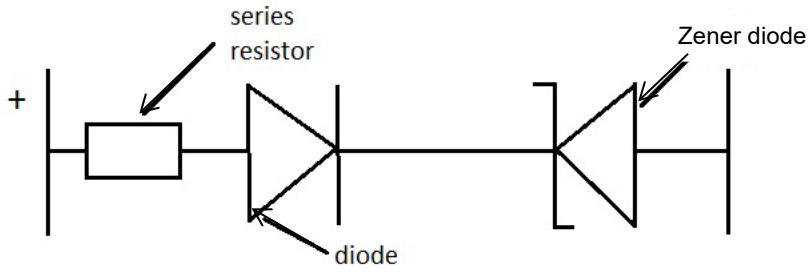
4.4



(3)

4.5
- Common emitter amplifier
- Common collector amplifier
- Common base amplifier (3)

[23]

QUESTION 5

5.1 If the reading on the galvanometer is zero the circuit is in balance,✓ if there is a reading on the galvanometer, the circuit is unbalanced.✓ (2)

5.2 3,5% of the supply voltages (2)

5.3
- Carbon composite resistors
- Carbon film resistors
- Metal film resistors
- Metal oxide resistors
- Metal-glazed resistors
- Wire-wound resistors
- Variable resistors (7)

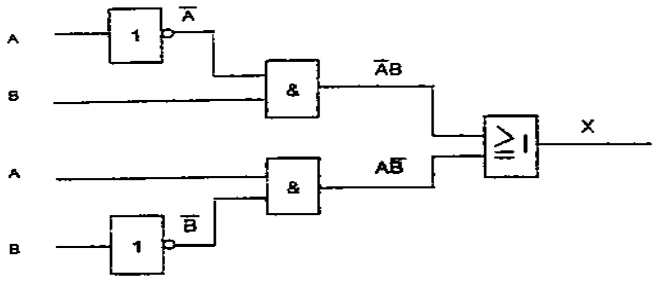
5.4
- Temperature
- Mechanical fault
- Electrical stress
- Environmental condition (4)

[15]

QUESTION 6

6.1 (A + B)(A + C)
= A ● A + AC + BA + BC✓
= A + AC + BA + BC✓
= A + BA + BC✓
= A + AB + BC✓
= A + BC✓ (5)

6.2



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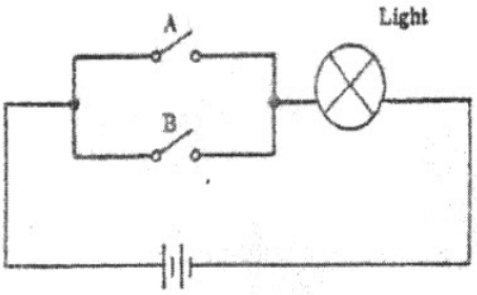
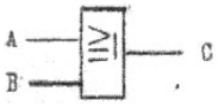
6.3





(4)
[14]

TOTAL: 100

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