



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

FAULT FINDING AND PROTECTIVE DEVICES N4

(8080104)

**4 December 2023
09:00–12:00**

Drawing instruments may be used.

This question paper consists of 4 pages.

249Q1G2304

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
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FAULT FINDING AND PROTECTIVE DEVICES N4
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
 2. Read all the questions carefully.
 3. Number the answers according to the numbering system used in this question paper.
 4. Start each question on a new page.
 5. Use only a black or blue pen.
 6. Write neatly and legibly.
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QUESTION 1

- 1.1 A fault-finder is concerned with corrective maintenance. What should a fault-finder's objective be? (2)
- 1.2 Draw the following electrical symbols:
- 1.2.1 Fuse
- 1.2.2 DC shunt motor
- 1.2.3 Brush on slip ring
- 1.2.4 Make contact. Single break
- 1.2.5 Break contact. Double break (5 × 1) (5)
- 1.3 A start button is pushed and there is no reaction. Describe FIVE faults that may occur in the circuits. (10)
[17]

QUESTION 2

- 2.1 Explain the operation of a voltage tester. (5)
- 2.2 Draw a forward-and-reverse control circuit diagram for a three-phase motor. (8)
- 2.3 Make a sketch to show the construction of a voltage tester (7)
[20]

QUESTION 3

- 3.1 Name THREE different hardware aids in fault finding and give an example of each. (3 × 2) (6)
- 3.2 Draw the wave form of the voltage supplied by a time-base generator of an oscilloscope. (2)
- 3.3 Describe how a voltage tester operates. (8)
- 3.4 Maintenance records are of vital importance. Name NINE such records which relate to the work situation. (9)
[25]

QUESTION 4

- 4.1 Briefly explain how to test a diode to determine whether it is faulty or not. (4)
- 4.2 Make a labelled sketch of a properly biased NPN transistor and indicate the emitter, base and collector junctions as well as the arrow heads of the currents. (5)
- 4.3 Name THREE elementary amplifier circuits. (3)
- 4.4 What are the advantages of metal oxide resistors? (3)
- 4.5 Define the unit, *ohm*. (3)
- 4.6 Draw a simple sketch of a cathode-ray tube. (5)

[23]**QUESTION 5**

- 5.1 Draw a single-phase full-wave rectifier with a centre-tap transformer. (5)
- 5.2 Draw a half-wave SCR power control circuit which is fed from a 50 Hz AC supply that controls the power to the load. (6)
- 5.3 5.3.1 Explain the term, *barrelling*. (2)
- 5.3.2 Explain the term, *triggering*, with reference to an oscilloscope. (2)

[15]**TOTAL: 100**