higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T680**(E)**(A1)T

NATIONAL CERTIFICATE

FAULT FINDING AND PROTECTIVE DEVICES N6

(8080126)

1 August 2019 (X-Paper)
09:00–12:00

This question paper consists of 4 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
FAULT FINDING AND PROTECTIVE DEVICES N6
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. Sketches must be large, neat and fully labelled.
5. Write neatly and legibly.

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QUESTION 1

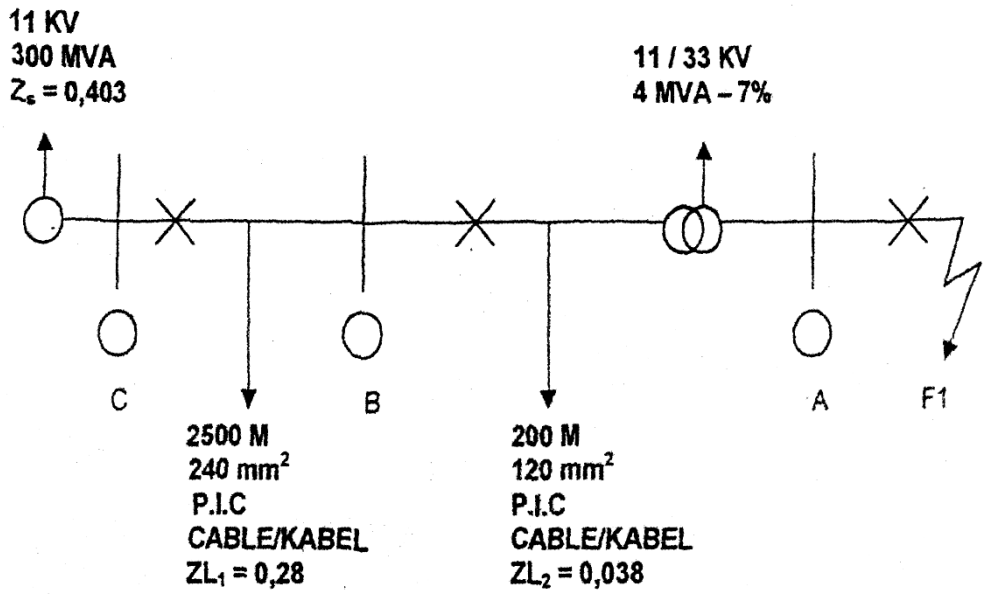
1.1 Explain *floating charge* concerning lead/acid cells. (2)

1.2 Name 16 maintenance checks on the bank of lead/acid cells already in use. (16)
[18]

QUESTION 2

2.1 Calculate the short-circuit current at points B and F1, assuming a source error level of 300 MVA.

2.1



(6)

2.2 Define *protection relay*. (2)

2.3 Name FIVE different items of equipment of which protection systems consist. (5)
[13]

QUESTION 3

3.1 Explain how an earth wire can protect an overhead line against lightning. (3)

3.2 Name EIGHT tests that should be carried out on high-voltage surge arresters. (8)

3.3 Explain, with the aid of line diagrams, the *radial* and *ring feed* systems. (8)
[19]

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QUESTION 4

4.1 Explain each of the following terms regarding faults on a transformer:

4.1.1 Rapid gas evolution

4.1.2 Medium gas evolution

4.1.3 Slow gas evolution

(3 × 2) (6)

4.2 Name 12 test to be carried out on transformer oil. (12)
[18]

QUESTION 5

5.1 Draw the wave shape for open-circuit and short-circuit. (2)

5.2 Name FOUR methods to reduce stress in cables. (4)

5.3 Explain how the pulse-reflection method of determining the fault in a cable can be carried out. (5)

5.4 How can a gas-filled cable be tested? (4)
[15]

QUESTION 6

6.1 Name EIGHT tests to be carried out on thyristors. (8)

6.2 Draw a block diagram of DC shunt-motor circuit for speed control showing a three-phase AC input. (5)

6.3 Draw a simple sketch to indicate how a logic pulser and logic probe will be used to test a single gate. (4)
[17]

TOTAL: 100

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