higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T680**(E)**(J23)T

NATIONAL CERTIFICATE

FAULT FINDING AND PROTECTIVE DEVICES N6

(8080126)

23 July 2018 (X-Paper)
09:00–12:00

Calculators may be used.

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. Write neatly and legibly.

QUESTION 1

1.1 What type of electrolytes would be used to top up the following types of cells:

1.1.1 Lead acid cells

1.1.2 Alkaline cells

1.1.3 Nickel cadmium cells

(3 × 1) (3)

1.2 Draw a series regulator that comprises a controlling device, error amplifier and reference unit. (7)

1.3 Name FIVE measuring instruments used to test different conditions of cells. (5)

[15]

QUESTION 2

2.1 Define *protection relay.* (2)

2.2 Name TWELVE commissioning tests to be carried out on a Translay three-phase system. (12 × ½) (6)

2.3 Explain the following terms with the aid of line diagrams (8)

2.3.1 Radial

2.3.2 Ring feed systems

(2 x 4)

2.4 The following information is given:

- Feeder with normal loading = 300A
- Current transformer ratio = 400/5
- Overcurrent relay plug setting set at 100% and saturation time = 2,2 seconds

Calculate the operating current at 20 seconds (5)

[21]

QUESTION 3

3.1 Name EIGHT tests to be carried out on a high-voltage surge arrester. (8)

3.2 State SIX tests to be done on metal-enclosed switchgear. (3)

3.3 Explain the principles of arc extinguishing with reference to a circuit breaker. (5)

[16]

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QUESTION 4

4.1 Name FOUR types of faults that will result in the slow release of gas inside a transformer. (4)

4.2 At what settings must a top-oil thermometer be set to give alarm and trip? (2)

4.3 Name EIGHT tests carried out on transformer oil. (4)

4.4 Explain, with the aid of a sketch, how you would phase in two 11 KV to 380 V transformers by using two 380 V/110 V transformers. (6)

[16]

QUESTION 5

5.1 State THREE causes of the following faults in cables:

5.1.1 Faults in cable joints

5.1.2 Faults within the cable itself

5.1.3 Faults due to external damage of the cable

(3 × 3) (9)

5.2 Why is it important to do a spike test on a cable before cutting it after the fault has been found? (5)

5.3 Give EIGHT safety steps to be taken before you test a cable. (8)

[22]

QUESTION 6

6.1 Draw a simple sketch to indicate how a logic and logic probe will be used to test a single gate. (4)

6.2 Name FOUR types of faults that can occur internally in a digital integrated circuit. (4)

6.3 What causes erratic triggering? (2)

[10]

TOTAL: 100

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