



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T660(E)(A2)T

NATIONAL CERTIFICATE

FAULT FINDING AND PROTECTIVE DEVICES N4

(8080104)

2 August 2018 (X-Paper)
09:00–12:00

This question paper consists of 5 pages.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE
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. Write neatly and legibly.
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QUESTION 1

- 1.1 A start button is pushed and there is no reaction.
Describe FIVE faults that occur in the circuits. (5 × 2) (10)
- 1.2 Draw the following electrical symbols:
- 1.2.1 Thermal-relay actuating device/Thermal overload
 - 1.2.2 Changeover contact
 - 1.2.3 Push button, normally closed, spring-loaded
 - 1.2.4 Fuse
 - 1.2.5 DC shunt motor
 - 1.2.6 Brush on a slip ring
- (6 × 1) (6)
[16]

QUESTION 2

- 2.1 Explain, with the aid of a drawing, the operation of a direct-on-line starter with start and stop buttons for a three-phase squirrel-cage inductor motor. (8)
- 2.2 Name the TWO quantities on which the speed of a three-phase induction motor is depending. (2)
- 2.3 What is the purpose of the hair spring in the moving instrument? (2)
[12]

QUESTION 3

- 3.1 Name TWO types of overload. (2)
- 3.2 Describe how an electromagnetic overload relay functions when it senses an overload. (6)
- 3.3 Draw a graph to show what happens to the di-electric strength of polythene when the thickness of the insulating materials is increased. (4)
- 3.4 Name TWO types of core losses in an inductive circuit. (2)
- 3.5 States the disadvantages of a moving coil meter. (3)
- 3.6 Name FIVE different aids, with regard to documentation on fault finding. (5)
[22]

QUESTION 4

- 4.1 Explain how Eddy-current can be minimised in coils of transformers. (2)
- 4.2 Make a simple sketch of a cathode-ray tube. (6)
- 4.3 Define the following terms:
- 4.3.1 Transducers (2)
- 4.3.2. Frequency (2)
- 4.4 What is the purpose of the luminescent layer in the cathode ray tube? (3)
- 4.5 Determine the total induction of three coils of 12,3 mH, 3,68 mH and 10,8 mH when they are connected in series. (3)
- [18]**

QUESTION 5

- 5.1 Name the type of implication which can be obtained from the following:
- 5.1.1 Common emitter
- 5.1.2 Common collector
- 5.1.3 Common base
- (3 × 1) (3)
- 5.2 Describe what is meant by reverse recovery of diode. (6)
- 5.3 How would you install a thermistor to protect a motor from overheating? (2)
- 5.4 Explain the term *deflecting plates* of an oscilloscope. (4)
- 5.5 Describe the term negative temperature coefficient. (3)
- 5.6 State TWO advantages and TWO disadvantages of wire-wound resistors. (4)
- [22]**

QUESTION 6

6.1 Explain force commutation of SCR. (2)

6.2 Complete the following laws of Boolean algebra:

6.2.1 $X + X =$

6.2.2 $X + 1 =$

6.2.3 $X \cdot X =$

6.2.4. $A + 0 =$

6.2.5 $A + AB =$

(5 × 1) (5)

6.3 Give the truth table and symbol of a NOR gate. (3)
[10]

TOTAL: 100