higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NON-NATIONAL CERTIFICATE

INSTALLATION RULES
(First paper)

(11040412)

26 July 2021 (X-paper)
09:00–12:00

Drawing instruments and nonprogrammable calculators may be used.

This question paper consists of 6 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NON-NATIONAL CERTIFICATE
INSTALLATION RULES
(First paper)
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. Answers must show candidates' understanding of the context of the questions.
5. Candidates must pass PAPER 1 and PAPER 2 with 50% each.
6. Both examination papers may be written during the same examination period.
7. For accreditation purposes, candidates must meet the requirements prescribed by the Department of Labour.
8. No condonations will be considered.
9. Write neatly and legibly.

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QUESTION 1: OCCUPATIONAL HEALTH AND SAFETY ACT, NO. 85 OF 1993, AND REGULATIONS

1.1 What are the responsibilities of the user or lessor of an electrical installation they use? (2)

1.2 What are the responsibilities of the user or lessor regarding electrical conductors on their premises? (2)

1.3 Briefly explain the start of construction and the permission to connect installation work, as per electrical installation regulation no 8. (6)

[10]

QUESTION 2: SANS 10142-1:2020: SCOPE

2.1 Name FIVE premises for which this part of SANS 10142 applies to electrical installations. (5)

2.2 Name FIVE aspects which this standard cover. (5)

[10]

QUESTIONS 3–7 ARE ALL COVERED BY SANS 10142-1:2020: SPECIAL INSTALLATIONS OR LOCATIONS

QUESTION 3

Explain the requirements regarding installation of appliances in the following spa zones:

3.1 Zone 0 (2)

3.2 Zone 1 (4)

3.3 Zone 2 (4)

[10]

QUESTION 4

Briefly explain the necessary items that a distribution board on a construction site shall contain to meet certain requirements. **[10]**

QUESTION 5

Section 5 of this standard deals with requirement regarding notices, labels and rating plates. Topics are given in Table 4.2.

Explain each of the following topics as discussed:

5.1 Socket outlets supplied by a dimmer (3)

5.2 High-voltage signs (3)

5.3 Supply from which equipment is supplied (2)

5.4 Indication of neutral earthed distribution system (2)

[10]

QUESTION 6

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (6.1–6.8) in the ANSWER BOOK:

6.1 Normal, safety and emergency lighting systems shall be independent of outdoor lighting systems. (1)

6.2 The electrical equipment of an emergency lighting system shall be independent of the electrical equipment and circuit of the normal lighting system. (1)

6.3 Normal, safety and emergency lighting systems may share the same source of supply if the voltage is the same. (1)

6.4 If the source of supply uses batteries that emit explosive fumes or gases (or both) it shall be installed as in a room that:

6.4.1 is designed to accommodate the source of supply and the batteries. (1)

6.4.2 does not have adequate ventilation to the outside. (1)

6.4.3 when required, contains explosion-proof electrical equipment. (1)

6.5 In case where the emergency supply is provided from a central power system, an emergency lighting supply circuit shall have a clearly identified manual control for use if the automatic control fails to operate. (1)

6.6 All controls of emergency lighting must be accessible to the general public for safety reasons. (1)

6.7 Exit signs shall be illuminated by the safety and emergency lighting system. (1)

6.8 An exit sign or an emergency luminaire that contains its own battery shall have continuous supply to the battery changing equipment. (1)

[10]

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QUESTION 7

Briefly explain the requirements for alternative sources of supply with regards to each of the following:

7.1 Display of notices (1)

7.2 Only supplying certain circuits in distribution board (3)

7.3 Only supplying part of electrical installation (2)

7.4 Prospective short-circuit current and prospective earth-fault current (4)

[10]

QUESTION 8: SANS 10142-1:2020: ANNEX C: EXAMPLE OF ASSESSING ESTIMATED LOAD FOR RESIDENTIAL TYPE INSTALLATION

A single-phase domestic installation consists of the following loads:

- 12 × 16 A socket outlet
- 13 × lighting points
- 2 × 2 kW water heater
- 100 W ceiling fan, with 3 lights
- Stove with 2 × 2 kW and 1 × 1,5 kW plates and a 2 kW oven
- Area under cover: 409,5 m²

8.1 Calculate each of the following:

8.1.1 Total connected load in kilowatts (kW) (6)

8.1.2 Total current drawn by installation (2)

8.2 Give the maximum size of the main circuit breaker that can be used for this installation. (1)

8.3 If the installation is fed from the meter kiosk by a 16 mm² × 3-core armoured copper cable, what will the ampere rating be of the circuit breaker protecting the cable in the meter kiosk? (1)

[10]

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QUESTION 9: SANS 10198-1 2004: PART 1: DEFINITIONS AND STATUTORY REQUIREMENTS

Define each of the following terms:

9.1 Cable (2)

9.2 Circuit breaker (3)

9.3 Earthed (2)

9.4 Earth resistance (1)

9.5 Low voltage (LV) (1)

9.6 Overcurrent (1)

[10]

QUESTION 10: SANS 10292 OF 2013: EARTHING OF LOW-VOLTAGE DISTRIBUTION SYSTEMS

Draw a labelled diagram of a TT system earthing with a TN-S system earthing extension. **[10]**

TOTAL: 100

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