higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NON-NATIONAL CERTIFICATE

INSTALLATION RULES
(First paper)

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This marking guideline consists of 5 pages.

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QUESTION 1: SANS 10198-1: DEFINITIONS AND STATUTORY REQUIREMENTS

1.1 Overcurrent protection that, when current flowing is equal to 1,5 times✓ the rated current of the circuit which it protects it will operate within 4 h.✓ (2)

1.2 Device that is capable of detecting a specified or predetermined current from a circuit to earth,✓ and of disconnecting automatically and reliably the affected circuit within a specified time✓ when such current exceeds the specified or predetermined value✓ (3)

1.3 Current resulting from insulation failure (1)

1.4 Continuous power frequency r.m.s. current that a cable will carry under the conditions in which it is installed (1)

1.5 Difference in electric potential (r.m.s) between two points on a feeder,✓ owing to actual circuit parameters, for example circuit impedance, line reactance, length and size of conductor✓ and the type of material of the conductor✓ (3)

[10]

QUESTION 2: SANS 10292: EARTHING OF LOW (LV) DISTRIBUTION SYSTEMS

2.1 True
2.2 False
2.3 True
2.4 False
2.5 False
2.6 True
2.7 False
2.8 True
2.9 False
2.10 True

(10 × 1) **[10]**

QUESTION 3: SANS 10142-1: SAUNAS

3.1 I
3.2 E
3.3 G
3.4 D
3.5 D
3.6 E
3.7 I
3.8 G
3.9 B
3.10 C

(10 × 1) **[10]**

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QUESTION 4: SANS 10142-1: TEMPORARY INSTALLATIONS

4.1
- Cables shall be selected or protected to withstand the possibility of mechanical damage
- Where cables are to be reused or repositioned, flexible cables should be used
- Conductors shall be copper and have a minimum cross-sectional area of 1,5 mm²
- Un-insulated live conductors are not permitted
- Un-armoured single core cables are permitted where they are out of arm's reach and will not be subjected to mechanical damage (5)

4.2
- An adequate number of socket-outlets shall be installed to safely comply with the user's requirements
- Floor-mounted socket-outlets shall be adequately protected from accidental ingress of water (2)

4.3
- All electric motors shall be provided with an effective means of isolation of all poles and such means shall be adjacent to the motor
- Any motor which is automatically or remotely controlled and which is not continuously supervised
- shall be fitted with a manually reset protective device to protect the motor form excessive temperature (3)

[10]

QUESTION 5: SANS 10142-1: D.C INSTALLATIONS

5.1
- All equipment and protection devices in d.c. installations shall be specified to operate✓ on the specific d.c. voltages and shall be suitably rated✓
- Where batteries are used, protection devices and conductors suitable for the short-circuit current rating of the batteries shall be selected✓
- The live polarity is the polarity that is not connected to earth, the earth or 'O V' polarity is the polarity that is connected to earth✓
- The polarities shall be clearly marked with + or -✓ (5)

5.2
- Within arm's reach from the terminals of the racks or cabinets
- In a distribution board, if the devices are capable of being locked in the open position (2)

5.3
- The multiple earthing or bonding connections to current-carrying conductors at points beyond the point of control
- The current that flows in the protective earth bonding conductors and in all metallic parts bonded to the system.
- Correct sizing of power conductors generally minimizes this (Any 2 × 1) (2)

[10]

QUESTION 6: SANS 10142-1: DISTRIBUTION SYSTEMS AS PART OF ELECTRICAL INSTALLATIONS

6.1 The distribution system is that part of the installation between the point of control connected to the point of supply✓ where electricity is supplied by the supply authority and the point of control of any particular electrical installation connected there to,✓ whether it is a specific user or a communial installation, where the user of that particular installation can switch it off.✓ (3)

6.2
- Multicore PVC insulated armoured cables
- Aerial bundle conductors
- Split concentric cables (3)

6.3 The designer of the distribution system shall select the components in order To ensure a minimum voltage drop over the system,✓ which will allow for the voltage drop over the entire installation,✓ which is the distribution system and any user's individual electrical installation connected to the system,✓ not to exceed 5% of the circuit nominal voltage✓ (4)

[**10]**

QUESTION 7: SANS 10142-1: SCOPE

- Fixed surface installation on mining properties
- Construction and demolition site installation
- Agricultural and horticultural premises
- Caravan sites and similar sites
- Marinas, pleasure craft and house boats
- Medical locations
- Exhibitions, fairs and other temporary installations
- Extra low voltage lighting installations
- Street lighting and street furniture
- Equipment enclosures **[10]**

QUESTION 8: SANS 10142-1: COMPLIANCE

8.1
- Any notices, labels or rating plates✓ shall be durable and not removable✓ except by determined and deliberate action.✓
- The inscription shall be legible and indelible.✓ (4)

8.2
- Standard socket-outlets not on 30mA earth leakage
- Socket-outlets powered from a safety supply or on dimmer control
- Voltage rating on socket-outlets if not a standard voltage
- Socket-outlets on ring circuits
- Socket-outlets in caravan parks, mobile homes and marina sites
- Socket-outlets supplied by a dimmer (6)

[10]

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QUESTION 9: OCCUPATIONAL HEALTH AND SAFETY ACT NO. 85 OF 1993 AND REGULATIONS: CONSTRUCTION REGULATIONS

Need to make sure that:

- Before construction commences and during the progress thereof, adequate steps are taken to ascertain the presence of and guard against danger to workers from any electrical cable or apparatus which is under, over or on the site.
- All parts of electrical installations and machinery are of adequate strength to withstand the working conditions on construction site
- The control of all temporary electrical installations on the construction site is designated to a competent person who has been appointed in writing for that purpose
- All temporary electrical installations used by the contractor are inspected at least once a week by a competent person and the inspection findings are recorded in a register kept on the construction site
- All electrical machinery is inspected by the authorised operator or user on a daily basis using a relevant checklist prior to use and the inspection findings are recorded in a register kept on the construction site (2 × 5) **[10]**

QUESTION 10: ANNEX C: EXAMPLE OF ASSESSING ESTIMATED LOAD FOR RESIDENTIAL TYPE INSTALLATIONS

10.1 10.1.1 Area = 188 + (5 × 2,5) = 200,5 m²

therefore S.O = 5 000 + 1 000 + 1 000 = 7 000 × 0,5 = 3 500✓

Lights = 12 × 60 × 0,5 = 360W✓

Geyser = 3000 × 1 = 3 000W✓

Heaters = 2 000 × 2 × 0,5 = 2 000W✓

Stove = 3 000 × 2 × 0,5 = 3 000W✓

Total load = 11860 Watts✓

I = P ÷ v

= 11 860W ÷ 230V = 51,565A✓ (7)

10.1.2 60/63 Amp (1)

10.2 In order to determine the type✓ and capacity✓ of the required electricity supply. (2)

[10]

TOTAL 100

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