higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NONNATIONAL CERTIFICATE: ENGINEERING CERTIFICATE OF COMPETENCY

SPECIALISED ELECTRICAL INSTALLATION CODES

(Second paper)

(8080644)

9 April 2021 (X-paper)
09:00–12:00

This question paper consists of 7 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
SPECIALISED ELECTRICAL INSTALLATION CODES
(Second 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. Start each section on a new page.
5. Use only a black or blue pen.
6. Write neatly and legibly.

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QUESTION 1: OCCUPATIONAL HEALTH AND SAFETY ACT, ACT 85 OF 1993 – ELECTRICAL INSTALLATION REGULATIONS

General duties of manufacturers and others regarding articles and substances for use at work:

1.1 What is the requirement with regard to any person who erects or installs any article for use at work on or in any premises? (3)

1.2 How will a person who designs, manufactures, imports, sells or supplies an article or substance to another person be relieved from the duty imposed upon him/her by the relevant section of the OHS Act code? (5)

1.3 Complete the following definition by writing only the missing word or words next to the question number (1.3.1–1.3.4) in the ANSWER BOOK.

Chief Inspector means the (1.3.1) … designated under (1.3.2) … 27 as chief inspector, and (1.3.3) … any officer (1.3.4) … as chief inspector.

(4 × ½) (2)

[10]

QUESTION 2: SANS 60079-14: 2014 ELECTRICAL INSTALLATIONS – DESIGN, SELECTION AND ERECTION

2.1 Describe the scope of this standard. (3)

2.2 Electrical equipment for use in explosive atmospheres can be divided into THREE groups. Name these groups. (1)

2.3 Which group is for mines and which is for surface industries? (2)

2.4 Define *Zone 0.* (3)

2.5 What is an intrinsically safe apparatus? (1)

[10]

QUESTION 3: SANS 60079-17: 2014 ELECTRICAL INSTALLATIONS – INSPECTIONS AND MAINTENANCE

3.1 What are the THREE most important requirements that one should verify about equipment that should be installed in a hazardous area? (3)

3.2 What should be done to the exposed conductors of equipment that is withdrawn from service for maintenance purposes? (3)

3.3 What is the requirement for labels on equipment? (3)

3.4 Flexible cables, conduits and their terminations are particularly prone to damage.

What are the requirements with regard to them? (2)

[11]

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QUESTION 4: SANS 60079-19: 2015 EQUIPMENT REPAIR, OVERHAUL AND RECLAMATION

4.1 Define the term *repair* according to this standard. (2)

4.2 What is the requirement with regard to documentation that is required to be made available to the repairer when equipment needs to be repaired? (3)

4.3 What is the responsibility of the user of the equipment with regard to the repair facility? (3)

4.4 What is the requirement with regard to cable/conduit entry systems before the repaired equipment is recommissioned? (2)

[10]

QUESTION 5: SANS 10086-2: 2013 THE INSTALLATION, INSPECTION AND MAINTENANCE OF EQUIPMENT USED IN EXPLOSIVE ATMOSPHERES

PART 2: Electrical equipment installed underground in mines

5.1 What is a competent person according to this standard? (8)

5.2 What is the requirement of this standard with regard to batteries of portable and hand-held intrinsically safe equipment? (4)

[12]

QUESTION 6: SANS 10089-2: 2017 ELECTRICAL AND OTHER INSTALLATIONS IN THE DISTRIBUTION AND MARKETING SECTOR

THE PETROLEUM INDUSTRY

6.1 What is a *combustible liquid*? (1)

6.2 What is a *flammable liquid*? (2)

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6.3 Choose a class in COLUMN B that matches a description in COLUMN A. Write only the letter (A–G) next to the question number (6.3.1–6.3.7) in the ANSWER BOOK.

COLUMN A		COLUMN B	
6.3.1	Liquids that have a closed-cup flash point at or above 60,5 °C and below 93 °C	A	Class 0
6.3.2	Liquids that have a closed-cup flash point at or above 93 °C	B	Class II
6.3.3	Liquids that have a closed-cup flash point at or above 38 °C and below 60,5 °C	C	Class IB
6.3.4	Liquids that have a closed-cup flash point at or above 23 ºC and a boiling point below 38 °C	D	Class IIIB
6.3.5	Liquids that have a closed-cup flash point below 23 °C and a boiling point below 35 °C	E	Class IC
6.3.6	Liquids that have a closed-cup flash point below 23 °C and a boiling point at or above 35 °C	F	Class IA
6.3.7	Liquefied petroleum gases	G	Class IIIA

(7 × 1) (7)

[10]

QUESTION 7: SANS 10142-1: 2020 THE WIRING OF PREMISES

7.1 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (7.1.1–7.1.4) in the ANSWER BOOK.

7.1.1 SANS 10142 is continuously updated, meaning problems can arise when deciding which version of the standard will be applicable when a contract is signed. The date of approval of the latest revision or amendment of SANS 10142 will be the implementation date of the revision or the amendment.

7.1.2 The applicable version of SANS 10142 is the one with the latest implementation date before the contract date. Contracts signed before the approval of an amendment shall be carried out in accordance with the provisions of the unamended standard.

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7.1.3 If an existing installation is extended or altered, such extension or alteration shall comply with the provisions of SANS 10142 that are applicable at the time of the erection of the extension or alteration.

7.1.4 The edition of the standard that is applicable at the date of erection of an electrical installation is not to be considered the edition defining the requirements applicable to that particular electrical installation.

(4 × 1) (4)

7.2 What is a certificate of compliance (CoC) according to this code? (2)

7.3 What is a test report according to this code? (2)

7.4 For the following electrical installations, state who can install and/or issue a test report and a certificate of compliance by writing only the answer next to the question number (7.4.1–7.4.5) in the ANSWER BOOK.

Type of Installation	**Single-phase**	– **Two-phase** – **Three-phase** – **DC**	**Specialised installations (hazardous, medical, explosive, petroleum, etc.)**
May be installed by	7.4.1 …? (2)	– electrical contractor, or any person under control of – installation electrician, or – master installation electrician	7.4.2 …? (2)
Test report and certificate of compliance may be issued only by	7.4.3 …? (3)	7.4.4 …? (2)	7.4.5 …? (1)

(10)
[18]

QUESTION 8: GENERAL

All intrinsically safe circuits (Ex-i circuits) shall have system certification from an ATL (Approved Test Laboratory) to ensure that the various devices in the circuit, with the interconnecting wiring and cabling, are compatible and suitable for the application.

8.1 What information/documentation should be submitted for approval by the ATL? (5)

8.2 How much distance is allowed between intrinsically safe circuits and non-intrinsically safe circuits? (1)

8.3 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (8.3.1–8.3.2) in the ANSWER BOOK.

8.3.1 Conductors for intrinsically safe circuits and non-intrinsically safe circuits shall not be run in the same cable.

8.3.2 In increased safety, Ex-e protection, components shall not be exchanged for any components that do not form part of the original certification of the equipment.

(2 × 1) (2)

8.4 List THREE characteristics of a flameproof enclosure used in hazardous areas. (3 × 2) (6)

8.5 What are the THREE components that are required for a fire or explosion to occur? (1)

8.6 The term *double protected* refers to the use of two explosion-protected techniques to protect equipment. Give an example. (1)

8.7 When an indirect entry is made into a flameproof enclosure, commonly by means of an increased safety type terminal box connected to the flameproof enclosure, how should this connection be done? (2)

8.8 How are conduit entries done on flameproof enclosures? (1)

[19]

TOTAL: 100

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