higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ELECTRICAL WORKMANSHIP
NQF LEVEL 3

(12041013)

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09:00–12:00

This question paper consists of 6 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
ELECTRICAL WORKMANSHIP
NQF LEVEL 3
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. Use only a black or blue pen.
5. The diagram must be labelled, clear and neat and a pencil may be used.
6. Write neatly and legibly.

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QUESTION 1

1.1 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.

1.1.1 Planning and organising tasks help to prevent mistakes.

1.1.2 Housekeeping means a place for everything and everything in any place.

1.1.3 According to Section 29 of OHSA (Occupational Health and Safety Act), the function of the employer is to question any person who is or was on the premises, on any matter that relates to this Act.

1.1.4 Employers must educate their employees to be aware of their rights and responsibilities in the workplace.

1.1.5 A task list is a tabulated notice informing employees of what must be done every day, week or month.

(5 × 1) (5)

1.2 Sometimes unexpected incidents happen that prevent you from keeping to your daily, weekly or monthly plan.

State THREE possible incidents that may cause your plan not to be completed as planned. (3 × 2) (6)

1.3 Explain the TWO main aims of the OHSA. (2 × 2) (4)

1.4 Everyone in the workplace should take the necessary safety precautions to identify hazards.

1.4.1 Define a *hazard.* (2)

1.4.2 State THREE steps to be followed when dealing with a hazard. (3)

1.5 Briefly explain FIVE general guidelines for completing an incident form. (5)

[25]

QUESTION 2

2.1 Testing and measuring instruments may be classified according to the various effects of voltage and current used in their operations.

Name the FOUR effects. (4)

2.2 What does *calibration* of an instrument mean? (1)

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2.3 Name SIX factors to consider when selecting the appropriate metering unit. (6)

2.4 Draw a neat, labelled connection diagram of a voltage transformer. (4)
[15]

QUESTION 3

3.1 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–E) next to the question number (3.1.1–3.1.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
3.1.1	Heat is produced in a radiant heater by an element that glows red hot when the power is on	A	simmerstat
		B	washing machine
3.1.2	It can be used to heat areas where other heating solutions may be impractical or difficult to install	C	thermostat
		D	radiant heater
		E	fan heater
3.1.3	It works by using mechanical energy, thermal energy and chemical energy		
3.1.4	It controls the oven temperature by turning the elements on or off as determined by the setting chosen on the oven selector switch		
3.1.5	It works on the same principle as a bimetallic thermostat		

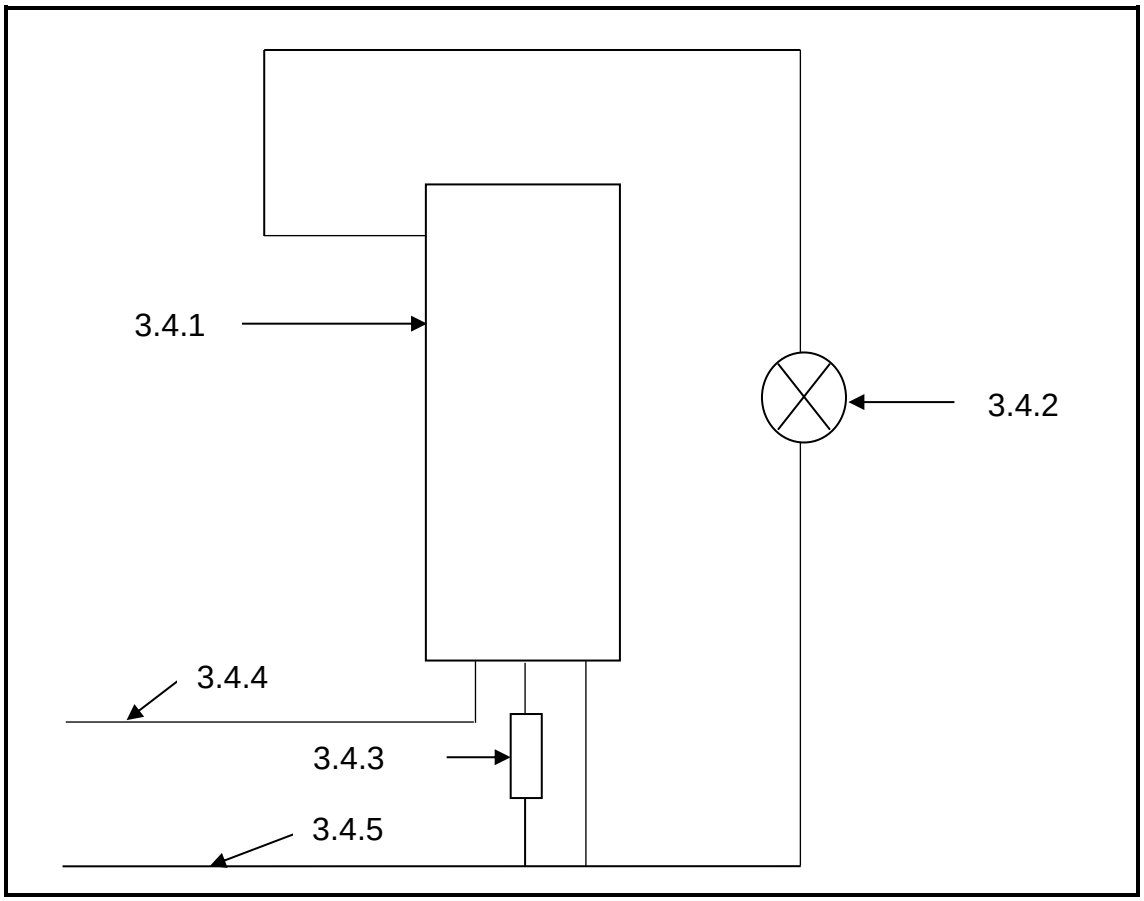
(5 × 1) (5)

3.2 Explain the operation of a convection heater. (3)

3.3 Complete the following sentences regarding Regulations 6.16.3.2.1 and 6.16.3.2.2. Write only the answer next to question number (3.3.1–3.3.2) in the ANSWER BOOK.

A dedicated circuit(s) shall be provided for cooking appliance(s) that are rated at more than (3.3.1) … . One circuit shall not supply more than one permanently connected (3.3.2) … unless the appliances are in the same room. (2)

3.4 Name the parts indicated in the diagram below by writing only the answer next to the question number (3.4.1–3.4.5) in the ANSWER BOOK.



(5 × 1) (5)
[15]

QUESTION 4

4.1 State FOUR guidelines that an electrician must follow to reduce the risk of injury when doing electrical testing, as part of the safety precautions. (4)

4.2 State SIX general maintenance procedures that should be carried out on a domestic appliance or electric power tool. (6)

4.3 As an electrician you have to repair an oven that does not work.

Give FOUR possible reasons that may cause the oven not to work. (4)

4.4 What will happen when the brushes of machines become sticky because of dirtiness? (1)
[15]

QUESTION 5

5.1 What does the term *earthed* mean? (2)

5.2 Safe operating procedures are the procedures commonly found in user manuals or service manuals and are used to guide employees in performing their jobs safely.

State FOUR conditions when or where safe operating procedures should be used. (4)

5.3 State the steps to be followed when installing a typical direct-on-line (DOL) starter. Do not explain them. (5)

5.4 State the expected readings for results of a short circuit and an open circuit of the following components of an AC motor:

5.4.1 Start winding

5.4.2 Run winding

5.4.3 Capacitor

5.4.4 Centrifugal switch

(4 × 1) (4)

[15]

QUESTION 6

6.1 Name TWO types of earth clamps. (2)

6.2 Define the following electrical and SMAW terminology:

6.2.1 Polarity

6.2.2 Ampere

6.2.3 Alternating current

6.2.4 Arc

6.2.5 Slag

(5 × 1) (5)

6.3 State FIVE symptoms of arc eyes. (5)

6.4 Give THREE reasons why it is important to remove particles of slag from the weld bead by using both a chipping hammer and a wire brush. (3)

[15]

TOTAL: 100

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