

Name: _____

Index No: _____ / _____

1521/205

1601/205

**ELECTRICAL INSTALLATION II
ESTIMATING AND TENDERING,
INDUSTRIAL MACHINES AND
CONTROLS**

Oct./Nov. 2015

Time: 3 hours

Candidate's Signature: _____

Date: _____



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**CRAFT CERTIFICATE IN ELECTRICAL AND
ELECTRONIC TECHNOLOGY
(POWER OPTION)
MODULE II**

**ELECTRICAL INSTALLATION II, ESTIMATING AND TENDERING,
INDUSTRIAL MACHINES AND CONTROLS**

3 hours

INSTRUCTIONS TO CANDIDATES

Write your name and index number in the spaces provided above.

Sign and write the date of examination in the spaces provided above.

You should have Mathematical tables/Scientific calculator for this examination.

This paper consists of EIGHT questions in TWO sections; A and B.

Answer FIVE questions; choosing any THREE questions from section A; and any TWO questions from section B in the spaces provided in this question paper.

All questions carry equal marks.

Maximum marks for each part of a question are indicated.

Do NOT remove any pages from this booklet.

Candidates should answer the questions in English.

For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A		20	
		20	
		20	
B		20	
		20	
TOTAL SCORE			

This paper consists of 20 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A

Answer any **THREE** questions from this section.

1. (a) Write the following abbreviations in full as applied in electrical installation:
- (i) PILC;
 - (ii) HSOS;
 - (iii) MIMS;
 - (iv) MICS.
- (4 marks)
- (b) Distinguish between 'Trunking and Ducting' types of wiring systems. (4 marks)
- (c) State **four**:
- (i) factors considered while selecting a particular wiring system;
 - (ii) obligations of the Kenya Power Company to the consumer.
- (8 marks)
- (d) (i) State **two** IEE regulations requirements regarding 'drawing in wires' in conduit wiring system.
- (ii) Explain **two** advantages of the regulations in d(i).
- (4 marks)
2. (a) (i) With the aid of a circuit diagram, explain how a single bell can be operated from four separated rooms.
- (ii) State **two** methods by which a switchboard operator can be able to note a call made in his absence. (9 marks)
- (b) State **two**:
- (i) IEE regulation requirements regarding fire alarm installations;
 - (ii) applications of the continuous ringing bell.
- (4 marks)
- (c) With the aid of a diagram explain the operation of a polarized electric bell. (7 marks)
3. (a) Explain:
- (i) the operation of a split phase induction motor;
 - (ii) reason why a single-phase induction motor is not self-starting;
 - (iii) how the motor in a (i) is reversed.
- (9 marks)

- (b) (i) Explain the importance of motor enclosures.
- (ii) Describe the following types of motor enclosures:
- I. drip proof type;
- II. flame-proof.
- (6 marks)
- (c) Explain the procedure followed when commissioning electrical machines. (5 marks)
4. (a) State **three** safety precautions observed while operating industrial machines. (3 marks)
- (b) With regard to motor control, list **two** devices that may be used for:
- (i) manual control;
- (ii) remote control.
- (4 marks)
- (c) With aid of a block diagram, explain the functions of the elements of an instrumentation system. (6 marks)
- (d) Draw a labelled diagram of a galvanometer type oscillographic recorder used in instrumentation system. (7 marks)
5. (a) State any **four** reasons that would cause a tender to be rejected. (4 marks)
- (b) Explain the importance of the following elements in project estimating:
- (i) materials;
- (ii) transport;
- (iii) supervision.
- (6 marks)
- (c) (i) State **two** requirements of a valid contract.
- (ii) Differentiate between Building and Electrical Engineering forms of contract. (6 marks)
- (d) Explain **two** causes for the lapse of an offer in a contract. (4 marks)

SECTION B

Answer any TWO questions in this section.

6. (a) State **four** qualities of a good lighting scheme. (4 marks)
- (b) (i) Explain the term 'glare'.
- (ii) List **two** methods by which glare is minimized in an electrical installation. (4 marks)
- (c) (i) With aid of a labelled diagram, describe the construction of a high pressure mercury vapour lamp.
- (ii) State **three** disadvantages of the lamp in c (i) over the sodium vapour lamp. (12 marks)
7. (a) State:
- (i) **one** advantage of the metadyne machine over the d.c. shunt motor;
- (ii) **two** unique features of the homopolar motor. (3 marks)
- (b) With aid of a labelled diagram, explain the operation of a Direct-On-Line method of starting a three-phase induction motor. (11 marks)
- (c) (i) State **two** methods of varying the speed of the motor in (b).
- (ii) Explain **one** drawback for each of the method in c (i). (6 marks)
8. (a) (i) Define the term 'corrosion' as used in electrical installation.
- (ii) With aid of a diagram explain the impressed currents method of protection against corrosion. (8 marks)
- (b) Explain the precautions observed in a temporary installation regarding:
- (i) switch gear;
- (ii) plugs and socket outlets;
- (iii) movable equipment and their accessories. (6 marks)

- (c) (i) State **two** IEE regulation requirements regarding motors installed in Agricultural and Horticultural installations.
- (ii) With aid of a diagram illustrate how an Insulation Resistance test between conductors and earth is carried out in a completed installation of a health clinic. (6 marks)

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