



# MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)  
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

FIRST SEMESTER EXAMINATION FOR DIPLOMA IN ELECTRICAL AND  
ELECTRONICS ENGINEERING

SUPPLEMENTARY EXAMINATION

EED102: ELECTRICAL INSTALLATION TECHNOLOGY I

DATE: 1/8/2016

TIME: 11.00-1.00 PM

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## INSTRUCTIONS TO CANDIDATES

### Attempt any THREE Questions

1. a) Define the following terms
  - i) Earthing Lead
  - ii) Earth Electrode . (4 marks)
- b) Explain with the aid of a diagram the current - operated earth leakage circuit breaker (6 marks)
- c) Define the term "a wiring system". (3 marks)
- d) A 4.7 KW, 240V, 50Hz single phase load operating at full- load efficiency of 90% and 0.87 power factor lagging is to be supplied from a distribution board 90m away. Find the most suitable cable size from table 1 below to satisfy the load current and volt drop requirement. (7 marks)

Table 1

Cable size(mm <sup>2</sup> )	6	10	16	25	35
Current rating (A)	77	105	140	180	220
Volt drop /A/m(mV)	7.0	4.4	2.8	1.8	1.3

2. a) Define the following terms
- i) Wiring Accessory
  - ii) Switch (4 marks)
- b) i) Describe the earthed concentric wiring system .
- ii) State two advantages of earthed concentric wiring system. (5 marks)
- c) Describe the following types of jointing methods
- i) Clamping
  - ii) Bolting (5 marks)
- d) Describe the procedure for making a Tee-twist joint for conductors (6 marks)
3. a) Explain the following term
- i) Sheathing
  - ii) Flexible cable (4 marks)
- b) State any two of the following
- i) Properties of Copper as a conductor material.
  - ii) Advantages of Aluminium material as a conductor (4 marks)
- c) State the following;
- i) The IEE regulation B23 regarding the voltage drop in a consumers installation.
  - ii) Any three factors that affect the current carrying capacity of a cable (5 marks)
- d) i) Define the term diversity factor as applied to a consumer installation (2 marks)
- ii) A fixed cooking appliance has 2 hot plates rated at 2 KW each, 2 hot plates each rated at 1.5 KW, an oven rated at 1 KW and a grill rated at 700W. If the rated voltage of the cooker is 240V, determine the size of a

cooker control Unit suitable to supply the appliance when it is to incorporate a socket outlet. (5 marks)

4. a) State the following
- i) Any two factors to be considered when choosing a wiring system.
  - ii) Any two advantages of a non-metallic conduit wiring system (4 marks)
- b) Describe the Holger Nielsen method used as a first aid treatment to victims of electric shock in an electrical workshop (6 marks)
- c) State any three advantages of trunking wiring system as compared to conduit wiring system (3 marks)
- d) State the following ;
- i) Two main functions of earthing an electrical system.
  - ii) Any two IEE Regulation requirements of earthing an electrical installation (4 marks)
- e) Show with a labeled diagram the earth fault loop path taken by a fault current in a consumers installation (3 marks)
5. a) i) Define the term safety with regard to an electrical workshop. (2 marks)
- ii) Explain two methods for the protection against the risk of an electrical shock (4 marks)
- b) i) Explain with a diagram the construction of a 2-core paper insulated lead sheathed steel wire armoured cable (5 marks)
- ii) State any three methods used for electrical conductor identification (3 marks)
- c) i) Define the term 'Conductor joint (2 marks)
- ii) Describe Welding as a method used for jointing conductors. (4 marks)