



MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

CERTIFICATE IN ELECTRICAL AND ELECTRONIC ENGINEERING

EPC 113; ELECTRICAL INSTALLATION TECHNOLOGY 1

DATE: 9/5/2019

TIME: 8.30-10.30 AM

INSTRUCTIONS:

Answer question one and any other two questions

QUESTION ONE (30 MARKS)

- a) Define the following terms
 - i. Earth – continuity conductor
 - ii. Earth Electrode . (4 marks)
- b) Explain with the aid of a labeled diagram the current operated earth leakage circuit breaker. (6 marks)
- c)
 - i State any three advantages of trunking wiring system as compared to conduit wiring system. (3 marks)
 - ii Describe the Holger Nielsen method used as a first aid treatment to victims of electric shock in an electrical workshop. (5 marks)
- d)
 - i Define the term " wiring system". (3 marks)
 - ii Describe the MIMS wiring system. (3 marks)
- e) 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. (6 marks)

Table 1

Cable size(mm ²)	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

QUESTION TWO (20 MARKS)

- 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. Welding
 - ii. Crimping (5 marks)
- d) Describe the procedure for making a Tee-married joint for a 3 - stranded conductor. (6 marks)

QUESTION THREE (20 MARKS)

- a) Explain the following terms;
 - 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 as a conductor material. (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)

QUESTION FOUR (20 MARKS)

- a) State the following
- i. Any three factors to be considered when choosing a wiring system.
 - ii. Any two advantages of a non-metallic conduit wiring system.
 - iii. Any three main functions of earthing an electric system. 8 marks
- b) Describe the following wiring systems
- i. Overhead busbar trunking
 - ii. PVC sheathed. (6 marks)
- c) State three safety requirements with regard to conductors and apparatus of an electrical installation to be observed against an electric shock. (3 marks)
- d) Show with a labeled diagram the earth fault loop path taken by a fault current in a consumer's installation. (3 marks)

QUESTION FIVE (20 MARKS)

- a)
- i Define the term safety with regard to an electrical workshop
 - ii Explain two methods for the protection against the risk of an electrical shock. (6 marks)
- b)
- i Explain with a labeled 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 State any four purposes of installing bare and lightly - insulated conductors in buildings. (4 marks)