



MACHAKOS UNIVERSITY

University Examinations for 2016/2017

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

**FIRST YEAR SECOND SEMESTER EXAMINATION FOR DIPLOMA IN
ELECTRICAL AND ELECTRONICS ENGINEERING**

EPC 113: ELECTRICAL INSTALLATION TECHNOLOGY

DATE: 30/5/2017

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

Answer Question One and Any Other Two Questions

SECTION A- COMPULSORY (30 MARKS)

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) (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 an 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

SECTION B- ATTEMPT ANY TWO QUESTIONS

2.
 - a) Define the following terms
 - i) Wiring Accessory
 - ii) Switch
 - b)
 - i) Describe the earthed concentric wiring system. (4 marks)
 - ii) State two advantages of earthed concentric wiring system. (5 marks)
 - c) Describe the following types of jointing methods
 - i) Clamping
 - ii) Bolting
 - d) Describe the procedure for making a Tee-twist joint for conductors. (6 marks)
3.
 - a) Explain the following terms;
 - i) Sheathing
 - ii) Flexible cable
 - b) State any two of the following
 - i) Properties of Copper as a conductor material.
 - ii) Advantages of Aluminum material as a conductor

- 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 following wiring systems
- i) Cleated Wiring
 - 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) 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 consumer's installation. (3 marks)
5. 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 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)
- iii) Define the term 'Conductor joint'. (2 marks)
- iv) Describe Welding as a method used to join conductors. (4 marks)