MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING

EED 109: ELECTRICAL INSTALLATION TECHNOLOGY

DATE: 7/5/2019 **TIME: 8.30-10.30 AM**

INSTRUCTIONS:

Section **A is compulsory**

Answer any **two in section B**

SECTION A: COMPULSORY QUESTION

QUESTION ONE (30 MARKS)

a) Define the term space factor. (2 marks)

b) State the space factors of the following,

i. Conduit

ii. Trunking

iii. Ducts (3 marks)

c) With the aid of a well labelled diagram, explain the sacrificial anode method of corrosion protection system (5 marks)

d) With the aid of a diagram, explain the term "Protective multiple earthing" (5 marks)

e) With the aid of a well labeled circuit diagram, explain how earth electrode resistance test is carried on a completed installation, name the instrument and state the reading expected. (8 marks)

f) A water heater is rated at 3KW, 240V. It is fed by butyl rubber insulated, single-core enclosed in conduit. The cables operate in an ambient temperature of 50^0 C and are

provided with close excess current protection. The distance between the heater position and the 240V, single phase ac distribution board is 28m. Choose a suitable cable to satisfy current and volt-drop requirements. Use table 7M provided. (6 marks)

SECTION B: ANSWER ANY TWO

QUESTION TWO (20 MARKS)

a) Define the following terms:

i. Accessory

ii. Wiring system (4 marks)

b) State any four types of wiring systems used in electrical installation. (4 marks)

c) A 7KW, 240V electric cooker is fed from a 240V, single phase ac supply positioned 38 metres away. Find a suitable size of PVC sheathed cable, twin with earth to satisfy both the load current and volt drop requirements. The cable is to be enclosed in a conduit and the ambient temperature is 40^0 C and coarse excess current is provided (5 marks)

d) With aid of a labelled diagram, describe Radial and Ring final sub circuits (3 marks)

e) i Two lamps, rated at 240V, 60W and 240V, 100W respectively, are connected in parallel to a 240V supply. Calculate the total current drawn from the supply. (3 marks)

ii What would be the rating of the Third Lamp to be connected in parallel with the existing two lamps in (e) above to increase the current drawn from the supply to 1 Ampere? (1 mark)

QUESTION THREE (20 MARKS)

a) Define the following terms:

i. earthed electrode,

ii. earth continuity conductor,

iii. earthing lead (6 marks)

b) Explain the term live metal work is as used in earthing. (2 marks)

c) State any two main functions of earthing (2 marks)

d) State any five factors that determine the choice of a wiring system (5 marks)

e) A five-amps rated switch is rated is to be used to control a circuit consisting of 150watts,240 volts tungsten bulbs. Determine the maximum number of lamps that may be connected. (5 marks)

QUESTION FOUR (20 MARKS)

a) Explain the purpose of testing and inspection (2 marks)

b) State the sequence of testing and inspection of an installation as recommended in the IEE regulations (4 marks)

c) With the aid of a circuit diagram, explain the operation of a current operated earth leakage circuit breaker (8 marks)

d) Describe any three types of motor enclosures used for protection. (6 marks)

QUESTION FIVE (20 MARKS)

a) Define the following terms with reference to fuses

i. Fuse element

ii. Current rating

iii. Fusing current

iv. Fusing factor (8 marks)

b) Given the fusing current of a rewirable fuse as 30A, and the fusing factor as 1.5, determine the current rating of the fuse. (2 marks)

c) Explain the term discrimination as applied in excess current protection. (2 marks)

d) Describe any Three types of special wiring systems (6 marks)