



# MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

CERTIFICATE IN ELECTRICAL AND ELECTRONICS ENGINEERING

1601/105 - ELECTRICAL INSTALLATION TECHNOLOGY 1

DATE: 14/12/2020

TIME: 2.30-5.30 PM

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## INSTRUCTIONS TO CANDIDATES

Attempt all questions

### QUESTION ONE

- a) Name three:
- i) Types of fire extinguishers and the type of fire they are used on;
  - ii) Components of a first aid box. (6 marks)
- b) Explain three main causes of electric fires. (6 marks)
- c) Define the following in relation to earthing and protection:
- i) Earth lead;
  - ii) Cartridge fuse;
  - iii) Circuit protective conductor: (6 marks)
- d) List two types of tools and their application in the field of electrical and electronics. (2 marks)

### QUESTION TWO

- a) State three sources of Electrical energy used in Kenya for power generation. (3 marks)
- b) Draw a labelled diagram of a typical supply system form generating station to consumer terminals. (7 marks)
- c) State three factors considered when selecting a wiring system for a particular installation. (3 marks)
- d) With aid of a labelled diagram describe the installation of cleated wiring system. (7 marks)

### QUESTION THREE

- a) Using a block diagram, show the sequence of control at the consumer's intake point; (8 marks)
- b) i Define the following terms as used in electrical circuits:
- I. Fusing factor
  - II. Fuse
- ii State three IEE regulations requirement regarding final circuits. (7 marks)
- c) With aid of a diagram, explain the operation of current operated earth leakage circuit breaker. (5 marks)

### QUESTION FOUR

- a) State two advantages of using
- i. PVC conduits over steel conduits;
  - ii. Trunking over conduits. (4 marks)
- b) With aid of a labeled diagram, describe the installation following:
- i. Catenary wiring system.
  - ii. Steel conduits (9 marks)
- c) Outline four safety precautions observed when installing bare conductor wiring systems. (4 marks)
- d) Write in full the meaning of the following abbreviation of different cables:
- i. PVC SWA;
  - ii. MIMS;
  - iii. PILC SWA. (3 marks)

### QUESTION FOUR

- a) Define the following terms with reference to cables
- i) Conductor
  - ii) Insulator (4 marks)
- b) Explain the following types of cables:
- i) Polychloroprene
  - ii) Mineral Insulation (4 marks)

- c) A supply is taken at 240V single phase. From the main switch to the main distribution board the distance is 55 metres, and the load is 40A. From the m.d.b. to the sub circuit fuse board the distance is 45 metres, and the load is 15A. A final sub circuit supplies and appliance of 1200W rating. The cross - sectional area of the sub circuit wires is 2.5 square mm, and the distance to the appliance is 25 metres.

Calculate the sizes of the main cable and the sub main cable to ensure that the voltage drop from the point of supply to the appliance comes within the limits imposed by the I.E.E regulations, and that no unnecessary copper to be used. (12 marks)