



MACHAKOS UNIVERSITY

University Examinations for 2021/2022

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

FIRST YEAR FIRST TERM EXAMINATIONS FOR TIVET

DIPLOMA CERTIFICATE IN ELECTRICAL AND ELECTRONICS ENGINEERING.

2601/105: ELECTRICAL INSTALLATION TECHNOLOGY I.

DATE:

TIME:

INSTRUCTIONS

Attempt any Five out of the following Eight Questions.

1. (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) Describe with a diagram the construction of a 2-core paper Insulated lead sheathed steel wire armoured cable. (6 marks)
- ii) State any three purposes of installing bare and lightly insulated conductors in buildings. (3 marks)
- (c) State the following ;
 - (i) Any two disadvantages of the Protective Multiple Earthing system .
 - (ii) Any three requirements for the effective use of Protective Multiple Earthing on a supply distribution system . (5 marks)

2. (a) Define the following terms ;
 - (i) Earth – Continuity Conductor
 - (ii) Consumer's earth resistance . (4 marks)
- (b) Explain with a labeled diagram the current operated earth leakage circuit breaker. (6 marks)
- (c) (i) Describe the earth concentric wiring system .
- ii) State two advantages of earth concentric wiring system. (5 marks)
- (d) Demonstrate the Holger Nielsen method used as a first aid treatment to victims of electric shock in an electrical workshop. (5 marks)
3. (a) (i) Define the term" wiring system". (3 marks)
- ii) State any two IEE regulation requirements for earthing an electrical installation . (2 marks)
- (b) Explain the following wiring systems
 - (i) Polychloroprene (PCP) sheathed .
 - (ii) Mineral - Insulated metal (MIMS) sheathed . (6 marks)
- c) (i) Describe the procedure for making a Tee-twist joint for conductors. (6 marks)
- ii) State any three Advantages of Aluminium as a conductor material . (3 marks)
4. 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. (5 marks)
- (b) Describe the following types of fire extinguishers ;
 - (i) Water
 - (ii) Dry chemical powder
 - (iii) Carbon dioxide. (6 marks)

- (c) (i) Define the term 'Conductor joint . (2 marks)
- (ii) State Three main functions of earthing an electrical system. (3 marks)
- d) Give any two causes of the following faults that occurs in portable electric tools.
 - i) Motor casing becomes too hot .
 - ii) Smoke emitted from motor . (4 marks)
- 5. (a) State three safety requirements with regard to an electrical installation to be observed as a precaution against an electric shock. (3 marks)
- (b) Explain the following wiring systems
 - (i) Cleated Wiring
 - (ii) PVC sheathed. (6 marks)
- (c) Show with a labeled diagram the earth fault loop path taken by a fault current in a consumers installation. (4 marks)
- (d) Define the following terms
 - i) Wiring Accessory
 - ii) Switch . (4 marks)
- (e) State any three methods used for electrical conductor identification. (3 marks)
- 6. (a) (i) State any three IEE Regulation requirements with regard to earthed concentric wiring system. (3 marks)
- (b) Describe the following types of jointing methods
 - i) Clamping
 - ii) Bolting . (4 marks)
- (c) State the following ;
 - (i) Any two advantages of Copper rods as an earth electrode used for earthing connection to the ground.
 - (ii) Any three properties of copper as a conductor material . (5 marks)

- (d) Define the following terms ;
- (i) A Cable.
- (ii) Armouring. (4 marks)
- (e) Explain the flexible metallic conduit wiring system. (4 marks)
7. (a) State the following ;
- (i) Any three advantages of a trunking wiring system.
- (ii) Any three disadvantages of Class ' B ' steel metal conduit system. (6 marks)
- (b) Define the following terms ;
- (i) Earth electrode .
- (ii) Earthing lead . (4 marks)
- (c) Explain the two main causes of an Accident in Electrical workshops. (4 marks)
- d) Describe the following tools used in workshops
- i) Hand file
- ii) Centre Punch. (6 marks)
8. (a) i) State any three precautions necessary while using an hammer in a striking operation . (3 marks)
- (ii) Explain the chipping operation carried out by a flat chisel . (4 marks)
- (b) Explain the steps involved in the filing operation performed by a hand file . (3 marks)
- (c) Explain the following classes of fires that are common in Industry ;
- (i) Class ' A ' fire
- (ii) Class ' B ' fire
- (iii) Class ' D ' fire . (6 marks)
- (d) Explain the following term
- (i) Sheathing
- (ii) ii) Flexible cable (4 marks)