



COLLEGE: COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)

SCHOOL: SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

CERTIFICATE IV IN ELECTRICAL ENGINEERING

UNIT CODE: EEC418

UNIT TITLE: ELECTRICAL INSTALLATION TECHNOLOGY I

FINAL EXAMINATION – QUARTER 3, 2019

ROOM: AS PER TIMETABLE

DURATION: 2 HOURS & 10 MINUTES

TOTAL MARKS: 100

INSTRUCTIONS TO STUDENTS

1. You are allowed **10 minutes** extra **reading time** during which you are **NOT** to write.
2. Begin each SECTION on a fresh page and use both sides of the sheet.
3. Write your candidate number at the top of each attached sheet.
4. Insert all written foolscaps, graph paper, drawing paper, etc. in their correct sequence and secure with a string.
5. For all sheets of paper on which rough/draft work has been done, cross it through and **ATTACH** these to your answer scripts.
6. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
7. Use of programmable calculator(s) is prohibited.
8. **ANSWER ALL QUESTIONS**
9. Show all working where necessary.
10. **ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE THE EXAM ROOM.**

SECTION A**USE OF WIRING STANDARD****(30MARKS)**

The following questions shall be answered using the AS/NZS3000:2007 Wiring Standard.

(Each question is worth 2marks)

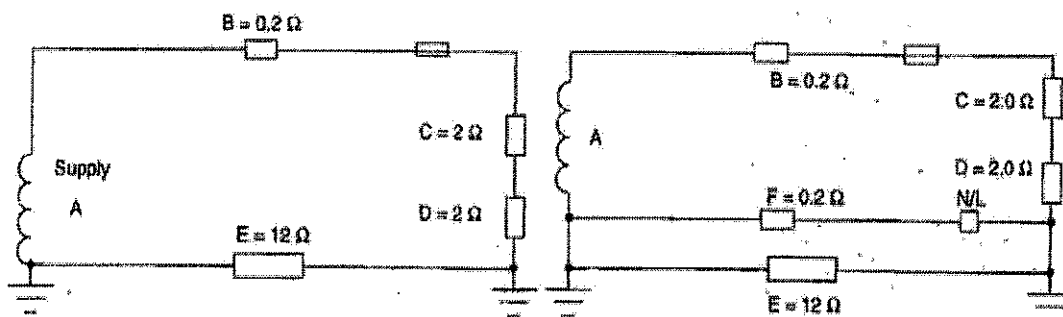
1. Where would you apply AS/NZS 3000:2007 Standard?
2. Name three conditions for a location of a switchboard?
3. What is the recommended voltage drop between the point of supply and at any point in a low voltage electrical installation?
4. List the nominal size of copper earthing conductor recommended to be used with the following active conductors:
 - a) Copper 6 mm²
 - b) Copper 10 mm²
5. What is the minimum depth at which a vertical type earth electrode shall be driven to?
6. What is the minimum separation of telecommunications lines to low voltage electrical service?
7. What is the minimum aerial conductor clearance of two core insulated hard-drawn cables over:
 - a) A road used by vehicles
 - b) Over other roofs and structures
8. Name the type of cables that are not permitted to be buried direct in the ground.
9. What is maximum span permitted for 25mm² aerial bundled cables (aluminum conductor)?
10. What should be the minimum cross-sectional area of insulated conductors to be used for:
 - a) Socket-outlets
 - b) Relay control circuits
11. What should be the default minimum clearance above the incandescent lamp which is recessed in the ceiling?
12. What is the maximum number of 2.5mm² PVC V90 two-core and Earth cables to be installed in a 25mm medium duty rigid UPVC conduit.
13. Why is it necessary to give a completed installation a thorough visual inspection?
14. Name the four types of cables where joints are not permitted when in tension?
15. State the minimum degree of protection for a switch installed in Zone 1 of the bathroom.

SECTION B**(30 MARKS)**

1. Outline the procedure in steps (5) of erecting ladders. (4 Marks)
2. List down five advantages of alternating current (A.C) over direct current (D.C) (5 Marks)
3. Briefly explain on what is the Grid System. (2 marks)
4. Name four methods of securing the supply in the event of power failures. (4 Marks)
5. Draw a single line diagram and identify the following;
(a) Consumer Mains (MSB)
(b) Sub- mains (DSB)
(c) Sub-circuit (LOAD) (4 Marks)
6. Draw and describe the electrical power generation and distribution in Fiji (Viti Levu).
Indicate the voltages values at each level. (6 Marks)
7. Draw the appropriate diagram and show the following:
(a) Main earthing conductor
(b) Main Earthing terminal
(c) Earth bar
(d) MEN link
(e) Protective Earthing Conductor
(f) Equipotential bonding conductors (3 marks)
8. Name four sources of extra low voltage supply. (2 marks)

SECTION C**(40 MARKS)**

1. For the figures given below determine the following:
 - a) Calculate the total impedance in each of the situation below. (3 marks)
 - b) Find the fault current in each circuit below. (2 marks)
 - c) Explain which of the circuit below is safe for a 16 amps protection device operation. (2 marks)



2. Find the value of the current flowing in the neutral conductor for the following load on a three phase star connected distribution system - Red Phase 125A at power factor of 0.79 lagging.
-White Phase 147A at power factor of 0.85 lagging.
-Blue Phase 215A at power factor of 0.80 lagging (10 marks)
3. With the aid of diagrams explain the operation of a circuit breaker at:
- a) Normal operation (2 marks)
 - b) O v e r l o a d operation (2 marks)
 - c) Short circuit operation (2 marks)
4. A circuit is carrying a fault current of 230A and is protected by a circuit breaker with a tripping time set to two seconds.
- a) Find the minimum size of single-core PVC insulated earthing conductor. (4 marks)
 - b) If this earthing conductor was laid with copper active conductors, determine the size of active conductors. (2 marks)
5. An electrical installation has a nominal phase voltage of 230V and is protected by a 16A Type C circuit breaker. The size of the active and earth copper conductor is 2.5mm , Calculate the maximum circuit length in meters. (4 marks)
(Prove your answer using Table B1). (2 marks)
6. A three-phase 400V motor having a rated full-load current of 50 A is to be supplied by a three-core 1/1kV MIMS cable with a route length of 60m from the main switchboard to the motor. Determine the minimum size of cable required for the circuit if the voltage drop in the consumer's mains is 8 V. (5 marks)

THE END