

071306T4EEN

ELECTRICAL TECHNICIAN (POWER OPTION) LEVEL 6

ENG/OS/PO/CR/01/6

PERFORM ELECTRICAL INSTALLATION

July/August 2024

Time: 3 Hours



WRITTEN ASSESSMENT

3 HOURS

INSTRUCTIONS TO CANDIDATE:

1. This paper consists of **TWO** sections: **A** and **B**.
2. Answer **ALL** questions in sections A and any **THREE** in section B in the answer booklet provided.
3. Marks for each question are indicated in brackets.
4. Do not write on this question paper.
5. Answer the questions in **English**.

This paper consists of FIVE (5) printed pages.

Candidate should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A (40 MARKS)

*Answer **all** the questions in this section*

1. The purpose of electrical test is to check that the phase conductor is taken through the fuse, the switch to the appliance and the neutral wire is earthed at the supply Authority's substation. Outline **three** main preparations for polarity test. (3 marks)
2. Figure 1 shows an installation diagram of a lighting circuit installed in a house to control a lamp. Name of accessories label X and Y respectively. (2 marks)

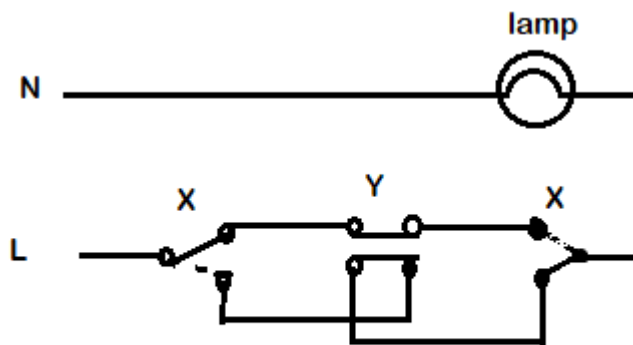


Figure 1

3. Newlync Enterprise Company is tasked to perform domestic electrical installation in a newly constructed building. Outline **five** factors to consider in selecting suitable wiring systems for the task. (5 marks)
4. Selecting the right tool to perform electrical installation is very essential as per the requirement of IEEE standards. State a tool recommended in performing the following task:
 - a) removing insulation from a conductor;
 - b) Taking measurement to the nearest mm;
 - c) testing for plumpness and levelness;
 - d) used to test the flow of current in a conductor. (4 marks)
5. Taking precaution measures in electrical workshop during electrical installation task is a key IEEE standard requirement. Outline **four** main causes of accident in an electrical workshop. (4 marks)
6. Earthing test is one of the key tests on electrical installation. It is a requirement that all newly installed electrical systems be subjected to such test before use. State **three** reasons for carrying out this test. (3 marks)

7. Designing a lighting scheme for a building requires consideration of design parameters for maximum illumination. Outline **four** such factors of consideration. (4 marks)
8. Complete Table 1 by indicating the type of final circuit, current rating for the Circuit breaker and size of cable to be used in each of the following final circuits.

(4 marks)

Table 1

Final Circuit	MCB rating	Size of cable
Domestic Lighting		1.5 mm ²
		2.5 mm ²
Cooker	32A	

9. Making a cable joint requires consideration of IEE standards so as to enhance good conductivity and safety purpose. Highlight **three** standards considered. (3 marks)
10. Tendering is an important process in acquisition of several commodities in an organization as per the law of procurement. Certain documents must be used during this process. Explain **two** contract documents required during this process. (4 marks)
11. During industrial installation site survey. It is very important to follow clear procedures before actual commencement of the work. Outline **four** systematic procedures during installation site survey. (4 marks)

SECTION B (60 MARKS)

*Answer any **three** questions in this section*

12.

- a) Synchronizing two or more alternators to a busbar requires clear check on certain factors. State **two** conditions which have to be fulfilled before an incoming generator can be switched on to an existing bus-bar. (2 marks)
- b) Occupational Health and Safety Act (OSHA) at the workplace, ensures proper safety, health, and welfare of all the employees and persons lawfully in attendance. Describe **four** roles of an employer to ensure proper health of the employees. (8 marks)
- c) Electrical accidents can be caused by a variety of factors which can result into damage or death. Explain **five** factors leading to such accidents. (10 marks)

13. Wiring diagram of an electrical installation is a visual representation of the electrical connection in a system.

- a) List **four** purposes of wiring diagrams. (4 marks)
- b) Draw a wiring diagram of a lighting circuit such that lamp:
 - i. L_1 is controlled by switches S_1 and S_2 ;
 - ii. Industrial socket outlet is wired from DP circuit breaker. (8 marks)The intake point has cut-out, energy meter, Main switch and C.C.U
- c) Conduit wiring involves use of conduit in protecting and enrooting electrical wiring in construction. Outline **two** types of this wiring systems. (2 marks)
- d) Circuit protective devices are used to protect electrical circuits from overloads, short circuits and any other hazard. Describe **three** types of these devices. (6 marks)

14.

- a) Logistics is a process of planning, implementing and controlling the efficient and cost-effective flow and storage of raw materials, goods, equipment and personnel from the point of origin to an installation site. Describe **five** logistical requirements considered for the transportation of materials, equipment and tools to the installation site. (10 marks)
- b) An electrical installation project involves installing two sockets in ring, one lamp controlled from one position. All the wiring is done from Customer control unit using heavy gauge PVC conduit.

- i. List **four** necessary permit and licenses as per the job above. (4 marks)
- ii. Design a Gantt chart showing clearly how the task will be performed. (6 marks)

15.

- a) Electrical tools and equipment are essential requirement in completing installation tasks. Explain the functions of the following tools used in performing basic electrical work:
 - i. Wire Strippers;
 - ii. Wire Cutters;
 - iii. Screwdriver;
 - iv. Crimping Tool or Crimpers. (8 marks)
- b) Cable joint is the physical and electrical connection of a cable end that connects to another cable, or to the terminal of the equipment for effective charge transfer. State **four** types of the electrical cable joint. (4 marks)
- c) Several test should be done on electrical installation after a physical visual inspection in order to establish the safety of the electrical installation. Explain the role of the following tests on an installed system:
 - i. Earth Continuity;
 - ii. Ring Circuit Continuity;
 - iii. Polarity;
 - iv. Insulation Resistance. (8 marks)

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