

SECTION A [40 MARKS]

Attempt **All** the Questions in this section.

Question One

Questions 1 to 20 are Multiple Choice Questions (20 marks).

Write numbers in **two** columns **1 to 10** and **11 to 20** in the answer booklet.

Write the letters against the numbers corresponding to the best alternatives.

1. Which of these is the right application of electric motor in an industry?
A. Water pumps B. Fish tanks C. Food processors D. Fork-lift trucks
2. Which of these is the right application of electric motor in residential homes?
A. Mills B. Food processors, DVD drives, power windows
C. Fork-lift trucks D. Extruders
3. Which type of earthing system is applicable for domestic installations?
A. T-N-C, systems BT-T Systems C. I-T systems D. All of these
4. The following types of earth electrodes are used in electrical installations except.....A.
Earth rods B. Earth tapes C. Earth plates D. Bonding Conductor
5. Earthing is defined as
A. the conductor in contact with the general mass of earth
B. the conductor that connects all exposed parts of metallic electrical equipment and extraneous metal work
C. the act of connecting the exposed conductive parts of an installation to the main protective earthing terminal of the installation.
D. the protective conductor that provides equipotential bonding
6. The following are reasons why we do earthing process during electrical installation work, except.....
A. To prevent the potential of live conductors rising above the declared value.
B. To prevent the danger of electric shock.
C. To prevent electrical losses in order to have a cost saving.
D. None of these
7. Which factor **does not** affect the type of electrical cable to be installed?
A. Temperature B. Conductor size C. Colour code D. Weather
8. Which of these types of wiring is preferred for workshop?
A. Casing Capping B. Batten wiring C. Concealed conduit wiring D. Surface conduit wiring
9. In an electric line, a switch is connected to
A. earth B. phase C. neutral D. Not connected
10. One of the factors affecting the choice of wiring system is
A. durability B. appearance C. cost D. All of these
11. PPE is defined as
A. All equipment designed to be worn, or held, to protect against a risk to health and safety.
B. Protective clothing, and equipment such as eye, foot and head protection,
C. Safety harnesses, life jackets and high visibility clothing.
D. All of these

12. The electrical engineers requirements for electrical installations are non-statutory regulations, that relate principally to the following partner, except
- A. design, selection, and erection B. inspection and testing of electrical installations
C. construction sites and caravans and their sites D. All of these
13. Electricity power is generated in power dam at voltages.
- A. 400 kv B. 270 kv C. 27 kv D. 33 kv
14. is the device that opens and closes the circuit safely under normal and abnormal conditions and operate automatically.
- A. An isolator B. A transformer C. A circuit breaker D. A fuse
15. cable breaks/melts when operating temperature exceeds 65 centigrade.
- A. PVC cable B. MIMS C. Silver cables D. Asbestos
16. The approximate efficiency of an electric motor is
- A. 65%-75% B. 70%-85% C. 35%-65% D. 50%-10%
17. DC motors need preventative maintenance, unlike their AC motor counterparts, due to
- A. DC motors IR and winding resistance changes with temperature.
B. Dc motors consume to Mach current
C. DC motors have wearing components that need to be checked regularly.
D. DC motors runs at a high speed than ac motors
18. Battery energy storage systems (BESS) are devices that enable
- A. Energy from renewables, like solar and wind, to be stored and then released when the power is needed.
B. Energy from renewables, like solar and wind, not to be stored
C. Stored energy to be kept for long time
D. All of these
19. These are a few ways to discharge a battery, except:
- A. Use the device until it runs out of power.
B. To short the battery
C. By a controlled discharge.
D. A constant current battery charger or a fast charge charger is used, the plugs or manifolds must be removed before charging.
20. These are types of battery charger, except
- A. Stand-alone chargers B. Constant voltage chargers
C. Smart chargers D. Constant voltage chargers

Write short answers for Questions 21 to 26 (20 marks).

21. State the installation height of the following accessories:

- (i) Single pole switch
- (ii) Wall socket outlet
- (iii) Fan regulator
- (iv) Consumer unit

(4 marks)

22. Draw a circuit diagram for controlling a lamp in one position only.

(2 marks)

23. State in sequence the four tests that are carried out on a newly completed electrical installation.

(4 marks)

24. Give any **four** reasons why earthing is carried out.

(4 marks)

25. Give four advantages of plastic conduit wiring systems in an installation.

(4 marks)

26. State any **two** factors that affect the resistance of the cable.

(2 marks)

SECTION B [60 MARKS]

Attempt **Only Three** Questions in this Section.

Question Two

(a) Using neat diagrams, explain the following types of renewable energy sources

- (i) Wind energy
- (ii) Biomass energy
- (iii) Hydro electric energy

(12 marks)

(b) State and explain **two** types transmission lines.

(2 marks)

(c) List and explain all transmission voltages.

(6 marks)

Question Three

(a) Explain the terms:

- (i) Current rating
- (ii) Tripping current
- (iii) Tripping factor:
- (iv) Close excess current protection:
- (v) Coarse excess current protection:

(15 marks)

(b) Explain how each of these implement the *Health and Safety at Work Act 1974*.

- (i) Employers
- (ii) Employees
- (iii) The HSE inspectors

(5 marks)

Question Four

- (a) Draw a block diagram to show how electricity is generated. (4 marks)
- (b) Draw a systematic diagram for (a) above. (8 marks)
- (c) Deficient between **Statutory Regulations** and Non statutory regulations (4 marks)
- (d) Explain Personal protective equipment regulations. (4 marks)

Question Five

- (a) What is an electrical isolator? (3 marks)
- (b) State **five** types of Electrical Isolators. (5 marks)
- (c) Explain the Working principle of an MCB. (5 marks)
- (d) Explain the Components of the circuit breaker. (7 marks)

Question Six

- (a) How does a circuit breaker work? (4 marks)
- (b) Circuit breakers are classified based on arc extinction.
- (c) With drawings, state and explain **four** types circuit breakers. (16 marks)

END
MERRY X-MASS