

# GENERAL CERTIFICATE OF EDUCATION BOARD

## Technical and Vocational Education Examination

### Electrical Technology and Diagram 1

5245

JUNE 2023

INTERMEDIATE LEVEL

Specialty Name and Acronym	<b>ELECTRICAL POWER SYSTEMS – EPS</b>
Centre No.	
Centre Name	
Candidate Identification No.	
Candidate Name	

Mobile phones are **NOT** allowed in the examination room.

### 5245 ELECTRICAL TECHNOLOGY AND DIAGRAM 1: MULTIPLE CHOICE QUESTION PAPER

**1 Hour 30 Minutes**

#### INSTRUCTIONS TO CANDIDATES

*Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.*

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

#### *Before the examination begins:*

3. Check that this question booklet is headed **“Intermediate Level – 5245 ELECTRICAL TECHNOLOGY AND DIAGRAM 1.”**
4. Insert the information required in the spaces above.
5. Insert the information required in the spaces provided on the answer sheet using your HB pencil:

**Candidate Name, Exam Session, Subject Code, Centre Number and Candidate Number.**

Take care that you do not erase or fold the answer sheet or make any marks on it other than those asked for in these instructions.

#### *How to answer the questions in this examination:*

6. Answer **ALL** the **50** questions in this Examination. All questions carry equal marks.
7. Each question has **FOUR** suggested answers: **A, B, C** and **D**. Decide which answer is correct. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen.  
For example, if **C** is your correct answer, mark **C** as shown below:  
[A] [B] **[C]** [D]
8. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
9. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
10. Do all rough work in this booklet, using, where necessary, the blank spaces in the question booklet.
11. **At the end of the examination, the invigilators shall collect the answer sheet first and then the question booklets. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**
12. **Non Programmable Calculators are allowed**

1.

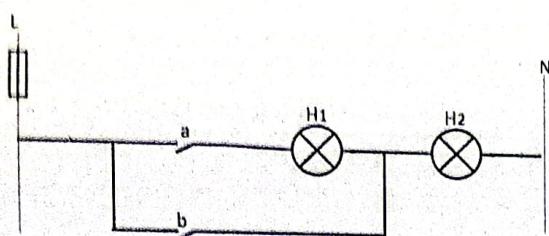


Figure 1

Considering the diagram in the Figure 1, what will happen to the heating elements H<sub>1</sub> and H<sub>2</sub> when the switch b is closed?

- A Both lamps H<sub>1</sub> and H<sub>2</sub> will dim
- B H<sub>1</sub> will dim while H<sub>2</sub> will be bright
- C H<sub>1</sub> will be OFF while H<sub>2</sub> will be ON
- D H<sub>1</sub> will be ON while H<sub>2</sub> will be OFF

2.

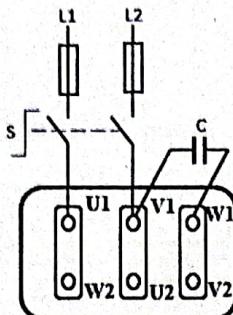


Figure 2

The diagram of the Figure 2 shows a connection of a three phase motor terminals. The motor operates as;

- A Three phase ac motor
- B Single phase motor
- C Star connected motor
- D Delta connected motor

3.

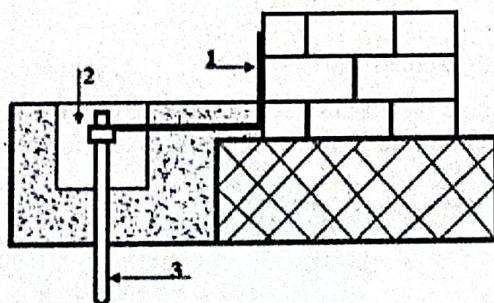


Figure 3

The termination of earth is done as shown in figure

3. What name do we give to part 3?

- A Earth electrode
- B Joint box
- C Earth chamber
- D Earth conductor

4.

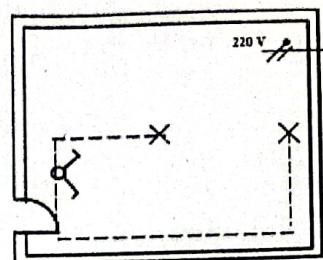


Figure 4

Given the architectural diagrams in the Figure 4, how are the lamps controlled?

- A Put ON/OFF from a single point one or more lighting points
- B Put ON/OFF from two points one or more lighting points
- C Put ON/OFF, from more than two points, one or more lighting points
- D Put ON/OFF, together or separately and from one point two separate circuits

5.

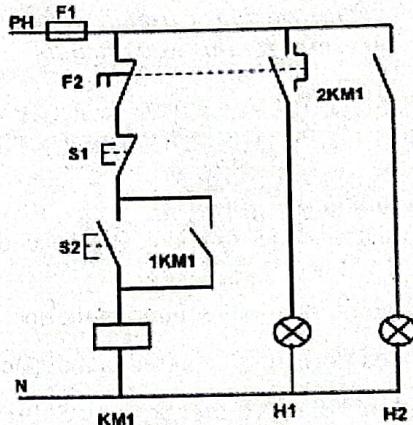


Figure 5

In the circuit of the Figure 5, the lamp H<sub>1</sub> indicate

- A Presence of supply
- B Short circuit fault
- C Normal functioning
- D Overload fault

6. For the protection of persons to be assured, an electrical installation must have:

- A A differential device
- B A differential device and an earth wire
- C A fuse and an earth wire
- D An earth wire

7. PVC stands for

- A Pressed and varnished cable
- B Polyvanised chloride
- C Polyvinyl chloride
- D Pressed Varnished conductor

8.

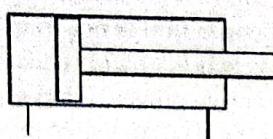


Figure 6

What is the name of the symbol represented in the figure 6?

- A Double effect acting cylinder
- B Tamden acting cylinder
- C Simple effect acting cylinder
- D Double rod acting cylinder

9.

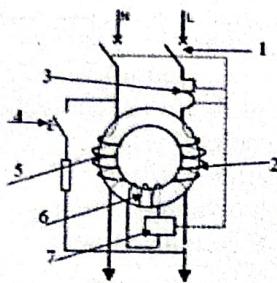


Figure 7

The element 6 of the differential circuit breaker shown in figure 8 is

- A Phase coil
- B Neutral coil
- C Detector coil
- D Trip coil

10.

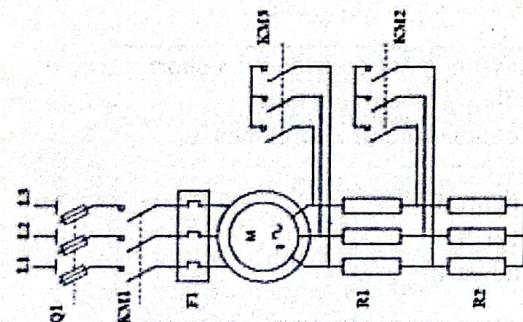


Figure 8

The diagram of figure 8 shows the starting of a three phase induction motor by elimination of rotor resistance. How many steps are there?

- A One
- B Two
- C Three
- D Four

3

11. A material that has zero resistance is called

- A Conductor
- B Insulator
- C Semiconductor
- D Superconductor

12. The Sequential function chart (GRFCET) level 2 is one

- A Where the functional specification is given in full statement
- B Where only technological specification is given in symbolic notation
- C In which the initial stage is represented by a double square
- D Which contains many stages, transitions and links

13. Except from \_\_\_\_\_ starting, the main purpose of a starter is to reduce the starting current of the three-phase induction motor.

- A Star-Delta
- B Stator resistance
- C Direct on line
- D Rotor resistance

14. The function of the capacitor across the supply to the fluorescent tube is primarily to:

- A Stabilize the arc
- B Improve the supply power factor
- C Reduce the starting current
- D Reduce noise

15. Conduit pipes are normally used to protect

- A VGV cables
- B Unsheathed cables
- C Insulated conductors
- D Armoured cables

16. A 5.5 kW-1430 rpm-230/400 V-50 Hz three phase asynchronous motor is to be supplied by a 230/400 V-50Hz network. The motor windings will be coupled in

- A Series
- B Parallel
- C Star
- D Delta

17. Which of the following power plants is free from environmental pollution?

- A Diesel
- B Nuclear
- C Hydroelectric
- D Steam

18. The symbol of the figure 9 represents:

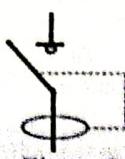


Figure 9

- A Differential switch
- B Differential Circuit breaker
- C Differential contactor
- D Residual current device

19. The c.s.a. of a conductor used in power cables depends on the

- A Operating voltage.
- B Power factor
- C Current to be carried
- D Type of insulation used

20.

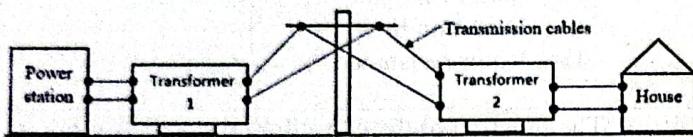


Figure 10

Figure 10 shows how electrical power is transferred from power stations to consumer using the Grid. What is the function of transformer 2 ?

- A To step-up the voltage for domestic use
- B To step-down the current for domestic use
- C To step-down the voltage for domestic use
- D To step-up and step-down the voltage for domestic use

21.

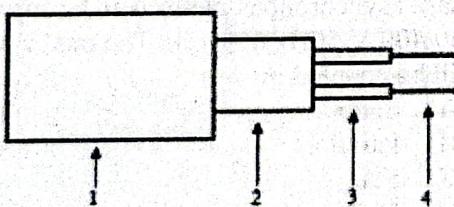


Figure 11

The element (3) of the electrical cable of figure 11 is ?

- A Cable jacket or external cover
- B Plastic insulation
- C Conductor or Wire
- D Wire insulator

22. Which of the following statement with respect to power factors correction is not true?

- A The reactive power reduces
- B The active power reduces
- C The apparent power reduces
- D The load current reduces

23.

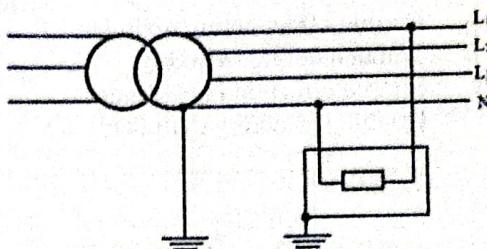


Figure 12

The circuit of figure 12 represents;

- A TT neutral System
- B IT earthing system
- C TN-S earthing system
- D TN-C earthing system

24. In the fluorescent lamp circuit, the function of choke is primarily to

- A Reduce the flicker
- B Minimize the starting surge
- C Initiate the arc and stabilize it
- D Reduce the starting current

25. In a PLC, a relay is classified as:

- A An input interface
- B An output interface
- C A memory device
- D Control unit

26. Which of the following is not considered a short circuit fault when they come in contact

- A Two live conductors of a three phase supply
- B Live and neutral
- C Live and earth
- D Neutral and earth

27. The reason for braking AC motors is to

- A Slow down the motor speed when supplied
- B Stop the motor from rotating when supplied
- C Stop the motor from rotating immediately supply is switched off
- D Slow down the motor immediately supply is switched off

35. The symbol of the Figure 13 represents ;



Figure 13

- A Magnetic relay
- B Differential relay
- C Magneto-thermal relay
- D Thermal relay

28. For a given step in a GRAFCET, a

- A Transition stops the action associated to that step
- B Receptivity starts the action associated to that step
- C Transition starts the action associated to the next step
- D Receptivity stops the action

29. The role of the capacitor connected in parallel with the starter of a fluorescent lamp is to

- A Reduce radio interference
- B Improve the power factor of the lamp
- C Improve the quality of light output of the lamp
- D Help in starting the lamp

30. The primary source of energy for a nuclear power station is

- A Fuel
- B Coal
- C Water
- D uranium

31. Which of the following is not a turbine used in hydro power station?

- A Pelton
- B Francis
- C Turbo
- D Kaplan

32. For the cable H07RN-F3G1.5; the letter G signifies the presence of

- A Green/red conductor
- B Green/yellow conductor
- C Green/grey conductor
- D Green/blue conductor

33. Which of the following is the cleanest electrical production plant

- A Solar
- B Hydro-electric
- C Thermal
- D Nuclear

34. In a three phase four wire supply, the neutral is obtained by earthing

- A The delta line of the three phase
- B The star point of the three phases
- C The frame of the transformer
- D The three lines at regular intervals

36. The rotor resistance starter is suitable for starting

- A Squirrel cage rotor motors
- B Wound rotor motors
- C Shirt-circuited rotor motors
- D Salient pole rotor motors

37. When the nameplate of a three phase induction motor indicates 220V/380V, the rated voltage between

- A The voltage across the two windings is 220V
- B The voltage across one winding should be 380V
- C The rated voltage between one winding
- D The rated voltage of one winding is 220V

38. The maximum value of faulty current a protective device will interrupt without being destroyed is referred to as

- A Nominal value
- B Sensitivity
- C Breaking capacity
- D Maximum value

39. Due to shortage of electrical energy selected parts of a locality are supplied while others are not. This practice is known as

- A Load balancing
- B Load shading
- C Load sharing
- D Load equilibration

40. Which of the following is not a sequencer?

- A Hydraulic sequencer
- B Pneumatic sequencer
- C Electronic sequencer
- D Electromagnetic sequencer

41. The ratio of the light output at the end of the designed life of a light source to the light output when the light source is new is termed

- Utilisation ratio
- Depreciation ratio
- Maintenance factor
- Depreciation factor

42. Which of the following is not an advantage of trunking installations over conduit installations

- It serves as decoration
- Modification is easier to carryout
- Access to cable is easier
- Its cheaper to install

43. Buchholz relay is used for protection of

- A transformer against external fault
- A transformer against internal fault
- A transformer against both internal and external faults
- Induction motors against prolonged overload

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44.

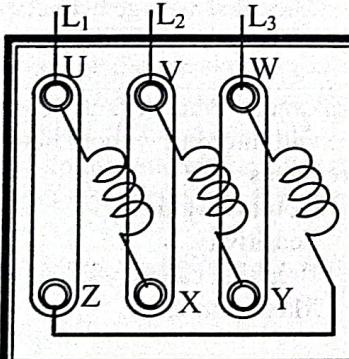


Figure 14

The motor whose terminal plate is represented in figure 14 is coupled in;

- Star
- Star-delta
- Delta
- Delta-star

45. The flicker effect of fluorescent lamps is more pronounced at

- Lower frequencies
- Higher frequencies
- Lower voltages
- Higher voltages

46. Which of the following transformer connected system is suitable for a 3 phase 4-wire systems?

- Star-delta
- Delta-zig-zag
- Delta-star
- Interconnected star

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47. Low power factor results in

- Increased losses
- Decreased losses
- No effect on losses
- Better generating efficiency

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48. Electric arc appears between two electrical contacts as a result of

- Closing and opening of the contacts on load
- The heavy load the contact is controlling
- The type of materials used for the contacts
- Poor insulation

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49. What is the phase voltage if a three phase star connected circuit is supplied by a 380V?

- 240V
- 230V
- 220V
- 110V

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50. At present level of technology, which of the following is used to generate electrical energy from sea?

- Tidal power.
- Geothermal
- Solar
- Hydroelectric

**STOP**

**GO BACK AND CHECK YOUR WORK**