



**Tertiary and Vocational Education Commission**  
**Knowledge Assessment – July 2022**  
**Electrician**  
**National Vocational Qualification Level 04**



**Time: 1 ½ Hours**

**Instructions for the Candidates**

- Answer all questions
- In each of the questions from 1 to 50, pick the one of the alternatives (a), (b), (c), (d) which you consider is correct or most appropriate.
- Mark a cross (x) on the number corresponding to your choice in the answer sheet provided.
- This question paper consists of 09 pages

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**Part 1**

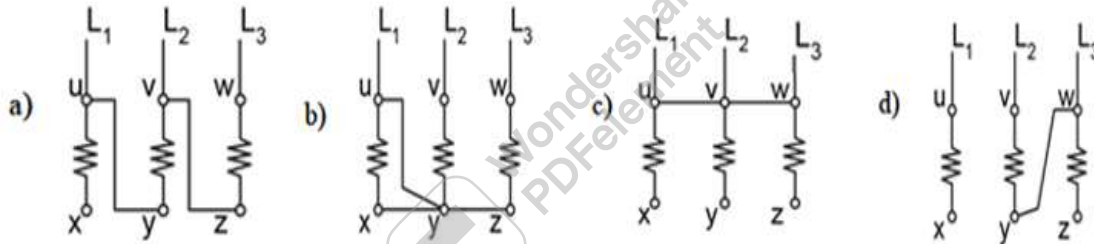
1. The unit used to measure voltage in an electric circuit is;
  - a) Ampere
  - b) Watt
  - c) Volt
  - d) Coulomb
2. The proportionality of resistance to the length of a conductor is;
  - a) Inverse
  - b) Direct
  - c) Direct or inverse
  - d) Negative
3. The formula that is used to calculate frequency of an alternating wave is;
  - a)  $f = T$
  - b)  $f = \frac{1}{T}$
  - c)  $T = \frac{f}{2}$
  - d)  $f = \frac{2}{T}$
4. The frequency of an alternating wave with 20ms of periodicity is;
  - a) 250ms
  - b) 50Hz
  - c) 50ms
  - d) 250Hz
5. A 230V is called as the \_\_\_\_\_ of the voltage wave in a domestic power supply.
  - a) Highest value
  - b) Lowest value
  - c) Normal value
  - d) Square root mean value

6. The international unit that is used to measure electric power is;
  - a) Henry
  - b) Coulomb
  - c) Watt
  - d) Watt hour
  
7. The purpose of connecting Miniature Circuit Breaker (MCB) to a domestic electric power circuit is;
  - a) To protect persons in case of electric shock
  - b) To protect the circuit from lightning
  - c) To prevent damage from high current through the sub circuit
  - d) To earthing if the current through circuit is increases
  
8. The number of poles of an electric motor when the synchronous speed ( $N_s$ ) becomes 3000rpm is;
  - a) Four
  - b) One
  - c) Two
  - d) Three
  
9. What is the meaning of the Slip of an alternating current electric motor?
  - a) The speed of the rotor is equal to synchronous speed
  - b) The speed of the rotor is lower than the synchronous speed
  - c) The speed of the rotor is higher than the synchronous speed
  - d) None of the above
  
10. What is the meaning of “IP” that is mentioned on the name board of the motor?
  - a) Introduction of the resistance of that motor to the external environmental effects
  - b) Introduction of the power of that motor
  - c) Introduction of number of rotation of that motor
  - d) Introduction of the voltage of that motor
  
11. What is the meaning of “F” that is mentioned in the name board of the motor?
  - a) The possibility of long term working
  - b) The temperature that can be borne by the motor
  - c) The operating temperature and speed of the motor
  - d) None of the above
  
12. The equipment that is used to measure speed of a motor is;
  - a) Multi meter
  - b) Clip on meter
  - c) Tacho meter
  - d) Voltmeter

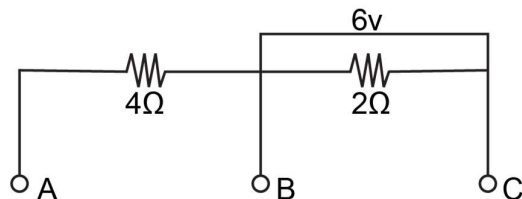
13. The suitable instrument that is used to measure diameter of a motor winding wires is;
- Sphero meter
  - Vernier Caliper
  - Metal ruler
  - Micro meter
14. The suitable method that is used to change speed of a three phase motor is;
- Change the supply voltage and current
  - Change supply frequency and number of poles
  - Change connected pole
  - Decrease the slip
15. What should be done when you need to change the direction of the rotation in a three phase motor;
- Push to other side when motor rotates
  - Change the side of the motor and start the motor
  - Change the two phases
  - Connect three phases to one end
16. The Device that is used as a starting torque by the single phase motor is;
- Dry Battery
  - Electric Generator
  - Capacitor
  - Set of bulbs
17. How many multiples of current is taken by a three phase motor at the start
- Two times
  - Three times
  - Four times
  - Five times
18. The device that convert electric power into mechanical power is;
- Generator
  - Electric motor
  - Battery
  - Fluorescent lamp
19. The most important factor to be considered in an Electric wire of an electric circuit is;
- Voltage factor
  - Voltage drop
  - Current drop
  - Resistance drop

20. The voltage that is used to measure insulation resistance of a domestic electric circuit is;
- 230V
  - 120V
  - 500V
  - 750V
21. The correct specification to select single phase 2pole MCB device is;
- 200V/50Hz/40A/2Pole
  - 230V/50Hz/40A/2Pole
  - 230V/50Hz/2Pole
  - 220V/2Pole/50Hz
22. The equation that is used to calculate the total load power of the balanced star and delta connected load is;
- $P = V_l I_l$
  - $P = \sqrt{3} V_l I_l$
  - $P = \sqrt{3} V_l I_l \cos \phi$
  - $P = \sqrt{2} I L \cos \phi$
23. The percentage of voltage drop of electric circuit according to the revision of IEE 17 is;
- 2.5%
  - 4.0%
  - 9.2%
  - 12.5%
24. The unit that is used to measure electric charges is;
- Volt (V)
  - Coulomb (C)
  - Ampere (A)
  - Watt (W)
25. The characteristic of a circuit of a bulb in a series is;
- Even if one bulb is turned off, all other bulbs are light up
  - Only one bulb is light up
  - One bulb is turned off and other bulb is light up
  - If one bulb is faulty, all other bulbs will be turned off
26. The electrical installation in a house is made;
- In series
  - In parallel
  - In series and parallel
  - By disconnecting each switches

27. The characteristic of the parallel connection is;
- Every load receives equilibrium current
  - Every load functions at a same time
  - Every load receives supply current
  - Every load receives supply voltage
28. What should be done to change the direction of rotation of a motor which is connected in a series;
- Disassemble the Armature
  - Disassemble the magnetic field
  - Connect ends of the armature and ends of the field coils together
  - Change the ends of the armature and ends of field coils
29. The centrifugal switch which connected to single phase motor always;
- Disconnected
  - Connected
  - Connected between windings
  - None of the above
30. The correct circuit installation of a Delta connection from the followings is;



31. The two  $4\Omega$  and  $2\Omega$  resistors are connected in a series is shown below;



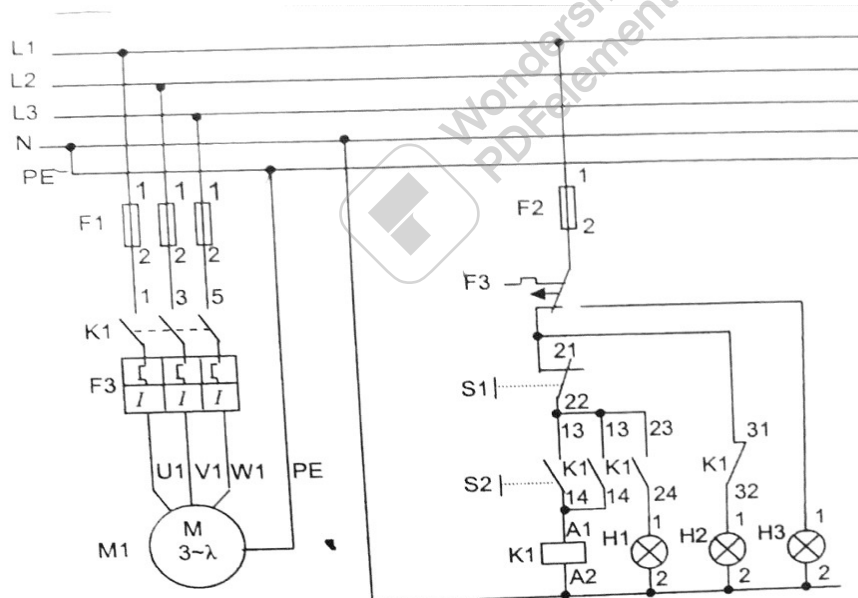
If the voltage between B and C is 6V, the voltage between A and B is;

- 2V
- 8V
- 12V
- 18V

32. The definition for the phase angle ( $\cos \phi$ ) is;
- Between the current and the resistance
  - Between the current and the voltage
  - Between the voltage and the induction
  - Resistor voltage
33. When an alternating voltage is applied through a net resistor, the current flows through that resistor is;
- The same phase with the current
  - The same phase with the voltage
  - Between the current and the voltage
  - Same as the resistance and current
34. The relationship between line current and the phase current of the star connection represented as;
- $\frac{I_p}{I_l}$
  - $\frac{I_l}{I_p}$
  - $I_p = I_l$
  - $I_p I_l$
35. The relationship between line voltage and the phase voltage of the star connection represented as;
- $\frac{V_p}{V_l}$
  - $V_p = V_l$
  - $V_l = \sqrt{3}V_p$
  - $\sqrt{3}V_l = V_p$
36. The relationship between line current and the phase current of the delta connection represented as;
- $I_l = I_p$
  - $\frac{I_l}{I_p}$
  - $I_l I_p$
  - $I_l = \sqrt{3}I_p$
37. The device that is used to control temperature in a refrigerator is;
- Connecting device
  - Temperature controller
  - Electric bulb
  - Condenser
38. The type of transformer that is used to reduce supply voltage is;
- Step up transformer
  - Step down transformer
  - Current transformer
  - Voltage transformer

39. The security device that is automatically operated when thieves are entering into the house is;
- Current Transformer
  - Motion sensor
  - Light emitting diode (LED)
  - Smoke detector
40. The method of connecting earth wires during electric installation in Sri Lanka is;
- TN
  - TY
  - TS
  - TT
41. The insulation resistance between windings of the three phase generator is;
- $5\Omega$
  - $10\Omega$
  - Lower than  $1M\Omega$
  - Higher than  $1M\Omega$

Using the following circuit diagram, answer for questions from 42 to 48.



42. The F1 in the above circuit diagram shows;
- The fuse used in control circuit
  - The over load switch used in the main circuits
  - The fuse used in the main circuit
  - Miniature circuit breaker

43. The F3 in the above circuit diagram shows;
- Main Circuit Breaker
  - Thermal Overload
  - Thermal and Magnetic Protection
  - Main switch
44. The correct serial number for F3 in the control circuit in the above circuit diagram is;
- 95,96,98
  - 90,94,96
  - 97,95,96
  - 95,96,99
45. The H3 bulb in the control circuit is operated in the above circuit diagram when;
- The circuit is being functioned
  - There is a fault occurred in the circuit
  - The motor is working speedily in the circuit
  - The motor is running backward in the circuit
46. The H2 bulb in the control circuit is functioned in the above circuit diagram when;
- The circuit is being functioned
  - There is a fault occurred in the circuit
  - The circuit is inoperative
  - The motor is inoperative in the circuit
47. The H1 bulb in the control circuit is operated in the above circuit diagram when;
- The circuit is inoperative
  - The circuit is operative
  - When there is a fault occurred in the motor in the circuit
  - The circuit is over loaded
48. What is the device used to disconnect the power supply first in the control circuit in the above circuit diagram?
- F3 over load switch
  - S2 switch
  - F2 fuse
  - S1 switch
49. The voltage of the well charged battery is;
- 10V
  - 11.5V
  - 12V
  - 13.2V



50. The suitable type of Miniature circuit breaker for the electric lighting circuit in an electric installation is;
- a) D
  - b) B
  - c) C
  - d) K

(01 x 50 = 50 marks)





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**Electrician**  
**National Vocational Qualification Level 04**



**Time: 1 1/2 Hours**

**Instructions for the Candidates**

- Answer four (04) questions including question number one (01). (Question number one (01) is compulsory and total number of questions should be answered is four (04))
- Answer the questions in the spaces provided in the same question paper
- This question paper consists of 07 pages.
- Nonprogrammable calculators are allowed.

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**Part 2**

1.

- i). Draw a circuit diagram by which three (03) lamps can be operated separately from three locations together. (Draw the symbols correctly and list the necessary materials)

(05 marks)

- ii). Draw the summary plan for the above circuit diagram. Mark the wire sizes correctly.

(05 marks)

- iii). It is needed to mount six (06) wall lamps and six (06) plugs of 13A for the hall of a house. As an electrician, draw the number of suitable sub circuits for these. (For the 06 wall lamps - setup three switches for three wall lamps in one place and for other three lamps in another place respectively).

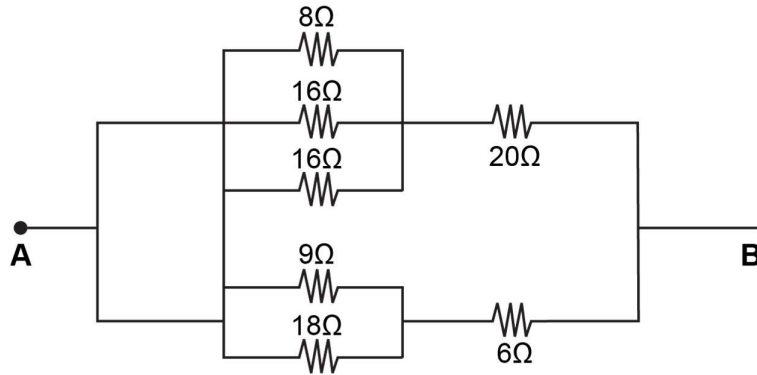
(07 marks)



- iv). List out the equipment and materials that are required for the above circuit diagram.

(03 marks)

2.



i). Calculate the equilibrium resistance between A and B.

(07 marks)

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ii). Calculate the current flows through the system when it is connected to a 24V voltage supply.

(03 marks)

3. There are three capacitors of  $2\mu\text{F}$ ,  $4\mu\text{F}$  and  $8\mu\text{F}$  capacities respectively. Calculate the equilibrium capacitance when these are connected in methods given below.
- i). Connect in series (Draw the circuit diagram) (05 marks)
- ii). Connect in parallel (Draw the circuit diagram) (03 marks)
- iii). How do you check whether a capacitor is in working condition or not? (02 marks)

- 4.
- i). Name two (02) types of single phase motor. (02 marks)
- ii). Draw the circuit diagrams for the above motors. (04 marks)
- iii). What is the suitable electric device that can be used to start single phase motor? (02 marks)
- iv). Explain the importance of connecting centrifugal switch to the windings of a single phase motor. (02 marks)



- 6.
- i). Draw a suitable Ladder diagram circuit to rotate three phase motor into forward or backward directions. (04 marks)
- ii). What are the devices you can use for the above circuit? (02 marks)
- iii). Draw the symbols for the above devices. (02 marks)
- iv). Draw the above function with switch interlocks and relay interlocks using control circuit diagram. (02 marks)