

SIR ARTHUR LEWIS COMMUNITY COLLEGE
Department of Professional and Lifelong Learning

EXAMINATION SESSION : Semester Two 2025
LECTURER : Shurman Francis
COURSE TITLE : Electrical Installation – Level II
COURSE CODE : ELE216
DATE : 8 May, 2025
COMMENCEMENT TIME : 4:00 pm
DURATION : 2 Hours
INVIGILATOR : Lindsley Philbert

INSTRUCTIONS:

- This paper consists of three (3) sections.
 - Section One – Definitions (50 marks)
 - Section Two – Calculations (10 marks)
 - Section Three – Multiple Choice (40 Marks)

- Please answer all questions in each section

Section One (1) – Definitions (50 marks)

Define each of the following terms and provide formulas where applicable. (15 marks)

1. Power
2. Inductance
3. Power Factor
4. Semi-Conductor
5. Earthing

6. List three types of earth Electrodes (3 marks)

7. Explain the following earthing systems (12 marks)

- a. TN-S
- b. PME (TN.CS)
- c. TT

8. What is the purpose of earthing an Electrical Installation? (5 marks)

9. What does RCD stand for? How do they work? (4 marks)

10. Name two types of resistors? (2mks)

11. Determine the resistance values / or colour coding of the following:



- a. Red/Black/Red (1 mark)
- b. Yellow/ violet/Orange (1 mark)
- c. Brown/Black/Brown (1 mark)
- d. $1.2k\Omega$ resistor (1 mark)
- e. 370Ω resistor (1 mark)
- f. 470Ω resistor (1 mark)

12. What /how do you correct power factor problems at large industrial installations? What does the corrective measure do? (3 marks)

Section Two (2) - Calculations (10 marks)

$$P = IV \quad V = IR \quad X_c = \frac{1}{2\pi fC} \quad X_L = 2\pi fL$$

$$E = \frac{I}{D^2} \quad 1\mu\text{f} = 1 \times 10^{-6}$$

1. A 240V light bulb uses 0.75 Amps. How much power is used by the bulb (1 mark)
2. What will be the current if a 12-volt battery is connected to a circuit with a resistance of 50 ohms? (1 mark)
3. What resistance would cause a flow of 15 Amps from a 240v supply (1 mark)
4. An RL circuit consists of a 40π resistor and a 3 m H inductor. What is its impedance at 60 Hz. (3 marks)
5. A capacitor of 100 uf is placed across a 250V supply at 50 Hz. Calculate the capacitive reactance of the circuit .(3 marks)
6. Calculate the illumination on a table when a 900 lm lamp is installed at a right angle 3 meters above the table.(1 mark)

Section Three (3) - Multiple Choice (40 marks)

1. All of these are advantages of an LED light except:
 - a. Long life span
 - b. Energy efficient
 - c. Emits a lot of heat
 - d. Can be found in many colours

2. Which one of these values tells us the colour of a light bulb?
 - a. 100 lm
 - b. 50 watts
 - c. 60 HZ
 - d. 5000K

3. The CRI of a lamp will indicate theof objects under the light when compared to a natural light source.
 - a. Colour
 - b. Brightness
 - c. Efficiency
 - d. Reflection

4. Materials with resistance allow more current to flow.
 - a. High
 - b. Small
 - c. Variable
 - d. Fixed

5. Insulators are able to allow less current to flow through a circuit.
 - a. True
 - b. False

6. An Electric Generator converts electrical energy to mechanical energy.
 - a. True
 - b. False

7. Running water can be a Prime Mover.
 - a. True
 - b. False

8. Which of these components is used for the flow of electrical charges into a circuit.
 - a. Armature
 - b. Shaft
 - c. Field Magnet
 - d. Slip rings

9. With a shunt motor control, the field coil is installed in Parallel to the-
 - a. Stator
 - b. Drive shaft
 - c. Armature
 - d. Voltage

10. One of the most effective ways of increase the output power of a motor is to :
 - a. Decrease the resistance across it
 - b. Increase the number of wire windings
 - c. Decrease the strength of the magnetic field
 - d. Increase the size of the motor

11. An example of a passive component is:
 - a. Integrated Circuit
 - b. Resistor
 - c. Diode
 - d. Transistor

12. Which of the following is not a formula for power?

- a. $P = IR$
- b. $P = IV$
- c. $P = v^2 / r$
- d. $P = I \times V \times \text{Pf} \times \sqrt{3}$

13. Two types of resistors are

- a. Heat and Cooling
- b. Resistance and impedance
- c. Fix and Variable
- d. Charge and Discharge

14. Which of the following IP rated devices can be used under water

- a. IP 44
- b. IP2X
- c. IP68
- d. IP56

15. This may be defined as the total opposition in a circuit to the flow of alternating current

- a. Induction
- b. Resistance
- c. Voltage
- d. Impedance

16. When AC is applied across a pure capacitor

- a. Current leads voltage by 90°
- b. The capacitor charges quickly
- c. Voltage leads the current by 60°
- d. The capacitor gets hot

17. Z (impedance) can be calculated with which formula

- a. $Z = IR$
- b. $Z = \frac{P}{R}$
- c. $Z = \sqrt{R^2 + X^2}$
- d. $Z = \sqrt{I^2 + V^2}$

18. _____ Components do not affect the nature or value of AC or DC supplies.

- a. Pure
- b. Electric
- c. Active
- d. Passive

19. Inductive reactance can be measured in ohms with the following

- a. IR
- b. $2\pi FR$
- c. $2\pi FL$
- d. $X_L = H$

20. In an inductive circuit

- a. Voltage leads current by $\frac{1}{4}$ of a cycle
- b. Voltage and current is in phase
- c. Current leads voltage by 90°
- d. Current is very low

21. Power factor problems can be present in

- a. All resistive circuits
- b. Highly capacitive circuits
- c. High inductive loads
- d. Low voltage circuits

22. Capacitance is measured in

- a. Ohms
- b. Henrys
- c. Farads
- d. Frequency

23. A Neutral conductor is not used in this wiring configuration.

- a. Delta
- b. Star
- c. 415V system
- d. none of the above

24. Some motors are connected to start in STAR configuration

- a. to get high speeds quickly
- b. to reduce the starting current
- c. for more power
- d. to use bigger power breakers

25. What is one solution to solve power factor problems?

- a. Buy bigger motors
- b. Change your breaker size
- c. Install auto cut - off switches
- d. Install a capacitor across the supply

26. The instrument used to measure current is called

- a. Ammeter
- b. Induction meter
- c. Fluke
- d. voltmeter

27. Magnetic fields are induced when electric current is applied to the

- a. Rotor
- b. Cage
- c. Stator
- d. Shaft

28. You can reverse a star or delta connected motor by

- a. Inter – changing the coils
- b. Inter – changing two phases
- c. Rewiring the coils in the opposite direction
- d. All the above

29. In the Star connection of motors or transformers

- a. The similar ends of three coils are connected together
- b. the neutral point is the star point
- c. the phase current is equal to the line current
- d. All of the above

30. In the Delta connected motor or transformer
- Three phase, four wire system is used
 - Requires less number of turns
 - Line current is equal to phase current
 - None of the above
31. Step down transformers
- Are very expensive
 - Are all double wound
 - Are always star connected
 - Converts high primary voltage into high current outputs
32. A transformer with a higher number of turns in the Secondary coil can be called?
- converting transformer
 - auto transformer
 - step up transformer
 - safety transformer
33. This device allows for the flow of current in one direction
- Diode
 - Resistance
 - Rectifier
 - straight flow resistor
34. When in reversed bias a diode acts like a
- transistor
 - an open switch
 - an electronic gate
 - all of the above
35. Keeping people safe by preventing electric shock is the function of the
- Licensed electrician
 - Supply authority
 - Earthing system
 - All of the above
36. What factor does not determine the effectiveness of earthing system.
- Moisture level
 - Earth resistance
 - Soil types
 - Distance from the main electric panel
37. CRI stands for:
- Current Resistance Insulation
 - 100 % pure light
 - Colour Rendering Index
 - All of the Above
38. Which of the follow is not an earthing system
- PME
 - TT
 - TT-NS
 - IT

39. In a situation where the supplier provides a source earth and the consumer provides their installation earth you get

- a. Higher levels of protection
- b. Very low earth resistance levels
- c. Double protection
- d. TT system

40. When a conductor cuts or is cut by magnetic lines of force, the result is

- a. High frequencies
- b. Induced EMF
- c. Voltage Surges
- d. All of the above