

Federal University of Technology
Department: Industrial and Technology Education
Course: ITE 214 (Principle of Electricity)
Session/semester: 2022-2023/ first semester Exam

Instruction: Answer four (4) questions. Question 1 and 2 are compulsory.

1a. Use the diagram in figure 1 to determine:

I₁, I₂, I₃, I₄, I₅, I₆, I₇, I₈, I₉ and I₁₀. **(10mks)**

1b. The following resistance are connected in parallel R₁=5Ω, R₂=3Ω, R₃=6Ω and R₄=10 Ω using 12v battery to operate the circuit. Determine the total resistance of the circuit and current that flows through each resistance. Diagram of the circuit is required. **(10mks)**

2a. Use the diagram in figure 3 determine: The current I₁ and I₂. **(5mks)**

2b. Determine the total resistance of a circuit having two resistance (R₁=10Ω and R₂=5Ω) connected in parallel and one resistance (R₃=2Ω) connected in series with 20v battery. Diagram of the circuit is required. **(10mks)**

2c. Highlight five (5) differences between series circuit and parallel circuit. **(5mks)**

3a. Figure 3 is a circuit consist of emf, resistors and current, determine: **(5mks)**

- a. The total resistance of the circuit
- b. The total current of the circuit

3b. When the temperature of a copper wire is 0⁰C, its resistance is 130Ω. Find its resistance at 50⁰C if the temperature coefficient of resistance of copper at 0⁰C is 0.0043/⁰C. **(5mks)**

4a. Use the diagram in figure 4 to determine: **(5mks)**

- a. The voltage at point A, point B, point C and point D
- b. The current at R₁, R₂ and R₃

4b. In a simple diagram indicate the effects of temperature on PURE METAL, ALLOYS and CARBON/INSULATORS and SEMI-CONDUCTOR. **(4mks)**

4c. State the formula for calculating the resistivity of a material. **(1mk)**

5a. At 60⁰C a carbon has a resistance of 100Ω and at 85⁰C it has a resistance of 96Ω. Determine the average temperature coefficient of resistance of carbon over this temperature range. **(5mks)**

5b. Briefly explain the two classification of conductors in battery. **(2mks)**

5c. Briefly explain these methods of battery charging: **(3mks)**

1. Constant current method
2. Constant voltage method
3. Rectifier method