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School of Basic Sciences
Bachelor of Science Honours in Physics
Mid Term Examination - Nov 2023

Duration : 90 Minutes
Max Marks : 50

Sem III - C1UD304T - Circuits Analysis and Networks

General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) Interpret the series connection of a resistor and obtain the equivalent series resistance in a circuit. K2 (2)
- 2) Explain the different ways of connection of a resistor in circuit. K1 (3)
- 3) Apply the concept of equivalent resistance connected in parallel, and find the equivalent resistance of a circuit in which three resistances of 10, 20 and 50 ohms are connected in parallel. K2 (4)
- 4) Derive current and voltage of a pure capacitive AC circuit and draw the phasor diagram K2 (6)
- 5) Three resistors are connected in series across a 12-V battery. The first resistor has a value of 1 ohm second has a voltage drop of 4 V and the third has a power dissipation of 12 W. Calculate the value of the circuit current. K3 (6)
- 6) Describe Kirchhoff's laws to solve the electrical circuits K3 (9)
- 7) Explain the charging and discharging mechanism of a capacitor in a circuit. K4 (8)
- 8) Analyse the factors on which the capacitance of a capacitor depends. What is the capacitance of a capacitor if a charging current of 100 mA flows when the applied voltage changes 20 V at a frequency of 50 Hz? K4 (12)

OR

In the circuit shown, determine the transient current after switch is closed at time $t=0$, given that an initial charge of $100\mu\text{C}$ is stored in the capacitor. Derive the necessary equations.

K4 (12)

