Harsh Sohel

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-2EXAMINATION – April 2019
B.Tech.,IInd Semester, BT-BI

COURSE CODE:18B11EC212   MAX. MARKS:25
COURSE NAME: **BASIC ELECTRICAL SCIENCE**
COURSE CREDITS: 4   MAX. TIME: **1:30** Hr.

Note:*All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Missing data, if any, can be appropriately assumed.*

Q1. [CO1]

(i)Why RC circuit is a better choice in making timer circuits?   (1)

(ii) Capacitance (C) is a dual of Inductance (L). Explain.   (1)

(iii) Explain the concept of duality in electrical circuits with reference to Thevenin's and Norton's theorem.   (3)

(iii) Apply mesh analysis to determine current drawn from the source in the network of Fig. given below.   (2)
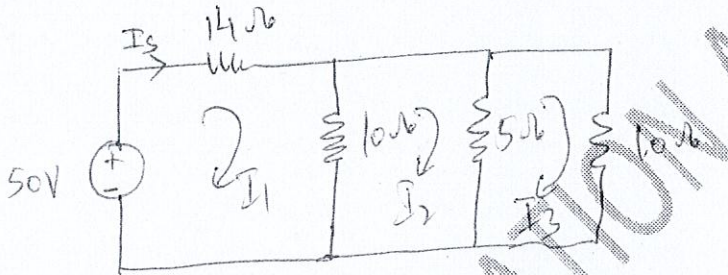
Q2. [CO2, CO3]

(i)An alternating current of frequency 50 Hz has a maximum value of 13 A. (a) Write down the equation for its instantaneous value. (b) Find the value of current after 1/360 seconds (c) Find the time taken to reach 9.6A for the first time.   (3)

(ii) Determine the *average* and *rms* value of resultant current in a wire carrying simultaneously a dc current of 5A and a sinusoidal current of peak value of 5A.   (2)

(iii) A sinusoidal ac voltage source having v=V_m sin (ωt) is connected across an ideal capacitance C. (a) Derive an expression for X_C in terms of frequency. (b) Draw the phase relationship between current and voltage with reference to current. (c) Give the real power consumed by the circuit.

(3+1+1)

Q3. [CO2]

(i) What do you understand by time constant (τ) in inductive circuit? How does it affect the rise and decay of current in an RL circuit? Draw the IV/VI relationship curves.   (2+1+1)

(ii) At t=0, suddenly a dc supply of 20 V is applied to a series RL circuit having R=11 Ω and L = 20 H. Determine (a) the time constant of the circuit (b) initial rate of change of current (c) current at t=2.5s.   (1+1+2)