F. Y. B. Tech Academic Year 2021-22

ECE101B: Basics of Electrical and Electronics Engineering

Trimester: III

Assignment 2

Date: 18/02/2022 **Max. Marks: 25**

Submission Date: 25/02/2022

Course Outcomes (COs) Covered:

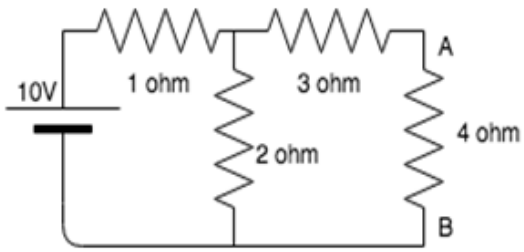
1. Predict the behavior and characteristics of basic electrical and magnetic circuits. (CLII)
2. Identify components/equipment required for any particular application related to electrical and electronics engineering. (CL-II)

Instructions:

1. **Q I is a set of 10 MCQs. Each MCQ carries one mark.**
2. **Q II, Q III, Q IV each carry 5 marks.**
3. **Please note that for Q II, Q III, Q IV, the component values are to be selected based on your division and roll number as mentioned in the question.**

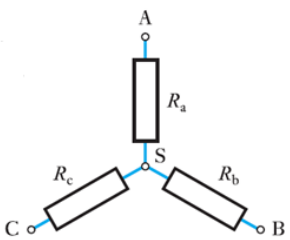
Q I. Select the answer of the following MCQs-

1) Calculate the Thevenin resistance across the terminal AB for the following circuit.



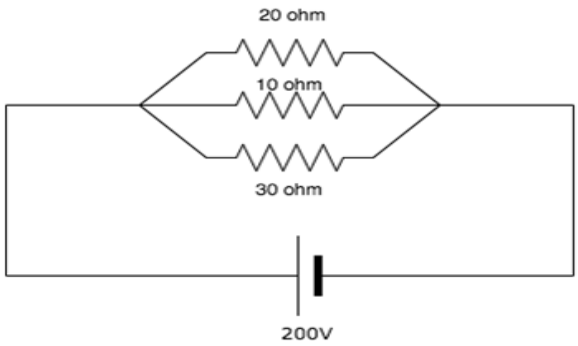
A. 4.34 ohm
B. 3.67 ohm
C. 3.43 ohm
D. 2.32 ohm

2) Ra is resistance at A, Rb is resistance at B, Rc is resistance at C in star connection. After transforming to delta, what is resistance between B and C?



A. Rc+Rb+Rc*Rb/Ra
B. Rc+Rb+Ra*Rb/Rc
C. Ra+Rb+Ra*Rc/Rb
D. Rc+Rb+Rc*Ra/Rb

3) Calculate the current through 20 ohm resistor.



A. 10A
B. 20A
C. 6.67A
D. 36.67A

4) KCL is associated with_____

A. Mesh analysis
B. Nodal analysis
C. Both mesh and nodal
D. Neither mesh nor nodal

5) In superposition theorem, when we consider the effect of one current source, all the other current sources are _____

A. Shorted
B. Opened
C. Removed
D. Undisturbed

6) A capacitor of 63 micro-F is connected across the voltage source of 230 V, 50 Hz. Current flowing through capacitor is

A. 4.59 A
B. 4.55 A
C. 4.69 A
D. 4.66 A

7) A voltage source of 230 V, 50 Hz is applied across ideal inductor of 0.11 mH. In this circuit,

A. Current lags the voltage by 90^0
B. Current leads the voltage by 90^0
C. Voltage leads the current by 45^0
D. Voltage and current are in Phase.

8) A series electric circuit contains resistance of 75 Ohm, capacitor of 5micro-F and inductor of 0.1 mH. At resonance impedance of the circuit is

A. $75 - j X_C + j X_L$
B. 75 ohm
C. $75 + j (X_C - X_L)$
D. None

9)An alternating voltage has equation , what is value of frequency and RMS voltage

A. 75Hz, 100v
B. 70Hz, 110v
C. 60Hz, 100v
D. 55Hz, 120v

10) The power factor at resonance in R-L-C parallel circuit is

A. Zero
B. 0.08 lagging
C. 0.8 leading
D. Unity

Q. II

Assume V_1= students division number, R_2= addition of last three digits of student's roll number (R2 is in Ω), R_1=5Ω, R_3=3Ω and I_1=8A. Using Superposition theorem, find current flowing through R_2. Comment on result. Refer the circuit shown below.

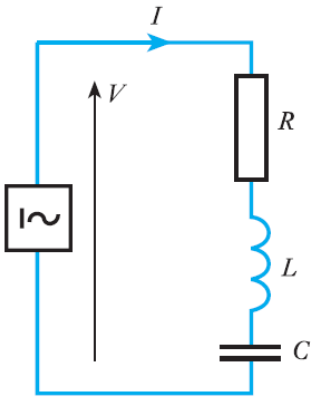
(For ex. If your Div is XIV then V_1= 14 V and if Roll No is 114016 then R_2= 1+6= 7 Ω)

Q.III

A circuit having following components in series a resistance R = last three digits of Roll No (Ω),

an inductance L = your division number (mH) and a capacitance C = 150 μF, is connected across a 150 V, 50 Hz supply.

(For ex. If your Div is XIV then L = 14 mH and if Roll No is 114016 then R= 16 Ω)



Calculate:

(a) the impedance

(b) the current

(c) the voltages across R, L and C

Q IV

Convert the following star network into its equivalent Delta network by taking the values of R1, R2 & R3 as follows.

R1 = 25Ω (fixed)

R2 = last three digits of your roll no

R3 = Your division no.

(For ex. If your Div is XI then R3 = 11 Ω and if Roll No is 111050 then R2= 050 Ω)