JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, September/October - 2021
BASIC ELECTRICAL ENGINEERING
(Common to ECE, EIE, ECM, CSBS, CSE(AI&ML), CSE(IOT))

Time: 3 Hours   **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a)   Explain the V-I relation of circuit elements R, L and C.
  b)   Find the value of current I_1, I_2 and I_3 from the circuit given below figure 1.   [6+9]
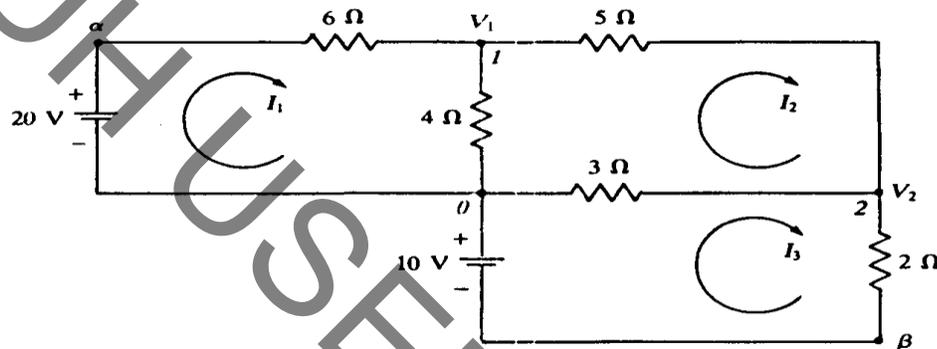

Figure: 1

2.a)   Obtain an expression for transient current flowing through R-C series circuit excited by D.C source at $t = o^{+}$.
  b)   Find the current flowing through 4 ohm resistance shown in figure 2 below using superposition theorem.   [7+8]
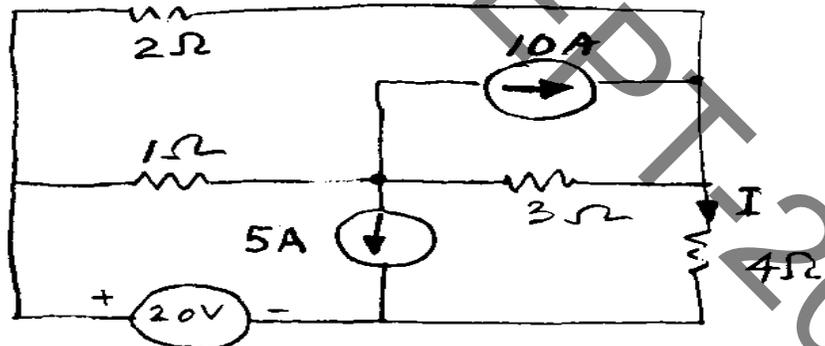

Figure: 2

3.a)   Obtain an expression for active power in a single phase R-L circuit excited by sinusoidal voltage.
  b)   Determine the power factor and the input power for a circuit with $v = 50 \sin (\omega t + 10^{0})$ and $I = 2 \sin (\omega t + 20^{0})$ A.   [8+7]

4.a)   A coil with inductance and resistance of 1 mH and 2 Ω respectively, is connected in series with a capacitor and this whole arrangement is connected across 120 V, 5 kHz A.C supply. Determine the value of capacitance that will cause the system to be in resonance.
  b)   A star connected load has $5 \llcorner 30^{0} \, \Omega$ impedance per phase and is connected across 400 V three phase balanced source. Calculate the line current and the phase current.   [8+7]

5.a) Give the applications of auto transformer.

b) Calculate the values of R_0, X_0, R_{01} and X_{01} for the equivalent circuit of a single phase, 4 KVA, 200/400 V, 50 Hz transformer of which the following are the test results:

O.C. test: 200V, 0.7A, 70W

S.C. test: 15V,   10A,   80W   [6+9]

6.a) State the advantages of 3-phase transformers.

b) The iron and full load copper losses in a 80KVA single phase transformer are 500 and 1000W respectively. Calculate the efficiency at half full load, 0.8 p.f. lag. Find, also the load at which the efficiency is maximum?   [6+9]

7.a) Explain why the rotor is forced to rotate in the direction of rotating magnetic field in a 3 phase Induction motor?

b) A 3 phase, 50 Hz induction motor has a full load speed of 970 rpm. Calculate (i) number of the poles (ii) slip frequency.   [9+6]

8. What is the need for earthing? Explain different types of earthing.   [15]

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