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SE-6007

B. E. I (Sem. I & II) (All Branches) Examination

April / May – 2011

Electrontechniques

Time : Hours] [Total Marks :

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ B. E. 1 (SEM. 1 & 2) (ALL BRANCHES)

Name of the Subject :

☛ Electrontechniques

☛ Subject Code No. : 6 0 0 7 ☛ Section No. (1, 2,.....) : 1, 2

Seat No. :

Student's Signature

(2) Attempt all the questions.

(3) Figures to the right indicate full marks.

(4) Assume suitable data if necessary.

SECTION - I

1 (a) Answer the following questions. **10**

(1) Define : Permeability.

(2) Explain Kirchhoff's current law.

(3) Define : Capacitive reactance.

(4) What is an ideal current source ?

(5) Admittance is defined as reciprocal of _____ and has unit _____.

(b) State "True" or "False" for the following sentences. **5**

(1) Unit of mutual inductance is henry.

(2) Resistance is the property of the material.

(3) Charge of $6.25 \times 10^{+18}$ electrons is 01 coulomb.

(4) Ideal current source is having assumed to have infinite internal resistance in parallel with it.

(5) Potential can also be expressed in joules/coulombs.

(c) Derive the expression for the energy stored in a capacitor. **5**

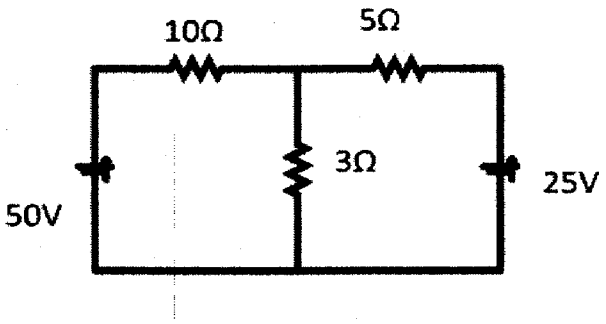
2 (a) State and explain Faraday's law of electromagnetic induction. **8**

(b) Explain self inductance of a coil and hence drive the expression for self inductance of a coil. **7**

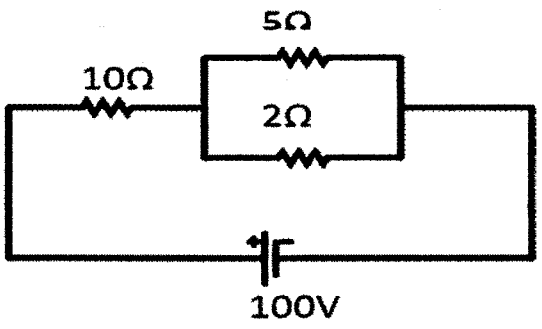
OR

2 (a) State and explain Thevenin's theorem. **4**

(b) Solve the following using any network theorem and find total power consumed by the circuit. **6**



(c) Find equivalent resistance and current through each branch in the following circuit. **5**



3 Attempt any **three** : **15**

(1) State and explain Coulomb's first and second law.

(2) Derive expression for star to delta transformation for resistance network.

(3) Explain Ohm's law and state properties of resistance.

(4) Derive the expression $K = M / \sqrt{L_1 L_2}$ with usual notations.

SECTION - II

4 (a) Answer the following questions : **10**

(1) In case of balanced three phase system,
$I_R + I_Y + I_B =$ _____.

(2) Define : Q-factor.

(3) Inverse of impedance is _____.

(4) Unit of capacitance is _____.

(5) For pure inductive circuit, frequency of instantaneous power is _____ times that of current or voltage in the circuit.

(6) Define : Time period.

(7) At resonance of series R-L-C circuit, the current is _____.

(8) If $R = 20\,\Omega$ and $X_L = 2\,\Omega$. The phase angle in electrical degrees is _____.

(9) If $Z = 10\,\Omega$ and phase angle is 30 degree lagging, Value of R = _____ ohm.

(10) Define : Power factor.

(b) State "True" of "False" of the following sentences : **5**

(1) Using two wattmeter method, reactive power cannot be measured.

(2) Inverse of resistance is called conductance.

(3) 'Phase' can be measured in radians.

(4) At resonance series R-L-C circuit behaves as purely resistive circuit.

(5) Power factor can be shown as ratio of resistance to impedance of the circuit.

(c) Derive expression for RMS value of full wave rectified sinusoidal waveform. **5**

5 (a) In case of an R-L series circuit, if voltage applied is 250V, 50 Hz, current in the circuit is 10A, and p.f. is 0.6 lag, find value of R, L, power consumed by the circuit and voltage across each element. **8**

(b) Explain resonance in series R-L-C circuit and derive the expression $f_c = 1/2\pi\sqrt{LC'}$ with usual notations. **7**

OR

5 (a) Two impedances of value $1+j1\Omega$ and $0-j2\Omega$ are connected in parallel across 250V, 50 Hz supply. Find total current of the circuit, current in each branch, p.f. of the circuit and power consumed by the circuit. **7**

(b) Derive expression for current, impedance, power factor and power in case of R-L series circuit fed with alternating supply. **8**

6 Attempt any **three** : **15**

(1) A three phase load connected with two watt meter method to measure power. If the two watt meter readings are 10 KW and 5 KW. Find total active power, reactive power of the circuit.

(2) Discuss resonance in parallel R-L-C circuit.

(3) Explain one wattmeter method for measurement of three phaes power.

(4) Determine relationship betwen line value and phase value in case of three phase balanced delta connected load.
