NEE101/NEE201

PAPER ID : 199130

Roll No.

B. Tech.

(SEM. I) (ODD SEM.) THEORY
EXAMINATION, 2014-15

**ELECTRICAL ENGINEERING**

Time : 3 Hours]   [Total Marks : 100

1   Attempt any FOUR parts :   5×4=20

a)   Why proper Earthing is necessary? What is the importance of earth's resistance value?

b)   Write detailed note on importance of electrical safety issues.

c)   State the dot convention for mutually coupled coil in terms of the flux direction.

d)   Derive the induced emf-flux relationship of the transformer.

e)   What is transformer? Explain the constructional features of different types of transformer.

f)   Write detailed note on Hysteresis loss and Eddy current loss in magnetic circuit and also state how to reduce the eddy current loss considerably.

2   Attempt any TWO parts :   **10×2=20**
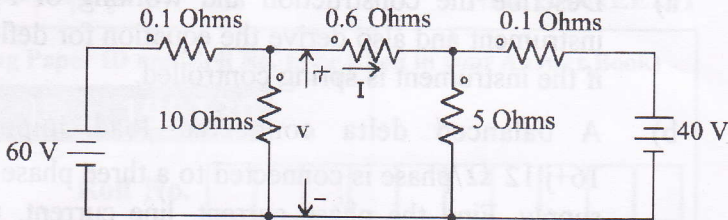
a)   Deduce Thevenins equivalent between the terminals a
     and b from the given circuit.
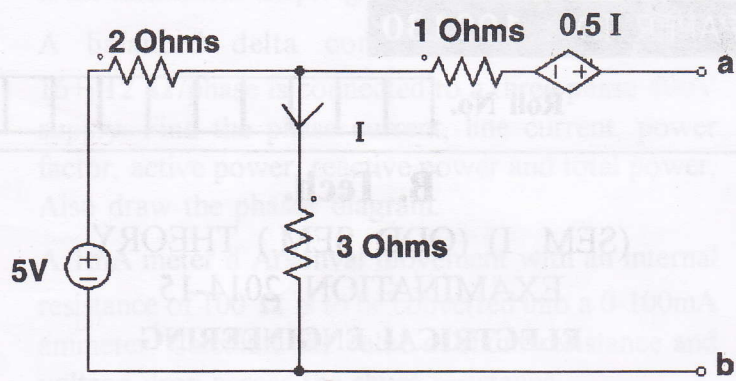
b)   Using Star-delta transformation, find the current in the
     branch b-c of the circuit. Consider all the values of
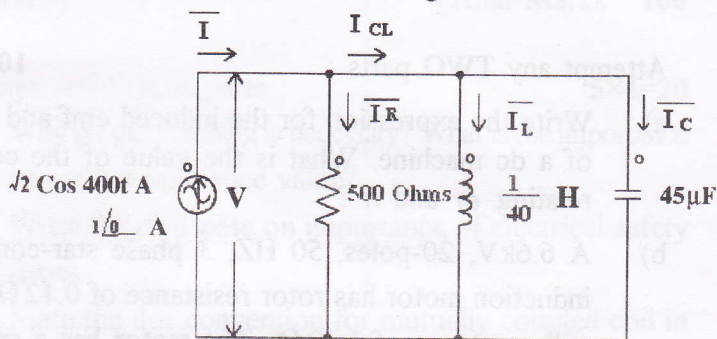   resistances are in Ohms.
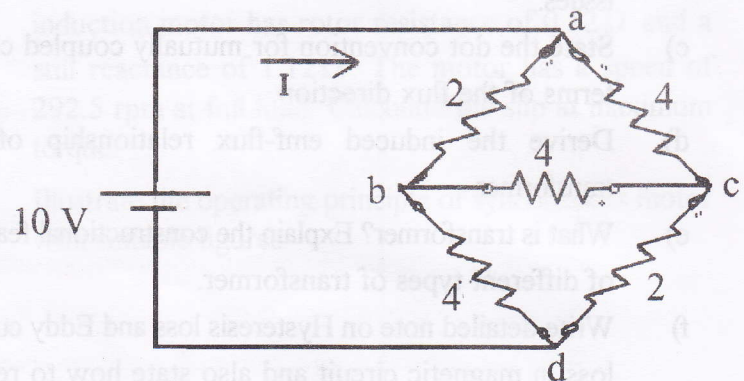
c) Find V and I in the given circuit by using Superposition theorem

3 Attempt any TWO parts : $10 \times 2 = 20$

a) Derive the quality factor of the Parallel RLC circuit at resonance.

b) In the given parallel RLC circuit, determine $i_R(t)$, $i_L(t)$ and $i_C(t)$ and $i_{CL}(t)$. Determine the phasor diagram showing all currents and voltage.

c) A series RLC circuit is composed of $10\,\Omega$ resistance, 0.1 H inductance and 50 µF capacitance. A voltage $V(t) = 141.4\ Cos(100\pi t)$ V is impressed upon the circuit. Determine (i) the expression for instantaneous current, (ii) the voltage drops V_R, V_L and V_C across Resistor capacitor and inductor, (iii) draw the phasor diagram using all the voltage relations.

199130]   3   [Contd...

4   Attempt any TWO parts   **10×2=20**

   a)   Describe the construction and working of PMMC instrument and also derive the equation for deflection if the instrument is spring controlled.

   b)   A balanced delta connected load impedance 16+j 12 Ω/phase is connected to a three phase 400V supply. Find the phase current, line current, power factor, active power, reactive power and total power. Also draw the phasor diagram.

   c)   A 1mA meter d'Arsonval movement with an internal resistance of 100 Ω is to be converted into a 0-100mA ammeter. Calculate the value of shunt resistance and voltage drop across the shunt resistance.

5   Attempt any TWO parts :   **10×2=20**

   a)   Write the expression for the induced emf and torque of a dc machine. What is the value of the constant relating ω and n ?

   b)   A 6.6kV, 20-poles, 50 HZ, 3 phase star-connected induction motor has rotor resistance of $0.12\,\Omega$ and a still reactance of $1.12\,\Omega$. The motor has a speed of 292.5 rpm at full load. Calculate the slip at maximum torque.

   c)   Illustrate the operating principle of synchronous motor with suitable figures.

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