(iii) Voltage / turn

(iv) Secondary current when it supplies a load of 200 KW at 0.8 power factor lagging. [12]

Q-6. (a) Explain the principle of operation of d.c. motors. How d.c. motors are classified? What is back *emf* in d.c. motors? What is its effect? [5+5+5]

(b) How torque is produced in 3ϕ induction motor? [5]

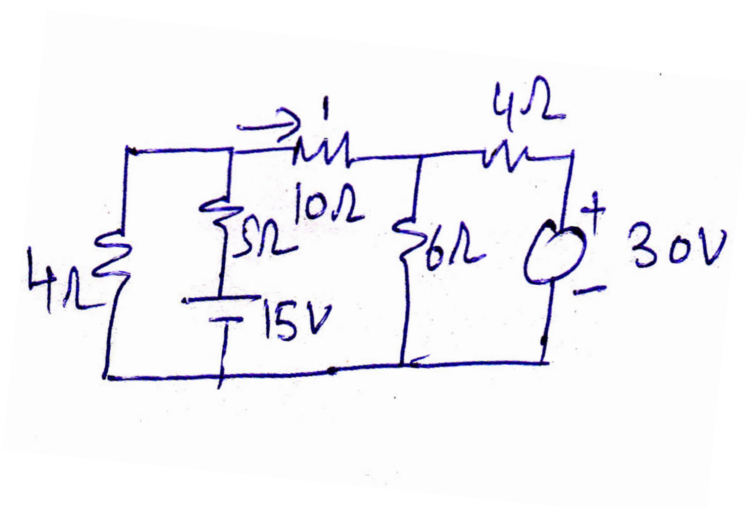
Q-7. (a) Explain essentials of indicating instruments. [10]

(b) Explain principle & construction of dynamometer wattmeter. [10]

Q-8. (a) Define (i) MMF (ii) flux (iii) flux density (iv) reluctance. [4]

(b) Compare electric & magnetic ckts. [8]

(c) Using Nodal Analysis, find current *I* through 10Ω resistor in the figure shown below. [8]



Roll No. …………………..

Lingaya's University
B.Tech 1st Year (Term – III)
Examination – May 2011
Electrical Engineering (EL - 101)

[Time: 3 Hours] **[Max. Marks: 100]**

Before answering the question, candidate should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note: – Attempt five questions in all. All questions carry equal marks. Question no. 1 (Section A) is compulsory. Select two questions from Section B and two questions from Section C.

Section – A

Q-1. Part – A

Select the correct answer of the following multiple choice questions. [10×1=10]

(i) Kirchoff's laws are valid for

(a) Linear ckt only (b) Passive time invariant ckt

(c) Non linear ckt only (d) Both linear & non linear ckt

(ii) Which of the following is an active element in a ckt?

(a) Current source (b) Resistance

(c) Inductance (d) Capacitance

(iii) Thevenin's resistance R_{th} is determined

(a) By short circuiting the given two terminals

(b) By removing resistance

(c) Between same open terminals as for V_{th}

(d) Between any two open terminals

(iv) The time period of an alternating quantity is 0.01 sec. Its frequency will be

(a) 25 Hz (b) 50 Hz (c) 100 Hz (d) .01 Hz

(v) The average value of sinusoidal quantity is given by the relation.

(a) $I_m/\sqrt{2}$ (b) 0.707 I_m

(c) $2I_m/\pi$ (d) None of the above

(vi) The peak factor of an alternating current is given by the relation

(a) I_{rms}/I_{av} (b) I_m/I_{rms}

(c) I_{av}/I_{rms} (d) I_{rms}/I_m

(vii) The operator *j* has a numerical value of

(a) $\sqrt{-1}$ (b) $\sqrt{+1}$ (c) -1 (d) 1

(viii) Induction wattmeter can be used to measure

(a) AC power (b) DC power

(c) AC & DC power (d) None of the above

(ix) The transformation ratio of a transforms is

(a) I_2 / I_1 (b) N_1 / N_2 (c) N_2 / N_1 (d) E_1 / E_2

(x) The rotating part of a d.c. machine is called the

(a) Yoke (b) Field

(c) Armature (d) Stator

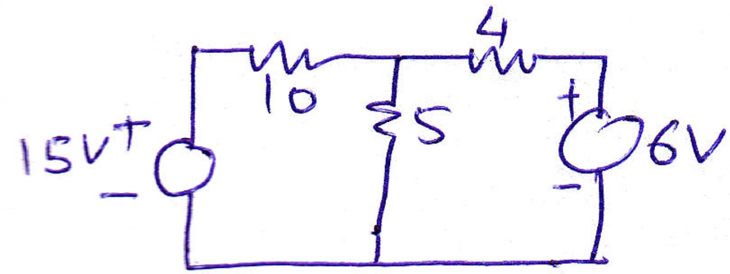
Q-1. Part – B

(a) State & explain superposition theorem. [5]

(b) Define Q factor for series resonant ckt and express it in the terms of circuit parameters. [5]

Section – B

Q-2. State Thevenin's Theorem & give a proof. Apply this theorem to calculate the current through the 4Ω resistor of ckt given below. [6+14]



Q-3. (a) Define amplitude, frequency, *rms* value, phase angle, average value of series R-L-C series ckt. [5]

(b) A coil of resistance 15Ω and inductance 0.05H is connected in parallel with a non inductive resistor of 20Ω. Find:

(i) The current in each branch ckt.

(ii) The total current supplied and

(iii) Phase angle of the combination,

when a voltage of 230V at 50 Hz is applied. Draw relevant phasor diagram. [15]

Q-4. Three 100Ω resistances are connected in (a) star (b) delta across a 440V, 3ϕ line, calculate the line & phase current and power taken from the mains in each case. Find also what values would be for each case, if one of the resistances were disconnected? [20]

Section – C

Q-5. (a) Explain the working principle of a transformer & derive its *emf* equation. [8]

(b) 3300 / 300 V single phase 300 KVA transformer has 1100 primary turns, find:

(i) Transformation ratio

(ii) Secondary turns