Roll No. …………………..

Lingaya's University, Faridabad
B.Tech (Term –II)
Examination – January, 2010
Electrical Engineering
Paper: 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: All questions carry equal marks. Attempt five questions. Question 1 is compulsory. Select two questions from Section B & Two from Section C.

Section – A

Part-A

Q-1
Fill in the blanks with the appropriate answer from the choices given.

(i) _____________ is a passive element.

(a) battery (b) current source (c) resistor (d) DC Generator

(ii) The resistance of a conductor is _____________ to its length.

(a) directly proportional (b) equal
(c) not related (d) inversely proportional

(iii) Maximum power is transferred when the load resistance _________ source resistance.

(a) is less than (b) is equal to
(c) is greater than (d) not related

(iv) In transformer laminated core are used to reduce ___________ loss.

(a) copper (b) windage (c) eddy current (d) hysteresis

(v) When the current and voltage in a circuit are out of phase by 90^o, the power is ____________________________.

Q-6. (a) A coil of resistance 20 Ω and an inductance of 200 mH is connected in series with a capacitance of 40 μF across 200V, 50 Hz, ac supply. Calculate (i) magnitude of current, (ii) power factor, (iii) voltage across each element (iv) phasor diagram of the circuit (10)

(b) A coil of 20 Ω resistance and 0.2 H inductance is connected in parallel with a capacitor of 100 μF. Find the frequency of resonance and effective impedance at resonance. (10)

Q-7. (a) When a balanced impedances are connected in delta across 3ϕ, 500V, 50 Hz supply the line current drawn is 20 A at 0.3 pf lagging. Calculate resistance and inductance per phase. (10)

(b) A three phase star connected load is operating from 400 V, 50 Hz supply takes 25A. The power factor is 0.5 lagging. If two wattmeters are used to measure the power, find the readings of W_1 and W_2. (10)

Q-8. (a) An iron ring 100 cm mean diameter and 10 cm^2 cross section has 1000 turns of Copper wire wound on it. If the permeability of the material is 1500, and it is required to produce a flux density of 1 Wb/m^2 in an air-gap of 2 mm width in the ring. Find (i) reluctance of ring (ii) flux required (iii) mmf required (iv) current produced. Neglect leakage and fringing. (10)

(b) Compare electric circuit and magnetic circuit. (10)

(a) active power (b) reactive power
(c) none of the above (d) apparent power

(vi) In a series R L C circuit at resonance the power factor is ______________.

(a) zero (b) unity (c) lagging (d) leading

(vii) In an inductive circuit ________________ leads the ___________________.

(a) current, voltage (b) voltage, current
(c) power, voltage (d) none of the above

(viii) Unit of magneto motive force is __________________________.

(a) ampere-turns (b) webers (c) ampere-turn/metre (d) Newton

(ix) _____________ meters are used to measure dc.

(a) moving coil type (b) moving iron type
(c) induction type (d) a and b both

(x) ___________________________ is the reciprocal of impedance.

(a) conductance (b) admittance
(c) susceptance (d) reluctance (1x10=10)

Part-B

(i) State KVL

(ii) Define RMS value

(iii) Write an expression for three phase power.

(iv) Draw B-H curve.

(v) What is creeping in energy meter? (5x2=10)

Section - B

Q-2 (a) Derive the emf equation of a dc generator (10)

(b) Explain the principle of operation of dc motor with a neat diagram. (5)

(c) What is slip of an induction motor? Can slip be zero for an induction motor? (3+2=5)

Q-3 (a) Explain shell type and core type single phase transformer with diagrams. (10)

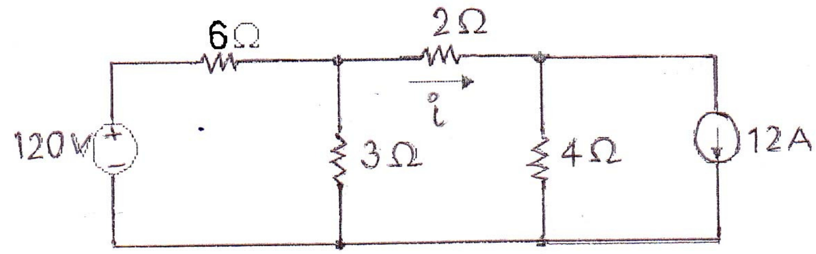
(b) Explain open circuit and short circuit test, for single phase transformer and draw the phasor diagram for lagging power factor. (10)

Q-4. (a) Explain construction of moving iron voltmeter, with the help of neat diagram. (10)

(b) Distinguish between energy meter and wattmeter. (10)

Section – C

Q-5. (a) Find the current in the i in the 2Ω using Super Position theorem. (10)



(b) Obtain the current in the 1 Ω resistor in the following circuit using mesh analysis. (10)