Registration no:

2nd Semester Back Examination 2016-17
BASIC ELECTRICAL ENGINEERING
BRANCH(S): ALL
Time: 3 Hours
Max Marks: 100
Q.CODE: Z1039
Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

**Q1**   **Answer all questions:**   **(2 x 10)**
 a) If a 220V heater is used on 110V supply, heat produced by it will be …….. times.
 b) Ideal current source offer .... internal resistance.
 c) At resonance, the power factor of the circuit is ……………
 d) A DC ammeter is …………… type of instrument.
 e) Permeability of magnetic circuit corresponds to …………………….. in electric circuit.
 f) The direction of DC motor is given by …………………. Rule.
 g) If a current of 5A flowing in a coil of inductance 0.1H is reversed in 10ms, emf induced in it is ……….. volt.
 h) Thin laminations are used in a machine in order to reduce..........................
 i) The unit of reluctance is ……………….
 j) The rms value of a half wave rectified current is 10A, its value for full wave rectification would be ………….. amperes.

Q2   **Answer the following questions:** *Short answer type*   **(2 x 10)**
 a) What are different transmission & distribution level voltages in your state?
 b) A coil, when connected to a DC voltage of 200v draws a current of 10A but when connected to 200V AC supply draws a current of 8A. Calculate the reactance of the coil.
 c) For a series RLC circuit, plot a graph for variation of Impedance with frequency.
 d) A 3 phase 6 pole 50Hz induction motor has a full load slip of 3%. Find the full load speed.
 **e)** Find V_{AB}.
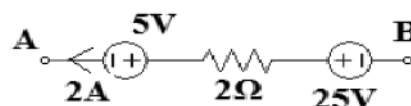
 f) State Thevnin's Theorm.
 g) What is the principle of operation of Transformer?
 h) Define Unilateral and bilateral elements with examples.
 i) If two coils of impedance 2+j3 and 4+j2 are connected in parallel, what is the power factor of the parallel circuit.
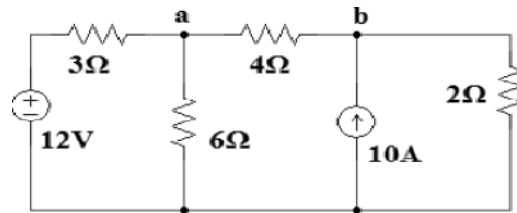 **j)** What is back emf?

Part – B (Answer any four questions)

Q3 **a)** Explain superposition theorem. What are it's limitations? **(5)**

b) Using superposition theorm find the voltage drop in 9 ohm resistance. **(10)**
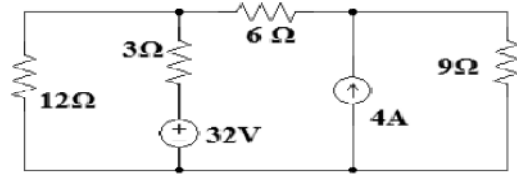
Q4 **a)** Using Nodal analysis method, determine the voltages V_a & V_b and current through the 6 ohm resistance. Compare nodal analysis method with mesh analysis method. **(10)**

b) Explain the principle of DC generator and hence derive the expression for generated EMF. **(5)**

Q5 **a)** Three similar coils, each having a resistance of 20Ω and an inductance of 0.05H are connected in (i) star (ii) delta to a 3-ϕ 50Hz 400V supply. Calculate the total power absorbed and the line current in each case. If power is measured using two wattmeter method, then find the readings of the wattmeters in case of star connection. **(10)**

b) An iron ring of mean diameter of 9.55cm has an air gap of 2mm and a winding of 200turns wound on it. If the permeability of the Iron is 300, when a current of 1A flows through the winding, find flux density in the air gap. Also draw the electrical equivalent of the magnetic circuit. **(5)**

Q6 **a)** A choke coil is in series with a 20μF capacitor across a 230V, 50Hz supply. The current taken by the circuit is 8A and power consumed is 200W. Calculate the inductance of the coil if power factor of the circuit is leading. Draw the vector diagram of the circuit. **(10)**

b) Define Average & RMS value of AC. Find the Average value, RMS value & form factor of an half wave rectified output voltage. **(5)**

Q7 **a)** Derive the Expression for growth and decay of transient current in RL circuit with DC excitation. An inductor coil of inductance 0.5 H and resistance 10 Ω is connected to a DC source of 100 V. Assuming that steady state is already achieved , the battery is suddenly removed and replaced with shorted link at t=0. Calculate (i)Time constant of the circuit (ii) Initial and final steady state current and (iii) Time taken for the circuit to decay the current to 70% of the initial current. **(10)**

b) A 25KVA single phase transformer has 500 turns on the primary and 50 turns on the secondary winding. The primary is connected to 3000V, 50 Hz supply. Find the full load primary and secondary currents, the secondary emf and maximum flux in the core. Neglect leakage drops and no load primary currents. **(5)**

Q8 **a)** A 4 pole, 32 conductor, lap-wound dc shunt generator with terminal voltage of 200volts delivering 12 amps to the load has armature resistance 2 ohm and field resistance of 200ohms. It is driven at 1000rpm. Calculate the flux per pole in the machine. If the machine has to be run as a motor with the same terminal voltage and drawing 5A from the mains, find the speed of the motor. **(10)**

b) A moving coil instrument gives full scale deflection with 20mA and a resistance of 4Ω. With appropriate connection diagram, show how this instrument can be used as (i) Ammeter 2A (ii) Voltmeter of 30V. **(5)**

Q9 **Write short answer on any Three:** **(5 x 3)**
  a) Magnetic Hysteresis and Hysteresis loss
  b) Norton's Theorm
  c) Two wattmeter method for measurement of 3 phase power.
  d) D/A conversion.