B.E. DEGREE END SEMESTER EXAMINATIONS, MAY 2011

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND SEMESTER

EE 9151 ELECTRIC CIRCUIT ANALYSIS

Time: 3 Hrs. Max. Marks: 100

Answer **ALL** Questions

Part – A **[10 x 2 = 20 Marks]**

1) A lamp rated 500w, 100v is to be operated from 220V supply. Find the value of the resistor to be connected in series with the lamp. What is the power lost in the resistance?
2) Define the form factor and give its value for a sinusoidal voltage.
3) Define poles and zeros of a network function.
4) State the final value therem in both time and frequency domain.
5) Draw the vector diagram for power components and mention their units.
6) Give two characteristics of series resonance.
7) Write the algorithmic steps of Loop current Analysis.
8) State Reciprocity theorem.
9) Give examples for series-aiding connection.
10) Draw the circuit diagram for measuring three phase reactive power using single wattmeter.

Part – B **[5x16 = 80 Marks]**

11)(i) Find the form factor and Peak factor for the symmetrical voltage wave shown in Fig. Q.11 (i)

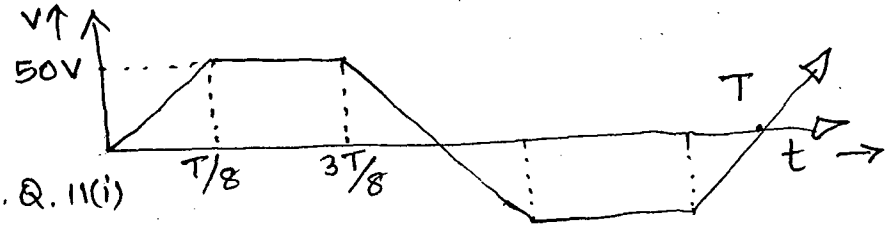

Fig. Q. 11(i)

(ii) In the circuit shown in Fig. Q.11 (ii), the resistances have values in ohms. Using star-delta transformation, determine the current supplied by the battery.

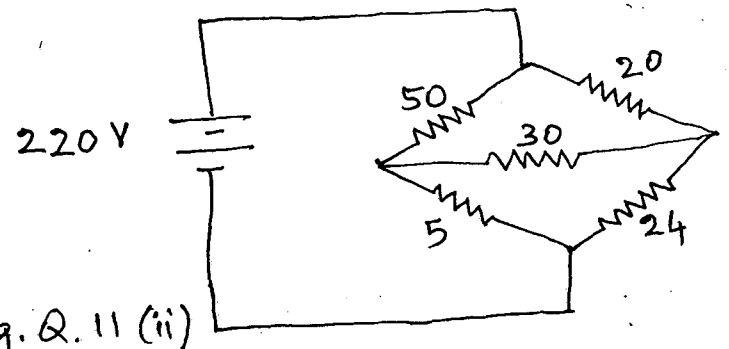

Fig. Q. 11 (ii)

12)a) Derive the current response of R-L series circuit for sinusoidal input.

(OR)

12)b) Derive the expressions for d.c. response of R-L-C series circuit.

13.a) A voltage v(t) = 150 sin 1000t is applied to a series RLC circuit where R=40Ω, L=0.13H and C=10μF. Find

(i) the power supplied by the source
(ii) the reactive power supplied by the source
(iii) the reactive power of the capacitor
(iv) the reactive power of the inductor
(v) the p.f. of the circuit.

(OR)

13.(b) A series RLC circuit has R = 20Ω, L= 0.005H and C= 0.2μF. It is fed from a 100V variable frequency source.

Find (i) frequency at which current is maximum (ii) impedance at this frequency (iii) voltage across inductance at this frequency, (iv) maximum value of the voltage across capacitance and the frequency at which this occurs.

14)a) (i) State and explain Thevenin's theorem
(ii) For the circuit of Fig. Q. 14(a) (ii), find V_1 using mesh analysis.

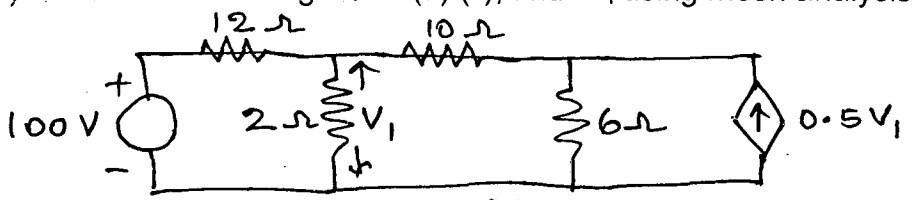

Fig. Q. 14(a)(ii)

(OR)

14.b) (i) State and explain maximum power transfer theorem.
(ii) Find the current through tjsΩ impedance of Fig. Q 14 (b) (ii) using Norton's theorem.

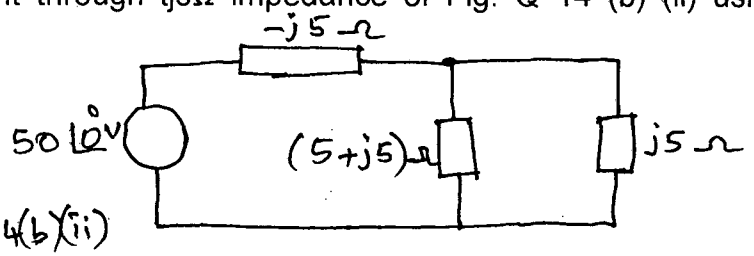

Fig. Q. 14(b)(ii)

15 a) (i) Three coils are connected in series as shown in Fig. Q. 15(a) (i). Find an expression for equivalent inductance.

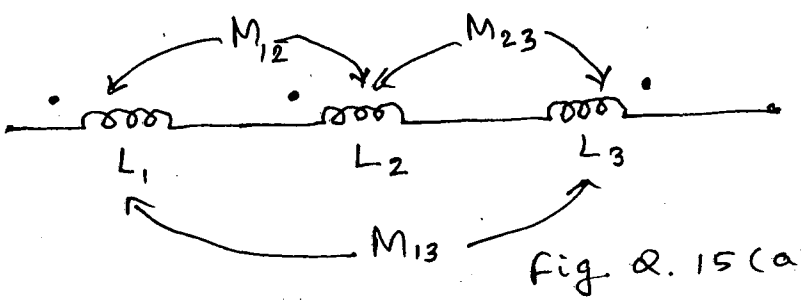

Fig. Q. 15(a)(i)

15)a) (ii) A star connected 3 phase load has a resistance of 6Ω and an inductive reactance of 8 Ω in each branch. Line voltage is 220 volts. Write the phasor expressions for line voltages. Also calculate the total power.

(OR)

15)(b) (i) Show that the sum of two wattmeter readings gives the total three phase power in two wattmeter method.

(ii) Three loads (31+j59), (30-j40) and (80 + j 60) ohm are connected in delta across a 200v, 3 phase supply. Find the line currents.