Code No. 4117/N

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) I-Sem. (New) Suppl. Examination

May / June - 2008

Subject : Basic Circuits Analysis

Time : 3 hours] [Max. Marks : 75

Note : Answer ***all*** questions of Part-A.
Answer ***five*** questions from Part-B.

PART - A (25 marks)

1. State initial conditions for inductor and capacitor. 2

2. Differentiate between steady state response and transient response. 2

3. Determine the voltage across 5Ω resistor in Fig. 1. 3

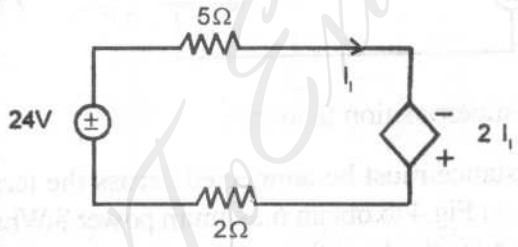

Fig.1

4. State Norton's theorem and explain its significance. 2

5. What is the significance of quality factor of resonance circuit ? 2

6. The current in 2mH inductor is i(t)=2 sin 377t. Find the voltage across inductor. 3

7. Find the bandwidth of series resonant circuit with R = 2Ω, L=2mH, C=1μF. 3

8. Explain what is meant by a dual network. 2

9. The current in a branch of RLC circuit with sinusoidal excitation is given by $I = 2\angle 60^\circ$ A and the voltage across it is $V=100\angle 30^\circ$. Find the real and reactive power in it. 3

10. Define complete incidence matrix and state its properties. 3

PART - B (5×10=50 marks)

11. Use nodal analysis to find the power delivered by the 2V source in Fig.2. 10

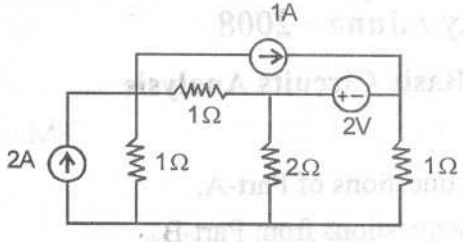

Fig.2

12. Obtain the zero state response and zero input response of the circuit in Fig.3. The response is i(t). Separate the total response into transient and steady state responses. 10

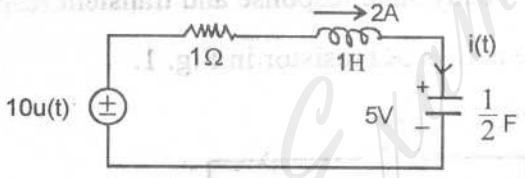

Fig.3

13. (a) Stat and prove superposition theorem. 5

(b) What load resistance must be connected across the terminals a, b of the network shown in Fig.4 to obtain maximum power ? What is the maximum power absorbed by the load ? 5

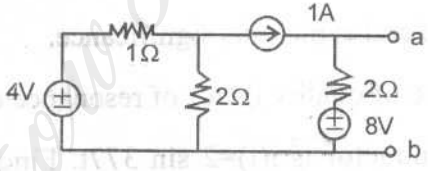

Fig.4

14. In the circuit of Fig.5, the switch 'S' was in postition '1' for a long time before it was moved to position '2' at t = 0. Determine the voltage $V_2(t)$ for $t \geq 0$. 10

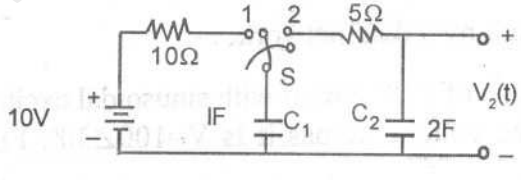

Fig.5

15. (a) Show that the resonant frequency of a series RLC circuit is the geometric mean of the two half power frequencies. 5

(b) Derive the relation between Q factor and bandwidth for a series R,L,C circuit. 5

16. (a) Show that a tree of a connected graph has (n-1) branches where 'n' is the number of nodes in the graph. 4

(b) For the network shown in Fig.6, wirte a tie-set schedule. Obtain the values of branch voltages and branch currents. 6

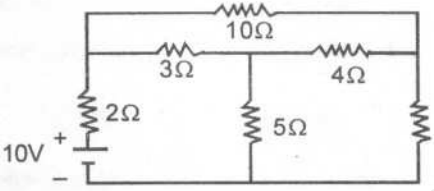

Fig.6

17. In the circuit shown in Fig.7, the driving voltage is V(t)=10cos (10t+60°). Find the current i_2 in the steady state. Draw the complete phasor diagram. 10

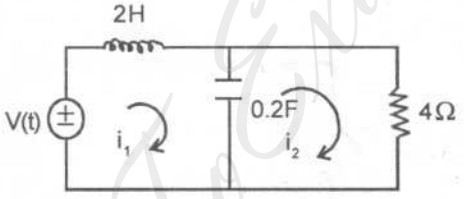

Fig.7