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SF-6481

B. E. - II (Sem. IV) (EL) (Common with EC & C) Examination

May / June - 2011

Electrical Network - II

(Old)

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ B. E. - 2 (SEM. 4) (EL) (COMMON WITH EC & C)

Name of the Subject :

☛ ELECTRICAL NETWORK - 2 (OLD)

☛ Subject Code No. : 6 4 8 1 ☛ Section No. (1, 2,.....) : NIL

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Assume appropriate data and give neat sketches wherever necessary.

(4) Numerical figures to the right indicate full marks.

(5) Scientific calculator upto casio-super fx100D, 100W, 100MS series and equivalent are permitted.

1 (a) Explain the following terms : **4**

(i) Graph

(ii) Co-tree

(iii) Path

(iv) Fundamental tie set

(b) Match list I and list II for fig. **1** **3**

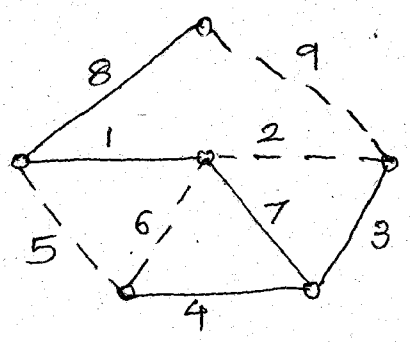

Fig. 1

	List I	**List II**
(a)	1, 7, 4, 5	(i) Twigs
(b)	2, 5 ,6, 9	(ii) Links
(c)	1, 3, 4, 7, 8	(iii) Fundamental Loop

(c) Do as directed (any three) **3**

(i) _____ sequence component of voltage is always absent in delta connection.

(ii) For a two port network $Z_{11}Y_{11}$ = _____

(iii) The steady state value of current in the circuit shown in fig 2 is _____.

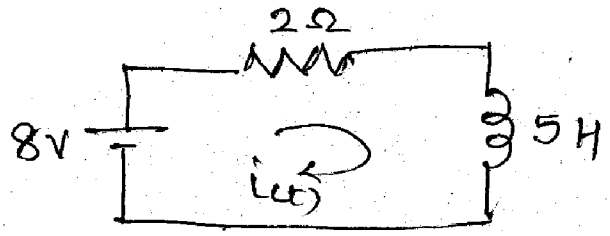

Fig. 2

(iv) For the graph having N nodes there will be _____ fundamental cutsets.

(d) A balanced delta connected load as shown in fig. 3 is connected to a symmetrical 3-ϕ system. If the fuse in line C melts, determine the symmetrical components of the line currents. Under this condition current Ia = 15 $\angle 0° A$ **10**

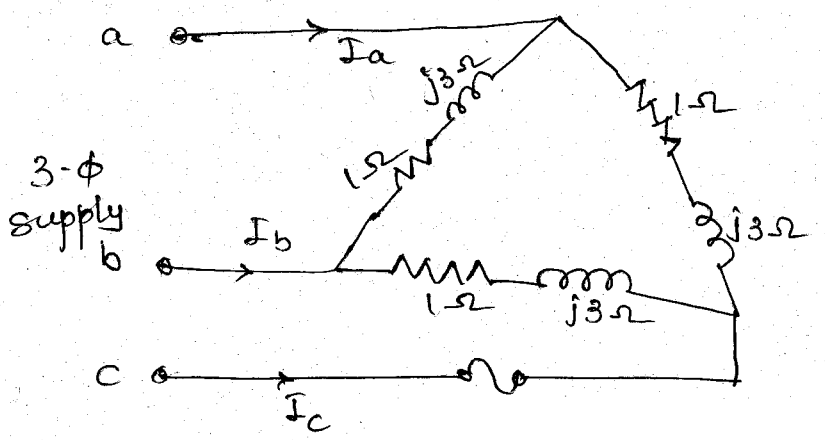

Fig. 3

2 (a) For the network shown in fig. 4

(i) Draw the oriented graph **3**

(ii) Write tie-set schedule. **3**

(iii) Find the current through and voltage across each element. **6**

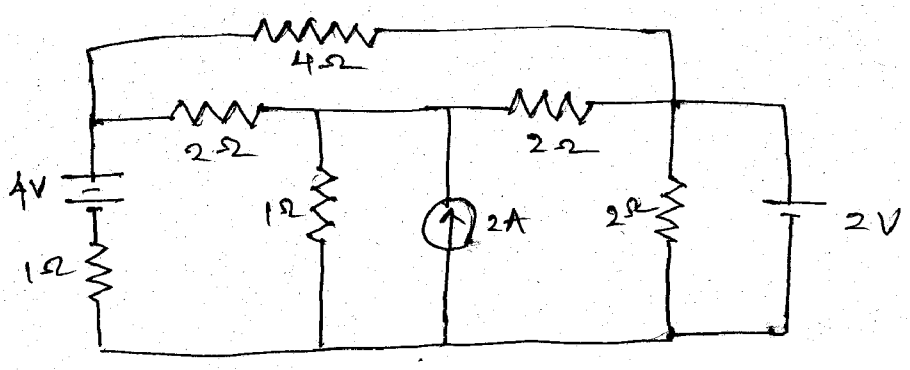

Fig. 4

OR

2 (a) For the network shown in fig. 4

(i) Draw the graph **3**

(ii) Write the cut-set schedule. **3**

(iii) Find the current through and voltage across each branch. **6**

(b) For the network shown in fig. 5 calculate the Y parameter.

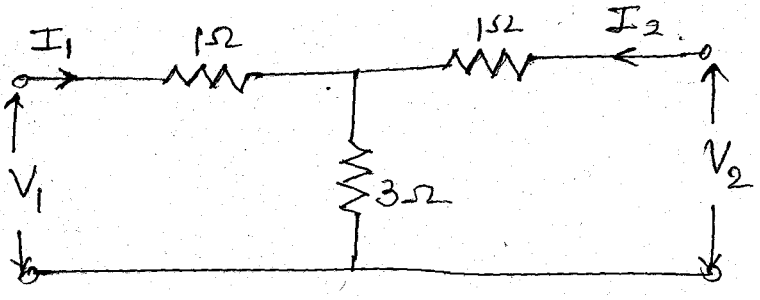

Fig. 5

3 (a) In the RC circuit shown in fig. 6 R = 15 Ω and C = 100 μF. Switch is closed at θ = 45°.Find current when $V_{(t)}$ = 100 sin (500t +θ) is applied to the circuit at θ=45°. **10**

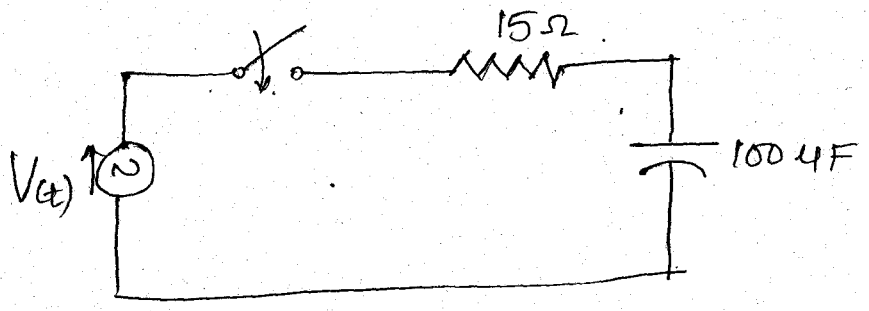

Fig. 6

OR

3 (a) For the circuit shown in fig. 7 S/W 'K' is opened at t=0. Obtain complete expression of voltage across resistance for time t ≥ 0. Assume zero current through inductor and zero charge on capacitor before the switch 'k' is opened. **10**

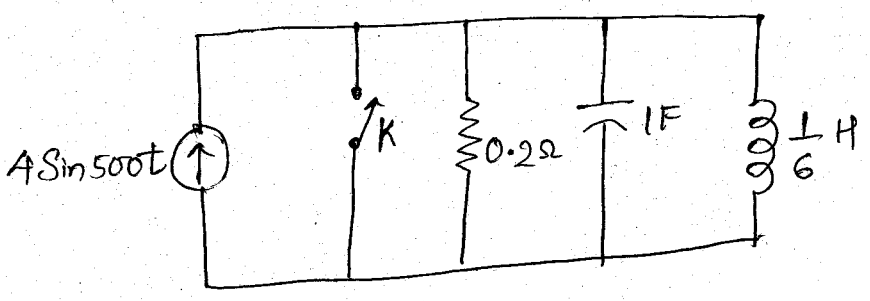

Fig. 7

(b) Derive the expression which shows the relationship of ABCD parameters in terms of Hybrid parameters. **5**

OR

(b) Discuss the absence of zero sequence components [current and voltage] for particular cases. **5**

4 (a) Define internal and external critical frequencies. **2**

(b) State the restrictions on the location of poles and zeros for driving point function. **4**

(c) Define image impedance. **2**

(d) State and prove separation property of one port L-C network. **5**

(e) State and explain Bartlett's bisection theorem. **4**

(f) Obtain Z_{ii} for the network shown in fig.8 **3**

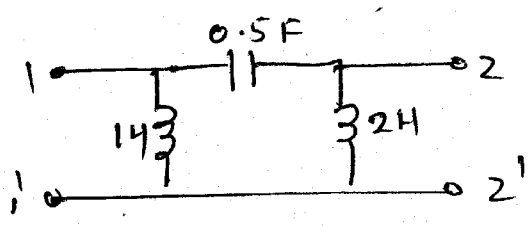

Fig. 8

5 Attempt any three : **15**

(a) A driving point impedance for L-C network is given by

$$z(s) = z\frac{(s^2+1)(s^2+9)}{s(s^2+4)}$$

Obtain pole-zero location in S-plane and show variation of reactance w.r.t W.

(b) The frequency response test gives the following critical frequencis for one port loss-less n/w. Obtain all four canonical network configuration (do not determine element value).

(c) Obtain Foster's first form of one port L-C n/w having

$$z(s)=\frac{3\left(s^2+4\right)\left(s^2+25\right)}{s\left(s^2+16\right)}$$

(d) Write a note on constant K-filter

(e) Explain Cauer's first form of reactive n/w.

6 (a) For symmetrical lattice network shown in fig-9, derive transfer function **8**

$$\frac{v_2(s)}{v_1(s)}=\frac{R-z_a(s)}{R+2_a(s)},$$

where $Z_L = R$ and $ZaZb = R^2$.

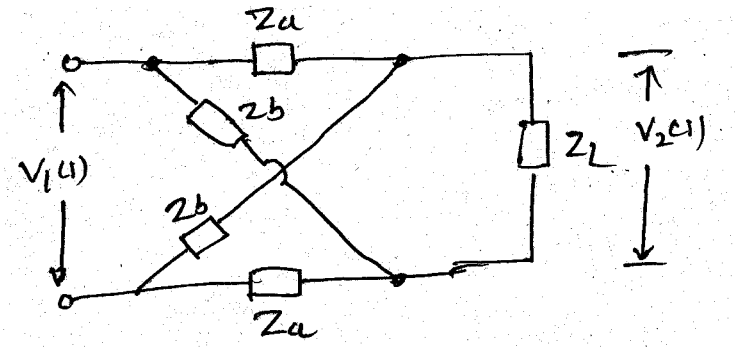

Fig. 9

(b) Derive expression for image impedance of symmetrical T-network. **7**

OR

6 (a) For a series R-L-C circuit $y(s)=\frac{s}{s^2+2s+1\cdot25}$ **8**

Find (i) dumping ratio (ii) natural frequency of oscillation (iii) Quality factor (iv) Bandwidth (v) values of R,L,C (vi) Location of poles and zeros of Y(s).

(b) For the network shown in fig. 10, determine pass band, stop band and cutoff frequencies. Comment on the type of filter. **7**

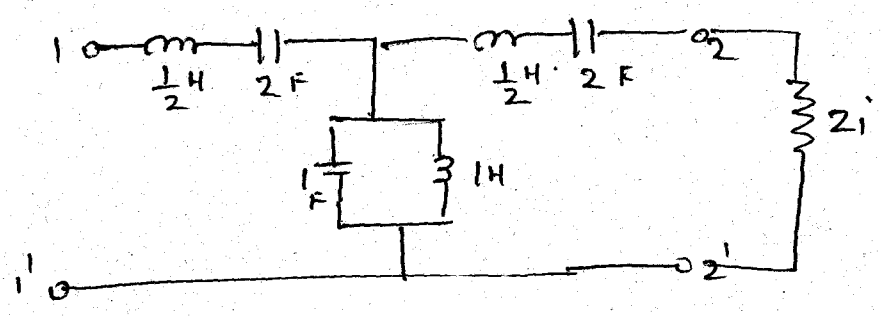

Fig. 10
