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EC - 305

B.E. III Semester

Examination, December 2014

Network Analysis

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each questions are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) For the circuit shown in Fig. 1 determine the current I through the 10 Ω resistance using nodal analysis.

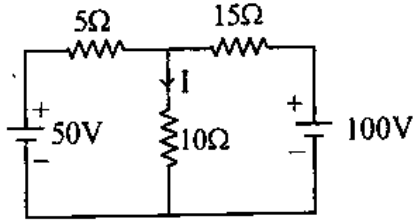

Fig. 1

b) Draw the dual network for the circuit shown in Fig. 2.

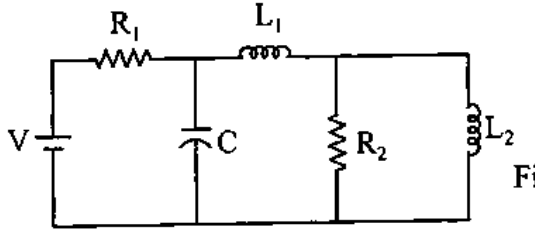

Fig. 2

c) Determine the expression of resonance frequency for RLC parallel network.

d) Write the three loop equations for the magnetically coupled circuit shown in fig. 3

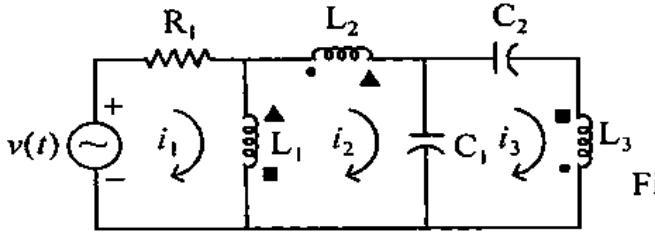

Fig. 3

OR

Calculate V in the circuit of Fig. 4.

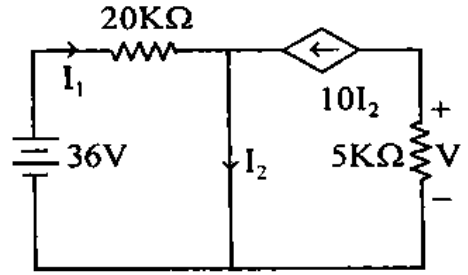

Fig. 4

Unit - II

2. a) State and explain Thevenin Theorem.

b) State and explain Reciprocity Theorem.

c) State and prove maximum power transfer theorem for AC networks.

d) Determine the value of R_L to be connected across AB in fig.5, for maximum power transfer. Also calculate the maximum power absorbed by the R_L.

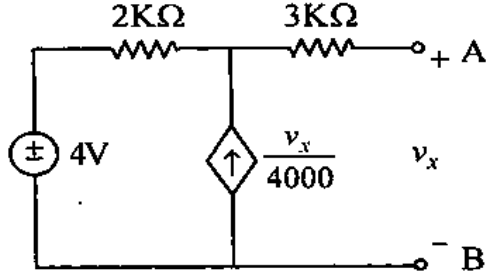

Fig. 5

OR

For the network shown in fig. 6 draw the network graph. Select 1, 2, 3 as tree branches. Obtain basic cut-sets and write basic cut set matrix.

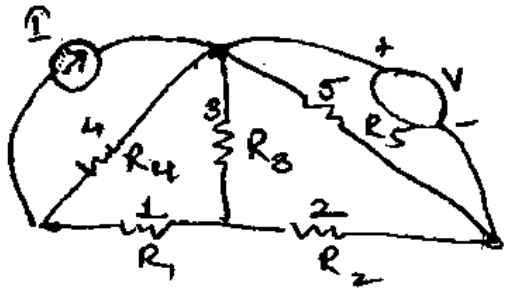

Fig. 6

Unit - III

3. a) For the RL series circuit shown in fig. 7 the switch s is closed at $t = 0$, find the current $i(t)$.

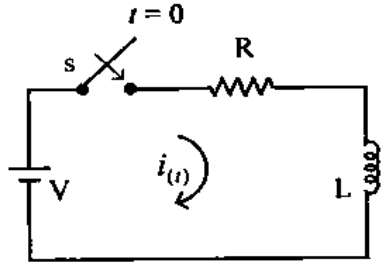

Fig. 7

b) For the RC circuit shown in fig. 8 determine the expression of voltage across capacitor if switch is moved from position A to B.

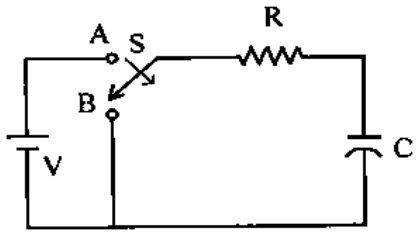

Fig. 8

c) At $t = 0$, s is closed in the circuit of fig. 9, find $v_c(t)$ and $i_c(t)$. All initial conditions are zero.

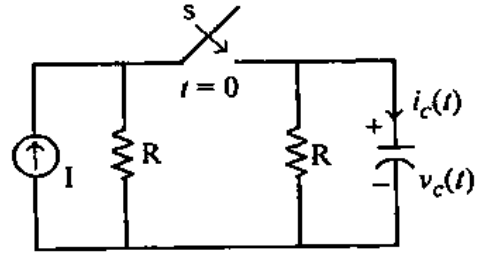

Fig. 9

d) In the circuit of fig. 10, at time t_0 after the switch S was closed it is found that $v_2 = +5V$. Determine the value of $i_2(t_0)$ and $\frac{di_2(t_0)}{dt}$.

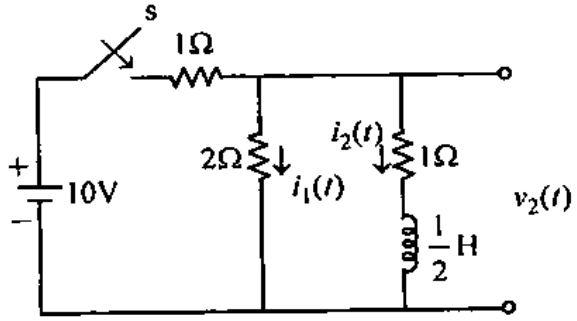

Fig. 10

OR

The switch in the circuit of fig. 11 is opened at $t = 0$. Determine the current i and its derivative at $t = 0^+$.

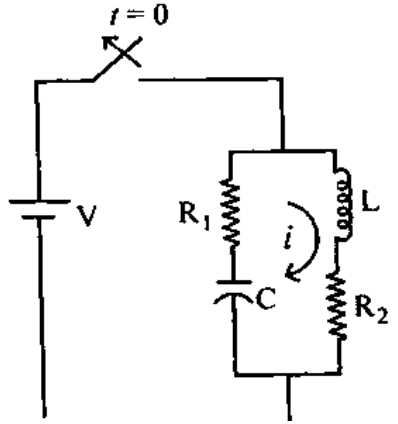

Fig. 11

Unit - IV

4. a) Find the Laplace transform of the ramp function $kt\,v(t$

b) Find the Laplace transform of the waveform shown Fig. 12.

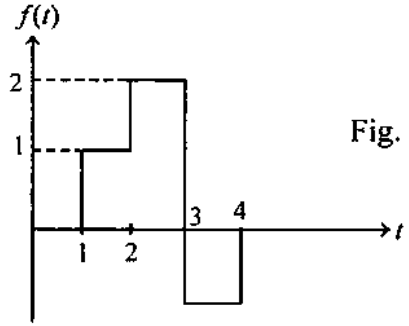

Fig. 12

in to

c) Obtain the Laplace transform of the pulse shown fig. 13(a) and determine $i(t)$ if this pulse $v(t)$ is applied the circuit of fig. 13(b).

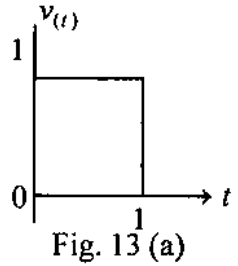

Fig. 13 (a)

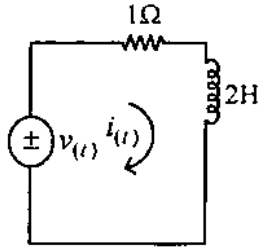

Fig. 13 (b)

ic

d) Obtain the Fourier series representation of the period waveform shown in fig. 14.

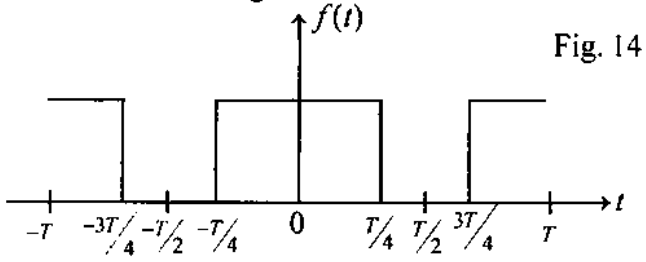

Fig. 14

OR

Find the trigonometric Fourier series for Triangular periodic signal $f(t)$ shown in fig. 15.

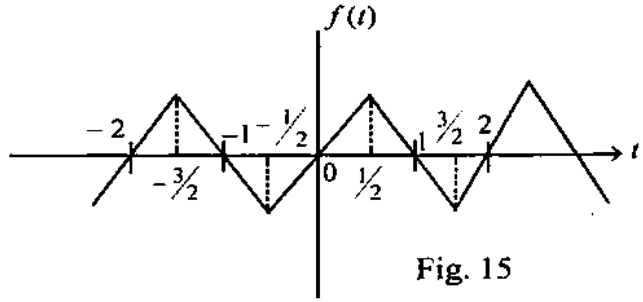

Fig. 15

Unit - V

5. a) Give the condition of symmetry in Z and Y parameters for a two port network.

b) Show the relation between Z-parameter and H-parameters.

c) Obtain the Z-parameters of the network shown in fig. 16.

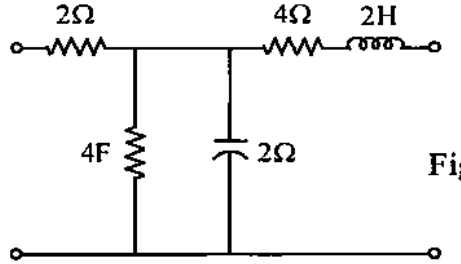

Fig. 16

d) Calculate the Z-parameters for the network shown in fig. 17.

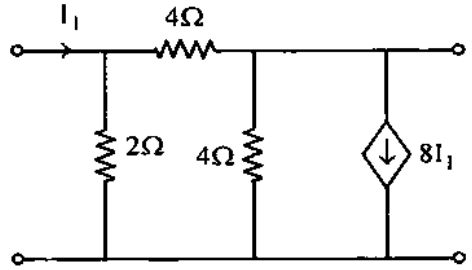

Fig. 17

OR

Determine the z-parameters of the network shown in fig. 18.

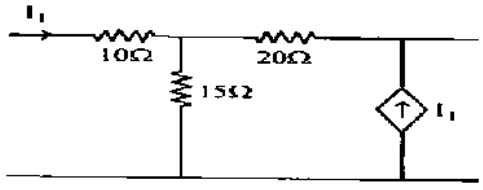

Fig. 18