Total No. of Questions :5] *[Total No. of Printed Pages :7*

Roll No .....

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.

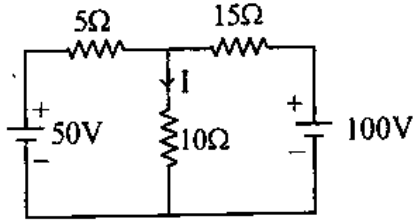

Fig. 1

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

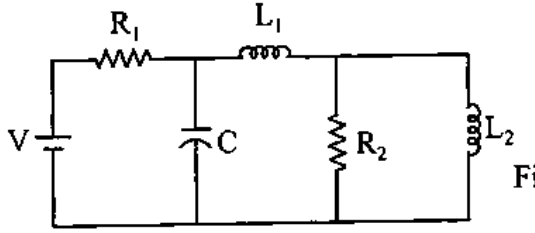

Fig. 2

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

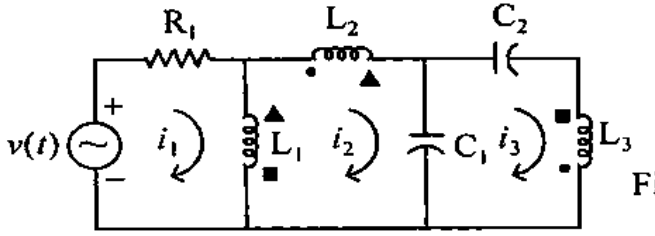

Fig. 3

OR

Calculate V in the circuit of Fig. 4.

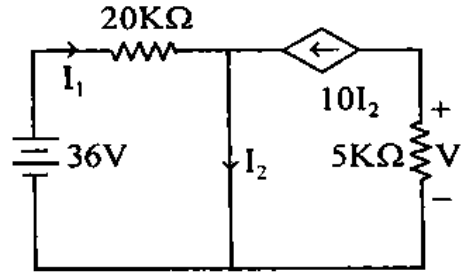

Fig. 4

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.

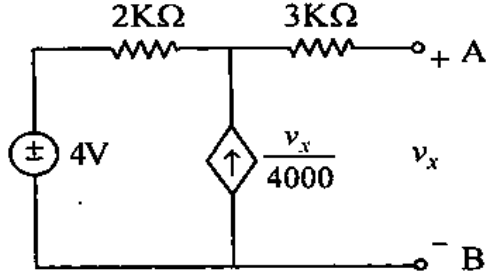

Fig. 5

[3]

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.

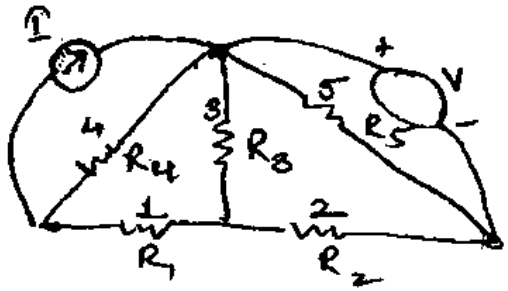

Fig. 6

Unit - III

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

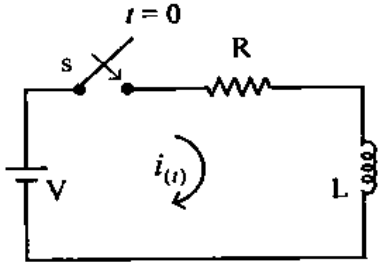

Fig. 7

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.

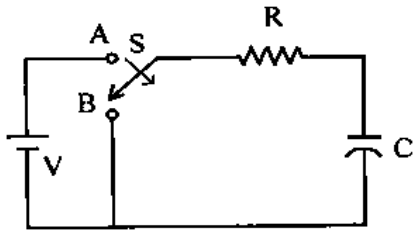

Fig. 8

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.

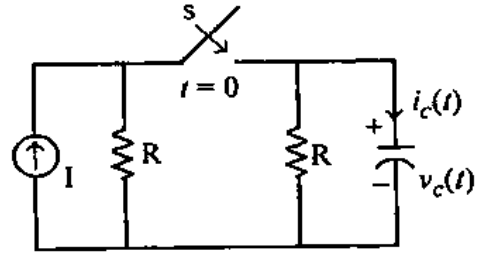

Fig. 9

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 $\frac{di_2(t_0)}{dt}$.

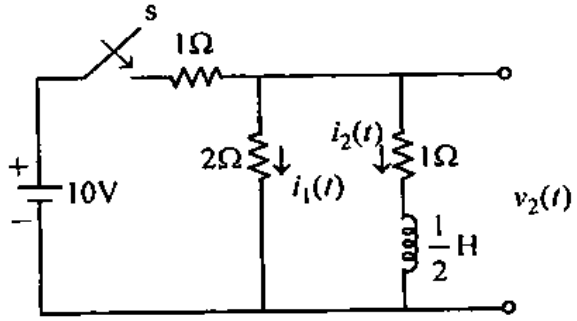

Fig. 10

OR

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

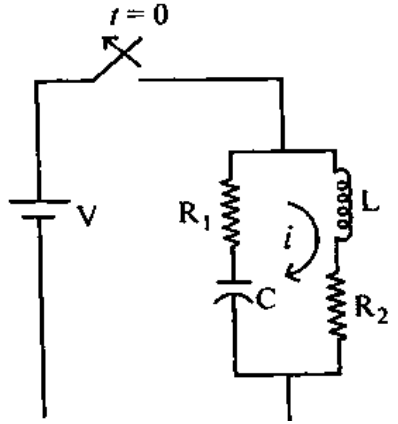

Fig. 11

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.

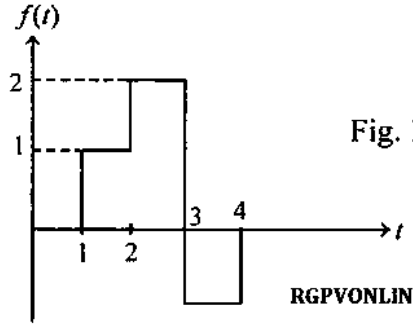

Fig. 12

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).

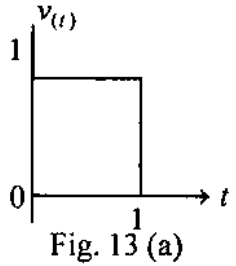

Fig. 13 (a)

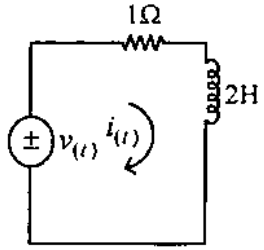

Fig. 13 (b)

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

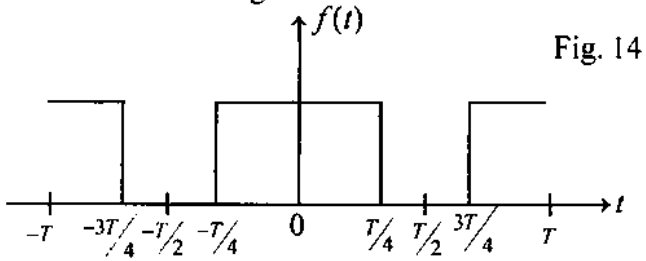

Fig. 14

OR

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

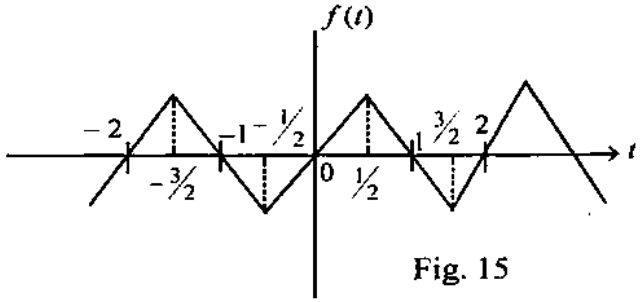

Fig. 15

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.

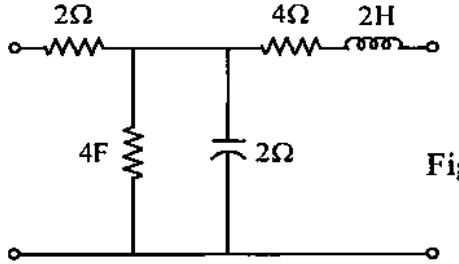

Fig. 16

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

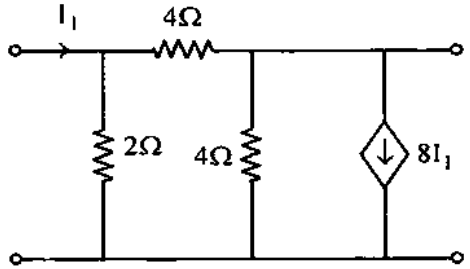

Fig. 17

OR

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

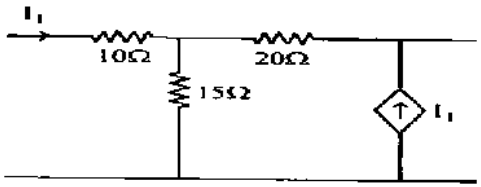

Fig. 18