

**3E1642**

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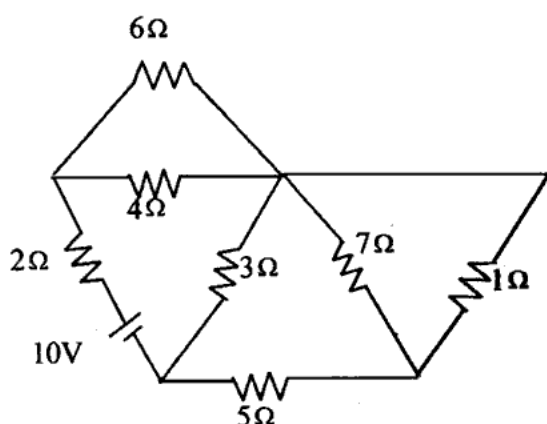
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**3E1642****B.Tech. III Semester (Main/Back) Examination - 2014****Electrical Engg.****3EE2A Circuit Analysis-I****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 24****Instructions to Candidates:**

Attempt any **five** questions, selecting **one** question from each unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.) rtuonline.com

**Unit - I**

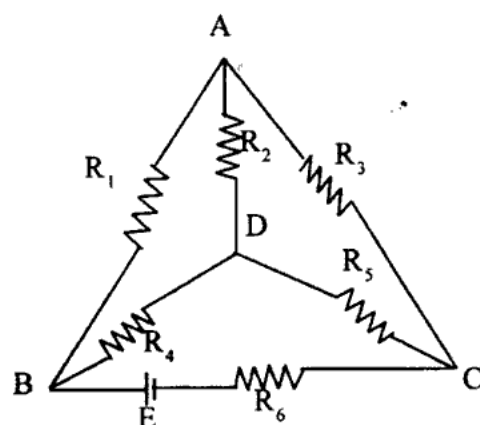
1. a) Write the incidence matrix for the network shown in fig. (8)



- b) Write a short note on a series RLC circuit resonance. (8)

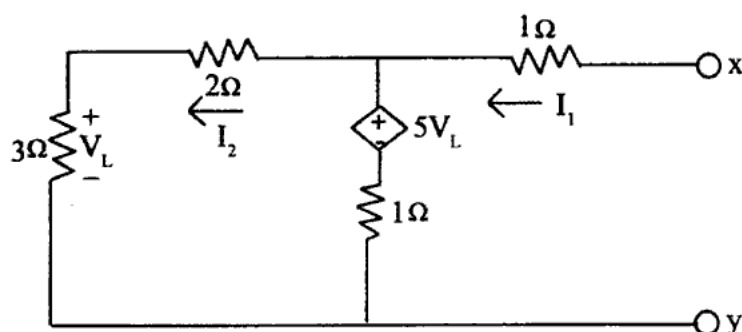
**OR**

1. Draw the graph of the network shown in fig. select a tree and write the  
 i. tie set matrix  
 ii. cut-set matrix. (16)



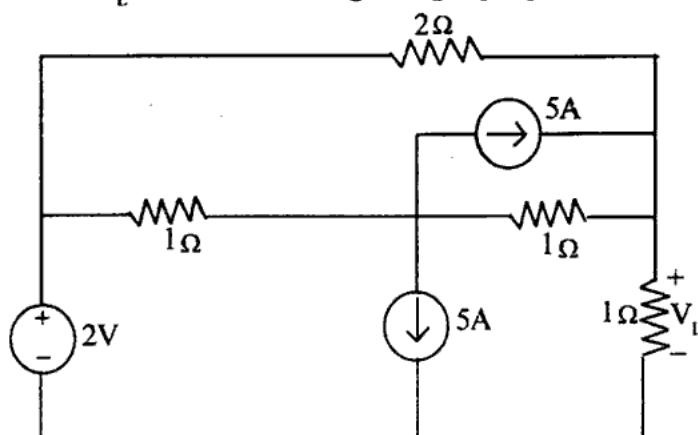
### Unit - II

2. a) Explain the compensation theorem with an example. (8)
- b) Calculate the internal resistance of the network given in fig. looking through open circuited x-y terminal using thevenin's theorem. (8)



OR

2. a) Explain the maximum power transfer theorem with an example. (8)
- b) Find  $V_L$  in the circuit of fig. using super position theorem. (8)



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(2)

**Unit - III**

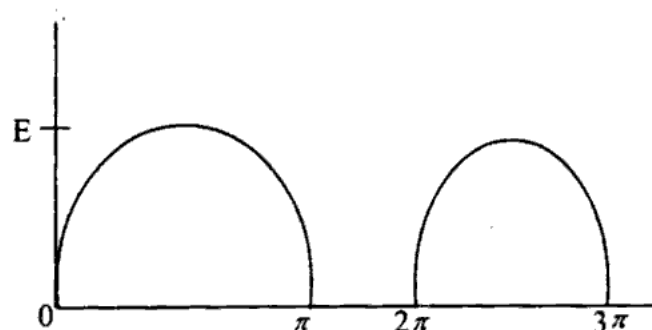
3. a) A three phase 4 wire 100V (L-L) system supplied a balanced Y connected load having impedances of  $10\angle -30^\circ \Omega$  in each phase. Find the line currents and how much current is flowing through the neutral. (8)
- b) Three impedances of  $(4-j3)\Omega$  are connected in star against a 440V 3ph voltage source. Find the power consumed and also obtain the reactive power of the load. (8)

**OR**

3. a) A 0.2 HP induction motor runs at an efficiency of 85%. If the operating power factor is 0.8 lag, find the reactive power taken by the motor. (8)
- b) Explain the power triangle in a.c. circuit. (8)

**Unit - IV**

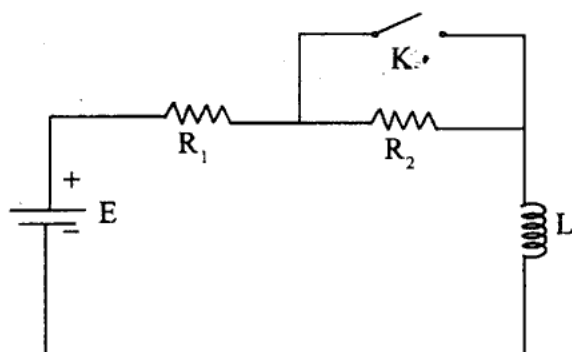
4. a) Find the first few terms of the Fourier series of the function given by  
 $f(\alpha) = 1$  for  $0 < \alpha < \pi$   
 $f(\alpha) = -1$  for  $\pi < \alpha < 2\pi$  (8)
- b) Find the fourier series expansion of half sinusoidal wave shown in fig. (8)

**OR**

4. In a linear circuit consisting of  $R=9$  ohms and  $L=8$  mH, a current  $i=5+100\sin(1000t+45^\circ)+100\sin(3000t+60^\circ)$  amps is flowing. Find
- the equation of applied voltage
  - r.m.s value of current and voltage and
  - the average power. (16)

Unit - V

5. a) In fig. the battery voltage is applied for a steady state period. Obtain the complete expression for the current after closing the switch K. Assume  $R_1 = 1\Omega, R_2 = 2\Omega, L = 1H, E = 10V$ . (8)



- b) Explain the initial and final value theorem. (8)

OR

5. a) Explain the impulse response of series RC network. (8)  
b) Assuming  $V_o(t) = t u(t)$ , find  $i(t)$  in the RC circuit of fig. (8)

