

C.U.SHAH UNIVERSITY

Summer Examination-2017

Subject Name: Circuit Theory**Subject Code: 4TE03CIT1****Branch: B.Tech (EEE,EE)****Semester: 3 Date: 29/03/2017****Time: 10:30 to 1:30****Marks: 70**

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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Q-1 Attempt the following questions: (14)

- a) If all the elements in a particular network are linear, then the superposition theorem would hold, when the excitation is
(a) DC Only (b) AC only (c) Either AC or DC (d) An impulse
- b) Super position theorem is not applicable for
(a) current calculations (b) voltage calculations (c) power calculations (d) None of the above
- c) Nodal analysis can be applied for
(a) Planar networks. (b) Non planar networks. (c) Both planner and non planner networks. (d) Neither planner nor non planner networks.
- d) Define: Node
- e) To apply reciprocity theorem response to excitation ratio is
(a) Ohm (b) Mho (c) No units (d) Either Mho or Ohm
- f) KCL works on the principle of which of the following
(a) Law of conservation of charge (b) Law of conservation of energy (c) Both (d) None of the above
- g) What is an impulse Function?
- h) Thevenins resistance R_{th} is found
(a) By removing voltage source (b) Between some open terminals (c) between any two terminal (d) All of the above
- i) For steady state current inductor acts as
(a) Short circuit (b) Open circuit (c) current source (d) voltage source.
- j) In RC series circuit $R = 2\Omega$, $C = 2\mu F$ and 10V dc is applied. What is the value of current?
(a) 0A (b) 2A (c) 5A (d) 10A
- k) Given network is having N nodes and B branches, then number of twigs are
(a) N (b) N-1 (c) B-N+1 (d) B-N-1
- l) There is a _____ between two nodes of signal flow graph.
(a) link (b) Branch (c) tree (d) None of the above
- m) In a series resonant circuit impedance is
(a) Minimum (b) Maximum (c) Zero (d) None of these.



- n) A branch of a network is said to be passive when it contains
 (a) Voltmeter (b) Voltage source (c) Current source (d) Battery
Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all questions (14)

- (a) Explain the poles and zeros of the network function. State its important features. (07)
 (b) Explain the terms (i) Non-Linear (ii) Uni-lateral (iii) Passive (iv) Reciprocal (07)
 (v) Time variant (vi) Lumped parameter and (vii) Dual with reference to Network.

Q-3 Attempt all questions (14)

- (a) Find the Power loss across the 5Ω resistor in Fig.1 (07)

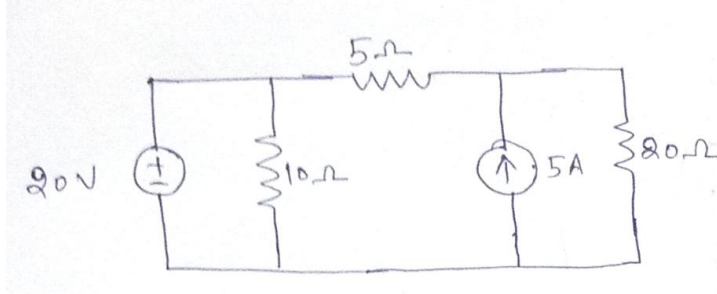


Fig.1

- (b) Using nodal method, find the current through r_2 Fig.2 (07)

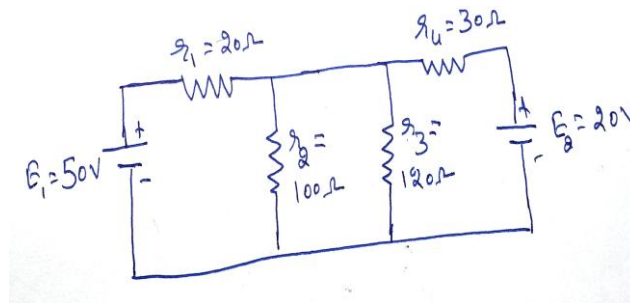


Fig.2

Q-4 Attempt all questions (14)

- (a) Explain following terms of graph in network terminology with suitable example. (05)
 (i) Tree (ii) Twing (iii) Link (iv) Co-tree (v) Incidence Matrix
 (b) For the network shown in fig.3, draw (i) the graph (oriented), (ii) select a tree,(iii)obtain (05)
 the cut set matrix. Also find the number of twigs and links.

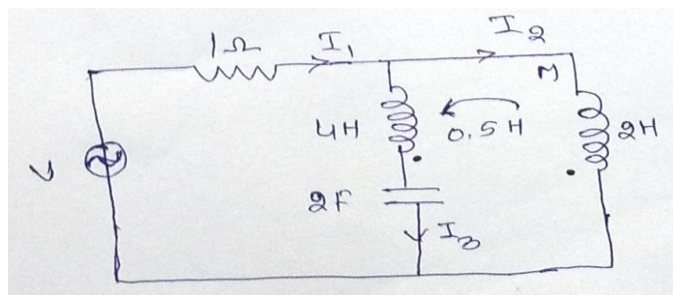


Fig.3

- (c) Write a short note on coefficient of coupling. (04)

Q-5 Attempt all questions (14)

- (a) Find the step response for RLC series circuit. (05)



- (b) State maximum power transfer theorem and obtain proof of maximum power transfer theorem. (05)
- (c) Explain source transformation. (04)
- Q-6 Attempt all questions (14)**
- (a) Explain following in Brief: Ideal and Practical Energy source. (05)
- (b) Find the Norton's equivalent circuit across a-b for the network shown in Fig 4. (05)

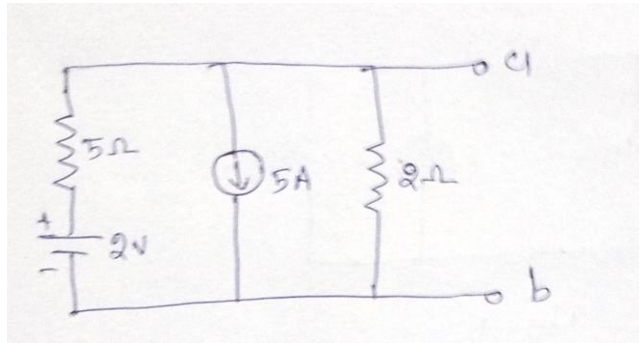


Fig.4

- (c) Find the inverse Laplace transform $F(S) = \frac{s-1}{s(s+1)^3}$ (04)

Q-7 Attempt all questions (14)

- (a) For the network of Fig.5 find Z-parameter. (07)

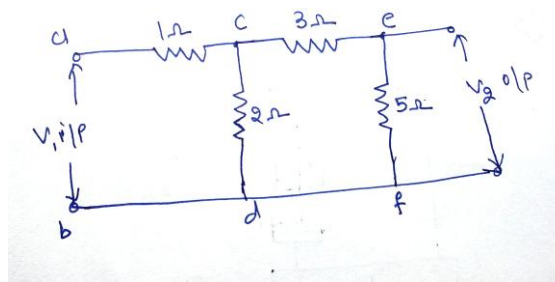


Fig.5

- (b) Find the relation between ABCD parameter and Y- parameter & also find Vice-Versa. (07)

Q-8 Attempt all questions (14)

- (a) A Coil having resistance of 10Ω and inductance of $1H$ is switched on to a direct voltage of $100V$. Calculate the rate of change of the current (a) at the instant of closing the switch and (b) when $t=L/R$ (c) Also find the steady state value of the current. (07)
- (b) A 10 volts step voltage is applied across a RC series circuit at $t=0$. Find $i(t)$ at $t=0^+$ and obtain the value of $\frac{di}{dt}|_{t=0^+}$. Assume $R=100\Omega, C=100\mu F$. (07)

