GUJARAT TECHNOLOGICAL UNIVERSITY

B. V. M. ENGINEERING COLLEGE, V. V. NAGAR

B. E. SEM – III, ELECTRICAL ENGINEERING

MID SEMESTER EXAM, 8th OCTOBER – 2009

CIRCUIT AND NETWORKS

TIME : 11.00pm – 12.00noon **MAX. MARKS : 20**

NOTE : 1) Assume suitable data and mentioned it clearly if required

2) Draw the necessary figures if required

3) Numbers/fig. On the right side indicates full marks

QUESTION : 1 Answer the following questions **(6)**

1) For the three resistances connected as shown in **fig.1**, the equivalent conductance is_____ .
   a) 21 Ohm^{-1} b) 1.5 Ohm^{-1} c) 2/3 Ohm^{-1} d) 144/19 Ohm^{-1} e) none of this
2) For the network of **fig.2**, the value of the voltage across terminals a and b is_____.
   a) 8 V b) 2 V c) -2 V d) -8 V e) none of this
3) For the circuit of **fig.3** the value of current ' i ' is _____.
   a) 2 A b) 0 c) infinite d) 1 A e) none of this
4) The voltage across the 2 Ohm resistor in the circuit of **fig.4** is _____.
   a) 6 V b) 16 V c) -8 V d) 32 V e) none of this

QUESTION : 2 Attempt any **Three** **(9)**

a) Replace the network of **fig. 5** by Norton's equivalent network.
b) For the **fig.6** what should be the value of R_{load} so that maximum power is absorbed ? Also find maximum power P_{max}.
c) For the network of **fig.7**, At t=0 the switch k is opened. Determine $V_2(t)$ for t >= 0.
d) For the network of **fig.8** calculate current ' i ' in 6 Ohm resistor using Superposition theorem.
e) For the **fig.9** find power delivered to 3 Ohm resistor using Thevenin's theorem.

QUESTION : 3 Attempt any **Two** **(5)**

a) State and prove Compensation theorem
b) Classify controlled sources if the control variable and the source controlled both are either a voltage or current source (Draw only circuit diagrams of classified sources)
c) A 3-phase, 4-wire system has a star connected load Z_R = (3-j1) Ohm, Z_Y = (1-j0.5) Ohm and Z_B = (3-j1) Ohm is connected across a 3-phase, 4-wire, 400V supply. The leads connecting the supply and the load have impedance of (2+j1) Ohm. The wire connecting the star point of load and system neutral also has impedance (2+j1) Ohm. Using Millman's theorem, determine the potential of the neutral.

P. T. O.