Total No. of printed pages = 6

CAI-401/BEC/4th Sem/2013/M

BASIC ELECTRICAL CIRCUITS

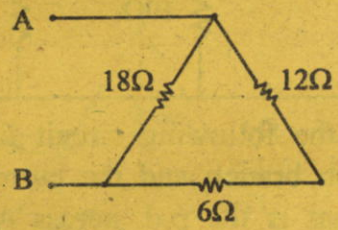
Full Marks – 70

Pass Marks – 28

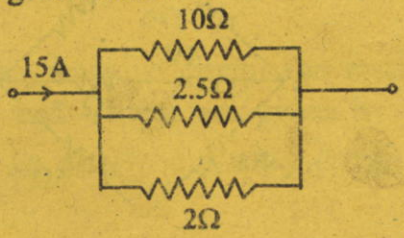
The figures in the margin indicate full marks for the questions.

Answer question No. 1 and any *four* from the rest.

1. (a) If d.c supply of 180V is connected across the terminals AB in the following figure, then what will be the current flowing through 6Ω resistance ? 3

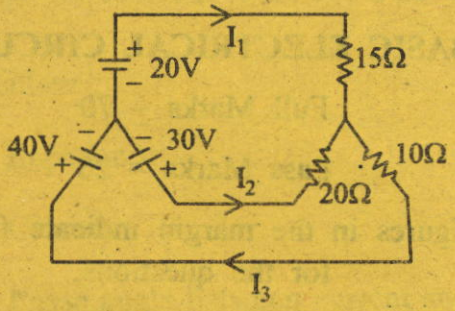


(b) Find the voltage drop across the parallel circuit given below : 3

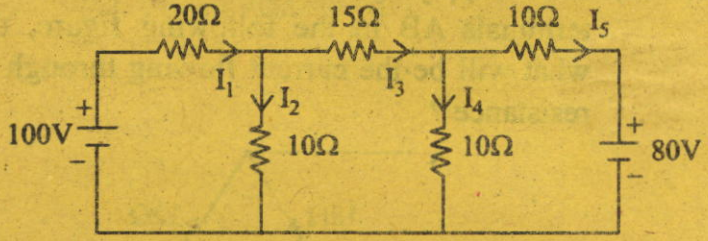


[Turn over

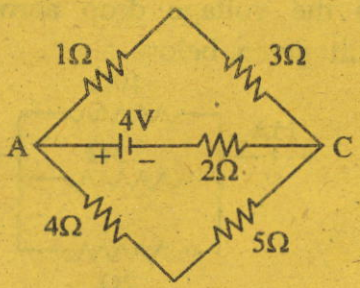
(c) Using superposition theorem, find the current in each branch of the network shown below : 8



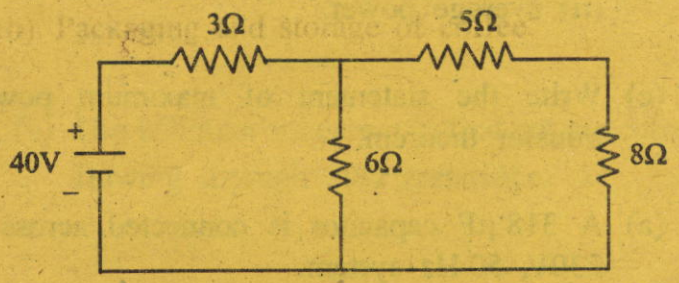
2. (a) Use nodal analysis to find the various currents in the branches of the circuit shown below : 9



(b) In the following circuit find the current in each branch and the current in the battery. What is the p.d. across A and C ? 5

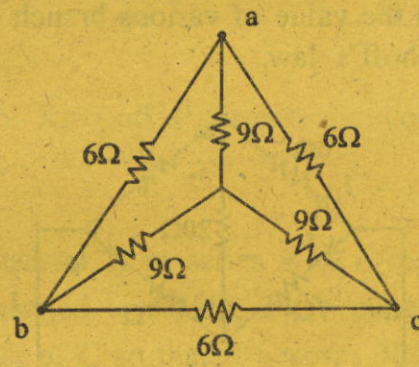


3. (a) Using Thevenin's theorem find out the current flowing through 8Ω resistance. 7



(b) Verify the answer of the previous question. 3(a) using Norton's theorem. 7

4. (a) Find the equivalent resistance between terminals a and b. 7



(b) In a pure resistive circuit the instantaneous voltage and current are given by : 5

$v = 250 \sin 314t$; $i = 10 \sin 314t$

Determine :

(i) the peak power

(ii) average power.

(c) Write the statement of maximum power transfer theorem. 2

5. (a) A 318 μF capacitor is connected across a 230V, 50 Hz system. 6

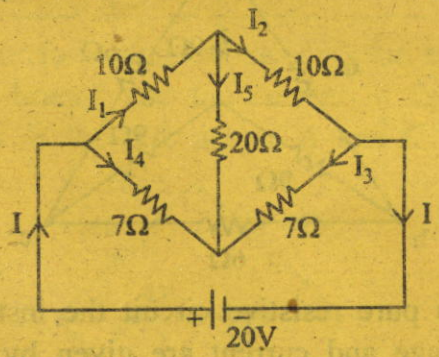
Determine :

(i) the capacitive reactance

(ii) r.m.s value of current

(iii) equation for voltage and current.

(b) Find the value of various branch currents by Kirchoff's law. 6



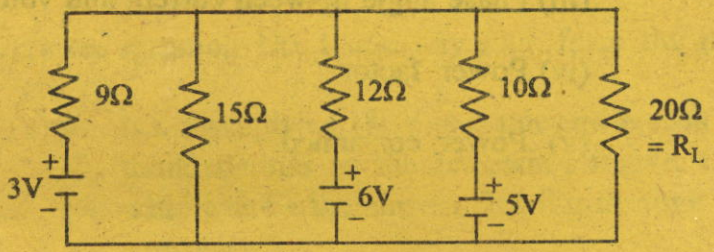
(c) State the Ohm's law. 2

6. (a) Define the following terms with example :

Node, Branch, Mesh, Loop, Unilateral circuit, Junction. 6

(b) Use Millman's theorem to find out the current flowing through 20Ω resistance.

6



(c) State Kirchoff's current and voltage law.

2

7. (a) A resistor R in series with a capacitor C is connected to 50 Hz, 240V supply. Find the value of C so that R absorbs 300W at 100V. Find also the maximum charge and maximum energy stored in C. 7

(b) A 230V, 50 Hz a.c supply is applied to a coil of 0·06H inductance and 2·5Ω resistance connected in series with a 6·8 μF capacitor. 7

Calculate :

(i) Impedance

(ii) Current

(iii) Phase angle between current and voltage

(iv) Power factor

(v) Power consumed.