Total No. of printed pages = 5

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

BASIC ELECTRICAL CIRCUITS

Full Marks – 70

Pass Marks – 28

Time – Three hours

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

Answer any *five* questions.

1. (a) What colour bands will be found on the following resistances ?

   (i) Nominal value of 1 MΩ and tolerance of ± 5%.

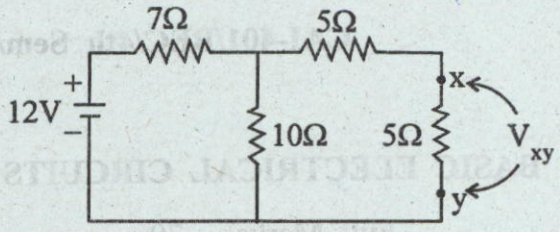
   (ii) Nominal value of 1 KΩ and tolerance of ± 5%.

   (iii) Nominal value of 10 KΩ and tolerance of ± 10%. 2×3=6

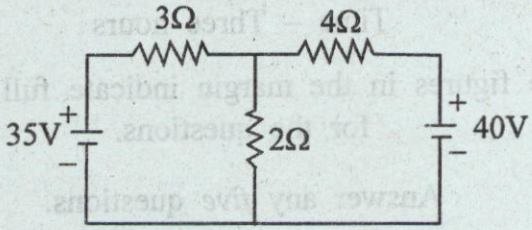
   (b) Two coils connected in series have a resistance of 18Ω and when connected in parallel have a resistance of 4Ω. Find the value of resistances of the two coils. 5

[Turn over

(c) Find the value of V_{xy}. 3

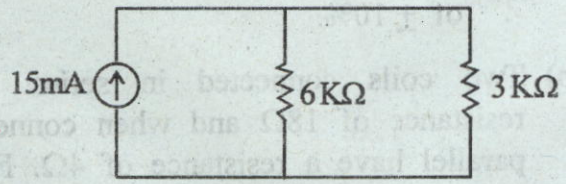


2. (a) Using Kirchoff's law, calculate the current in 2Ω resistor of the following network. 5

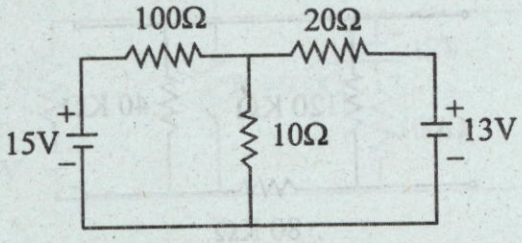


(b) When a 1 KΩ load is connected across a 20mA current source, it is found that only 18mA current flows in the load. What is the internal resistance of the source ? 6

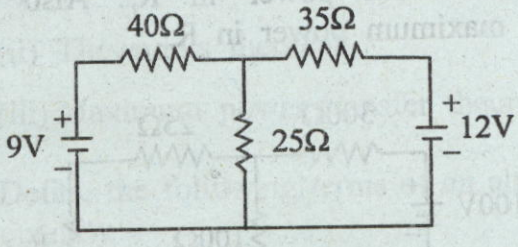
(c) Calculate the current in the 3 KΩ resistor by converting the current source into a voltage source. 3



3. (a) In the following network find the magnitude and direction of each branch current by using Mesh Current Method. 7

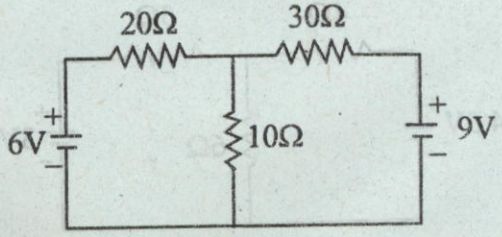


(b) Using Nodal analysis, find the current through 25Ω resistance. 7

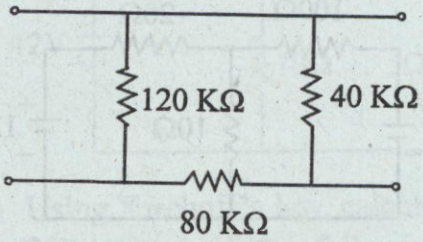


4. (a) Verify the answer of Q. 3(a) using superposition theorem. 7

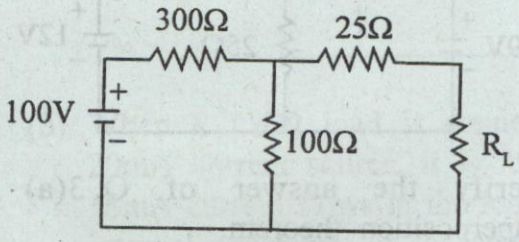
(b) Using Thevenin's theorem, find the value of current flowing through 10Ω resistor. 7



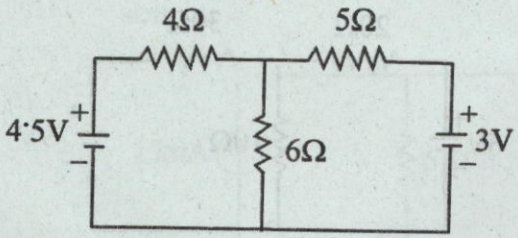
5. (a) Convert the following ◁–network to an equivalent λ –network. 7



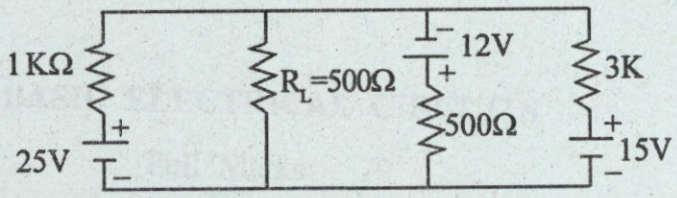
(b) Find the value of R_L necessary to obtain maximum power in R_L. Also find the maximum power in R_L. 7



6. (a) Using Norton's theorem, find the current in 6Ω resistor. 7



(b) Using Millman theorem, find the current through load resistance R_L in the following network. 7



7. (a) Write short notes on : 9

(i) Kirchoff's current and voltage laws

(ii) Thevenin's theorem

(iii) Maximum power transfer theorem.

(b) Define the following terms of an alternating quantity —

rms value, form factor, peak factor, average value, phase. 5