Total No. of printed pages = 6

BASIC ELECTRICAL CIRCUITS

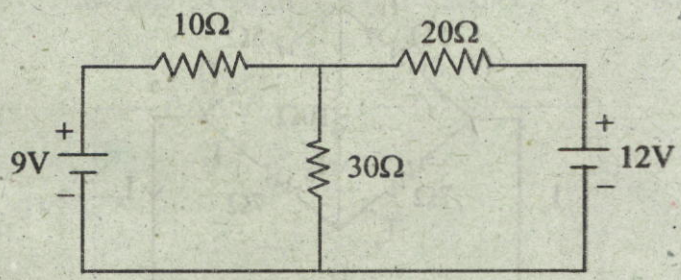
Full Marks – 100

Pass Marks – 30

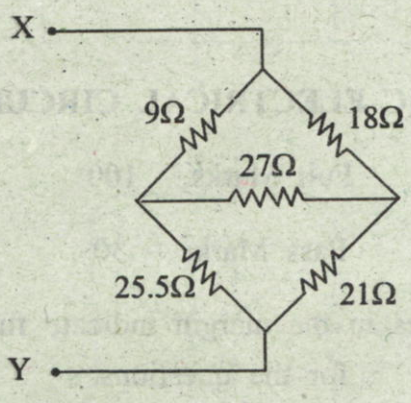
The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

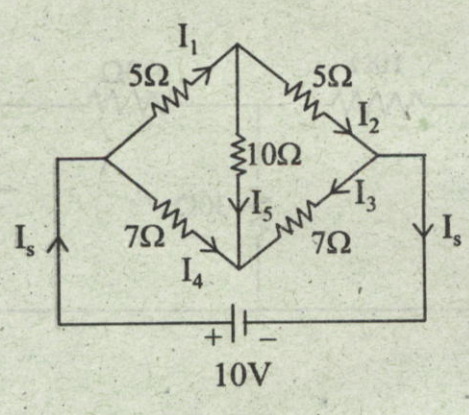
1. (a) Find the value of loop currents I_1, I_2 using loop current method. 10



(b) Using $\Delta \rightarrow \lambda$ transformation, find the equivalent resistance between terminals X and Y. 10



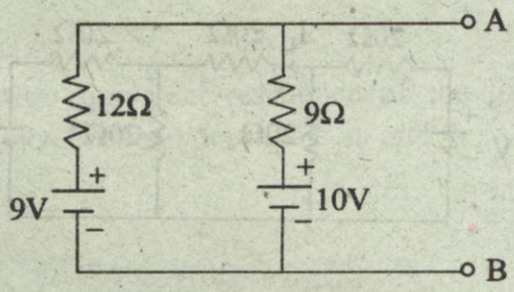
2. (a) Find the value of currents I_1, I_2, I_3, I_4, I_5 and I_s by Kirchoff's law. 10



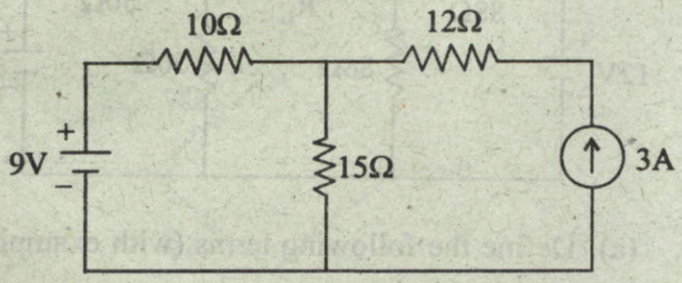
(b) State and explain Kirchoff's current and voltage law. 6

(c) Write the statement of Ohm's Law. Give a suitable example. 4

3. (a) Convert the following circuit to an circuit containing one current source and resistance. 10



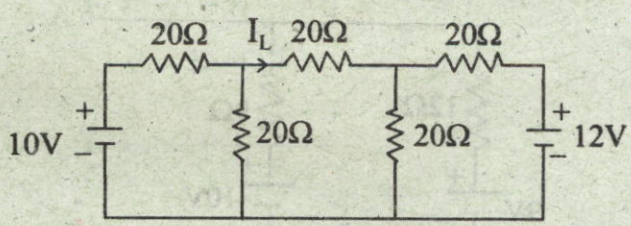
(b) Using superposition theorem, find the current flowing through 15Ω resistance. 10



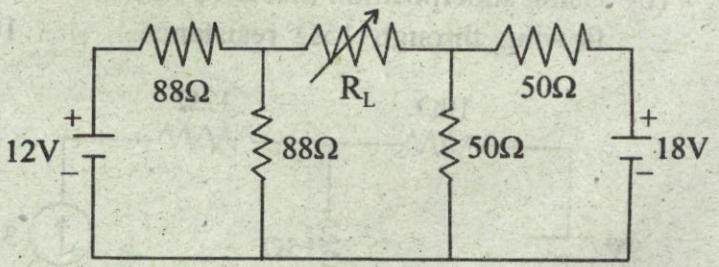
4. (a) Use Thevenin's theorem to verify your answer of the previous question [3(b)]. 10

(b) State and prove maximum power transfer theorem. 10

5. (a) Using Nodal analysis find the load current I_L. 10



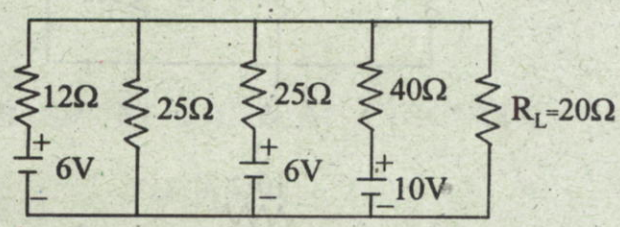
(b) Find the value of R_L which will extract maximum power from the circuit. 10



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

Loop, Mesh, Bilateral circuit, Junction, Node. 10

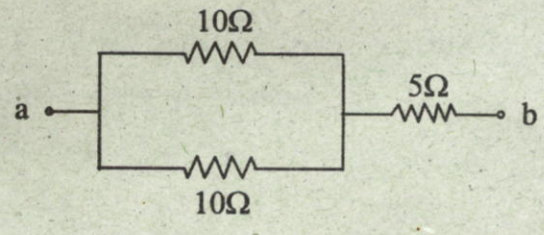
(b) Use Millman's theorem to find out the current flowing through 20Ω resistance. 10



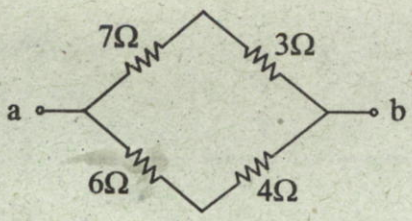
7. Find the equivalent resistance of the following networks between terminals a and b :

5×4=20

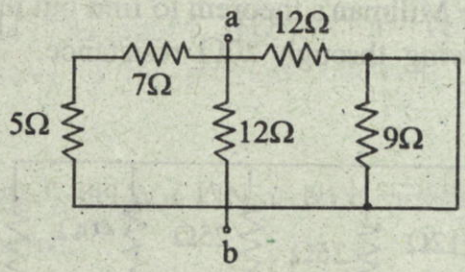
(i)



(ii)



(iii)



(iv)