Total number of printed pages–7

2015

BASIC ELECTRICAL ENGINEERING
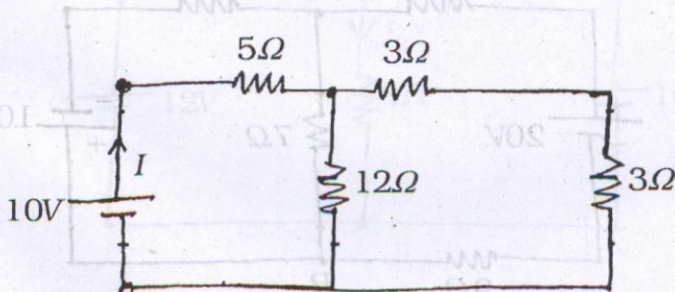
Paper : EE 201

Full Marks : 100

Time : Three hours

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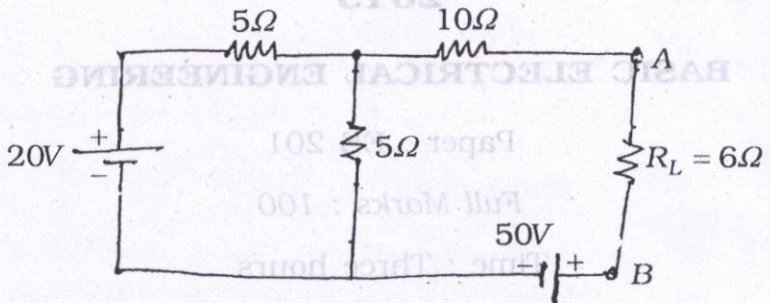full marks for the questions.**

*Answer **any five** questions*

1.   (a)   Explain the Ohm's law. In the following
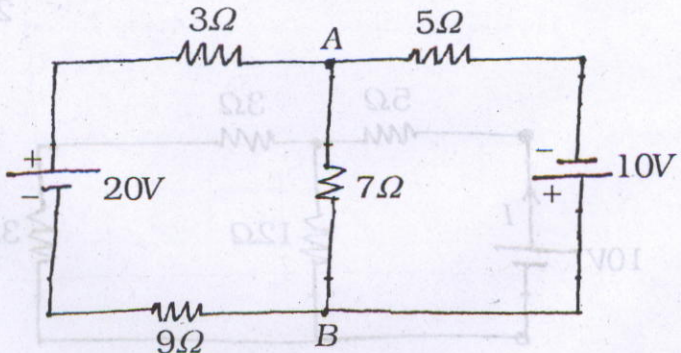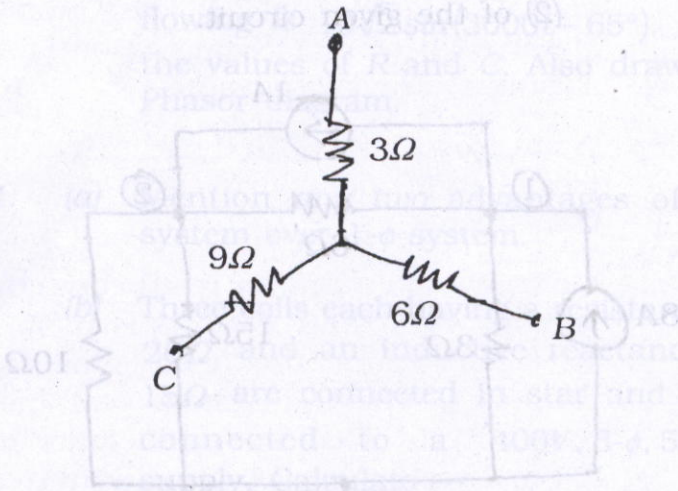circuit, calculate the current I.

2+4=6

(b) Calculate the current flow in the load resistor R_L in the following circuit using Thevenin's theorem. 8
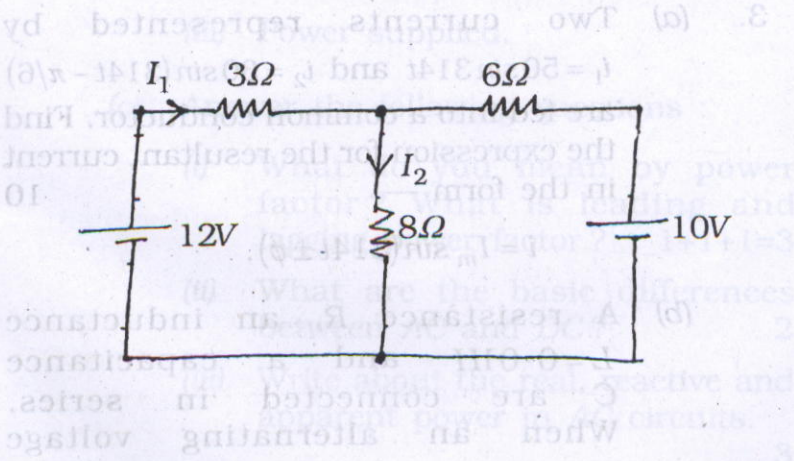

(c) Use superposition theorem to calculate the current in the branch AB having resistance 7Ω in the following network — 6
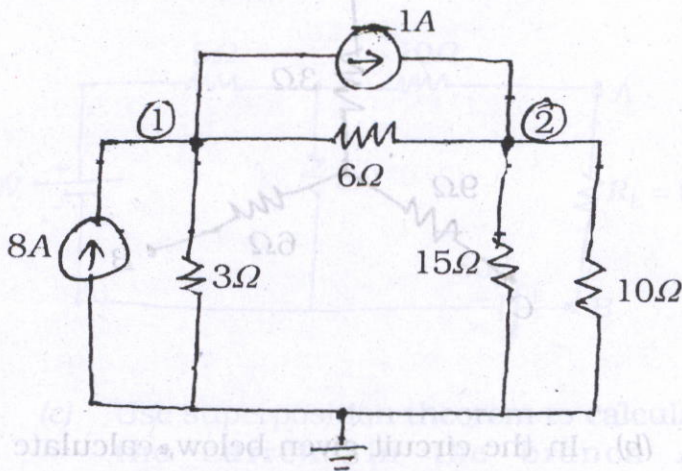
2. *(a)* Convert the following Star to Delta — 5

(b) In the circuit given below, calculate I_1 and I_2 using Kirchhoff's law. 7

(c) Using Nodal analysis, find the node potentials V_1 and V_2 at notes *(1)* and *(2)* of the given circuit.   8

3. *(a)* Two currents represented by $i_1 = 50 \sin 314t$ and $i_2 = 30 \sin(314t - \pi/6)$ are fed into a common conductor. Find the expression for the resultant current in the form —   10

$$i = I_m \sin(314t \pm \phi).$$

(b) A resistance R, an inductance $L = 0 \cdot 01H$ and a capacitance C are connected in series. When an alternating voltage

$v = 400\sin(3000t - 20°)$ is applied to the series combination, the current flowing is $10\sqrt{2}\sin(3000t - 65°)$. Find the values of R and C. Also draw the Phasor diagram.   10

4. (a) Mention *any two* advantages of 3-ϕ system over 1-ϕ system.   2

   (b) Three coils each having a resistance of 20Ω and an inductive reactance of 15Ω are connected in star and it is connected to a $400V$, 3-ϕ, $50Hz$ supply. Calculate —   10

   (i) the line current

   (ii) Power factor and

   (iii) Power supplied.

   (c) Answer the following questions :

   (i) What do you mean by power factor ? What is leading and lagging power factor ?   1+1+1=3

   (ii) What are the basic differences between *AC* and *DC* ?   2

   (iii) Write about the real, reactive and apparent power in *AC* circuits.

                                           3

5. (a) What are the different methods of obtaining the controlling torque in an indicating instrument ? Discuss briefly about each of them bringing out the advantages and disadvantages.   10

(b) Write down the difference between moving iron and moving coil type of instruments.   4

(c) A moving iron voltmeter reads correctly on $200V$ d.c. If $200V$, $50Hz$ ac is applied on it, determine the reading of the voltmeter. The instrument coil has resistance of 300Ω and inductance of $2H$ while the series non-inductive resistance is 1000Ω.   6

6. (a) Define the following :   5
   (i) Magnetic flux density
   (ii) Composite magnetic circuit.

(b) Write the Faraday's Laws of electromagnetic induction and explain.   5

(c) An iron ring has a circular cross-section of $4cm$ in radius and an average circumference of $100cm$. The ring is uniformly wound with a coil of 700 turns. Calculate the current

required to produce a flux of 2m wb in the ring, if the relative permeability of the iron is 900. If a cut 1mm wide is made in the ring, calculate the current which will give the same flux i.e. 2m wb. Neglect leakage. 10

7. (a) Describe the various systems of distribution of electrical energy for internal wiring. 10

(b) What do you mean by grounding or earthing? Explain it with an example. 6

(c) Draw the sketch of a single core low tension cable and level the various parts. 4