BIEE-001

00794

B.Tech. VIEP - ELECTRICAL ENGINEERING - III

Term-End Examination

June, 2011

BIEE-001 : Basics of Electrical Engineering

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any five** questions. All questions carry **equal** marks.*

1. (a) State superposition theorem. Find the current in 4Ω resistance using thevenin's theorem for circuit given in fig 1 a. 7

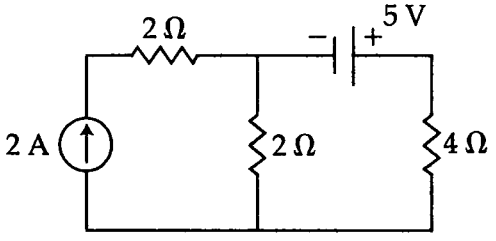


Fig. 1 a

(b) Derive the expression for Star to Delta network transformation. Find the equivalent resistance across terminal A, B in fig 1 b.

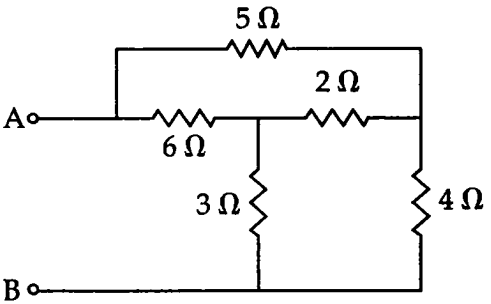
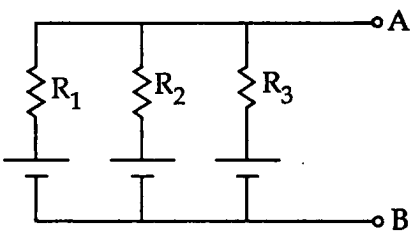


Fig. 1 b

2. (a) What do you mean by primary and secondary cell. Convert the following (fig 2a) Parallely connected batteries into one single battery across A,B terminal.



(Fig. 2 a)

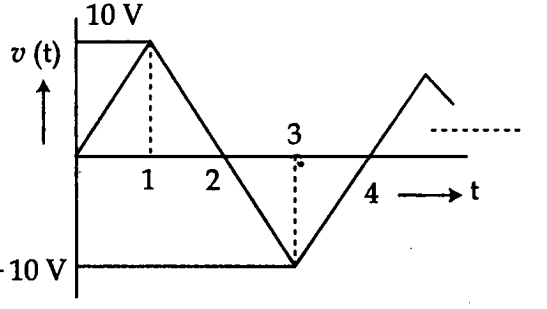
(b) A Iron ring of cross - section area 3 cm^2 having mean diameter of 30 cm, calculate current in coil of 300 turns to produce flux density (through the ring) of 0.2 mWb/m^2. Relative permeability of iron is 800.

(a) Define magnetomotive force, Reluctance and flux density in reference to a magnetic circuit. Give two similarities between electric and magnetic circuit. 7

(b) Derive expression for energy and energy stored in magnetic field. 7

(a) Explain Faraday's law of electromagnetic induction. State Lenz's law for determining the direction of induced emf. 7

(b) Calculate average, RMS value and form factor for following wave form. 7



5. (a) The voltage and current of an RLC series circuit are : 7

$v = 141.4 \text{ Sin}(314t + 45°)\text{V}$

$i = 28.28 \text{ Sin } (314 - 15°)$ A. Find :

(i) RSM value of voltage and current

(ii) Power factor

(iii) Power consumption

(iv) Time period

(v) Resistance in a circuit

(b) Derive condition for parallel RLC resonance circuit. Determine resonance ferquency, draw resonance curve and define Quality factor Q.

6. (a) What are the advantage of 3ϕ system over 1ϕ system. Three identical resistors of 20Ω each are connected in Star to a 415 V, 50 Hz, 3ϕ supply

Calculates :

(i) The total power consumed

(ii) The total power consumed, if they are connected in delta.

(iii) The power consumed, if one of the resistors is opened.

(b) Derive relation between line and phase parameter (Voltage and current) for Star connected system. A balanced delta connected inductive load is supplied from 400V, 50, 3ϕ supply, takes 8 A current in each phase. Calculate :

(i) impedance of each phase,

(ii) Total power for (pf = 0.8)

7. Write short note on following (***any two***)

(a) Improvement of power factor

(b) Power measurement in 3ϕ load

(c) B- H curve

(d) Thevenin's and Norton's theorem