

**B.Tech. VIEP - ELECTRICAL
ENGINEERING - III/BTCSVI/BTECVI/BTELVI**

Term-End Examination

December, 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 and explain Norton's theorem. Find current through $10\ \Omega$ resistance by Norton's theorem (refer fig. 1(a)). 7

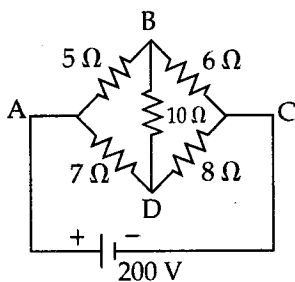


Fig. 1 (a)

- (b) Derive expression for Delta to star network transformation. Find the equivalent resistance between points A-B (refer fig. 1(b)). 7

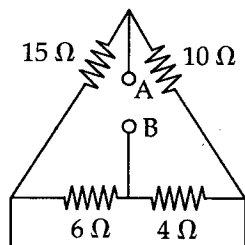


Fig. 1 (b)

2. (a) Explain silver oxide cells charging methods. What do you mean by primary and secondary cells ? 7
- (b) What is magnetic field and magnetic line of force ? State the properties of line of force. Point out the analogy between electric and magnetic circuit. 7
3. (a) An iron ring of 8 cm, mean diameter is made up of round iron ring of diameter 1 cm and permeability of 900, has an air gap of 2 mm wide. It consists of winding with 400 turns carrying of 3.5 A. Determine, 7
 - (i) MMF
 - (ii) Total reluctance
 - (iii) The flux
 - (iv) Flux density in ring

- (b) State the Faraday's law of electromagnetism. 7
What is the difference between dynamically induced emf and statically induced emf.
Derive expression for the magnitude of the dynamically induced e.m.f.
4. (a) Derive expression for energy and energy 7
stored in magnetic field.
- (b) A sinusoidally varying alternating current 7
of frequency 60 Hz has a maximum value of 15 amperes.
- (i) Write down the expression for instantaneous value
- (ii) Find the value of current after $\frac{1}{200}$ sec
- (iii) Find the time to reach 10 ampere for the first time,
- (iv) Find its average value and RMS value.
5. (a) An Inductive coil of resistance $10\ \Omega$ and 7
Inductance $0.1\ \text{H}$ is connected across a $150\ \mu\text{F}$ capacitor to a variable frequency, $200\ \text{V}$ supply. Find the resonant frequency at which the total current taken from the supply is in phase with the supply voltage. Also find the value of this current. Draw the phasor diagram.

- (b) Derive the expression for resonating frequency of series resonance circuit state the characteristic of resonant circuit. What is Q-factor ? 7
6. (a) Each phase of delta connected load has a resistance of 25Ω , and inductor of 0.15 H and a capacitor of $120 \mu\text{F}$. The load is connected across a 400V , 50 Hz , $3 - \phi$ supply. Determine the line current, active power and reactive volt - ampere. 7
- (b) Derive the relationship between a line current and a phase current and a line voltage and a phase voltage related to star connected and delta connected load, also write power relations for three phase system. 7
7. Write short note on *any two* of the following : $7 \times 2 = 14$
- (a) Generation of 3ϕ voltages and Phase Sequence.
- (b) Superposition and Thevenin's theorem.
- (c) Hysteresis loop and B - H curve.
- (d) Principle of self and mutual Induction.
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