

A Government College of Engineering, Aurangabad
(An Autonomous Institute of Government of Maharashtra)

F.E.(NEW) CBCS-EEP Examination

End Semester Examination

EE 1001 Basics of Electrical Engineering

Time: Three Hours

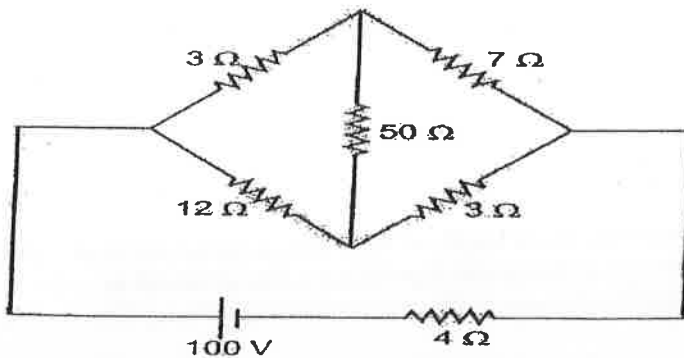
Date: 27 DEC 2016

Max. Marks: 60

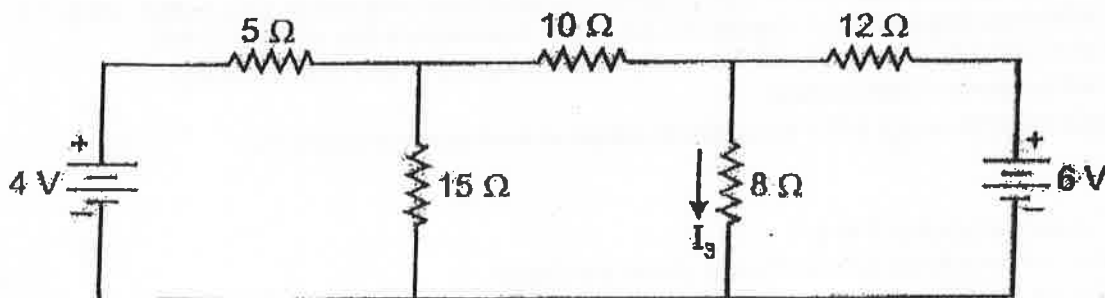
N.B:-

1. Solve any five questions.
2. Figures to the right indicate full marks
3. Assume suitable data if necessary and state it clearly
4. Use of non-programmable calculator is allowed

- Q.1. a) Explain star and delta connection. Derive the expression for equivalent resistance of star to delta conversion. [06]
- b) Apply Mesh Analysis to find the current flowing through $4\ \Omega$ resistance for network shown below [06]



- Q.2. a) By using Superposition theorem, determine current I_3 flowing through $8\ \text{ohm}$ resistance of network as shown below. [06]



- b) State and prove Maximum power transfer theorem as applied to d.c. resistive network. [06]

- Q.3. a) Explain real power, reactive power, apparent power and power factor in detail [03]
- b) Define as related to alternating quantity: (i) Instantaneous value (ii) Periodic Time (iii) Waveform (iv) Amplitude (v) Peak factor (vi) Form factor. [03]
- c) A pure resistance R, a choke coil and a pure capacitor of $15.91 \mu\text{F}$ are connected in series across a supply voltage of V volts and carry a current of 0.25 Amp. The voltage across choke is 40 V, voltage across capacitor is 50 V and voltage across resistance is 20 V. The voltage across combination of R and choke coil is 45 V. Calculate (i) Supply voltage (ii) Frequency of supply (iii) Power loss in choke coil. [06]
- Q.4. a) Derive the relation between phase – line voltage and current for balanced three phase delta connected load. Also find total active power and draw the vector diagram. [06]
- b) A sinusoidal wave of frequency 50Hz has its maximum value of 9.2 Amperes. What will be its value at (a)0.002 sec after the wave pass through zero in positive direction .(b)0.0045 sec. after the wave passes through positive maximum. Show the values of current in a neat sketch of the wave form. [06]
- Q.5. a) Define coefficient of self and mutual inductance of the coils and hence state the factor affecting the value of self inductance of coil. [06]
- b) A coil of N turns is wound on a cast iron ring which has mean length of 50cm and its cross section is of 4cm diameter. The current flowing through the coil is 2Amp which produces a flux of 6mwb in the air gap of 2mm length. If the relative permeability of iron is 1000, calculate number of turns N. [06]
- Q.6. a) Two coils A and B are placed such that 40% of flux produced by coil A links with coil B. Coil A and B have 2000 and 1000 turns respectively. A current of 2.5A in coil A produces a flux of 0.035 mWb in coil B. Find (i) Mutual inductance of coil, (ii) The coefficient of coupling K, (iii) Self inductance. [06]
- b) Compare electric and magnetic circuit in detail [03]
- c) Explain in detail how monthly energy bill is calculated by taking at least eight appliances for measurement. [03]
- Q.7. Write a short note on following (Any Three) [12]
- a) Principle of operation, constructional details of single phase transformer.
- b) Principle of operation of DC Motor.
- c) Necessity of earthing
- d) Mercury vapor lamp
- e) Source conversion