Dr. Babasaheb Ambedkar Technological University,Lonere

B. Tech First Year (CHEM/CIVIL/MECH/PETRO)
End Semester Examination
Subject: - BASIC ELECTRICAL ENGINEERING (Supplementary)

Time: 3 Hrs **Semester:-I** **Date-** 26/12/17

MARKS : 60

Instructions:

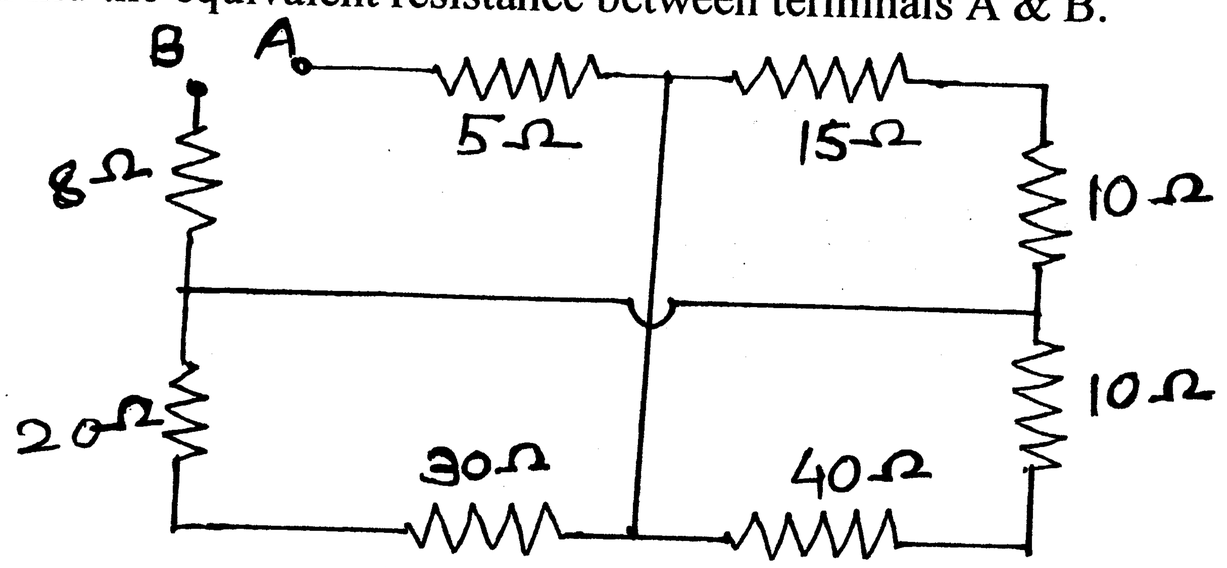
1. Attempt any Five questions from Q. 1 to Q. 6 .
2. Illustrate your answers with neat sketches, diagrams etc. wherever necessary.
3. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

Q 1 **a)** Explain the Concept of Potential Difference, Current & Resistance. Also derive the expression for equivalent Resistance when three resistances are connected in Parallel. **6**

b) Determine the current flowing at the instant of switching a 100 W lamp on 230 V supply. The ambient temperature is 25 °C. The filament temperature is 2000°C and the resistance temperature coefficient is 0.005/°C at 0°C. **6**

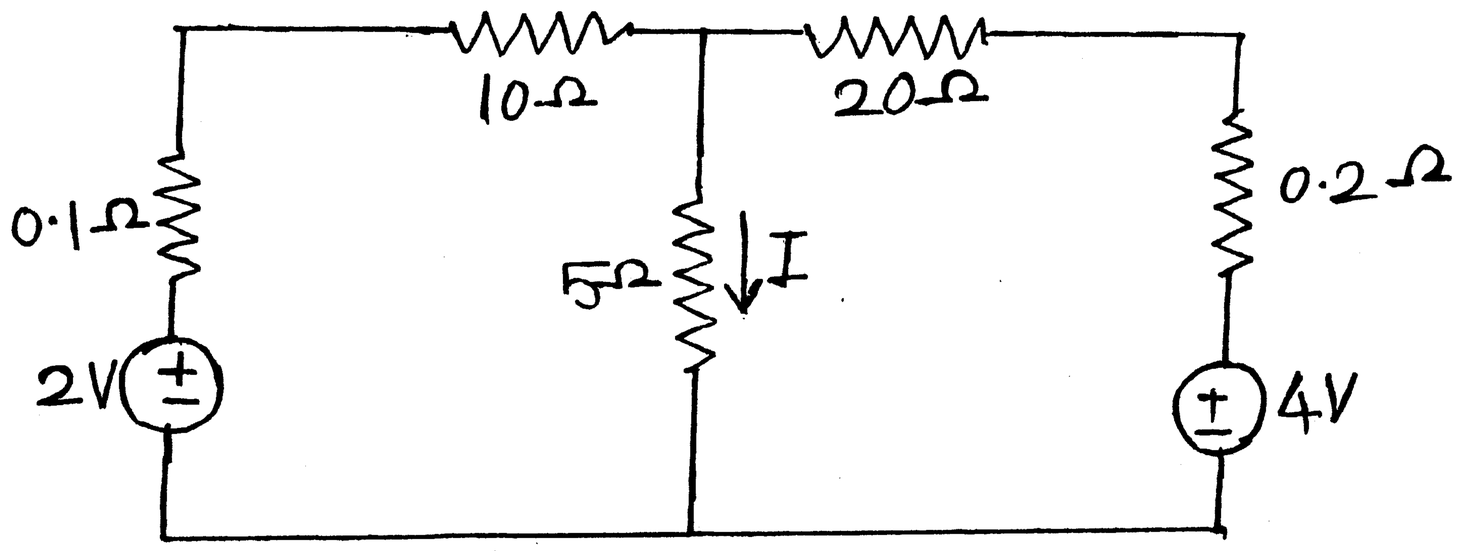
OR

c) Find the equivalent resistance between terminals A & B. **6**



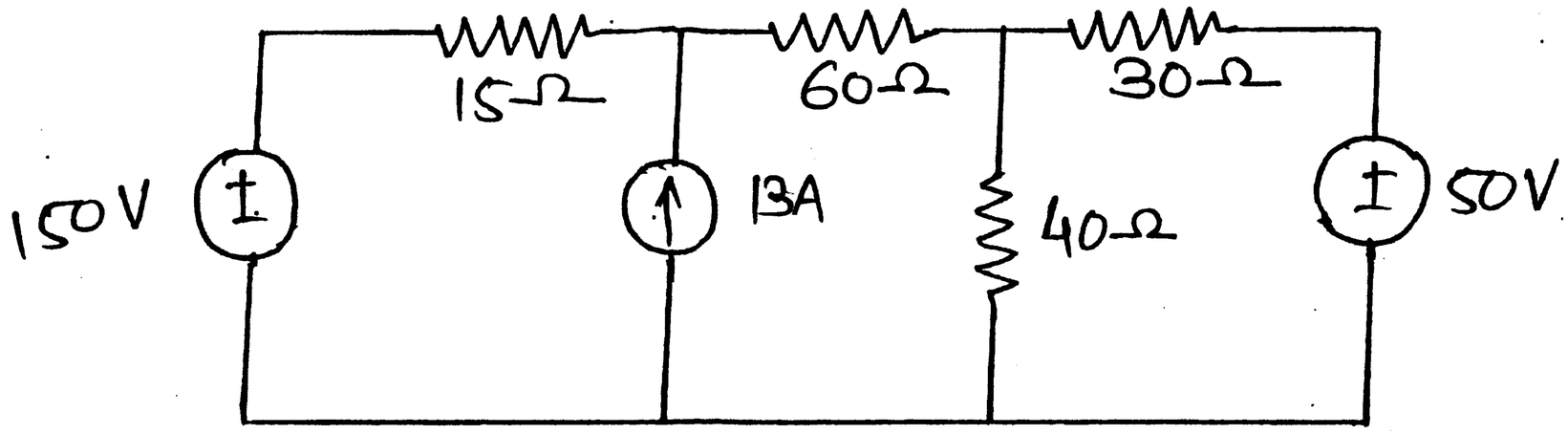
Q 2 **a)** State and prove Maximum Power Transfer Theorem. **6**

b) Determine the current through 5Ω using Superposition theorem. **6**



OR

c) Determine the Thevenin's equivalent network & hence find the current through 30 Ω. **6**



Q 3 a) Explain AC circuit with Pure Capacitance . Derive equations for Average Power and Instantaneous Power. **6**

b) Four wires p, q, r, s are connected to a common point . The currents in lines p, q, r, are $6\sin(\omega t + 60°)$, $5\cos(\omega t + 60°)$ & $3\cos(\omega t + 60°)$ respectively. Find the current in wire "s". Draw all the phasors. **6**

Q 4 a) Explain series R-L circuit with neat labelled diagram & waveform. Draw the Impedance triangle and Power triangle for the same circuit. **6**

b) When an Inductive coil is connected to a Dc supply at 240 V , the current in it is 16 Amp. When the same coil is connected to AC AC supply at 240 V, 50 Hz, the current is 12.27 Amp. Calculate **6**
1. Resistance 2. Impedance 3. Reactance & 4. Inductance of the coil.

Q 5 a) State and explain Faraday's law of Electromagnetic Induction. **6**

b) A 50 cm long conductor is moved in a uniform magnetic field with a constant velocity , in a direction perpendicular to the field. The density of the filed is 0.5T and emf developed in the conductor is 2.5 V. This conductor is a part of Electric circuit having a resistance of 0.25 Ω. Find – **6**
1. Velocity of the conductor 2. Force acting on the conductor & 3. Work done, when conductor covers a distance of 5 m in 0.5 seconds.

Q 6 a) For a Transformer , explain the terms – **6**
1. Turns Ratio 2. Voltage Ratio 3 Transformation Ratio 4. Rating of a Transformer

OR

b) Define Efficiency. Derive the condition for maximum efficiency in transformer. **6**

c) A step down transformer operates on a 50 Hz AC supply with a primary voltage of 230 V . The cross sectional area if the core is 50 cm^2 . Calculate- **6**
1. The maximum flux
2. The maximum flux density
3. Voltage induced in the secondary side
Assume primary and secondary turns to be 500 & 250 resp.

— × —