

A Government College of Engineering, Aurangabad
 (An Autonomous Institute of Government of Maharashtra)
F.E.(REVISED) (CE/ME/EEP) Examination
 End Semester Examination
EE 143: Basics of Electrical Engineering

Time: Three Hours

Date: 2 DEC 2016

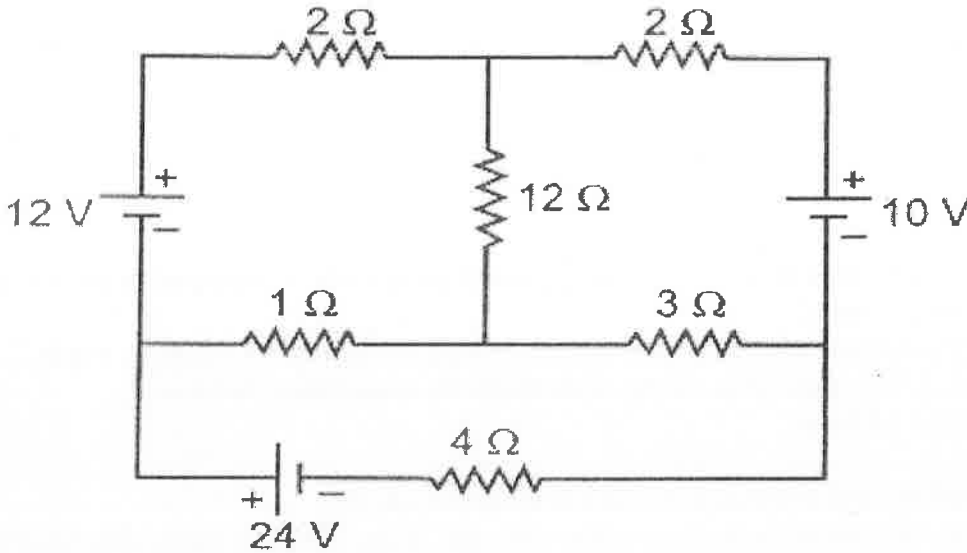
Max. Marks: 60

N.B:-

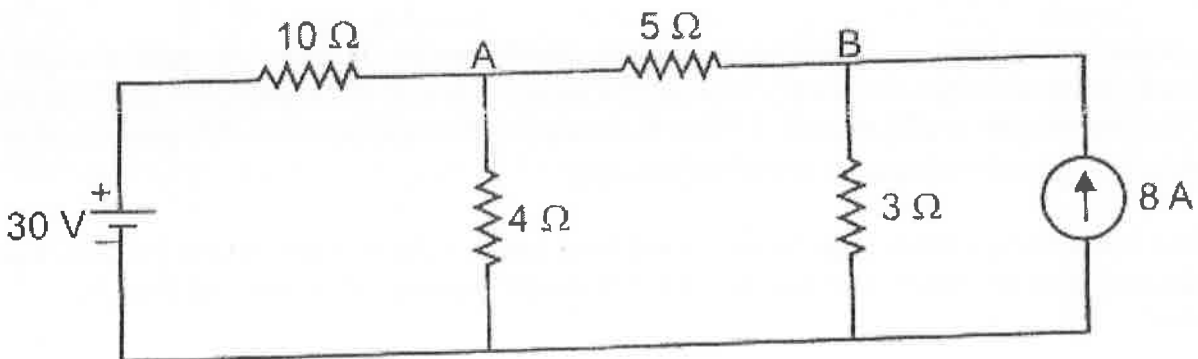
1. Solve any five questions.
2. Figures to the right indicate full marks
3. Assume suitable data if necessary and state it clearly
4. Use of non-programmable calculator is allowed

Q.1. a) Define capacitance. Derive the expression for voltage across capacitor of R- C circuit connected across d. c. supply; also define time constant for R-C circuit. [06]

b) Find the current flowing through $4\ \Omega$ resistance by Mesh Analysis. [06]

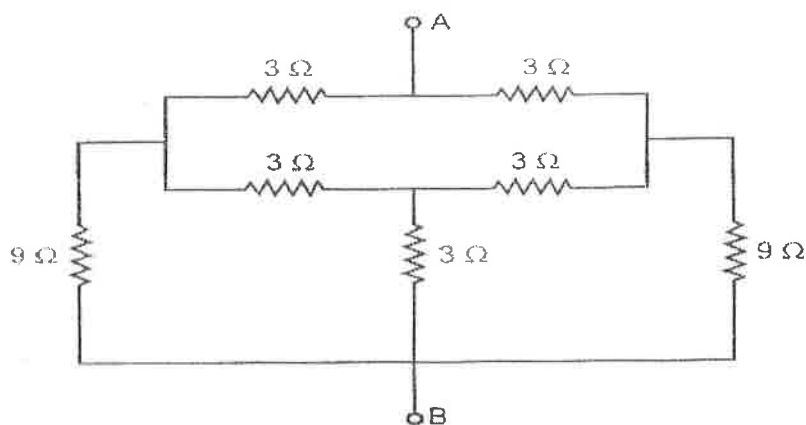


Q.2. a) Determine the current flowing through $5\ \Omega$ resistance by Thevenin's theorem. [06]



Q.2. b) Find the equivalent resistance across the terminals A and B.

[06]



Q.3. a) Compare electrical and magnetic circuits.

[06]

b) A e.m.f. given by $v=100\sin 100\pi t$ is impressed across a circuit consists of resistance of 40Ω in series with $100\mu\text{F}$ capacitor and 0.25 H inductor. Determine (i) RMS value of current, (ii) power consumed (iii) power factor.

[06]

Q.4. a) Prove that three phase balanced load draws three times as much power when connected in delta as it would draw when connected in star.

[06]

b) A balanced 3-phase star connected load of 120 kW takes a leading current of 100 ampere , when connected across 3-phase, 3.3 kV , and 50 Hz supply. Determine the impedance, resistance, capacitance and power factor of load.

[06]

Q.5. a) Explain term magnetic leakage and fringing as related to magnetic circuit.

[03]

b) Define coefficient of self and mutual inductance of the coils and hence state the factor affecting the value of self inductance of coil.

[03]

c) Two circuits having impedances $z_1 = 10 + j15\ \Omega$ and $z_2 = 6 - j8\ \Omega$ are connected in parallel. If total current supplied is 15 A . Find (i) Branch currents, (ii) Power consumed in each branch (iii) Phasor diagram.

[06]

Q.6. a) A ring shaped core is made up of two parts of same material. Part one is a magnetic path of length 25 cm and with cross-sectional area 4 cm^2 , whereas part two is of length 10 cm and cross-sectional area 6 cm^2 . The flux density in part two is 1.5 Tesla . If the current through the coil is 0.5 Amp , calculate number of turns of coil. Assume $\mu_r=1000$ for material.

[06]

b) A 50 Hz sinusoidal current has peak factor 1.4 and form factor 1.1 . Its average value is 20 Amp . The instantaneous value of current is 15 Amp at $t=0\text{ sec}$. Write the equation of current and draw its waveform.

[06]

Q.7. Write a short note on following (any Three)

[12]

i) Types and application of single phase transformer.

ii) Mercury vapour lamp

iii) Types of wirings systems

iv) Compare shell and core type transformers

v) Expression for Coefficient of coupling of two mutually coupled coils.