FE | Sem - I (Rev.) 18/6/12
BEE

(Two Papers due to re-exam) 18/06/2012- original paper

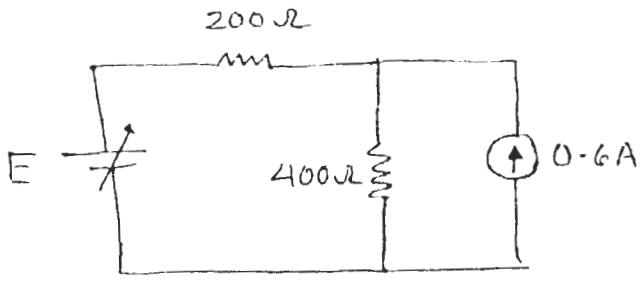
GN-1048

(3 hours) [Total Marks: 100

N.B. 1) Question No 1 is compulsory and solve any four questions from remaining six.
2) Assume suitable data if required and mention that assumption while solving that question.
3) Figures to the right indicate full marks.

Q1 Any Four. (20)

A) To what voltage should adjustable source E be set in order to produce a current of 0.3 A in 400 ohms resistor.

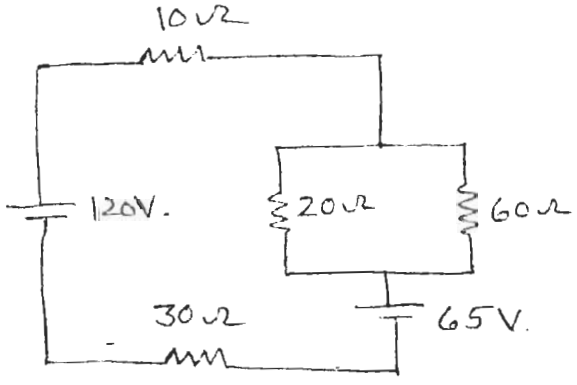


B) A series RLC circuit is connected to the ac voltage source $v(t) = 24\sin(1000t + 20^{\circ})$ V. If R = 15 ohms and L = 0.1 H, what value of capacitance C is required to make the phase angle between v(t) and i(t) in the circuit equal to zero degrees.

C) Explain two wattmeter method for measurement of 3 – phase power.

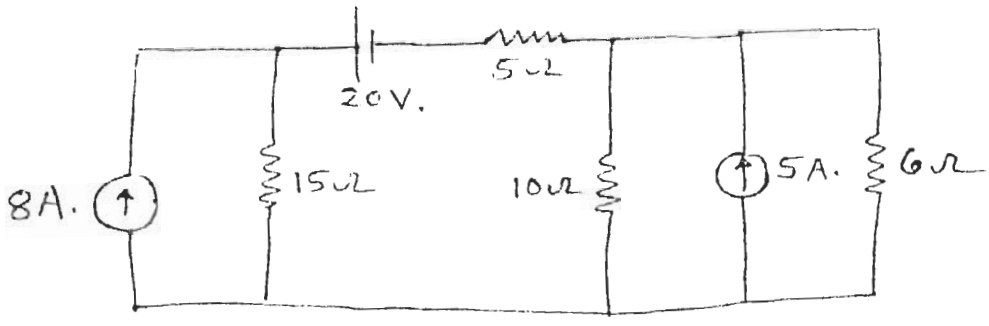
D) A 50 KVA,2200/440 V, 50 Hz single phase transformer has primary turns of 200.Determine 1)flux in core 2) secondary turns 3) rated primary current 4) rated secondary current.

E) Find the current which flows through 20 ohms resistor.

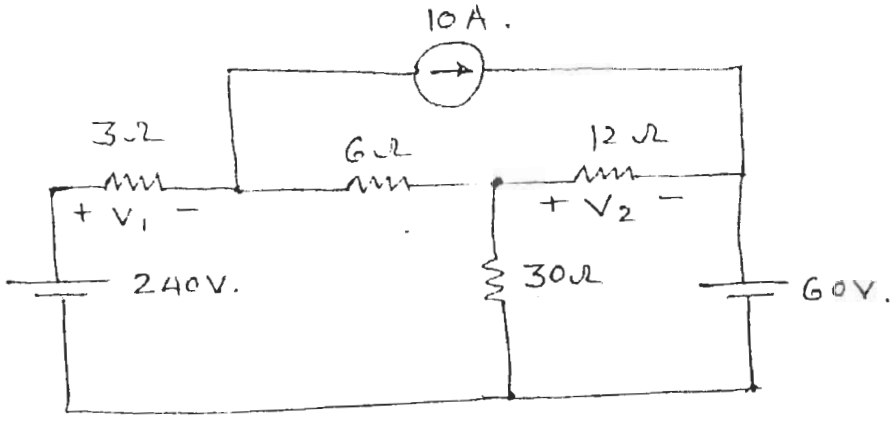


Q2 A) Find the current through 6 ohms resistor using Thevenin's Theorem for the given circuit. (12)

Verify the same using Superposition Theorem.



B) Use Nodal Analysis to determine 1) V_1 and V_2 2) Power absorbed by 6 ohms resistor. (08)



Q3 A) Two practical coils A and B are connected in series and excited by single phase ac supply (10) of 240 V, 50 Hz. Input from the supply to the circuit is 3 KW and 2 KVAR. If resistance of coil A is 5 ohms and inductance of coil B is 15 mH then calculate

1. Inductance of coil A
2. Resistance of coil B
3. Voltages across both the coils.

B) Three impedances are connected in parallel across 60Sin(wt) voltage source Vs. (10) Z1 = 50 ohms, Z2 = j40 ohms and Z3 = -j80 ohms. Find currents in each impedance, show that total current = voltage*total admittance. Also draw phasor diagram showing Vs , i_1, i_2, i_3, i_T.

Q4 A) 33 ohms resistance, 10 mH inductor and 0.1 micro farads capacitor is connected in series and excited by a supply voltage Vs = 13.2+j0 . V Find (10)

1. The resonant frequency in Hertz
2. Value of quality factor Q.
3. Polar forms of current and voltages across R, L and C at resonance.
4. Draw a phasor diagram showing all quantities in 3.

B) In a 50 KVA, 1100/220 V transformer, the iron and copper losses at full load are 350 W and 425 W respectively. Calculate the efficiency at (10)

1. Full load with unity power factor
2. Half load with unity power factor.
3. Full load with 0.8 pf lagging.

Also determine the maximum efficiency and the load at which maximum efficiency occurs assuming the load to be resistive.

Q5 A) A 5 KVA, 400/200 V ,50 Hz, single phase transformer gave the following results during open and short circuit tests, (10)

O.C. Test : 400 V , 1 A , 60 W ..... (H.V.Side)

S.C. Test : 15 V , 12.5 A, 50 W ..... (H.V.Side)

Calculate

1. No load parameters R_o and X_o.
2. Equivalent resistance and reactance referred to high voltage side.
3. Regulation at full load and 0.8 pf lagging.
4. Iron and copper losses at full load.
5. Efficiency at half load and 0.8 pf lagging.

B) Three inductive coils each with a 15 ohms resistance and 0.03 H of inductance are connected a) in star and b) in delta, to 3 – phase 400 V , 50 Hz supply. Calculate for each of the case (10)

1. Phase and line currents.
2. Total power absorbed.

Q6 A) Draw experimental set-up to plot Input/Output characteristics of CE BJT amplifier. Explain the characteristics and draw it. (08)

B) Draw and explain construction and working of D.C shunt Motor. Explain its characteristics and applications. (10)

C) Define RMS value in alternating waveforms. (02)

Q7 A) How is rotating magnetic field is produced in 3- phase Induction Motor. What is a slip in Induction Motor. (10)

B) Explain full wave bridge rectifier with resistive load. Find the expression for average voltage and rectifier efficiency. What is ripple factor. (10)

Con. 3667-12.

FE | sem - I (REV) 26/5/12 BEE

GN-4907

(3 Hours) [Total Marks : 100

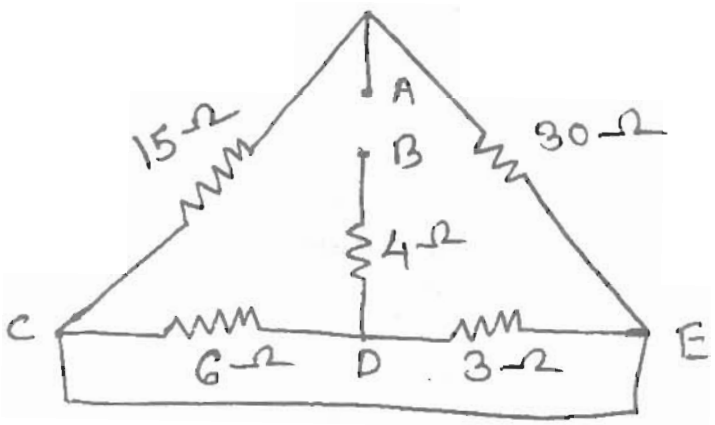
N.B. (1) Question No. **1** is **compulsory.**
(2) Attempt any **four** questions out of remaining **six** questions.

1. (a) Derive the relationship between Phase and Line voltages and currents for a star connected balanced load across a three-phase balanced system. **5**

(b) Four wires p, q, r and s are connected to a common point. The currents in the lines p, q and r are $6 \sin\left(wt + \frac{\pi}{3}\right)$, $5 \cos\left(wt + \frac{\pi}{3}\right)$ and $3 \cos\left(wt + \frac{\pi}{3}\right)$. Find the current in wire s. **5**

(c) Differentiate between Ideal and Practical transformers. **5**

(d) Calculate the effective resistance R_{AB} of given network. **5**



2. (a) Explain the input and the output characteristics of transistor in common emitter configuration. **10**

(b) A circuit has L = 0·2 H and inductive resistance 20 Ω is connected in parallel with 200 μF capacitor with variable frequency, 230 V supply. Find the resonant frequency at which the total current taken from the supply is in phase with supply voltage. Also find the value of this current. Draw the phasor diagram. **10**

3. (a) Each phase of three phase delta connected load has an impedance of $Z_{ph} = (50 \angle 60)\Omega$. The line voltage is 400 V. Calculate the power consumed by each phase and the total power. What will be the readings of the two wattmeters connected to measure the power ? **10**

(b) Draw the circuit diagram for bridge rectifier. Explain it and deriv equations for I_{dc}, I_{rms}, V_{dc} and η. **10**

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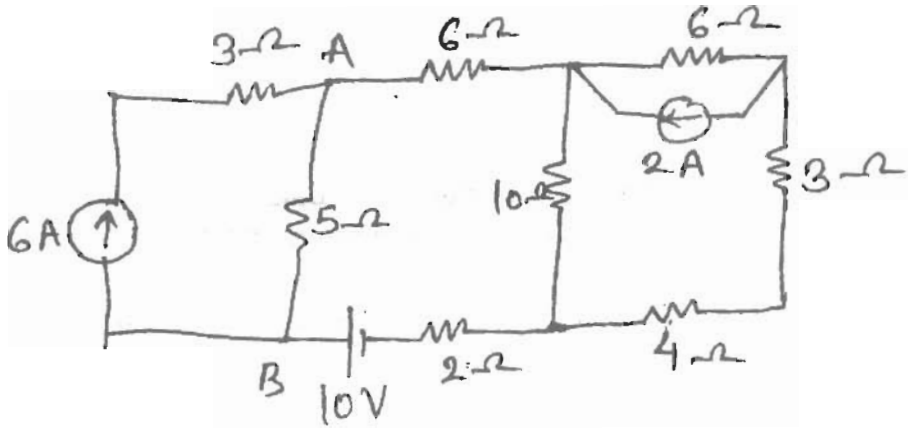
4. (a) Explain how rotating magnetic field is produced in 3-phase induction motor. **10**
   (b) By Norton's Theorem, find the current in 5Ω resistor. **10**



5. (a) Open circuit and short circuit tests on 5 kVA, 200/400 V, 50 Hz, single-phase transformer gave the following test results :— **10**

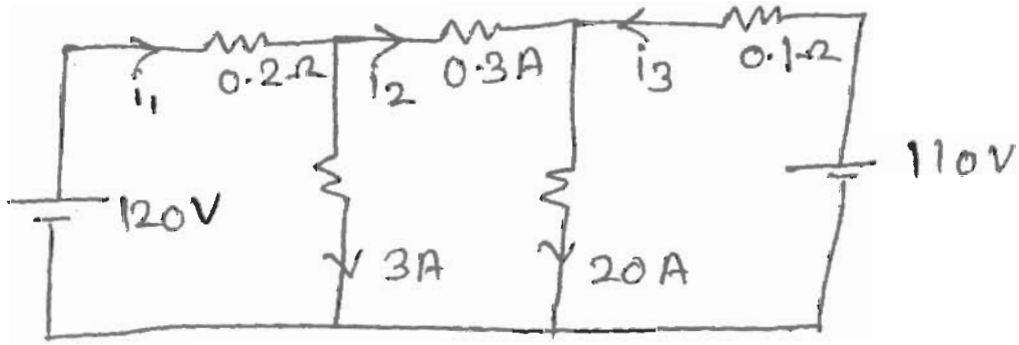
OC test	200 V	1 A	100 W
SC test	15 V	10 A	85 W

   (i) Draw the equivalent circuit referred to prim.
   (ii) Calculate the % η at 80% load, 0·8 p.f.

   (b) Explain how two wattmeters can be used to measure power and power factor in a 3ϕ balanced star connected load with lagging pf. **10**

6. (a) A coil of 0·6 p.f. is in series with a 100 μF capacitor and is connected to a 50 Hz supply. The potential difference across the coil is equal to the potential difference across the capacitor. Find the inductance and resistance of the coil. **10**
   (b) Three identical coils, each having a resistance of 10 Ω and an inductive reactance of 10 Ω are connected in delta, across 400 V, 3 ϕ supply. Find the line current and readings on each two wattmeter connected to measure the power. **10**

7. (a) By Nodal Analysis, find I_1, I_2, I_3. **10**



   (b) Write short notes on following :— **10**
   (i) Construction, classification and application of DC motor.
   (ii) Maximum Power Transfer Theorem.