2017-12-15 11:00 am - 02:00 pm T0121 - F.E.(SEM I)(ALL BRANCHES) (CBSGS) / T1863 - Basic Electrical & Electronics Engineering.

Q. P. Code: 25774

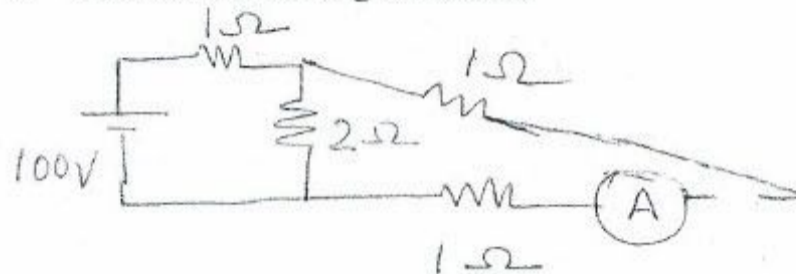**TOTAL MARKS: 80**   TIME: 3hrs

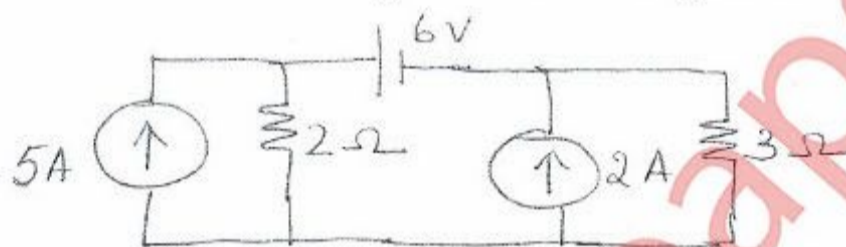**NB**
1) Question No. 1 is compulsory.
2) Answer any three questions out of remaining five questions.
3) Assumption made should be clearly stated.
4) Answer to questions should be grouped together and written together.


Q1 a. Find current through ammeter   3

   b. Find the current through 3 Ω resistor using source transformation   3


   c. Two voltage sources have equal emfs and phase difference α . When they   3
       are connected in series the voltage is 200 V. When one source is reversed
       the voltage is 15 V. Find their emfs and phase angle.

   d. Derive the equation of resonance frequency of a R-L-C series resonance   3
       circuit. What will be the power factor under this condition?

   e. Draw power triangle for a three phase balanced inductive load and mark   2
       its all sides along with units

   f. Derive the emf equation of a single phase transformer.   4

   g. Draw the input and output voltage waveform of a full wave rectifier.   2

Q2 a. Using Nodal analysis find current through 6 Ω resistor.   6

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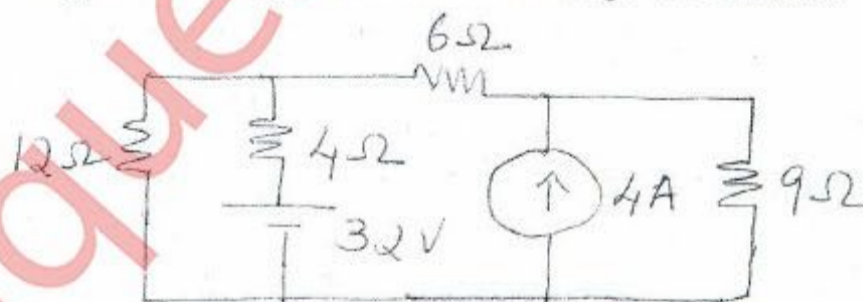
b. Find current through Z_1 and total current. Also calculate the power and power factor of the entire circuit and supply voltage.   8
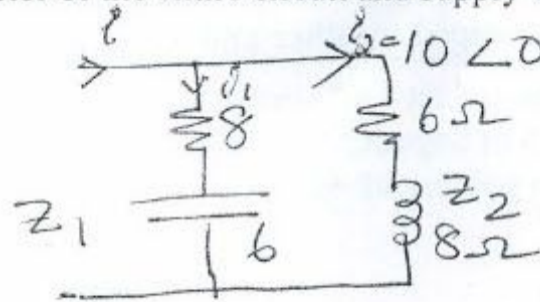
c. Draw phasor diagram of a single phase transformer connected to a resistive load.   6

Q3 a. The circuit shown in figure is supplied by a 240 V, three phase, 4 wire system.   8
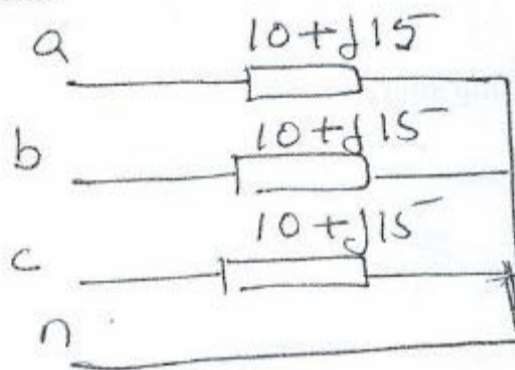
1. Determine line and phase currents
2. Draw neat phasor diagram showing the relationship between phase and line quantities.
3. Is the system balanced or not justify
4. Find active power, reactive power and apparent power

b. A 5 kVA, 100/400 V, 50 Hz single phase transformer gave the following test results.   6
Open circuit test(L.V side): 100 V, 0.7 A, 60 W
Short circuit test(H.V side): 22 V, 16A, 120 W
Draw equivalent circuit referred to LV side

c. With neat circuit diagram and characteristics explain the input and output characteristics of a CE transistor configuration.   4

d. Draw the circuit diagram and output voltage waveform of a full wave center tapped rectifier with capacitor filter.   2

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Q4 a. Find current through 20 Ω using Thevenin's Theorem.   7
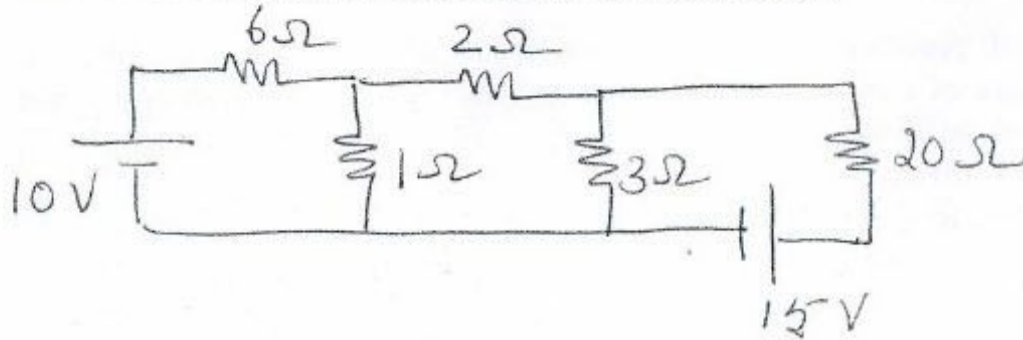

b. In a balanced three phase star connected circuit power is measured by two wattmeter. Draw circuit diagram indicating clearly the wattmeter connection and the phasor diagram   4

c. An alternating current is given by   5
$$i(t) = 300\sin(50\pi t + \frac{\pi}{3})$$
What is the maximum value of current, frequency and time period? What is the rms value and average value of this equation.

d. Derive rectification efficiency and ripple factor of a full wave bridge rectifier.   4

Q5 a. Calculate the load resistance which can abstract maximum power and also calculate the maximum power.   8
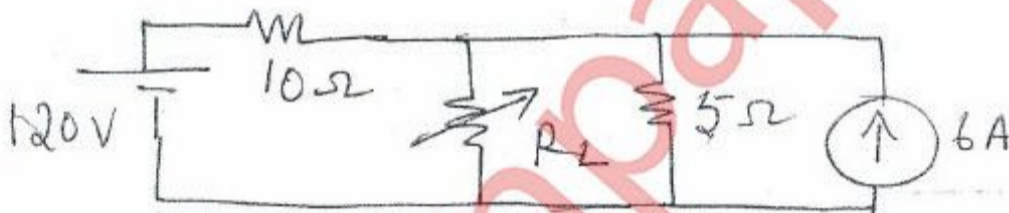
b. Current flowing through an inductive circuit is   4
$i(t) = 15\sin(\omega t + \frac{\pi}{4})$ when the voltage across it is $30\cos\omega t$ find the power factor of the circuit

c. Develop complete equivalent circuit of a single phase transformer   8

Q6 a. Find current through 10 Ω resistor using superposition theorem.   7
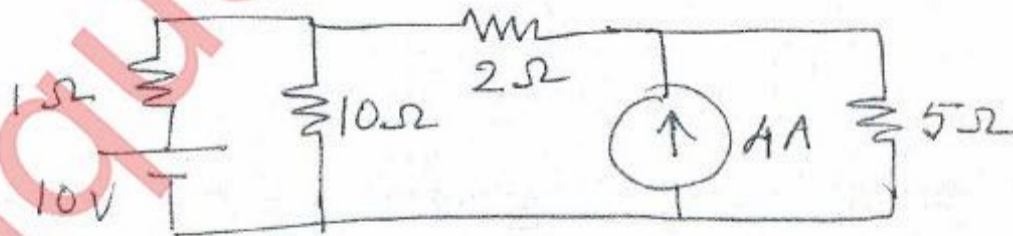
b. A coil of resistance 2 Ω and inductance of 0.07 H. Calculate the 7
capacitance of a capacitor required to produce resonance when connected
in parallel with the coil across a 230 V, 50 Hz supply. What is the Q
factor and current?

c. Two wattmeters are connected to measure power in a three phase circuit. 6
The reading of one wattmeter is 7 kW when load power factor is unity. If
the power factor of the load is changed to 0.707 lagging without changing
the total input power, calculate the reading of two wattmeters

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