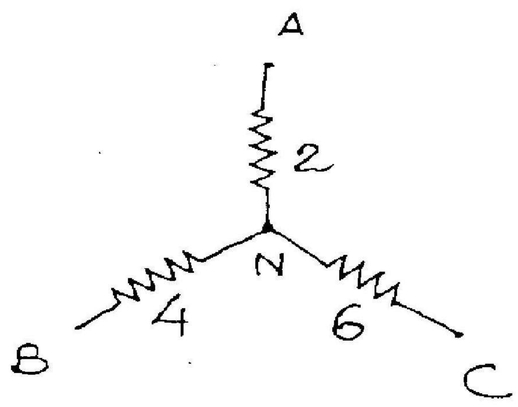
F.E. Sem-I (CBGS) M/J-2015 BEE 22/5/2015

**(REVISED COURSE)** QP Code : **1015**

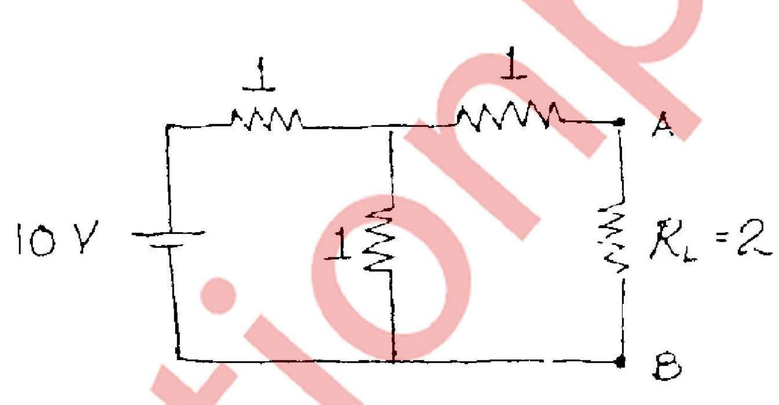
(3 Hours) [ Total Marks : 80

N.B. : (1) Question no. 1 is **compulsory.**
(2) Attempt any **three** questions from the remaining **five.**
(3) **Figures** to the **right** indicate **full** marks.
(4) Wherever **not** mentioned **values** of resistance is in **ohms.**
(5) **Assume** suitable **data** if **necessary.**

1. (a) Convert the star circuit into its equivalent delta circuit. 3




(b) For the given circuit find the Norton equivalent between points A and B. 3




(c) Draw an a.c. waveform, indicate there on and explain (i) instantaneous value, (ii) peak value and (iii) time period for one cycle of the alternating quantity 3

(d) Differentiate between series and parallel resonance with respect to 3
(i) Impedance at resonance
(ii) Current at resonance
(iii) Magnification factor

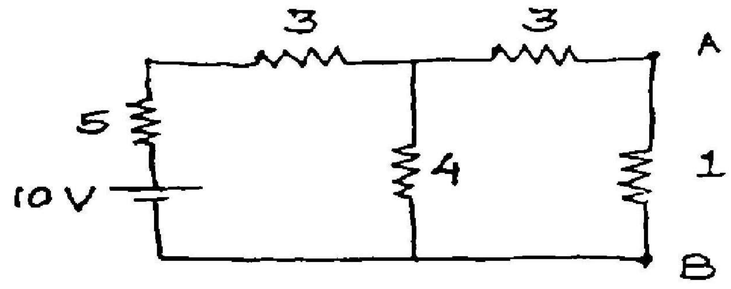
(e) Draw the phasor diagram for 3 phase delta connected load with a lagging power factor. Indicate line and phase voltage and currents. 2

(f) Derive the emf equation for a single phase transformer. 4

(g) Draw a neat circuit diagram for a full wave bridge rectifier using 4 diodes and the corresponding input and output waveforms for voltage. 2

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2. (a) Find the current through 1Ω resistance using Mesh Analysis. 6




(b) A coil having a resistance of 10Ω and an inductance of 40 mH is connected to a 200V, 50 Hz supply. Calculate the impedance of the coil, current, power factor and power consumed. 8

(c) Draw the phasor diagram of a transformer on no load and explain the various currents and voltages in it. 6

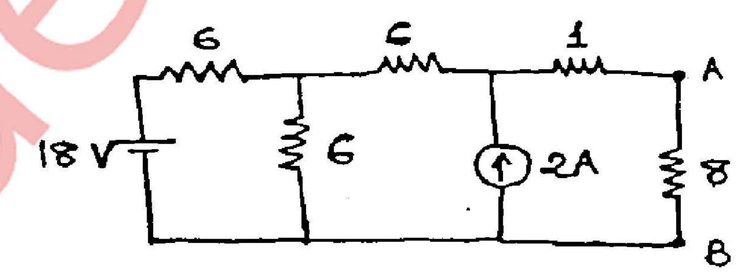
3. (a) Three similar coils each having a resistance of 10Ω and inductance of 0.04 H are connected in star across a 3 phase, 50 Hz, 200V supply. Calculate the line current, total power absorbed, reactive volt amperes and total volt amperes. 8

(b) With the help of a neat diagram explain how short circuit test is conducted on a single phase transformer 6

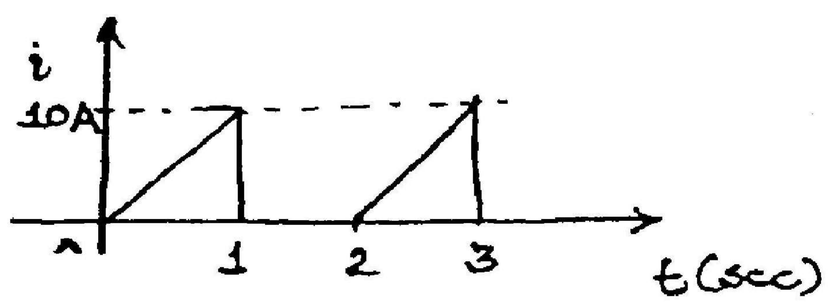
(c) Draw the circuit diagram of a full wave centre tapped rectifier with capacitor filter and the corresponding input and output waveforms. 2

(d) With the help of a neat diagram explain the output characteristics of an NPN transistor in common emitter configuration 4

4. (a) Using source transformation find the current flowing through the 8Ω resistance 7



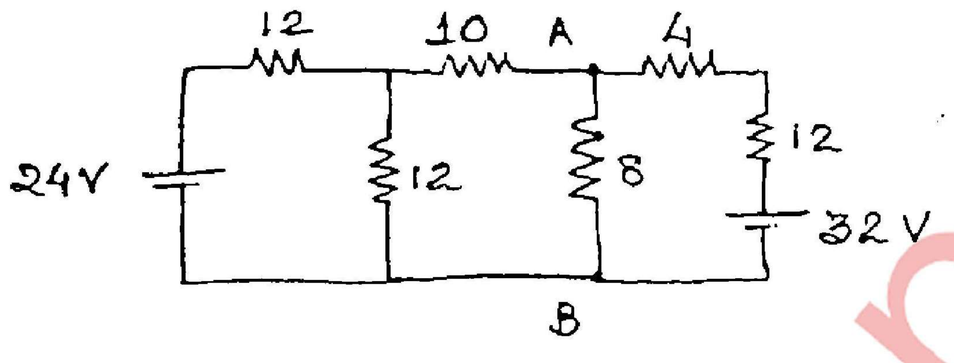

(b) Find the rms value for the given waveform 5



(c) Two wattmeters are used to measure power in a 3ϕ balanced delta connected load using two wattmeter method. The readings of the 2 wattmeters are 500 W and 2500W respectively. Calculate the total power consumed by the 3ϕ load and the power factor 4

(d) With the help of a neat circuit diagram and input and output waveforms explain the working of a half wave rectifier. 4

5. (a) Find the current through 8Ω resistance using Thevenin's theorem 8



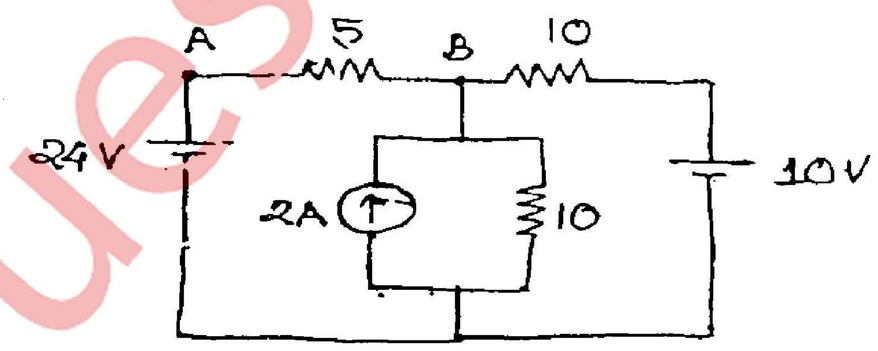

(b) A resistance of 10Ω and a pure coil of inductance 31.8 mH are connected in parallel across 200V, 50 Hz supply. Find the total current and power factor. 4

(c) A 5kVA, 1000/200V, 50 Hz, single phase transformer gave the following test results. 8

| | | | |
|---|---|---|---|
| OC test (hv side): | 1000V | 0.24 A | 90W |
| SC test(hv) side: | 50V | 5A | 110W |

Calculate the equivalent circuit parameters of the transformer and draw the equivalent circuit diagram.

6. (a) Find the value of current flowing through the 5Ω resistance using superposition theorem. 7




(b) A series RLC circuit has the following parameter values: R= 10Ω , L=0.014H, C= 100μF Compute the resonant frequency, quality factor, bandwidth, lower cut-off frequency and upper cut-off frequency. 7

(c) With the help of a neat circuit diagram and phasor diagram explain the 2-wattmeter method to measure power in a 3ϕ balanced star connected load. 6