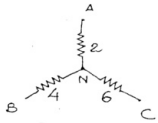
F.E. Sem.I (CBGS) M/J-2015 BEE 22/5/2015

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

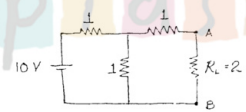
(3 Hours) [Total Marks : 80

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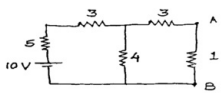
2. (a) Find the current through 1Ω resistance using Mesh Analysis. 6



(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

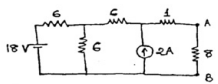
3. (a) Three similar coils each having a resistance of 10Ω and inductance of 0.04 H are connected in star across a 3 phase, 50 Hz, 200V supply. Calculate the line current, total power absorbed, reactive volt amperes and total volt amperes. 8

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

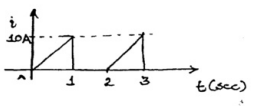
(c) Draw the circuit diagram of a full wave centre tapped rectifier with capacitor filter and the corresponding input and output waveforms. 2

(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



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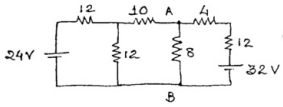
(c) Two wattmeters are used to measure power in a 3ϕ balanced delta connected load using two wattmeter method. The readings of the 2 wattmeters are 500 W and 2500W respectively. Calculate the total power consumed by the 3ϕ load and the power factor 4

(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

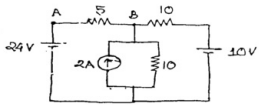
(c) A 5kVA, 1000/200V, 50 Hz, single phase transformer gave the following test results. 8

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