

(REVISED COURSE)

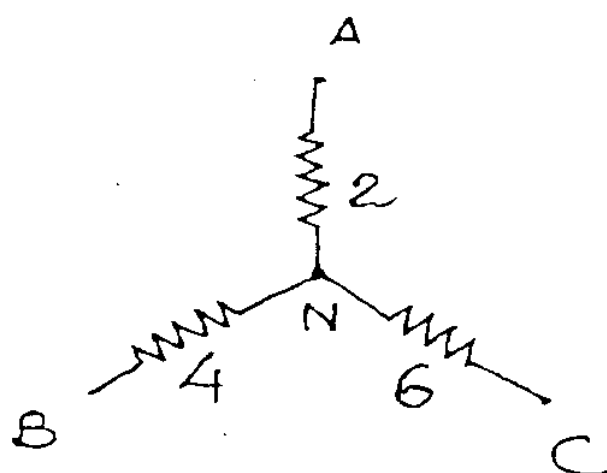
QP Code : 1015

(3 Hours)

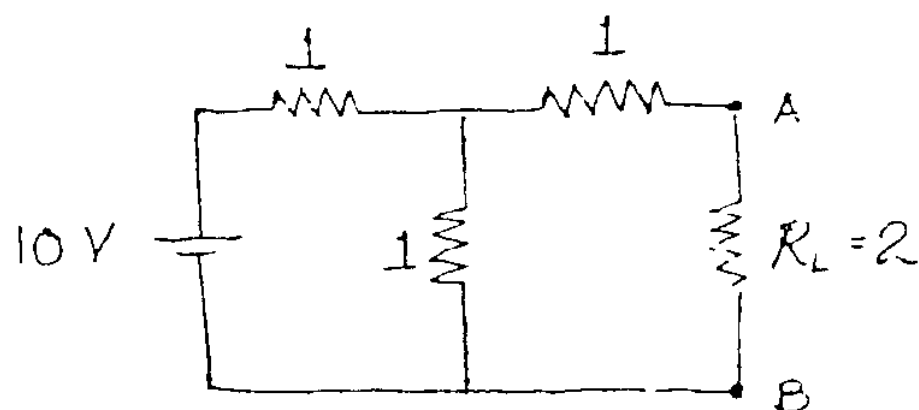
[Total Marks : 80

- 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



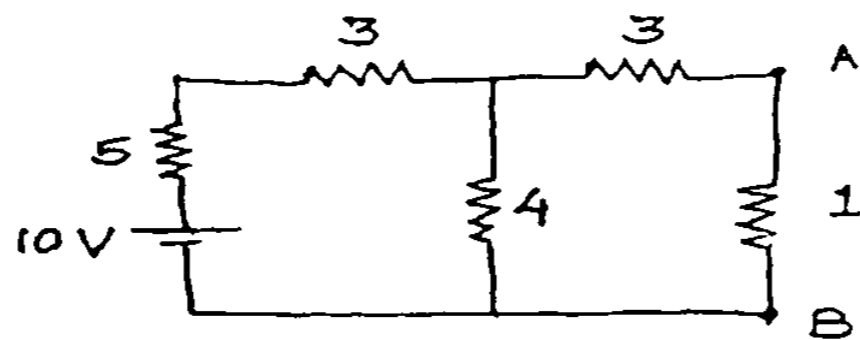
(b) For the given circuit find the Norton equivalent between points A and B. 3



- (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

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.

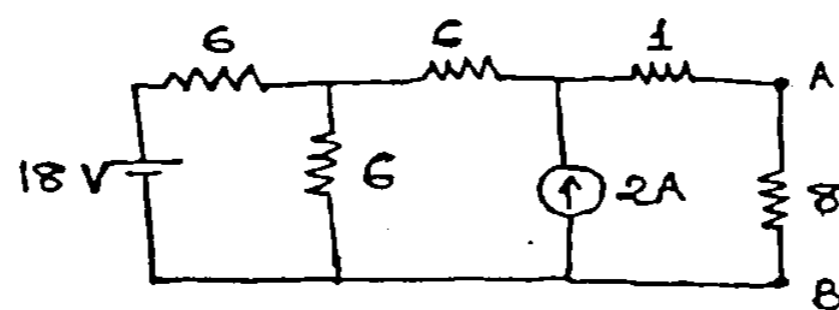
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- (d) With the help of a neat diagram explain the output characteristics of an NPN transistor in common emitter configuration

4

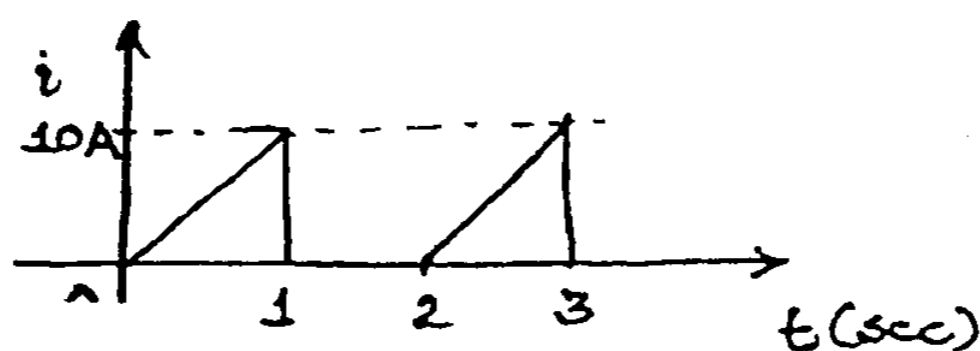
4. (a) Using source transformation find the current flowing through the 8Ω resistance

7



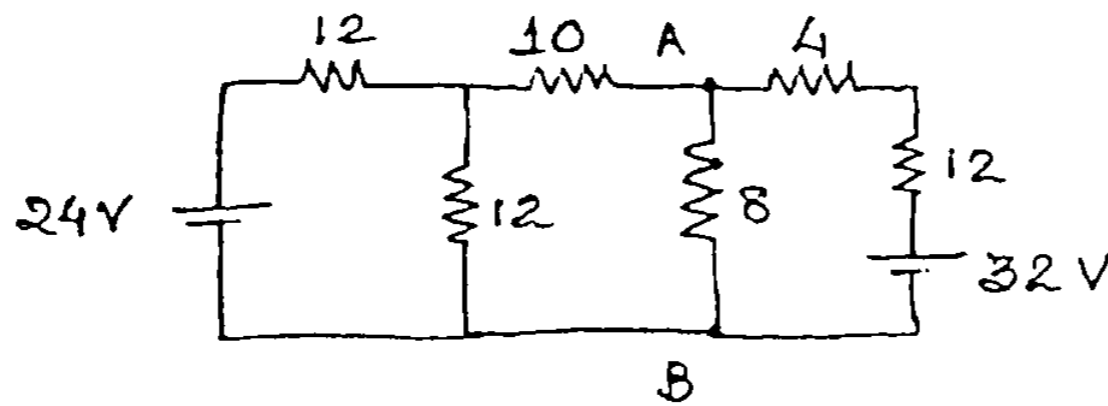
- (b) Find the rms value for the given waveform

5

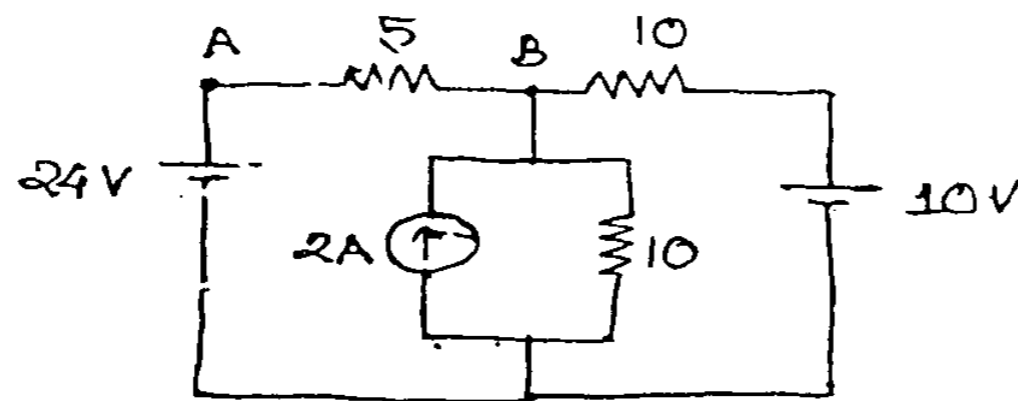


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- (c) Two wattmeters are used to measure power in a 3 ϕ balanced delta connected load using two wattmeter method. The readings of the 2 wattmeters are 500 W and 2500W respectively. Calculate the total power consumed by the 3 ϕ load and the power factor 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 8 Ω resistance using Thevenin's theorem 8



- (b) A resistance of 10 Ω 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 5 Ω resistance using superposition theorem. 7



- (b) A series RLC circuit has the following parameter values: $R=10\Omega$, $L=0.014H$, $C=100\mu F$ 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 3 ϕ balanced star connected load. 6

