22/9/2017

Mid Semester Examination – PH2102

(Date : 22 / 09 / 2017, Time 10.00 AM)

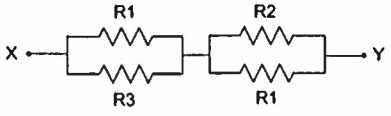
Time : 1 Hour **Full Marks : 20**

SECTION – A

Each question carries 1 mark (Give short answer in one or two sentences only)

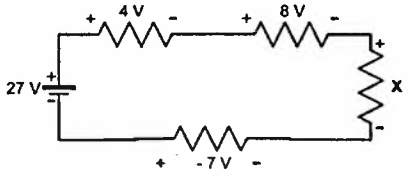
[**8** Marks]

1) Find out the effective resistance, R between X and Y points.



2) Write down the value of V_{rms} of a Half-Wave rectifier output. Vp is the peak voltage of the input sinusoidal wave to the rectifier.

3) Use Kirchhoff's voltage law to calculate the voltage, **X** in the circuit given here.



4) In a standard 3-phase STAR connection power supply, write down the relation between line voltage (V_L) and phase voltage (V_P).

5) In a pure inductive circuit, which one is correct:

- Current and voltage are in same phase.
- Current leads the voltage.
- Voltage leads the current.

6) What happen to quality factor, Q when R increases in a LCR series circuit ?

- Q Remain unchanged
- Q increases as R increases
- Q decreases as R increases

7) What is the band gap of pure Si and Ge in eV unit.

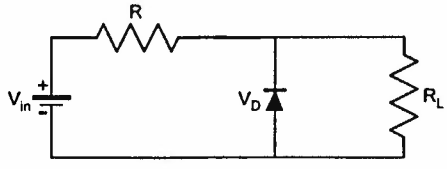
8) If Gallium (Ga) is doped to pure Germanium (Ge), then it makes n-type or p-type semiconductor ?

[P.T.O]

SECTION – B

[1+1+1 = 3 Marks]

9) In the circuit V_{in} = 120 V, R = 8 KΩ, R_L = 12 KΩ,



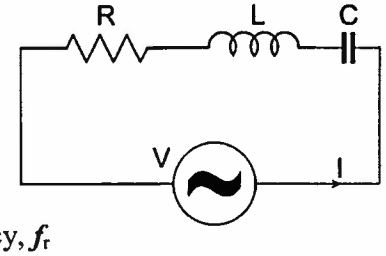
The Diode is an ideal diode. Then find out

(i) Voltage drop, V_D across the Diode.
(ii) The voltage drop across the series resistor, R
(iii) Current, I_D through the diode.

[1.5+1.5+ 2 = 5 Marks]

13) In the series LCR circuit

V = 10 Volts with variable frequency, *f*.
R = 25 Ω , **L** = 20 mH , **C** = 2 μF



(i) Find out the resonance frequency, f_r
(ii) Find out the maximum circuit current, I_m passing through the circuit.
(iii) Find out the voltage across "L" at resonance frequency, f_r

[4 Marks]

14) Draw a series RC circuit with resister, R, capacitor, C connected to a DC voltage source, V. Show that the voltage, "*v*" developed across the capacitor, C while discharging at time, "*t*" can be written as

$$v = V \cdot e^{-\frac{t}{RC}}$$

Use the boundary conditions as applicable.

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