**11920**

3 Hours / 100 Marks   Seat No.

Instructions :
- (1) All Questions are *compulsory.*
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data, if necessary.
- (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
- (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. **Attempt any TEN :**   **20**

   (a) Draw B-H curve for hard and soft magnetic material.

   (b) Define self inductance and mutual inductance.

   (c) Draw the constructional diagram of PVC gang capacitor.

   (d) Define PIV and TUF w.r.t. rectifiers.

   (e) State different types of filters used in rectifiers.

   (f) State superposition theorem.

   (g) Draw Ideal and Practical current source.

   (h) Convert following current source to its equivalent voltage source :

   20 A   4 Ω
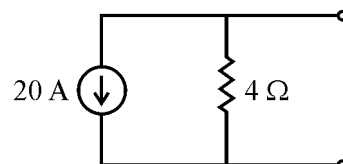
    (i)   Draw the symbol of Tunnel diode and Schottky diode.

    (j)   Write four applications of Zener diode.

    (k)   Draw the circuit diagram of RC integrator. Draw nature of output signal for sine wave input.

    (l)   Write two applications of clippers and two applications of clampers.

2. **Attempt any FOUR :**   **16**

    (a)   Explain the working of TDR along with its symbol and characteristics.

    (b)   Compare linear and logarithmic potentiometer.

    (c)   Draw the constructional diagram of electrolytic capacitor and explain the working.

    (d)   Describe working of variable air gang capacitor.

    (e)   Describe working of slug tuned inductor with neat sketch.

    (f)   Explain operation of tunnel diode with its characteristics.

3. **Attempt any FOUR :**   **16**

    (a)   Compare Avalanche breakdown and Zener breakdown.

    (b)   Describe the working of PN junction diode with the help of its VI characteristics.

    (c)   Describe the operating principle of LASER diode with neat sketch.

    (d)   Enlist four specification of Zener diode.

    (e)   State the values of following with respect to HWR :

        (i)   Ripple factor

        (ii)   Ripple frequency

        (iii)   TUF

        (iv)   Efficiency

    (f)   Compare half wave rectifier and center tapped full wave rectifier with respect to

        (i)   No. of diodes

        (ii)   PIV

        (iii)   Nature of output waveform

        (iv)   Efficiency

4. **Attempt any FOUR :**   **16**

    (a)   Describe the working of full wave rectifier with input and output waveforms.

    (b)   Calculate values of capacitor if following is printed on body of capacitor :

        (i)   104

        (ii)   3k3

(c) Draw circuit diagram of capacitor filter with bridge rectifier. Explain it with input-output waveforms.

(d) In FWR $V_M = 10V$, $R_L = 10$ kΩ, calculate V_{DC}, I_{DC} and ripple factor.
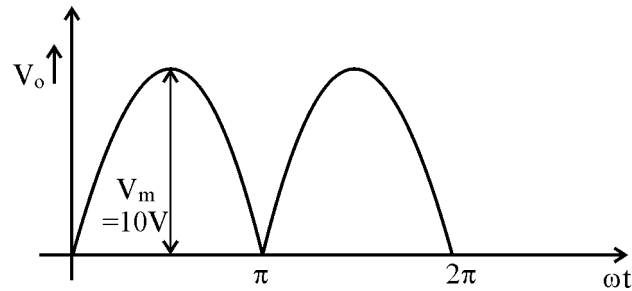
(e) State operating principle of LED. Write material names used to manufacture LED.

(f) Compare PN-Junction and Zener diode.

5. Attempt any FOUR : **16**

(a) Explain operation of combinational clipper with neat circuit diagram and waveforms.

(b) Describe the working principle of RC differentiator with neat sketch.

(c) State and explain Norton's theorem with example.

(d) Identify the following circuit shown in Figure. Draw input and output waveforms.
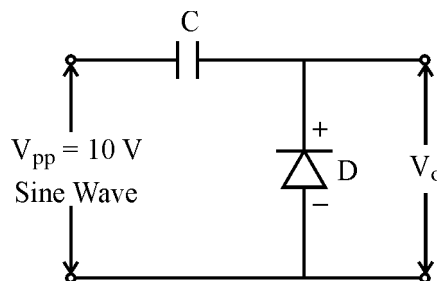
Figure No. 3

(e) State the following :

   (i) Kirchoff's voltage law

   (ii) Kirchoff's current law

(f) Define the following terms :

   (i) Active Network

   (ii) Linear Network

   (iii) Bilateral Network
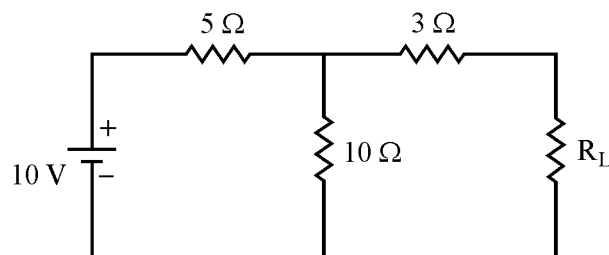
   (iv) Unilateral Network

6. **Attempt any FOUR :** **16**

(a) Compare clipper and clamper.

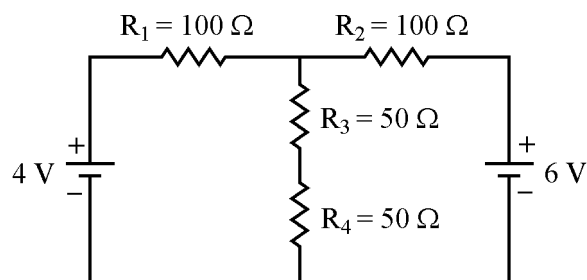(b) Identify the circuit shown in Figure. Draw input and output waveforms.

D

$V_{pp} = 10$ V
Sine Wave

R

2 V

V_o
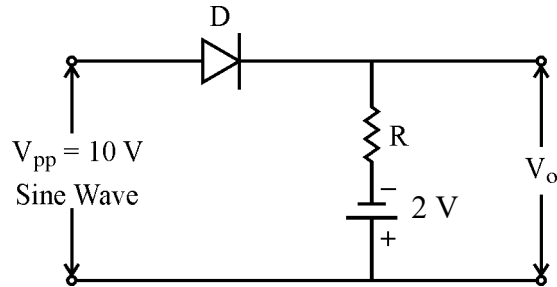
(c) Calculate I_L for the network shown in Figure.

10 Ω   20 Ω

I_L

50 V   30 Ω   20 V
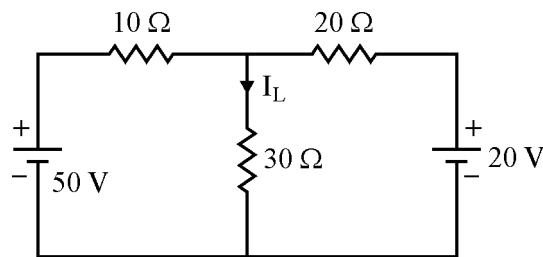
(d) Find the value of load resistance R_L to get maximum power transferred to it.

5 Ω   3 Ω

10 V   10 Ω R_L

(e) Find current through R_4 using superposition theorem.

$R_1 = 100$ Ω $R_2 = 100$ Ω

$R_3 = 50$ Ω

4 V   6 V

$R_4 = 50$ Ω

(f) State the meaning of term open circuit and short circuit with neat diagram.

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