

# 17215

16117

**3 Hours / 100 Marks**

Seat No.

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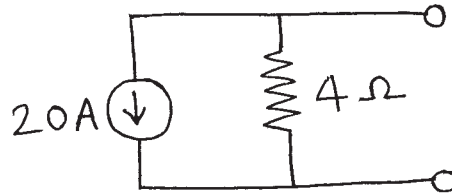
- Instructions* – (1) All Questions are *Compulsory*.
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Use of Non-programmable Electronic Pocket Calculator is permissible.
- (5) Mobile Phone, Pager and any other Electronic Communication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

**Marks**

1. **Attempt any TEN of the following:** **20**
- a) Define permeability and reluctivity of magnetic material.
- b) State Faradays law of electromagnetic induction.
- c) List any four dielectric materials used for manufacturing capacitors.
- d) Draw circuit diagram of centre-tap full wave rectifier and label it.
- e) Enlist different types of filters (any four).
- f) State maximum power transfer theorem.
- g) Draw ideal voltage source and practical voltage source.

P.T.O.

- h) Convert following current source to its equivalent voltage source (Refer Fig. No. 1).



**Fig. No. 1**

- i) Draw symbols of zener diode and PIN diode.  
 j) State any two applications of schottkey diode.  
 k) What is the need of waveshaping circuit? State its types (any four).  
 l) Draw circuit diagram of RC differentiator.

**2. Attempt any FOUR of the following:**

**16**

- a) With the help of constructional diagram explain working of LDR with neat sketch.  
 b) Compare PTC and NTC thermistors w.r.t.  
 (i) Materials used  
 (ii) Characteristics  
 (iii) Temperature coefficient  
 (iv) Application  
 c) Describe PVC gang capacitor with neat diagram.  
 d) Enlist any four specifications of capacitor.  
 e) Describe working of slug tuned inductor with neat sketch.  
 f) Define following w.r.t. PN junction diode:  
 (i) Knee voltage  
 (ii) Breakdown voltage  
 (iii) Static resistance  
 (iv) Dynamic resistance

**3. Attempt any FOUR of the following:****16**

- a) Describe working of PN junction diode with the help of its VI characteristics.
- b) Explain operations of tunnel diode along with its symbol and characteristics.
- c) State the meaning of avalanche breakdown and zenner breakdown. Explain it.
- d) Describe operating principle of LASER diode with neat sketch.
- e) Draw the circuit diagram of bridge rectifier with  $\pi$  filter. Draw its input and output waveforms.
- f) Define following w.r.t. rectifier:
  - (i) PIV
  - (ii) Ripple factor
  - (iii) Efficiency
  - (iv) TUF

**4. Attempt any FOUR of the following:****16**

- a) Describe working of half wave rectifier with the help of circuit diagram and waveforms.
- b) Calculate value of capacitor if following is printed on body of capacitors:
  - (i) 103
  - (ii) 3k3
- c) Compare HWR and FWR w.r.t.
  - (i) PIV
  - (ii) Ripple frequency
  - (iii) Average output voltage
  - (iv) Efficiency

- d) In bridge rectifier load resistance  $R_L = 2k\Omega$ . The diode has forward dynamic resistance of  $10\Omega$ . The AC voltage across the secondary winding of transformer is  $V = 50 \sin 314 t$  V. Determine:
- Peak current  $I_m$
  - DC value of current  $I_{dc}$
  - PIV of diode
  - DC voltage  $V_{DC}$
- e) Compare PN junction diode and zenner diode (any four points).
- f) Compare LED and photodiode (four points).

5. Attempt any FOUR of the following:

16

- Describe working of negative clamper circuit with neat diagram and waverorms.
- Draw circuit diagram of RC integrator. Draw its input and output waveforms for square wave and tringular wave inputs.
- Define:
  - Active network
  - Passive network
  - Linear network
  - Unilateral network
- Find output of the circuit shown in Fig. No. 2  
(Refer Fig. No. 2)

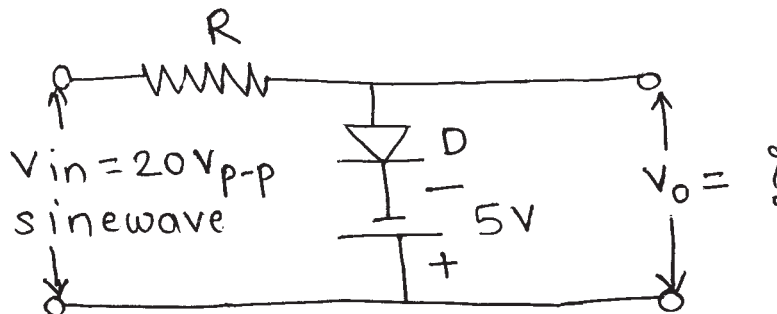


Fig. No. 2

- e) State Thevenien's theorem with suitable example.
- f) State the following:
- Kirchoffs voltage law
  - Superposition theorem

6. Attempt any FOUR of the following:

16

- With the help of circuit diagram, input and output waveforms explain operation of combinational clipper.
- Identify the circuit shown in Fig. No. 3. Draw its input and output waveforms for sine and square wave as input.

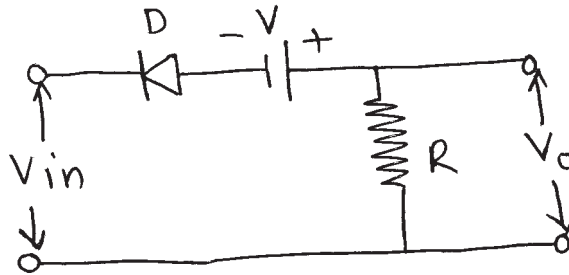


Fig. No. 3

- Calculate equivalent resistance,  $R_{AB}$  between terminals A and B using delta-star transformation. (Refer Fig. No. 4)

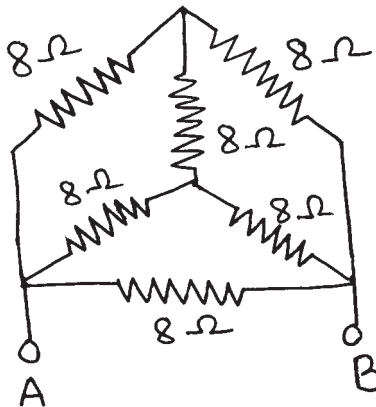


Fig. No. 4

- d) Find value of current in  $5\ \Omega$  resistance using Norton's theorem for a network shown. (Refer Fig. No. 5)

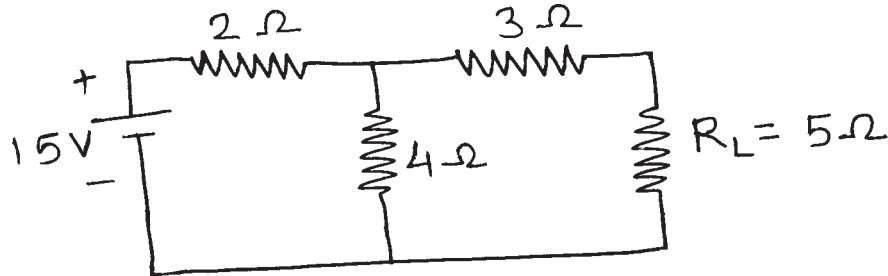


Fig. No. 5

- e) State the meaning of term open circuit and short circuit with neat diagram.
- f) Calculate value of  $R_L$  so that power transferred is maximum in circuit shown in Fig. No. 6. (Refer Fig. No. 6)

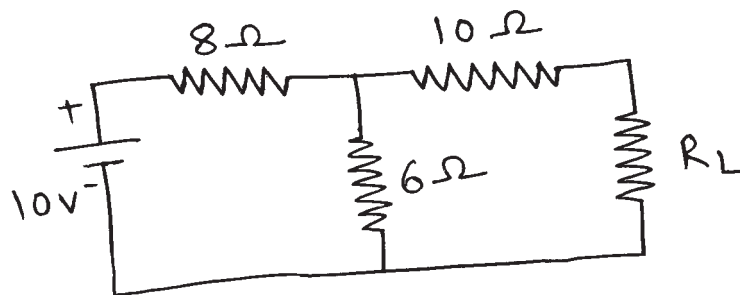


Fig. No. 6

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