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3 Hours / 100 Marks

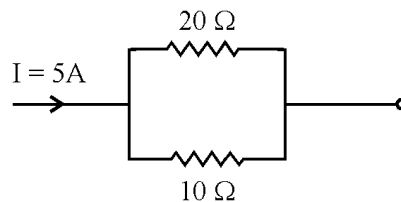
Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.

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

- (a) State Faradays Law of electromagnetic induction.
- (b) Draw the label diagram of air core inductor.
- (c) State the specifications of capacitor.
- (d) Define rectifier. State its types.
- (e) State different types of filters.
- (f) Draw the ideal & practical current source.
- (g) State KVL & KCL.
- (h) Calculate the current through  $20\Omega$  resistor shown in Fig. 1.

**Fig. No. 1****[1 of 4]****P.T.O.**

- (i) Draw the symbol of
  - (1) Zener diode
  - (2) Schottky diode
- (j) State four applications of p-n junction diode.
- (k) Draw RC integrator & RC differentiator circuit.
- (l) Define clipper & clamper.

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

- (a) Draw and describe the construction of LDR. List its applications.
- (b) Compare linear and logarithmic potentiometer.
- (c) State the functions of following essential parts of electrolytic capacitor.
  - (1) Aluminium foil
  - (2) Oxide film
  - (3) Spacers
  - (4) Aluminium container
- (d) Compare soft & Hard magnetic materials.
- (e) List different types of capacitors ? State the dielectric materials used for it.
- (f) Draw V-I characteristics of p-n junction diode ? Define static and dynamic resistance of diode.

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

- (a) Draw the construction of Schottky diode, state its applications.
- (b) Compare p-n junction and zener diode.
- (c) Describe the operating principle of photodiode with neat sketch.
- (d) Describe the working principle of laser diode.
- (e) Draw  $\pi$ -filter and state its working.
- (f) State the advantages and disadvantages of series inductor and shunt capacitor filter.

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

- (a) Compare Half wave and Full wave rectifier on the basis of,
  - (1) number of diodes used
  - (2) Ripple factor
  - (3) Rectification efficiency
  - (4) PIV rating
- (b) Draw shunt capacitor filter with centre-tapped rectifier. Draw its input and output waveforms.
- (c) Using colour code, write colour code for the following :
  - (1)  $10\text{ k}\Omega, \pm 10\%$
  - (2)  $4\text{ k}\Omega, \pm 5\%$
- (d) An AC supply of 230 V is applied to half wave rectifier circuit. A transformer turns ratio is 10:1 find,
  - (1) DC output voltage.
  - (2) Peak inverse voltage.
- (e) Compare zener breakdown and avalanche breakdown.
- (f) Draw the construction of tunnel diode. State its applications.

**5. Attempt any FOUR :****16**

- (a) Draw output waveforms of RC integrator for square and triangular wave as input.
- (b) Draw and explain the working of combinational clipper with waveforms.
- (c) Explain the following terms :
  - (1) unilateral network
  - (2) Bilateral network
- (d) State the superposition theorem and maximum power transfer theorem.
- (e) Draw the star and delta conversion, state conversion formula for any one.
- (f) State necessity of wave-shaping circuits. Classify wave-shaping circuit.

**P.T.O.**

## 6. Attempt any FOUR :

- (a) Compare clipper and clamper.
- (b) Define :
- (1) Mesh
  - (2) Sign conversion
  - (3) Potential rise
  - (4) Potential drop
- (c) State and explain Thevenin's theorem with suitable example.
- (d) Calculate the current in  $10\ \Omega$  resistance using Nortons theorem shown in Fig. 2.

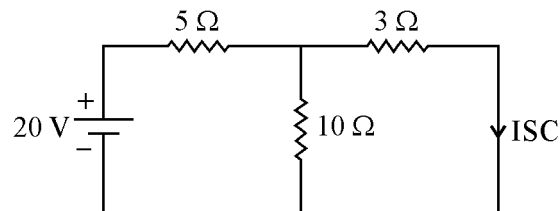


Fig. No. 2

- (e) Draw circuit diagram for positive and negative clipper with input and output waveforms.
- (f) Find the value of load resistance  $R_L$  so that maximum power is transferred in the circuit shown in Fig. 3.

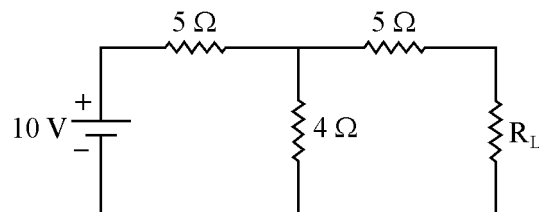


Fig. No. 3