22216

12223

3 Hours / 70 Marks Seat No. | | | | | | | | |

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 FIVE of the following : **10**

(a) Draw the constructional diagram of LED and label it.

(b) State the working principle of photodiode.

(c) Define Operating point and give its significance.

(d) List two applications of FET.

(e) Name two types of JFET & draw their symbols.

(f) Draw the circuit of Zener diode as voltage regulator.

(g) State the advantages of transistorized regulator.

2. **Attempt any THREE of the following :** 12

(a) Define Energy band and state the effect of temperature on it for a semiconductor with an example.

(b) Draw the circuit diagram of transistor in CE configuration and explain its output characteristics.

(c) Draw the circuit of base bias with emitter feedback and describe its operation.

(d) Draw the block diagram of DC regulated power supply and describe the working of each block.

3. **Attempt any THREE of the following :** 12

(a) A full wave rectifier uses two diodes, the internal resistance of each diode may be assumed constant at 20 Ω. The transformer r.m.s. secondary voltage from centre tap to each end of secondary is 50 V and load resistance is 980 Ω.

Find :

(i) D.C. load current

(ii) r.m.s. value of load current.

(b) Define the following terms :

(i) PIV

(ii) Efficiency

(iii) Ripple factor

(iv) TUF

(c) Draw the output characteristics of JFET and describe the salient points related to it.

(d) Draw the circuit of transistorized series voltage regulator and explain its operation.

4. **Attempt any THREE of the following :** 12

(a) Compare between LC filter and π filter on the basis of :

(i) Load regulation

(ii) Ripple factor

(iii) Suitable for type of load

(iv) Components used

(b) Explain the terms w.r.t. BJT biasing :

(i) Stabilization

(ii) Thermal runaway

(c) Calculate the emitter current in the voltage divider circuit shown in Fig. 4(c). Also find the value of V_{CE} and collector potential V_C.

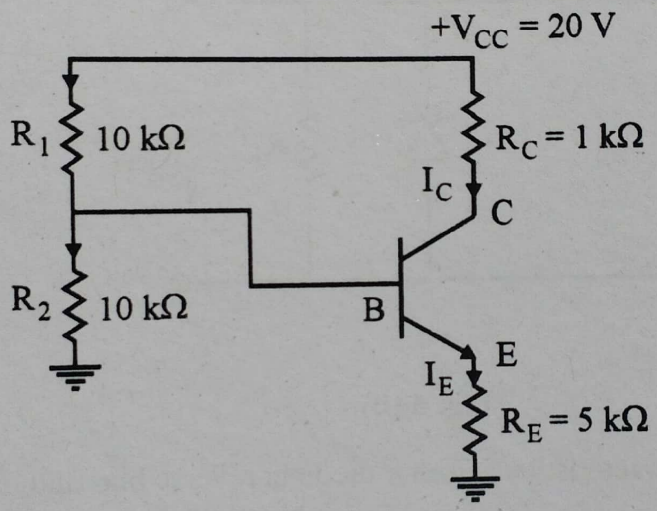


Fig. 4 (c)

(d) Compare between source self bias and drain to source bias. (any 4 points).

(e) Describe the terms :

(i) Load regulation

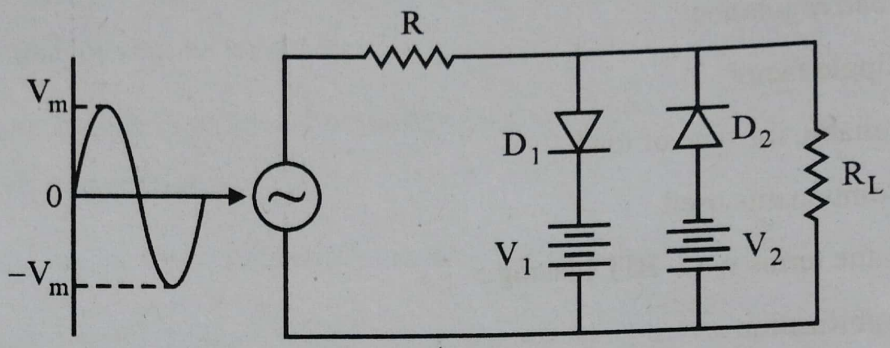
(ii) Line regulation

5. **Attempt any TWO of the following :** 12

(a) State the working principle of E-MOSFET and draw and explain its constructional sketch.

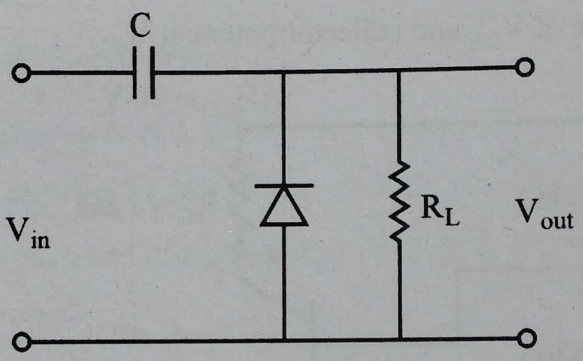
P.T.O.

(b) Identify the circuit in Fig. 5(b) (i) & (ii) and draw the input and output waveforms.



(i)

Fig. 5 (b)



(ii)

Fig. 5 (b)

(c) Draw the V-I characteristics of Zener diode in reverse bias and explain it.

6. Attempt any TWO of the following : **12**

(a) Draw and explain forward and reverse V-I characteristics of PN junction diode and justify their use as rectifier.

(b) Draw the bridge rectifier circuit. Describe its working with the input and output waveforms.

(c) Justify the use of CE configuration in transistor amplifiers with respect to their DC load line & operating point.