22216

**21222**

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

**15 minutes extra for each hour**

***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.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any FIVE of the following :** **10**

(a) Draw the symbol of LED and Zener diode.

(b) State types of JFET and draw its symbol with terminal names.

(c) Define transistor & state its types.

(d) State any two application of FET.

(e) State the need of DC regulated power supply.

(f) Define :

(i) Line regulation

(ii) Load regulation

(g) Draw the forward bias characteristics of Silicon (Si) pn junction diode.

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

(a) Compare pn junction diode and zener diode.

(b) Describe operation of voltage divider biasing with neat circuit diagram.

(c) Draw block diagram of DC regulated power supply and write function of each block.

(d) Explain the phenomenon of thermal runway in BJT. Write the method to avoid it.

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

(a) State the values of the following parameters with reference to full wave rectifier :

(i) Ripple factor (ii) Efficiency

(iii) TUF (iv) PIV

(b) Draw circuit diagram and waveforms for full wave center tapped rectifier.

(c) Sketch input & output characteristics of CE configuration. Label various regions on it.

(d) Determine output voltage $V_O$, load current $I_L$, zener current $I_Z$ & power dissipation in zener diode for the circuit shown below (Fig. – 1).

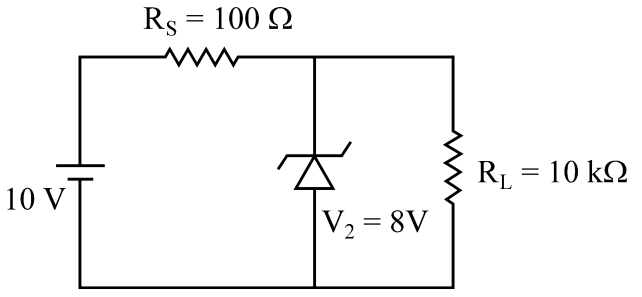



**Fig. – 1**

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

(a) Compare L, C, LC and TT filters (any 4 points).

(b) Explain working of NPN transistor with neat labelled diagram.

(c) Compare CB, CE & CC configuration of transistor on the basis of any four factors.

(d) A JFET has a drain current of 5 mA. If $I_{DSS}$ = 10 mA & $V_{GS}$ (off) – 6V. Find the value of (i) $V_{GS}$ (ii) $V_P$

(e) With the help of reverse characteristics of zener diode explain its use as a regulator.

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

(a) Draw & explain the drain & transfer characteristics of N-channel JFET.

(b) An AC supply of 230 V is applied to HWR through a transformer with turns ratio of 10 : 1. Find average DC output voltage, output current and PIV of diode, also rms value of voltage & current.

(c) Explain forward and reverse biased VI characteristics of PN junction diode.

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

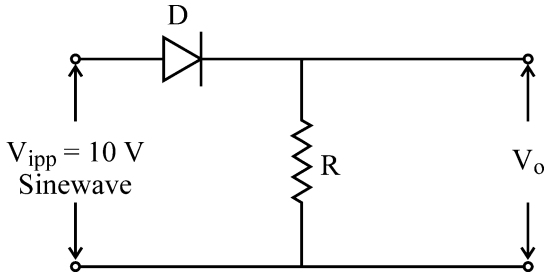
(a) Draw the construction of LED & write advantages, disadvantages and applications of it (each two points).

(b) (i) In CE configuration if $\beta$ = 99, leakage current $I_{CEO}$ = 50 $\mu$A. If base current is 0.5 mA, determine $I_C$ & $I_E$.

(ii) Derive relation between $\alpha$ & $\beta$.

(c) Identify the given circuits in figure 2 and draw input and output waveform for following circuit (Fig. – 2) :

(i)




(ii)

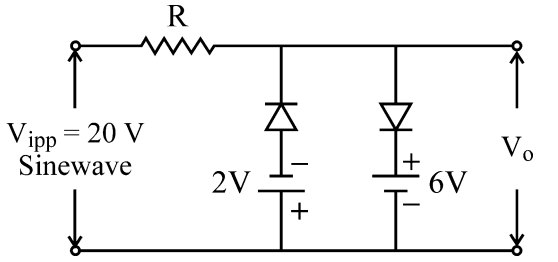



**Fig. – 2**

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