

11819

3 Hours / 70 Marks

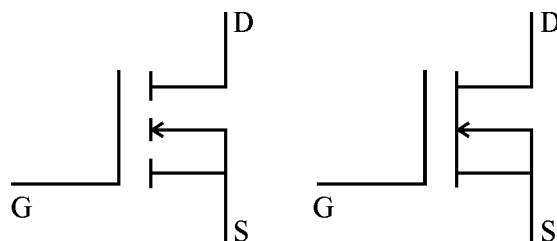
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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.

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

- (a) Draw the symbol of photodiode.
- (b) Define Transistor. State its type.
- (c) Define load and line regulation.
- (d) State application of FET.
- (e) Sketch energy band diagram of semiconductor.
- (f) State the need of DC regulated power supply.
- (g) Name the components of following symbol :



(i)

(ii)

2. Attempt any THREE of the following :

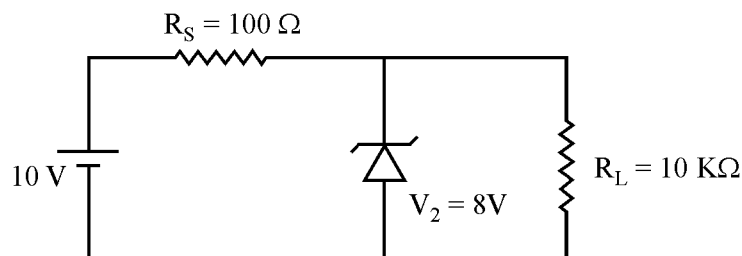
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- (a) Compare PN junction diode & zener diode (four points).
- (b) Explain with a neat circuit diagram of voltage divider bias method for biasing a transistor.
- (c) Draw the block diagram of DC power supply. Explain the function of each block.
- (d) Explain the concept of DC load line and operating point.

3. Attempt any THREE of the following :

12

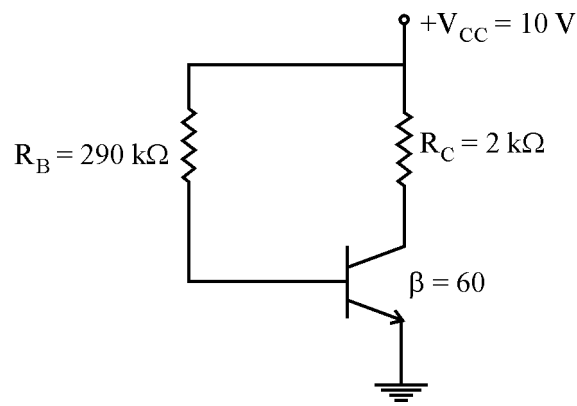
- (a) An AC supply of 230 V is applied to HWR through a transformer with turns ratio 10 : 1. Find Average DC output, Voltage current and P/V of diode, RMS value of voltage and current.
- (b) State the values of following parameters with reference to full wave rectifier :
 - (i) Ripple factor
 - (ii) Efficiency
 - (iii) TUF
 - (iv) P/V
- (c) Compare EMOSFET & DMOSFET.
- (d) Determine output voltage V_o , load current I_L , zener current I_Z & power dissipation in zener diode for the circuit shown below.



4. Attempt any THREE of the following :

12

- (a) Compare L, C, LC and π filter on the basis of usefulness in reducing ripple or suitability for heavy / light load.
- (b) Explain the operating principle of PNP transistor.
- (c) Find the Q point values for the following circuit. Assume $V_{BE} = 0.7 \text{ V}$ & $\beta = 60$



- (d) Compare BJT & JFET with reference to following point :
 - (i) Symbol
 - (ii) Transfer characteristics
 - (iii) I/P impedance
 - (iv) Application
- (e) Describe the working of zener diode as a voltage regulator with reverse characteristics of zener diode.

P.T.O.

5. Attempt any TWO of the following :

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- (a) With neat circuit diagram and mathematical expressions, explain the self biasing used in FET.
- (b) Identify the following circuit shown in Fig. No. 1 and draw input and output waveforms

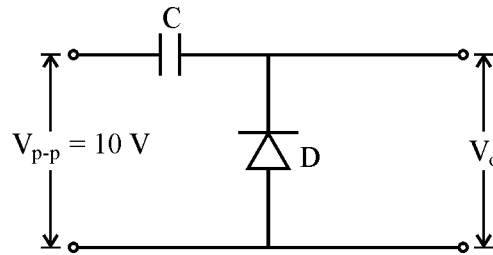


Fig. 1

- (c) Explain V-I characteristics of zener diode.

6. Attempt any TWO of the following :

12

- (a) Draw the characteristics of LED and write advantages, disadvantages and application of it. (each two points)
- (b) Draw circuit and describe working of full wave rectifier using center tapped transformer with waveforms.
- (c) (i) In CE configuration if $\beta = 99$ leakage current $I_{CEO} = 50\ \mu\text{A}$. If base current is $0.5\ \text{mA}$. Determine I_C and I_E .
- (ii) Derive relation between α & β .