

22216

23124

3 Hours / 70 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) 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) List semiconductor materials used in LED.
- (b) State any two advantages of FET.
- (c) Draw symbols of NPN and PNP transistor.
- (d) Draw transfer characteristics of N-channel JFET.
- (e) Define Line and Load regulation.
- (f) Draw the circuit diagram of a transistorized shunt regulator.
- (g) Write any two applications of Photo diode.



2. Attempt any THREE of the following : 12

- (a) Compare PN junction diode and Zener diode based on symbol, biasing, doping and application.
- (b) The common base dc current gain (α) of a transistor is 0.967. If the emitter current is 10 mA, calculate the value of base current.
- (c) Draw the block diagram of regulated power supply. Explain each block.
- (d) Draw the circuit diagram of a transistor in CE configuration. Sketch the output characteristics and indicate active, saturation and cutoff region.

3. Attempt any THREE of the following : 12

- (a) Describe the working of center-tap full wave rectifier with circuit diagram and input/output waveforms.
- (b) Compare half wave rectifier and bridge rectifier based on (i) No. of diodes (ii) Ripple factor (iii) Ripple frequency (iv) Waveform.
- (c) Compare BJT and FET (any four points).
- (d) Compare transistorized series and shunt regulator based on (i) Control element (ii) Output impedance (iii) Voltage regulation (iv) Application.

4. Attempt any THREE of the following : 12

- (a) Draw half wave rectifier with π filter. Also draw its input and output waveforms.
- (b) With the help of neat diagram, explain voltage divider biasing of a transistor.
- (c) Derive the relationship between α and β of a transistor.

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- (d) For a JFET, the maximum value of drain current $I_{DSS} = 6 \text{ mA}$ and pinch off voltage $V_p = -4.5 \text{ V}$. Determine I_D at $V_{GS} = -2 \text{ V}$.
- (e) For the circuit shown in figure calculate :
- Output voltage
 - The current through Zener diode, Refer Figure (1).

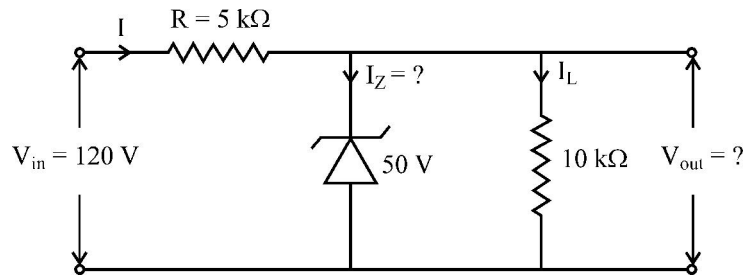


Figure (1)

5. Attempt any TWO of the following : 12

- Describe the working of N-channel E-MOSFET with neat constructional diagram and VI characteristics.
- A full wave bridge rectifier has $230 \text{ V}_{\text{rms}}$ sinusoidal input voltage with load resistance of $1 \text{ k}\Omega$. If the supply frequency is 50 Hz and turns ratio of a transformer is $10 : 1$, calculate (i) V_{DC} (ii) I_{DC} (iii) PIV.
- Draw experimental setup to get VI characteristics of PN junction diode. Draw neat and labelled VI characteristics and explain briefly.

6. Attempt any TWO of the following : 12

- Compare LED and photo diode based on (i) Symbol (ii) Working principle (iii) Biasing (iv) Applications (two) (v) Semiconductor material used.
- Compare CB, CE and CC configurations (any six points).

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- (c) Identify the given circuits shown in Figure 2(a) and Figure 2(b). Draw input and output voltage waveforms for the following circuits. (Refer Figure 2(a) & 2(b))

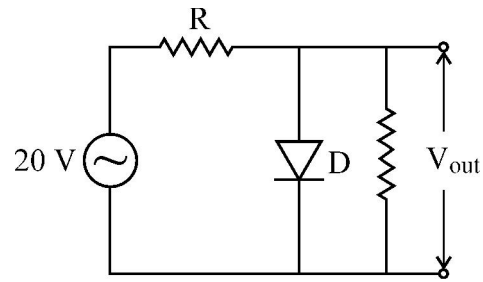


Figure (2a)

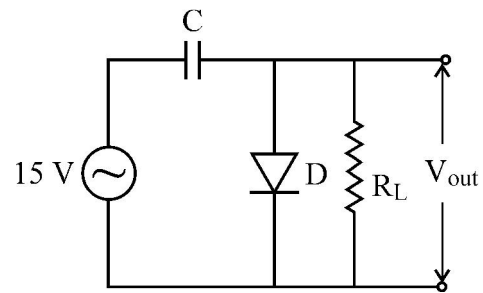


Figure (2b)
