

22216

21718

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) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (6) 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) State materials used for LED's to emit different colour light.
- (b) Sketch the symbol of P-channel and n-channel depletion type MOSFET.
- (c) List any two BJT biasing circuits with respect to operating point.
- (d) State different methods of biasing of FET.
- (e) Sketch reverse characteristics of zener diode with proper labelling.
- (f) Define line regulation. State the formula for its regulation.
- (g) State cut in voltage value of diode for silicon and germanium.

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

- (a) Describe experimental set-up for operation of P-N junction diode in forward bias. Draw its characteristics.
- (b) Define alpha and beta of a transistor and state the relation between them.
- (c) Explain basic block diagram of regulated DC power supply, draw its input and output waveforms.
- (d) Explain the need of stabilization of Q point.

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

- (a) Describe circuit diagram of bridge rectifier, draw its input and output waveforms.
- (b) Explain the working of positive clamper with proper circuit diagram and draw the waveforms at input & output of clamper.
- (c) A JFET has  $I_{DSS} = 10 \text{ mA}$ ,  $V_p = -5 \text{ volts}$ ,  $g_{mo} = 2 \text{ ms}$ . Calculate the trans-conductance and drain current of the JFET for  $V_{GS} = -2.5 \text{ volts}$ .
- (d) Draw the circuit diagram for transistor series regulator and explain functions of each component.

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

- (a) State the values of following parameters for half wave and full wave rectifiers :
  - (i) Number of diode used in circuit.
  - (ii) Rectification efficiency ( $\eta$ )
  - (iii) Transfer Utilization Factor (TUF)
  - (iv) Ripple factor

- (b) Explain the operation of npn transistor in the active region.
- (c) Draw the input and output characteristics of CE configuration with proper labelling of various regions.
- (d) Draw the constructional details of n-channel MOSFET. State its working principle.
- (e) Describe the working of zener as a voltage regulator.

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

**12**

- (a) Explain drain characteristics of JFET with ohmic region, saturation region, cut off region and break down region.
- (b) Draw circuit diagram and input and output waveforms of full wave rectifier connected with  $\pi$  filter.
- (c) Describe V-I characteristics of zener diode.

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

**12**

- (a) Show constructional details of LED. Give any two applications of LED.
  - (b) Describe the working of single stage CE amplifier with neat circuit diagram.
  - (c) Differentiate clipper and clamper with following points :
    - (i) Components used in circuit.
    - (ii) Function
    - (iii) Application
    - (iv) Configuration
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