

22216

23242

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) Assume suitable data, if necessary.
  - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any FIVE :**

**10**

- (a) Define : Intrinsic semiconductor and Extrinsic semiconductor.
- (b) State two application of FET.
- (c) State the need of rectifier and filter.
- (d) Draw symbol of NPN and PNP transistor.
- (e) Define : Load regulation and Line regulation.
- (f) State any two application of transistor.
- (g) Write two application of clipper and clamper.

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

**12**

- (a) Compare p-n junction diode and zener diode.



- (b) Sketch circuit diagram of DC regulated power supply and write function of each block.
- (c) Draw and explain full wave bridge type rectifier with suitable diagram.
- (d) Describe the working of a p-channel JFET with diagram.

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

**12**

- (a) Explain the phenomenon of thermal runaway in BJT. Write the method to avoid it.
- (b) Differentiate between conductor, insulator and semiconductor.
- (c) Define with respect to FET :
  - (i) Static drain resistance
  - (ii) Transconductance
  - (iii) Dynamic resistance
  - (iv) Pinch off voltage
- (d) State the values of following parameters with reference to full wave rectifier :
  - (i) Ripple factor
  - (ii) Efficiency
  - (iii) TUF
  - (iv) PIV

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

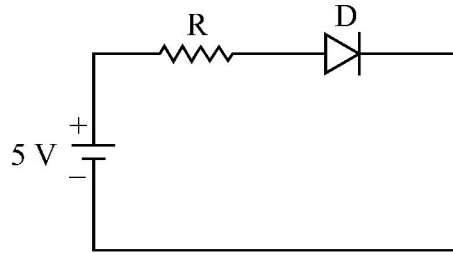
**12**

- (a) Draw the circuit diagram of zener regulator and explain the regulation action.
- (b) Compare L, C, LC and  $\pi$  filter (any four points).
- (c) State advantages of MOSFET over JFET.

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- (d) Calculate the value of  $R$  in the circuit given below to get maximum forward current of 100 mA.



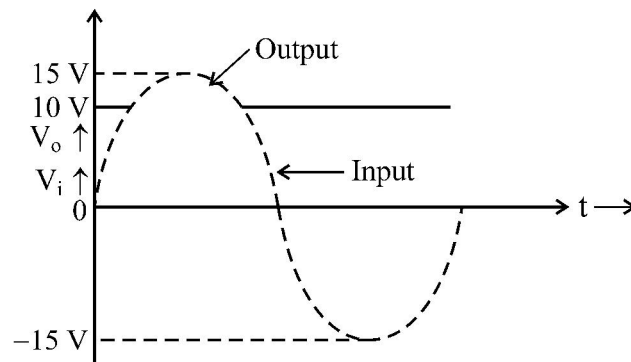
- (1) When diode is Si  
(2) When diode is Ge
- (e) Differentiate between CB, CE and CC configuration of transistor on the basis of any four factor.

5. Attempt any TWO of the following :

12

- (a) What are the types of clipper and clamper.

Design the clipper circuit to generate the output voltage waveform as shown in following figure. Draw neat labelled circuit diagram.



- (b) Sketch constructional diagram of LED and state its three application.  
(c) Derive relation between  $\alpha$  and  $\beta$ . If  $\alpha$  of transistor is 0.9, calculate the  $\beta$ .

P.T.O.

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

**12**

- (a) With the help of circuit diagram, explain in brief transistorized series and shunt regulator.
  - (b) Explain with circuit diagram voltage divider biasing method and state its two advantages.
  - (c) Draw and explain the drain and transfer characteristics of N-Channel JFET.
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