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11718

3 Hours / 100 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) **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 ten** :

20

- a) Give two points of comparison between active and passive components.
- b) Draw the symbol of N-channel and D-channel FET.
- c) Define LED. Draw its symbol.
- d) State any two advantages of ICs.
- e) Define knee voltage of pn junction diode. Give its value for Si diode and Ge diode.
- f) Draw the frequency response of an amplifier and define bandwidth.
- g) Give the value of maximum rectifier efficiency in half wave and full wave rectifier.
- h) Define drain resistance and trans conductance for FET.
- i) Draw V-I characteristics of P-N junction diode under forward bias. Label it.
- j) Give classification of ICs.
- k) Give two points of distinction between zener breakdown and avalanche breakdown.
- l) Draw the symbol of LDR and thermistor.

2. Attempt **any four** :

16

- a) Give any four applications of electronics.
- b) Draw the experimental set-up used for obtaining reverse characteristics of zener diode. Draw the V-I characteristics for the same.
- c) With suitable diagram explain the working of NPN transistor.
- d) Draw the circuit diagram of RC coupled CE amplifier. List two advantages.
- e) Compare zener diode and p-n junction diode (4 points).
- f) With suitable circuit diagram, explain the working of crystal oscillator.

3. Attempt **any four** :

16

- a) Give the classification and use of different types of resistances.
- b) Draw the symbol of :
 - i) p-n junction diode
 - ii) Tunnel diode
 - iii) Varactor diode
 - iv) Schottky diode.

P.T.O.



- c) Distinguish between JFET and MOSFET.
- d) Define α and β . Derive the relation between them.
- e) A transistor has collector current $I_C = 1.5$ mA and base current, $I_B = 90 \mu$ A. Find α and β of the transistor.
- f) Define oscillator. State its need and condition required for sustained oscillations.

4. Attempt any four :**16**

- a) Draw and explain the V-I characteristics of tunnel diode.
- b) With suitable circuit diagram, explain the working of half wave rectifier. Draw the necessary waveforms.
- c) Draw the V-I characteristics of CE configuration. Show cut-off, active and saturation regions.
- d) Draw the circuit diagram of direct coupled two stage amplifier. State the use of R_C and R_E .
- e) With suitable diagram, explain the working of capacitor filter. Draw the necessary waveforms.
- f) Define :
 - 1) Current gain
 - 2) Voltage gain
 - 3) Power gainGive formula for current gain.

5. Attempt any four :**16**

- a) Define :
 - i) Peak inverse voltage
 - ii) Static resistance of diode
 - iii) Knee voltage
 - iv) Reverse saturation current.
- b) Define :
 - i) Line regulation
 - ii) Load regulation.Give the necessary formulae.
- c) With suitable diagram, explain the working of transistor as a switch.
- d) With suitable diagram, explain the V-I characteristics of reverse biased p-n junction diode.
- e) State the need of multistage amplifier. State one application each of different types of multistage amplifiers.
- f) With suitable diagram, explain the operating principle of varactor diode.

6. Attempt any four :**16**

- a) With suitable diagram, explain the construction of P-N junction diode. What are majority and minority carriers ?
 - b) Draw the block diagram of regulated power supply and describe each block.
 - c) Define biasing. State the requirements of biasing.
 - d) With suitable diagram, explain the working of astable multivibrator. Draw the necessary waveforms.
 - e) Draw the transfer characteristics of JFET. Give the meaning of I_{dss} and $V_{gs(off)}$.
 - f) A transistor has $\beta = 100$. If the collector current $I_C = 50$ mA. Find I_B and I_E .
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