24225

3 Hours / 70 Marks   Seat No. ☐☐☐☐☐☐☐☐

Instructions : (1)   All Questions are *compulsory.*

(2)   Illustrate your answers with neat sketches wherever necessary.

(3)   Figures to the right indicate full marks.

(4)   Assume suitable data, if necessary.

Marks

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

(a)   State any two advantages of Integrated circuits.

(b)   Write PIV ratings of diode for half wave and full wave centre tap Rectifier.

(c)   Justify why 'α' is less than unity.

(d)   Define Amplification factor and transconductance of JFET.

(e)   Define Active and Passive components.

(f)   Define Active and Passive Transducers.

(g)   State selection criteria for Transducers.

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

(a)   Explain voltage source with diagram.

(b)   Explain zener diode as a voltage regulator with diagram.

(c)   Draw neat labelled construction of LED & explain its working principle.

(d)   Differentiate BJT & FET.

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

(a)   Draw symbol & neat labelled construction of MOSFET.

(b)   Draw a sketch & describe the working of pressure transducer.

(c)   State different types of resistors & state any four specifications of resistors.

(d)   Explain the working of single stage RC coupled amplifier with diagram.

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

    (a) Draw a sketch & describe the working of temperature transducer.

    (b) Differentiate between P-N junction diode & zener diode.

    (c) Derive relation between 'α' & 'β' of a transistor.

    (d) When VGS of FET changes from –3.3 V to –3.0 V, the drain current changes from 1.1 mA to 1.5 mA, Find the value of transconductance.

    (e) Draw block diagram of regulated power supply & explain its working.

5. **Attempt any TWO of the following :** 12

    (a) Solve the following :

        (i) Define wavelength & frequency.

        (ii) In the waveform shown in figure-1.
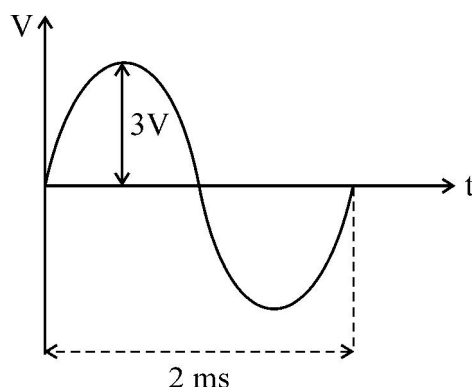
        Determine its Amplitude, frequency, phase & wavelength.

    (b) In CE configuration, if β = 99, leakage current ICEO = 100 μA. If the base current is 0.7 mA, determine the collector current & emitter current.

    (c) In full wave Rectifier (Bridge type) Vm = 20 V, RL = 15 kΩ, Find out VDC, IDC, ripple factor & PIV.

6. **Attempt any TWO of the following :** 12

    (a) Draw neat labelled Transfer characteristics of JFET. Differentiate Depletion type MOSFET & Enhancement type MOSFET.

    (b) State the applications of BJT, FET & photodiode.

    (c) With suitable diagram, explain the steps to measure the temperature of any metal using transducer.

———————