22225

Seat No.

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 <u>FIVE</u> of the following: 10

a) Draw the symbol of Inductor and Capacitor.

b) Draw the symbol of n-channel and p-channel JFET.

c) Write two applications of P-N junction diode.

d) Define transducers and name two active transducers.

e) Define active components and passive components.

f) List the type of transistor and draw their symbols.

g) Draw symbol of photodiode.

2. Attempt any <u>THREE</u> of the following: 12

a) What is the color code for a $220\,\Omega$ 10% and $1.2\,K\Omega$ 5% resistor.

b) Draw and explain reverse biased V-I characteristics of Zener diode.

c) Draw and describe working principal of LED.

d) Explain the construction of N-P-N transistor with the help of diagram.

Marks

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

   a) Draw a sketch and describe the working of resistive transducer.

   b) Draw the construction and explain the operation of n-channel JFET.

   c) Give four differences between analog and digital circuits.

   d) Draw and explain voltage divider bias network.

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

   a) In CE configuration if $\beta = 150$, leakage current $I_{CEO} = 100\ \mu A$, if base current is 0.2 mA, determine collector current I_C and Emitter current I_E.

   b) Sketch the block diagram of regulated power supply. Draw the waveforms at the output of each block.

   c) Draw the construction of MOSFET and explain the working.

   d) Explain:

     (i) Seeback effect

     (ii) Peltier effect

   e) Draw center tap full wave rectifier and explain its operation.

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

   a) With circuit diagram explain how transistor works as a switch and as an amplifier.

   b) Give the need of a filter. Draw the circuit diagram of π filter and state its working.

   c) (i) Given below (Fig. No. 1) the following waveform. State its amplitude, frequency, phase and wavelength.
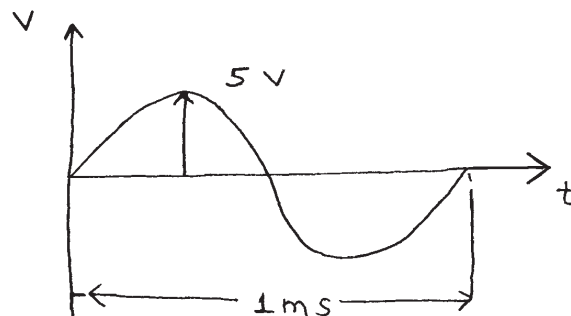

Fig. No. 1

(ii) Given below is triangular waveform determine its amplitude and frequency. (Fig. No. 2)
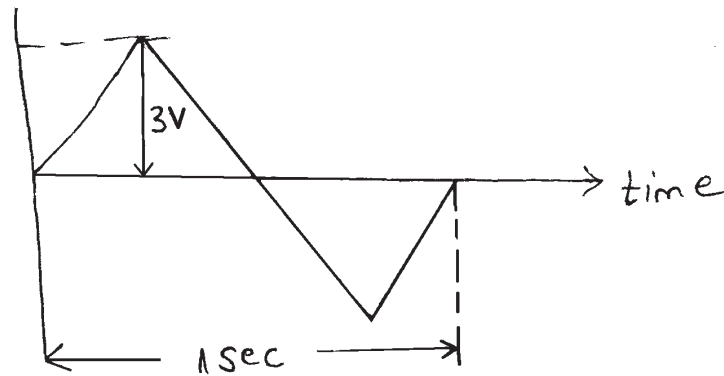

Fig. No. 2

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

a) Derive the relation between α and β of a transistor. For CE configuration, BJT has $\beta = 90$. If collector current (I_C) is 10 mA, then calculate:

(i) Base current I_B

(ii) Emitter current I_E

(iii) α

b) Draw the drain characteristics and transfer characteristic of JFET.

c) Explain the working principal of phototransistor and photodiode with neat sketches.

_____