F.Y.B.Sc. (Comp. Science) Semester - I
Regular Semester-End Examination
Session : Nov. 2022

Subject : Semiconductor Devices and Basic Electronic Systems **Subject Code : USCSEL-111**

Time : 2 Hrs. **Total Marks 35**

Instructions : (1) All questions are compulsory.
(2) Draw labelled diagrams wherever necessary.
(3) Figures to the right indicate full marks.
(4) Use of non-programmable calculator is allowed.

Q.1 Attempt any Five of the following. **(1*5=5)**

(a) Calculate resolution of 4 bit DAC.

(b) Draw symbols at light emitting diode and photodiode.

(c) If transistor has $\beta = 50$ and $I_B = 25\mu A$, find collector current I_C and forward current gain α.

(d) State the majority and minority current carriers in N-type semiconductor.

(e) State atleast two points of comparison between BIT and MOSFET.

(f) What is Q point of a transistor ?

(g) Name the fastest ADC.

Q.2 Attempt any Five of the following. **(3*5=15)**

(a) Explain MOSFET as a switch.

(b) Compare half wave rectifier, full wave rectifier and Bridge rectifier.

(c) Explain characteristics of DE-MOSFET.

(d) Explain following terms w.r.t. zener regulator :

(1) Line regulation

(2) Load regulation

(e) What is the need of DAC? State different types of DAC.

(f) State any five parameters of ADC.

(g) Draw diagram of crystal oscillator.

Find series frequency for $R = 1k\Omega$, $C = 0.22\ \mu F$.

Q.3 Attempt any three of the following. **(5*3=15)**

(a) With the help of circuit diagram, explain working of R – 2R ladder.

(b) Draw diagram of A stable multi vibrator using IC 555. Calculate the output frequency if $R_A = 1\ k\Omega$, $R_B = 100\ k\Omega$, $C = 0.1\ \mu F$.

(c) Explain working of n-channel. E only MOSFET with neat diagram.

(d) Draw output characteristics of transistor in CE configuration and explain all regions.

(e) For a four bit resistive ladder, find the following :

(1) Weight assigned to the LSB and MSB.

(2) Analog output voltage for digital input of 1011.

(assume logic O = OV log1 = 10V.

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