MORNING

30 DEC 2022

[Total No. of Questions: 09] [Total No. of Pages: 02]

Uni. Roll No. .....

Program: B.Tech. (Batch 2018 onward)
Semester: 3
Name of Subject: Electronic Devices
Subject Code: PCEC-101
Paper ID: 16031
Scientific calculator is Allowed.

Detail of allowed codes/charts/tables etc. Not Required.

Time Allowed: 03 Hours **Max. Marks: 60**

NOTE:

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately

Part – A **[Marks: 02 each]**

Q1

(a) Compare intrinsic semiconductors and extrinsic semiconductors.
(b) Define operating point in transistors.
(c) Show the ideal V-I characteristics of p-n junction diode with the help of graph.
(d) Explain various hybrid parameters in h-equivalent circuit of a two-port network.
(e) A transistor having α=0.975 and reverse saturation current I_{CO}= 10μA, is operated in CE configuration. Determine β for this configuration. If the base current is 250μA, evaluate the emitter current.
(f) At 300K, the intrinsic carrier concentration of Silicon is $1.5x10^{16}$ m^{-3}. If the electron and hole mobilities are 0.13 and 0.05 $m^2/(V-s)$ respectively, determine the intrinsic resistivity of silicon at 300K.

Part – B **[Marks: 04 each]**

Q2. Distinguish between LEDs and photodiodes.
Q3. Develop the relation between conductivity and carrier mobility in a semiconductor.
Q4. Illustrate any one bias stabilization technique in transistors.
Q5. Examine the operation of UJT with respect to applied external voltage.
Q6. An n-channel JFET has I_{DSS}= 12mA and pinch-off voltage V_P=-4V. Evaluate the drain current for V_{GS}= -2V. If the transconductance g_{m0} of a JFET with the same I_{DSS} at V_{GS}=0 is 4 millimho, Determine the pinch-off voltage.

PTO

Q7. A transistor amplifier in CE configuration couples a source of internal resistance 1kΩ to a load of 20kΩ. Determine the input and output resistances, if $h_{ie} = 1k\Omega$, $h_{re} = 2.5x10^{-4}$, $h_{fe} = 150$ and $1/h_{oe} = 40k\Omega$.

Part – C **[Marks: 12 each]**

Q8. Compare half wave rectifiers and full wave rectifiers.

OR

Explain the input and output characteristics of n-p-n transistor connected in common base configuration.

Q9. Classify and explain the working and characteristics of MOSFETs.

OR

Analyze Common emitter transistor amplifier using h-parameters in terms of:

(i) Input impedance,
(ii) Output impedance,
(iii) Current Gain,
(iv) Voltage Gain.

****