

Uni. Roll No.

08 MAR 2021

Program: B.Tech. (Batch 2018 onward)

Semester: ... 3rd

Name of Subject: ... ELECTRONIC DEVICES.....

Subject Code: PCEC-101....

Paper ID: 16031

Time Allowed: 3 Hours

Max. Marks: 60

NOTE:

- 1) Part 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 diffusion current and drift current in semiconductor?
- b) Define beta of transistor.
- c) What do you mean by h-parameters?
- d) Draw and label the ideal characteristics of UJT.
- e) The rms output voltage of Center Tap full wave rectifier is 30V. What is PIV across the diode?
- f) Justify that FETs are called unipolar devices but BJT's are called bipolar devices.

Part – B

[Marks: 04 each]

- Q2.** Why does a pure semiconductor behave like an insulator at zero temperature? Compare intrinsic and extrinsic semiconductor materials.
- Q3.** What is a phototransistor? Discuss basic operation and V-I characteristics of phototransistor.
- Q4.** Summarize the basic conditions required for faithful amplification? What is the need of Bias Stabilization in transistor amplifier?
- Q5.** A *p-n-p* silicon transistor is used in the self-biasing arrangement. The circuit component values are $V_{CC} = 5\text{ V}$, $R_C = 1.2\text{ k}\Omega$, $R_E = 0.3\text{ k}\Omega$, $R_2 = 2.7\text{ k}\Omega$ and $R_1 = 26\text{ k}\Omega$. If $\beta = 45$, find (a) the stability factor S , (b) the quiescent point (c) recalculating these values if the base-spreading resistance of $650\ \Omega$ is taken into account.
- Q6.** Elaborate the operation of N-channel MOSFET in depletion mode with the help of proper diagrams.
- Q7.** Develop the expressions for input impedance, output admittance, current gain and voltage gain for common emitter transistor amplifier circuit using h-parameters.

Q8. What are the advantages of FET over a conventional bipolar junction transistor? Explain how an FET is used as voltage dependent resistor? Draw and explain the self biasing circuit for a JFET.

OR

Explain the working principle of two supply emitter bias circuit of BJT with the help of diagrams and write the advantages of this circuit over the self bias circuit?.

Q9. A full-wave rectifier with a centre-tapped transformer supplies a dc current of 150 mA to a load resistance of $R = 25 \text{ k}\Omega$. The secondary resistance of transformer is 8Ω . Each diode has a forward resistance of 0.5Ω . Determine (i) rms value of the signal voltage across each half of the secondary, (ii) dc power supplied to the load, (iii) PIV rating of each diode, (iv) ac power input to the rectifier, (v) conversion efficiency and (vi) transformer rating.

OR

A junction transistor has the following h-parameters $h_{ie} = 2 \text{ K}\Omega$, $h_{re} = 1.6 \times 10^{-4}$, $h_{fe} = 50$, $h_{oe} = 50 \mu \text{ A/V}$. Determine the current gain, voltage gain, input resistance and output resistance of the common emitter amplifier if the load resistance is $12 \text{ K}\Omega$ and the source resistance is 500Ω ?
