B.Tech. CSE 3rd Sem Dec. 2017

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University Institute of Engineering & Technology

(Recognised Under Section 2(f) and 12B of UGC)

Kurukshetra University, Kurukshetra

Roll No. -

THEORY EXAMINATION – DECEMBER 2017	
B.TECH - ECE	SEMESTER – III

TIME – 3 Hrs.

M.M. - 75

COURSE NO. - ECE-203

COURSE TITLE - ELECTRONIC DEVICES

Note: All questions in Part-A and Part-B are compulsory. Attempt any four questions from Part-C selecting at least one from each unit.

PART-A (15 Marks)

Q. No. – 1 Answer the following questions. **15x1=15**

(i)	Discuss the applications of Hall Effect.
(ii)	Define the term early effect in BJT's.
(iii)	Draw the low frequency model for FET's.
(iv)	Classify the capacitances of PN junction diode.
(v)	Define Transconducatance in FET's.
(vi)	What is meant by Voltage Regulation?
(vii)	Plot the Transfer characteristics of JFET.
(viii)	Current flow in a semiconductor depends upon what type of phenomenon?
(ix)	When the transistor is operated in active region the collector junction is reverse biased but the collector current is quite high. Why?
(x)	List the applications of Tunnel diode.
(xi)	Write the voltage and current equations of hybrid parameters.
(xii)	Define Quiescent point.
(xiii)	Give the total expression of Diffusion Current Density.
(xiv)	Write two main differences between BJT and FET?
(xv)	Draw the equivalent circuit of an ideal zener diode in the breakdown region.

PART-B (20 Marks)

	UNIT-I	
2	Derive the expression of built in potential barrier in p-n junction diode with the help of energy Band diagram.	5
	UNIT-II	
3	In a zener diode shunt voltage regulator V_{in}= 40V, R_s=50Ω , R_L = 100Ω and breakdown Voltage is 20V. Calculate: i) Voltage drop across load resistance. ii) Current through load resistance. iii) Current through zener diode.	5
	UNIT-III	
4	Discuss the high frequency limitations of BJT'S.	5
	UNIT-IV	
5	Explain the following terms: i) Pinch off Voltage ii) FET Parameters	5

PART-C (40 Marks)

	UNIT-I	
6	Derive the expression for drift current, current density, conductivity and resistivity in extrinsic semiconductors.	10
7	A potential difference of 20 V is applied longitudinally to the rectangular specimen of intrinsic germanium of length 25 mm, width 4 mm and thickness 1 mm. Determine the i) Electron and holes drift velocities ii) Conductivity of intrinsic germanium if intrinsic carrier density is $2.5 * 10^{19}/ m^3$ iii) Total current Mobility of electrons is 0.38 m^2/ V-s and holes is 0.18 m^2/ V-s.	10
	UNIT-II	
8	By using hybrid parameters derive the expressions for all the parameters of common emitter transistor amplifier.	10
9	Write a brief note on: i) Hetro-junction Transistor ii) Hybrid pi model of Transistor	10
	UNIT-III	
10	Explain in detail two terminal MOS structure. How the working of a MOSFET can be compared by the capacitor. Draw the energy band diagrams when negative voltage is applied at the gate terminal.	10
11	Plot and explain the ideal current voltage relationship of FET's. Also explain the effect of feedback in high frequency model of FET's.	10
	UNIT-IV	
12	Distinguish between series and shunt voltage regulators. Explain the working of Op-Amp series voltage regulator.	10
13	With the help of block diagrams explain the working of Linear power supply and Switched mode power supply.	10