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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 2016

TIME – 3 Hrs.

B.TECH - ECE

SEMESTER – 3rd

M.M. - 75

COURSE NO. – ECE-203

COURSE TITLE - Electronic Devices

PART-A (15 Marks)

Q. No. – 1 Answer the following questions carrying one mark each. 15x1=15

(i)	Define Fermi Energy Level.
(ii)	Discuss Hall Effect and its applications.
(iii)	Discuss the effect of temperature on semiconductors.
(iv)	A certain transistor has $I_C = 15 \text{ mA}$ and $I_B = 167 \mu\text{A}$; β_{DC} is?
(v)	Derive the relationship between transconductance and amplification factor.
(vi)	In the zener diode shunt voltage regulator, if the current through the load decreases then what is its effect on zener current.
(vii)	The 7812 regulator IC provides _____.
(viii)	Calculate the voltage regulation of a power supply having $V_{NL} = 50 \text{ V}$ and $V_{FL} = 48 \text{ V}$.
(ix)	Write any two differences between Schottky and PN junction diode.
(x)	Why FET is called as the voltage controlled device?
(xi)	Discuss the limitations of BJT's.
(xii)	Discuss the limitations of Ebers Moll Model.
(xiii)	Plot the transfer characteristics of MOSFET.
(xiv)	Name the blocks used in Linear Power Supply in exact order.
(xv)	Which is better for amplification BJT or FET? Why?

PART-B (20 Marks)

Answer the following questions, one from each unit & all question carrying equal marks. 5x4=20

UNIT-I		
2	Plot the V-I characteristics of a tunnel diode and explain each region of operation in detail. Give the equivalent circuit of tunnel diode.	5
UNIT-II		
3	Draw the power supply using a full wave bridge rectifier, a capacitor filter, and a IC Regulator to provide an output of +5V.	5
UNIT-III		
4	Analyse the low frequency and high frequency models of Field Effect Transistors.	5
UNIT-IV		
5	Explain in detail the working of SMPS.	5

PART-C (40 Marks)

Students are required to attempt four question, by selecting atleast one question from each unit & all question carrying equal marks. 10x4=40

UNIT-I		
6	A potential difference of 10V is applied longitudinally to a rectangular specimen of intrinsic Germanium of length 25mm, width 4 mm and thickness 1.5mm. Determine at room temperature (i) Electron and hole drift velocities. (ii) the conductivity of intrinsic Ge if intrinsic carrier density is $2.5 \times 10^{16}/m^3$ (iii) total current Provided that $\mu_e = 0.38m^2/Vs$ and $\mu_h = 0.18m^2/Vs$.	10
7	Explain in detail the two terminal MOS structure. Draw and explain the different energy band diagrams of MOS.	10
UNIT-II		
8	Explain the following terms: a) Early Effect b) Pinch off voltage c) Hetrojunction transistor d) Voltage Regulation	10
9	Derive the expression of built in potential barrier in PN junction diode at zero bias. Also explain the difference between Diffusion and Depletion capacitance in PN Junction.	10
UNIT-III		
10	Draw the hybrid model of CE Transistor Amplifier. Derive the expression of Voltage gain and Current gain in CE Transistor Amplifier.	10
11	Explain in detail the controlled transistor series voltage regulator with the help of block and circuit diagram and also derive its output equation.	10
UNIT-IV		
12	In the zener diode shunt voltage regulator calculate the values of maximum current flowing From the zener diode, value of series resistance and load current provided that zener operates in Breakdown region of voltage 5V, $V_i = 12V$, $R_L = 1K$ and maximum power rating of the zener	10