University Institute of Engineering & Technology

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

Kurukshetra University, Kurukshetra

Roll No. - 252102[redacted]

THEORY EXAMINATION – DEC 2022		TIME – 3 Hrs.
B.TECH - ECE	SEMESTER -III	M.M. - 75

PAPER - EC-201	SUBJECT- 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)

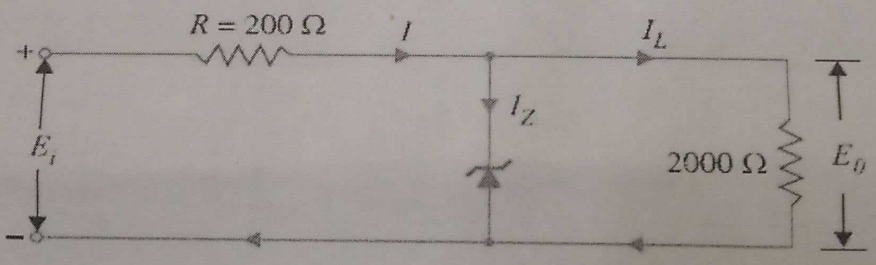
Q. No. – 1 Answer the following questions. **15x1=15**

(i)	Define an ideal diode.
(ii)	What is base width modulation?
(iii)	For a forward-biased diode, the barrier potential _____ as temperature increases.
(iv)	A transistor amplifier has a voltage gain of 100. If the input voltage is 75 mV, the output voltage is:
(v)	Design an IC of voltage regulator which provides the output of -12 V.
(vi)	What is the order of doping, from heavily to lightly doped, for each region in BJT?
(vii)	Define cut-in voltage of a PN junction diode.
(viii)	What is meant by voltage regulation?
(ix)	What is drift current?
(x)	What is PIV of a rectifier?
(xi)	What is the function of drain terminal in FET?
(xii)	The dimensions of h_{oe} parameter are_____
(xiii)	When transistor is said to be in cut off mode?
(xiv)	Why FET are known as unipolar devices?
(xv)	If the reverse bias on the gate of a JFET is increased, then width of the conducting channel_____

PART-B (20 Marks)

	UNIT-I	
2	With appropriate circuit diagram explain the DC load line analysis of semiconductor diode. Explain the working of positive clamping circuit.	5
	UNIT-II	
3	In a Common Emitter transistor circuit if $\beta = 100$ and $I_B = 50\mu A$, compute the values of α, I_E and I_C.	5
	UNIT-III	
4	Why FETs are called as voltage controlled devices? Explain with the help of proper equations.	5
	UNIT-IV	
5	Explain complete DC power supply with the help of waveforms.	5

PART-C (40 Marks)

	UNIT-I	
6	Explain the VI characteristics of aSilicon based PN junction diode showing its knee and breakdown voltages. Also write the diode current equation.	10
7	Find the resistivity and drift velocities (electrons and holes) of an intrinsic semiconductor of length 2m with intrinsic concentration of 1.5×10^{19} per m^3having potential difference of 10V.The mobilities of electrons and holes are 0.40 m^2/ V-s and0.20 m^2/ V-s.	10
	UNIT-II	
8	Distinguish between the different types of transistor configurations with necessary circuit diagrams and equations and also derive the relation between their current gains.	10
9	Draw the hybrid equivalent model of CE transistor amplifier with the help of its hybrid equations. Using this model derive the voltage gain and output impedance of CE transistor.	10
	UNIT-III	
10	Explain the following terms of FET's a. Pinch off Voltage b. Transconductance c. Amplification factor and its relation with transconductance d. Small signal FET low frequency model (only diagram)	10
11	Explain MOS capacitor theory. With neat diagram explain the operation of MOSFET in depletion mode.	10
	UNIT-IV	
12	 For the circuit shown above Find : (i) the output voltage (ii) the voltage drop across series resistance (iii) the current through zener diode If Input voltage = 12V and $V_Z = 8V$.	10
13	With the help of block diagram, circuit diagram and equations, explain the working of transistor shunt voltage regulator.	10