JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1EXAMINATION- 2025

B.Tech-III Semester (ECE/ECS/EE VLSI)

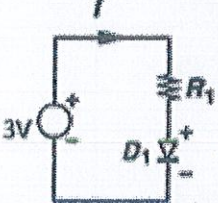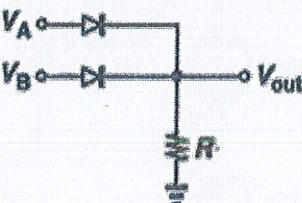COURSE CODE (CREDITS):25B11EC313 (04) / 25B11EC314 (03)   MAX. MARKS: 15

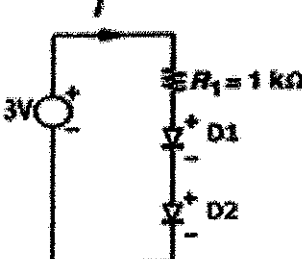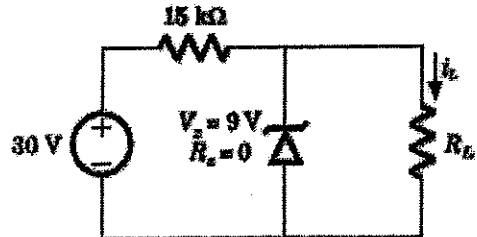COURSE NAME: Electronic Devices and Circuits / Electronic Devices

COURSE INSTRUCTORS: Dr. Shruti Jain   MAX. TIME: 1 Hour

Note:(a)All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required

for solving problems

Q.No	Question	CO	Marks
Q1	i. The thermal voltage when the temperature is 25°C. ii. Voltage drops produced by a diode at forward bias in ideal diode model is equal to _____ iii. What is the current I through the circuit (shown in Fig 1) if we consider diode in ideal diode model. Fig 1 Fig 2 iv. What will be the voltage V_{out} (shown in Fig 2) if $V_A = 3V$ and $V_B = -5V$ and the diodes are ideal? v. The threshold voltage of a diode at Kailsah and Srilanka were found to be V_1 and V_2 respectively. Which of the following relations between V_1 and V_2 hold good? vi. A positive clipper using an ideal diode clip_____ of input signal. vii. Which circuit element is usually added in series with a diode in a clipper circuit? viii. For a half-wave rectifier, the average DC output voltage (without filter) is_____. ix. Sita is working on a rectifier circuit. Help her by stating the efficiency of a half-wave rectifier and a full-wave rectifier. x. A full-wave bridge rectifier is supplied from a transformer that gives an output of V_{rms}=12 V (secondary). Assume diodes are ideal.Find the DC output voltage.	1	5

Q2	i.	Calculate the reverse saturation current of a diode if the current at 0.2V forward bias is 0.1mA at a temperature of 25°C and the ideality factor is 1.5. [2]		
	ii.	Derive the equation [2] a) load line for a circuit consisting of a DC source, a series resistor, and a diode. b) $E_F = E_V + {E_G}/{2}$ (terminologies define the same meaning)	1	5
	iii.	Draw and explain the variation of diode capacitance with applied voltage (both forward and reverse bias regions) [1]		
Q3.	i.	Find current I through the circuit using shockley equation of diode. The terminal voltage of each diode is 0.6V. Reverse saturation current is 10^{-12}A. [2] Fig 3 Fig 4	1	5
	ii.	An n-type silicon semiconductor has $N_D = 5 \times 10^{17}$ cm^{-3} and $N_C = 2.8 \times 10^{19}$ cm^{-3}. Calculate the Fermi level shift from the conduction band. [1.5]		
	iii.	Find the maximum load current that can be drawn as shown in Fig 4. [1.5]		