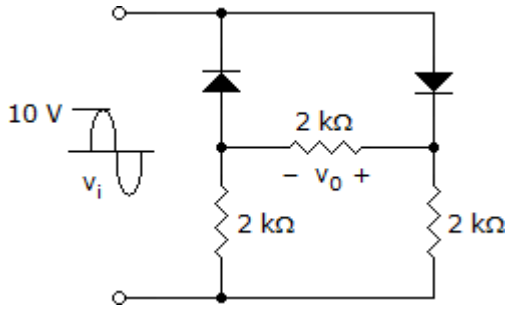
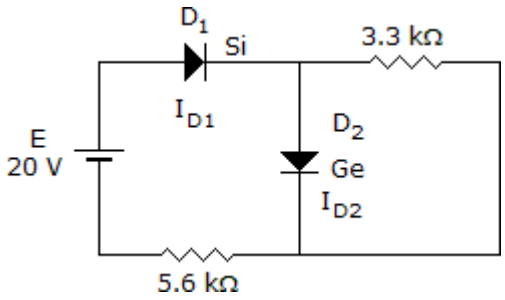
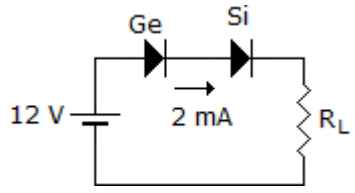
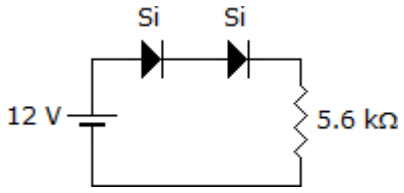
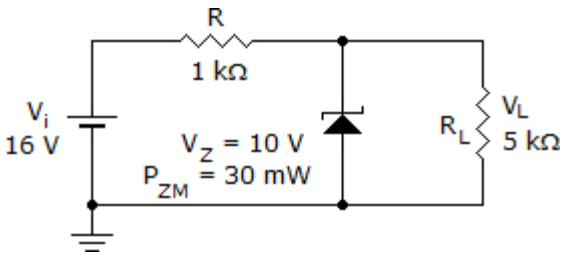
UE25EC141A - Electronic Principles and Devices (4-0-0-4-4)
Session 2025-26
Question Bank
Unit II: Semiconductor diode applications

	Class - 1 & 3
1.	Discuss the construction & working of Half wave rectifier with the relevant circuit diagram and waveforms.
2.	Derive the DC voltage & DC current expression for half wave rectifier.
3.	With relevant waveforms, derive expressions for $I_{DC,}$ Irms and ripple factor of a FWR assuming ideal diodes.
4.	If the ac supply is 60 Hz, what will be the ripple frequency out of the half-wave rectifier?
5.	Determine the peak value of the current through the load resistor. 
6.	Determine Current through Ge-diode of the below circuit. 
7.	Find the value of the load resistor. 
8.	Show that the DC voltage of half wave rectifier is available only for one half cycle of the applied input voltage of secondary coil signal.
9.	Show that the ripple content of a half wave rectifier is more as compared to DC component.

10.	Find current I_D. 
Class - 2 & 4	
11.	Explain how full–wave rectification is achieved using two diodes and center-tap transformer with a circuit diagram and output waveforms.
12.	Explain the operation of bridge rectifier with circuit diagram and waveforms
13.	Give the advantages and disadvantages of Bridge rectifier over center-tap FWR.
14.	Show that the ripple factor of a bridge rectifier is 0.48.
15.	Define PIV/PRV and explain its significance
16.	Discuss the output ripple frequency in case of HWR and FWR.
17.	If the ac supply is 50 Hz, what will be the ripple frequency out of the full-wave rectifier?
Class - 5	
18.	An a.c. supply of 230 V is applied to a half-wave rectifier circuit through a transformer of turn ratio 10:1. Find (i) the output d.c. voltage and (ii) the peak inverse voltage. Assume the diode to be ideal.
19.	A semiconductor diode having internal resistance r_f = 20Ω is used for half-wave rectification. If the applied voltage v = 50 sinωt and load resistance R_L= 800 Ω, find : (i) I_m, I_{dc}, I_{rms} (ii) a.c. power input and d.c. power output (iii) d.c. output voltage (iv) efficiency of rectification.
20.	A half-wave rectifier is used to supply 50V d.c. to a resistive load of 800 Ω. The diode has a resistance of 25 Ω. Calculate a.c. voltage required.
Class - 6	
21.	In a two diode FWR using Si diodes, the RMS voltage across each half of the transformer secondary is 100V. The load resistance is 975 Ω and each diode has a forward resistance of 25Ω Find (i) Average current (ii) Average output voltage (iii) PIV of diode.
22.	A Bridge rectifier with ideal diodes has an ac source of RMS value 220 V, 50Hz connected to the primary of transformer. If the load resistance is 200Ω and turns ratio of transformer is 4:1, find the dc output voltage, dc output current and output frequency.
Class – 7	
23.	Discuss the working principle of shunt capacitor filter with the circuit diagram & waveforms for half wave rectifier.

24.	With circuit diagrams and relevant waveforms explain the working of FWR with shunt capacitor filter.
	Class - 9
	Class – 10
25.	Give any three differences between a Zener diode and a rectifier diode. Define voltage regulator. What is the property of the Zener diode which makes it suitable as a voltage regulator?
	Class - 11
26.	Design a Zener regulator that maintains V_0 at 10V for input voltage variation of 20V±10% and load current variation of 30mA ±20%. Given I_{Zmin} =2mA and P_{Zmax} = 0.5W
27.	Determine the minimum and maximum values of R_L in a Zener regulator to maintain V_O at 10V for an input voltage of 20V and R_S = 200Ω. Given P_{Zmax} = 600mW and I_{Zmin} = 1mA. Draw the circuit diagram.
28.	Determine the range of V_i that will maintain V_0 at 15V for a Zener regulator. Given series resistor R=200Ω, R_L= 1.5KΩ, I_{zmin}=1mA and P_{Zmax} = 0.5W. Draw the circuit diagram.
29.	In a Zener diode regulator, the input DC is 10 V±20%. The output requirement is 5 V and 20 mA. Assume I_{Zmin} and I_{Zmax} as 5 mA and 80 mA, design the voltage regulator. Calculate the power rating of the Zener diode.
30.	Calculate I_L and I_Z. 
31.	Zener regulator circuit has an input voltage of 50 Volts. I_{Zmax} of 32 mA and a series resistor of 1 KΩ. Determine the range of R_L and I_L that will result in the load voltage being maintained at 10 Volts. Determine the wattage rating of the diode. Draw the circuit diagram with all components values.
32.	Design a voltage regulator for input voltage variation of 8V-12V and load variation of 250Ω-10KΩ. Izmin=5mA, Vz=5V, Pz=400mW.

33.	Design a voltage regulator that will maintain an output voltage of 20V across a 1 kΩ load with an input that varies between 30V and 50V.
34.	Design a Zener regulator for the following sepcifications: output voltage= 5V, Load current =10mA, I_{Zmin} = 1mA, Zener wattage = 400 mW, Input voltage =10 V±2 V.