Course: Basic Electronics Engineering   Semester: II
Program: B.Tech (CIT: BAO, ECRA, IFM, BFSI)
Time: 03 hrs.   Max. Marks: 100
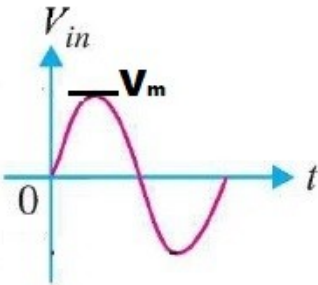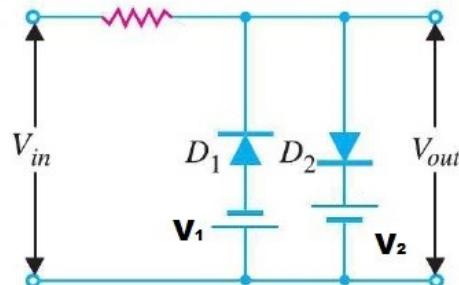
Instructions:
1. **Draw suitable circuit diagrams wherever required to justify your answer.**
2. **Your answer should be concise and to the point.**

|	Section A (All questions are compulsory)		
1.	Explain the effect of temperature on the Zener and avalanche breakdown voltage.	[4]	CO1
2.	Write down the steps for determining the output waveform of unbiased positive Clampers.	[4]	CO1
3.	In a transistor amplifier, $\beta = 50$, load resistance $R_L = 6k\Omega$ and input resistance $R_{in} = 0.6$ kΩ. Determine its voltage amplification.	[4]	CO3
4.	What do you mean by the term input offset voltage and output offset voltage.	[4]	CO1
5.	An amplifier operating over the frequency range from 18 to 20 MHz has a 10kΩ input resistor. What is the rms noise voltage at the input to this amplifier if the ambient temperature is 27ºC?	[4]	CO3
	Section B (All questions are compulsory. Question no. 9 has internal choice)		
6.	(i) Determine the currents I_1, I_2 and I_{D2} for the network below. (ii) A Ge p-n junction at 300 K has the following parameters $N_D = 5 \times 10^{18}$ / cm^3, $N_A = 6 \times 10^{16}$ / cm^3, $n_i = 1.5 \times 10^{10}$ / cm^3. Calculate the minority electron density in the P – region.	[6 + 4]	CO3
7.	Explain the classification of amplifiers on the basis of position of the operating point on load line. Which of the transistor amplifier is actually a half-wave rectifier?	[8+2]	CO2
8.	Discuss the Amplitude Modulation superhetrodyne receiver by explaining the function of each stage with the help of a suitable block diagram.	[10]	CO1

9.	Explain the construction and working of depletion mode of depletion type MOSFET with the help of a suitable diagram. OR Explain the construction and working of enhancement mode of depletion type MOSFET with the help of a suitable diagram.	[10]	CO2
	Section C (Question 10 is compulsory. Question 11 has internal choices.)		
10.(a)	What do you understand by the term noise? Discuss in detail the different types of noises that occur in communication system.	[3 + 7]	CO2
10.(b)	Draw the circuit diagram of Operational amplifier as an Integrator and derive an expression for the output voltage. Design an adder circuit using Operational amplifier to give the output $V_o = -(3V_1 + 4V_2 + 5V_3)$ where V_1, V_2 and V_3 are the inputs and $R_f = 20k\Omega$	[5 + 5]	CO3
11.(a)	(i) Solve the given clipper circuit to draw its output waveform assuming diode terminal voltage as V_T. (ii) A four stage Operational amplifier circuit is required to provide voltage gains of +21, -15, +11 and -24. Design the Op-amp circuit. Use a 240 kΩ feedback resistor for all the four circuits. What output voltage will result for an input of 160µV? **OR**	[10] {10]	CO3 CO4
11.(b)	(i) Solve the given clamper network to draw its output waveform.	[10]	CO3
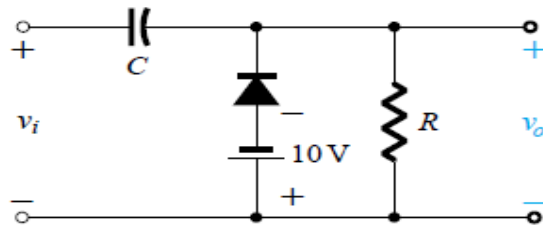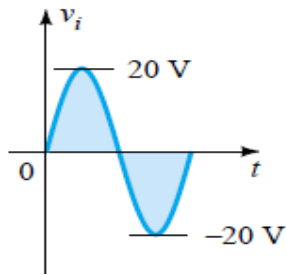
(ii) Find the expression for the output voltage at points A, B, C, D and E in the circuit shown below.

[10] CO4