EVEN SEMESTER EXAMINATION, 2023 – 24
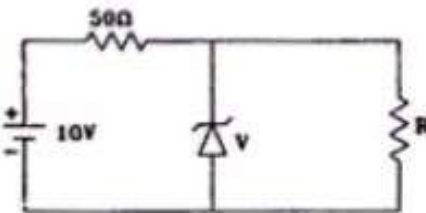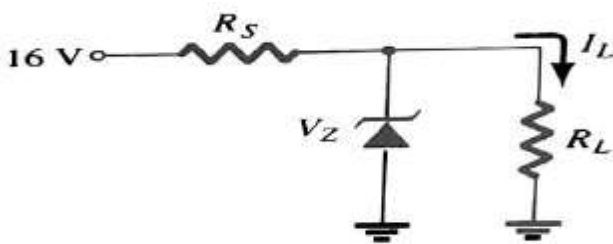**Ist yr B.Tech.**
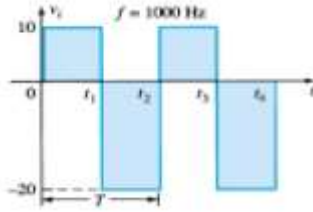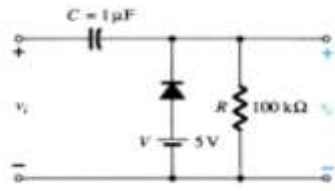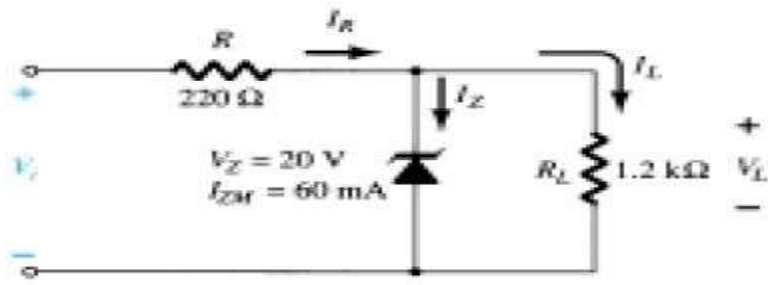**NAME OF SUBJECT: Basic Electronics Engineering**

Duration: 3:00 hrs   **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	Answer any four parts of the following. a) What is law of mass action for semiconductor? Write the mass action law for the n-type and p-type semiconductor? b) The 6V zener diode shown below has zero resistance and a knee current of 5mA.The minimum value of R. So that voltage across it does not fall below 6V is c) Sketch the Common base BJT transistor configuration and indicates the polarity of the applied bias and resulting current directions? d) Explain slew rate of op-amp. Derive the expression for maximum signal frequency? e) What are the universal gates and implement AND gate by using any one universal gate? f) Explain the fixed bias configuration of JFET?	5x4=20
Q 2.	Answer any four parts of the following. a) Explain the inverting and non-inverting amplifier with the help of suitable diagram? b) Design of the network of figure given below to maintain V_L at 12 Volts for a load variation from 0 mA to 200 mA. That is, Determine R_S and V_Z c) Calculate the following: 1. Given an α_{dc} of 0.997, determine the corresponding value of β_{dc}. 2. Given $\beta_{dc} = 180$. if $I_C = 2mA$ Find I_E and I_B.	5x4=20

	d) Explain the energy band diagram for conductor, semiconductor and insulator?	
	e) Explain the potential divider biasing of BJT?	
	f) Explain the construction and working of JFET?	
Q 3.	Answer any two parts of the following.	10x2= 20
	a) Explain the construction and working of Common emitter transistor and sketch input and output characteristics of Common emitter transistor?	
	b) For the network of figure: (1) Calculate 5τ (2) Compare 5τ to half the period of the applied signal (3) Sketch v_o. Here, τ is the time constant of RC Network given below. 	
	c) What is simplified Boolean equation by using K-map for the following logic equation expressed by minterms? $$F(A,B,C,D)=\sum(7,9,10,11,12,13,14,15)$$	
Q 4.	Answer any two parts of the following.	10x2= 20
	a) A full wave bridge rectifier with a 120 V RMS sinusoidal input has a load of $1k\Omega$. (i) If silicon diode are employed, what is the dc voltage available at the load (ii) Determine the required PIV rating of each diode. (iii) Find the maximum current through each diode during conduction.	
	b) Sketch output and transfer characteristics of n-channel JFET?	
	c) Derive the expression for summing amplifier and difference amplifier with circuit diagrams?	
Q 5.	Answer any two parts of the following.	10x2= 20
	a) Explain the construction and working of n-channel depletion type MOSFET?	
	b) Determine the range of values of V_i that will maintain the Zener diode of Fig. given below in the "on" state. Here, $R=220\Omega, V_Z=20V, I_{ZM}=60mA \& R_L=1.2k\Omega$. 	
	c) Explain the donor and acceptors impurities in semiconductor materials?	

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