PART-A

*(Answer 05 questions. Each question carries **2 marks**)*

[5x2= 10]

Q.No	Question	Marks	Bloom's Level
Q.1	a) What is clamper and how it operates?	[2]	L-1
	b) Compare CE, CB and CC configurations.	[2]	L-2
	c) Why we call FET as a Voltage Controlled Device?	[2]	L-4
	d) List the non-ideal DC characteristics of an op-amp.	[2]	L-1
	e) Define CMRR.	[2]	L-1

END OF PART A

PART-B

*(Answer **05** full questions. Each question carries **12 marks**)* **Marks**

Q.2(a)	Derive the expression for PN junction diode current.	[06]	L-2
(b)	A full wave rectifier is fed from a transformer having a center-tapped secondary winding. The RMS voltage from either end of secondary to center-tap is 30V. If the diode forward resistance is 2Ω for a load of 1 KΩ, calculate: (i) power delivered to load (ii) rectifier efficiency (iii) % regulation	[06]	L-5
	OR		
Q.3(a)	With a neat circuit diagram and necessary wave forms explain the operation of full wave rectifier. Also derive the efficiency for full wave rectifier.	[06]	L-2
(b)	With help of neat circuit diagrams and waveforms explain the operation of following shunt circuits: (i) positive clipper with reference voltage (ii) negative clipper	[06]	L-1

Q.4(a)	Explain the input and output characteristics of a transistor in CB configuration.	**[06]**	**L-1**
(b)	A CE amplifier is drawn by a voltage source of internal resistance $R_S = 800\Omega$ and load impedance $R_L = 1K\Omega$. The h-parameters are $h_{ie}=1K\Omega$, $h_{re} = 2 \times 10^{-4}$, $h_{fe} = 50$ and $h_{oe} = 25\ \mu A/V$. Compute A_I, R_I, A_V and R_O.	**[06]**	**L-5**
	OR		
Q.5(a)	Explain in detail how BJT acts as a switch.	**[06]**	**L-4**
(b)	Derive the operating point using AC and DC load lines.	**[06]**	**L-3**
Q.6(a)	Describe the construction and working principle of enhancement mode MOSFET and draw its characteristics.	**[06]**	**L-1**
(b)	Draw and explain the MOSFET small signal model. Also derive transconductance from this model.	**[06]**	**L-2**
	OR		
Q.7(a)	Describe the operation of common drain MOSFET amplifier and derive the equation for A_V, R_i and R_o.	**[06]**	**L-2**
(b)	Explain the constructional features of a P-channel MOSFET and its basic operation.	**[06]**	**L-2**
Q.8(a)	Draw the circuit diagram of complementary symmetry class B amplifier and explain its operation. Also find its conversion efficiency.	**[06]**	**L-2**
(b)	List and explain in detail ideal characteristics of an op-amp.	**[06]**	**L-1**
	OR		
Q.9(a)	Show that the transformer coupled class A amplifier maximum efficiency is 50%.	**[06]**	**L-4**
(b)	Define slew rate. How fast can the output of an op-amp change by 10V, if its slew rate is 1V/μs?	**[06]**	**L-4**
Q.10(a)	Explain and draw the output waveforms of the ideal integrator circuit when the input is (i) sine wave (ii) square wave (iii) step input.	**[06]**	**L1**
(b)	Construct a Schmitt trigger using op-amp and explain its operation.	**[06]**	**L-6**
	OR		
Q.11(a)	Design a second order low pass Butterworth filter using op-amp.	**[06]**	**L-6**
(b)	Explain the operation of triangular waveform generator using op-amp.	**[06]**	**L-3**