PVP 23

Code: 23ES1401

II B.Tech - II Semester – Regular Examinations - MAY 2025

ANALOG CIRCUITS
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
4. All parts of Question paper must be answered in one place.

BL – Blooms Level CO – Course Outcome

PART – A

		BL	CO
1.a)	Build a circuit of a series positive clipper.	L2	CO1
1.b)	Sketch a collector to base bias circuit.	L2	CO1
1.c)	Define the h-parameters hi, ho, h_f, and h_r	L1	CO1
1.d)	Illustrate the approximate formulas for A_i, R_i, A_v, R_o	L2	CO1
1.e)	List the ideal values of CMRR, Input offset current, Input offset voltage.	L1	CO1
1.f)	Write the applications of oscillator.	L1	CO1
1.g)	Give the output voltage formula for an integrator and differentiator.	L2	CO1
1.h)	List the applications of OP-AMP.	L1	CO1
1.i)	Define the phase locked loop.	L1	CO1
1.j)	Classify the different types of DAC.	L1	CO1

PART – B

			BL	CO	Max. Marks
UNIT-I					
2	a)	Explain the operation of a diode clipper in a series circuit for positive clipping.	L2	CO1	5 M
	b)	Describe a diode clipping circuit that clips an input signal at two independent levels with its transfer characteristics.	L3	CO2	5 M
OR					
3	a)	Illustrate the collector to base bias technique for a BJT with necessary circuit diagram.	L3	CO2	5 M
	b)	Consider the self bias circuit where V_{cc}=23V, R_C=12KΩ, R_1 = 90KΩ, R_2 = 10KΩ h_{fe}=55, V_{BE}=0.6V. Determine (i) Operating point (ii) Stability Factor.	L3	CO2	5 M
UNIT-II					
4	a)	Derive the expressions for Z_i, A_v, A_I and Y_o for a Common-Emitter Configuration.	L3	CO2	5 M
	b)	Relate the approximate conversion formulas for CB, CE, CC configurations and represent with its two port network.	L3	CO2	5 M
OR					
5		A CE amplifier has the h parameter given by h_{ie}=1KΩ, h_{re}=2x10^{-4}, h_{fe}=50 and h_{oe}=25μmhos. If both the load and source of internal resistance 1KΩ. Determine i) Current gain ii)Voltage gain	L4	CO4	10 M

UNIT-III					
6	a)	Explain the operation of a crystal oscillator and write the expression for its frequency of oscillation.	L2	CO3	5 M
	b)	Calculate the frequency of oscillation for a Wien bridge oscillator with R=6KΩ and C=46nF	L3	CO3	5 M
OR					
7	a)	Develop an adder circuit and obtain the output voltage of an adder circuit using 741 OP-AMP	L4	CO4	5 M
	b)	Analyze the circuit of a V to I and I to V convertor and obtain its output expression.	L4	CO4	5 M
UNIT-IV					
8	a)	Describe the basic operation of an a integrator using 741 OP-AMP	L2	CO3	5 M
	b)	Explain the working of a sample and hold circuit with waveform.	L2	CO3	5 M
OR					
9	a)	Describe the working of a non-inverting comparator with waveforms.	L3	CO3	5 M
	b)	Draw the circuit of a triangular wave generator using a 741 OP-AMP and explain its operation.	L2	CO3	5 M

UNIT-V					
10	a)	Explain the basic operation of a 565 PLL using its functional block diagram.	L3	CO3	5 M
	b)	Draw the block diagram of a PLL and explain the function of Phase detector, low-pass filter and VCO.	L3	CO3	5 M
OR					
11	a)	Explain the operation of a Successive approximation ADC.	L4	CO4	5 M
	b)	Illustrate the following ADC and DAC specification: resolution, Linearity, accuracy, monotonicity, settling time.	L4	CO4	5 M