



Third Semester B.E./B.Tech. Degree Examination, June/July 2025

Analog and Digital Electronics

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M: Marks, L: Bloom's level, C: Course outcomes.

Module – 1			M	L	C
Q.1	a.	Define filter and discuss different types of active filters with frequency response diagrams.	10	L1	CO1
	b.	Explain the operation of wide band pass filter circuit diagram and frequency response.	10	L2	CO2
OR					
Q.2	a.	Describe first order high pass butterworth filter with necessary equations, circuits and wave forms.	10	L1	CO1
	b.	Explain the operation of Wide Band-Reject filter with circuit diagram and frequency response.	10	L2	CO1
Module – 2					
Q.3	a.	Explain the oscillator principle and working of wien bridge oscillator with neat diagram.	8	L2	CO2
	b.	With a neat circuit diagram, explain the operation of phase shift oscillator.	8	L2	CO2
	c.	Design a phase shift oscillator with $f_0 = 200$ Hz (assume $C = 0.1 \mu F$).	4	L3	CO2
OR					
Q.4	a.	Explain the operation of Schmitt trigger with all necessary diagrams.	10	L2	CO2
	b.	Define comparator. Explain the operation of inverting comparator.	10	L1	CO2
Module – 3					
Q.5	a.	Explain the operation of 555 timer as monostable multivibrator and derive the expression for pulse width.	10	L2	CO3
	b.	Explain the architecture of 555 timer with a neat sketch.	6	L2	CO3
	c.	List the applications of 555 timer.	4	L1	CO3
OR					
Q.6	a.	Derive an expression for charging time (T_c), discharging time (T_d), frequency of oscillation and duty cycle for a 555 timer astable multivibrator.	10	L3	CO3
1 of 2					

	b.	Explain Astable multi vibrator application as square wave oscillator.	10	L2	CO3
Module – 4					
Q.7	a.	Simplify the Boolean functions using K-maps i) $f(a, b, c, d) = \sum (1, 3, 4, 5, 7, 10, 12)$ ii) $f(A, B, C, D) = A'B'C' + B'CD' + A'BCD' + AB'C'$	10	L3	CO4
	b.	Explain half adder and full subtractor with the help of truth table, derive the expression for sum, carry, borrow and difference.	10	L2	CO4
OR					
Q.8	a.	Implement the following function with a multiplexer by taking A as input and remaining as select lines $f(A, B, C, D) = \sum (0, 1, 3, 4, 8, 9, 15)$	10	L3	CO4
	b.	What is Encoder? Realize octal to binary encoder using basic gates and write its truth table.	10	L3	CO4
Module – 5					
Q.9	a.	Explain the operation of RS flipflop with diagram and different input combination using truth table and its characteristic equation.	10	L2	CO5
	b.	Explain the operation of JK flip flop with diagram and different input combination using truth table and its characteristic equation.	10	L2	CO5
OR					
Q.10	a.	Explain the operation of D flip flop with diagram and different input combination using truth table and characteristic equation.	10	L2	CO5
	b.	Design 3 bit synchronous up counter.	10	L3	CO5
