



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE (AUTONOMOUS) (Grant-in-Aid)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



Bachelor of Science (Semester 3) External Examination - 2025
US03IDELE03: NUMER SYSTEMS and LOGIC GATES

Date: 08-10-2025, (WEDNESDAY)

Time: 02:00 PM to 03:30 PM (1.5 HRS.)

Total marks: 25

NOTE: Figure to the write indicates the marks of the questions.

Q-1	Write the most appropriate answer from the following multiple-choice questions.		[05]
(1)	$25_{16} + 3A_{16} = ?$		
	(a) 5F	(b) 65	
	(c) 4F	(d) 6F	
(2)	1's and 2's complement system is used to represent -----numbers		
	(a) Positive numbers	(b) Negative numbers	
	(c) Complex numbers	(d) Irrational numbers	
(3)	Hexadecimal number system has ____ unique digits.		
	(a) 4	(b) 16	
	(c) 2	(d) 8	
(4)	Which gate is considered the "equality detector"?		
	(a) XNOR	(b) OR	
	(c) RON	(d) NOR	
(5)	The expression for Absorption law is given by _____.		
	(a) $A + AB = B$	(b) $AB + A\bar{A} = A$	
	(c) $A + B = B + A$	(d) $A + AB = A$	
Q-2	Describe the process of converting a decimal number to binary, octal, and hexadecimal systems. Choose the number 156 and show step-by-step conversion into each system. Explain how positional weights differ across these number systems.		[10]
	OR		
Q-2	Describe any three laws of Boolean algebra with examples. Include Identity Law, Domination Law, and DeMorgan's Theorem.		[10]
	OR		
Q-3	Explain the two's complement method for representing negative binary numbers. Why is it preferred over sign-magnitude representation in digital systems? Illustrate with the conversion of -18 into 8-bit two's complement form.		[10]
	OR		
Q-3	Write the laws of complementation, AND laws, OR laws and commutative laws.		[10]