

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION DECEMBER 2025
(Fifth Semester)
Branch - PHYSICS

PRINCIPLES OF DIGITAL ELECTRONICS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Recognize the number system that uses both alphabets and numerals. a) binary number system b) octal number system c) decimal number system d) hexadecimal number system	K1	CO1
	2	Classify the number of bits used to represent one decimal digit in 8421 code. a) 3 bits b) 4 bits c) 5 bits d) 8 bits	K2	CO1
2	3	Name the logic gate whose output is high only when all input are high. a) OR gate b) AND gate c) NOT gate d) XOR gate	K1	CO2
	4	Simplify the Boolean expression $A+AB=$ ____? a) AB b) A c) B d) A+B	K2	CO2
3	5	Label the function of each gate in full adder. a) AND for carry, XOR for sum b) OR for sum, AND for carry c) XOR for carry, NOT for sum d) NAND for carry, OR for sum	K1	CO3
	6	Interrupt the selection line in a 4 to 1 multiplexer. a) 1 b) 2 c) 3 d) 4	K2	CO3
4	7	Which component is primarily used to store one bit of data in digital circuit? a) multiplexer b) amplifier c) flip flop d) decoder	K1	CO4
	8	Show another name for an asynchronous counter. a) ripple counter b) synchronous counter c) shift register d) ring counter	K2	CO4
5	9	Identify the method used to access a specific location in memory. a) encoding b) decoding c) multiplexing d) addressing	K1	CO5
	10	Relate the role of the two comparators inside the 555 timer IC. a) control b) generate pulse c) amplify d) regulate	K2	CO5

Cont...

SECTION - B (35 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Outline the process of Gray code and ASCII code conversion.	K2	CO1
	(OR)			
	11.b.	Define 1's and 2's complement. Convert the following numbers into their 1's and 2's complements. a) 10100100 b) 00011101		
2	12.a.	Apply your knowledge of basic logic gates to construct the truth tables and logic circuit symbols for AND, OR and NOT gate.	K3	CO2
	(OR)			
	12.b.	Identify the ways De-Morgan's theorem can simplify logic expressions.		
3	13.a.	Analyze how a four bit adder operates, when adding two binary numbers.	K4	CO3
	(OR)			
	13.b.	Implement AND and OR matrix in Programmable Logic Arrays.		
4	14.a.	Discover how an SR flip flop responds to different input conditions.	K4	CO4
	(OR)			
	14.b.	Develop a detailed timing diagram for 4-bit asynchronous counter.		
5	15.a.	Construct a circuit for Binary-Weighted Resister D/A converters and explain their operations.	K3	CO5
	(OR)			
	15.b.	Explain internal block diagram of the 555 timer.		

SECTION - C (30 Marks)Answer **ANY THREE** questions**ALL** questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Explain about types of Number systems. Give one example for each conversion.	K4	CO1
2	17	Examine the methods for building AND, OR and NOT gates using only NAND gates.	K4	CO2
3	18	Inspect how the carry-in input in a full adder influences the sum and carry outputs compared to a half adder.	K4	CO3
4	19	Elaborate on the role of the J and K inputs in J-K flip flops.	K4	CO4
5	20	How an IC 555 timer is connected as an Astable multivibrator. Examine its operations.	K4	CO5