



PRESIDENCY UNIVERSITY

BENGALURU

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End - Term Examinations – May / June 2026

Date: 27 -05-2026

Time: 09:30am – 12:30pm

School: SOE	Program: B.Tech	
Course Code : ECE2022	Course Name : Digital Design	
Semester: II	Max Marks: 100	Weightage:50%

CO - Levels	C01	C02	C03	C04	C05	C06
Marks	14	10	10	20	24	22

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1	Mention some applications of Digital systems.	2 Marks	L1	C01
2	Identify the logic gate when output is high, when both the inputs are high and low. When one of the inputs are low, the output is low. Construct the truth table with logic symbol and write the boolean expression using AND-OR-NOT operators.	2 Marks	L1	C01
3	Show that $A+BC = (A+B)(A+C)$.	2 Marks	L1	C02
4	Identify the device in which one input data signal is divided into various output signals, based on the number of select lines. Also write the block diagram.	2 Marks	L1	C02
5	Define decoder and write the truth table for 2*4 decoder.	2 Marks	L1	C02
6	A parity generator is a combinational logic circuit that generates the parity bit in the transmitter. Write the truth table for odd parity generator.	2 Marks	L1	C02

7	Bring out some differences between combinational and sequential circuits.	2 Marks	L1	C02
8	Define Latch and Flip-flop. Mention the types of Flip-flops.	2 Marks	L1	C05
9	Mention the different types of triggering methods. What is the purpose of using a clock in the sequential circuits.	2 Marks	L1	C05
10	Define synchronous and Asynchronous counter.	2 Marks	L1	C06

Part B

Answer the Questions

Total 80 Marks.

11.	a. Logic gates are the basic building block of a digital system which can take two or more inputs and produce one output. Explain all different types of logic gates with truth table, logic symbol and expressions. b. Find the minimal SOP expression using k-map for the following equation $F(A,B,C,D) = \sum m(0,1,5,7,9,12,13,15) + \sum d(2,3,10,11)$	10+10 =20 Marks	L2	C01/C03
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Or

12.	a. A Boolean expression is a mathematical expression that uses Boolean values and Boolean operators. For the given boolean expression, construct the truth table and implement using NAND gates, $F=A'C+A'B+AB'C+BC$. b. Express the given function as a sum of minterms. Find the minimal SOP expression using k-map.	10+10 =20 Marks	L2	C01/C03
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13.	a. All the gates can be implemented using multiplexer, Implement basic gates, universal gates and special gates using 2X1 multiplexer.	20 Marks	L2	C04
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Or

14.	a. When more than one inputs are high at the same time priority should be given for different inputs. Define priority encoder and implement 4 to 2 priority encoder using basic gates with truth table and appropriate expressions.	20 Marks	L2	C04
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15.	a.	Flip-flops form the building blocks of registers, counters, and memory systems. Using NAND gates draw the logic diagram for the SR Flip-flop and explain its operation with necessary truth table, characteristic table and excitation table with boolean expressions.	20 Marks	L2	C05
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Or

16.	a.	Latches are the asynchronous circuits where the output changes instantly with the change in input. In this regard explain transparent and gated SR latch with Nand gate implementation, truth table and timing diagram	20 Marks	L2	C05
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17.	a.	Counter is composed of flip-flops connected in a specific manner to count binary numbers. Design a 3-bit counter using JK flip-flops . The counter should start from binary 111 and count downwards sequentially. Use a synchronous clock and Derive the state table, excitation table, Boolean expressions, and circuit diagram for the counter.	20 Marks	L3	C06
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Or

18.	a.	Registers are used to transfer data between memory, input/output devices, and the processor. Define and classify the types of Registers. With a neat block diagram explain the different types of registers.	20 Marks	L3	C06
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******* BEST WISHES *******