



PRESIDENCY UNIVERSITY

BENGALURU

Roll No.														
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End - Term Examinations – May / June 2026

Date: 25- 05- 2026

Time: 09:30am – 12:30pm

School: SOE	Program: B. Tech	
Course Code : ECE2021	Course Name : Digital Electronics	
Semester: II	Max Marks: 100	Weightage: 50%

CO - Levels	C01	C02	C03	C04	C05	C06
Marks	8	10	18	24	20	20

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

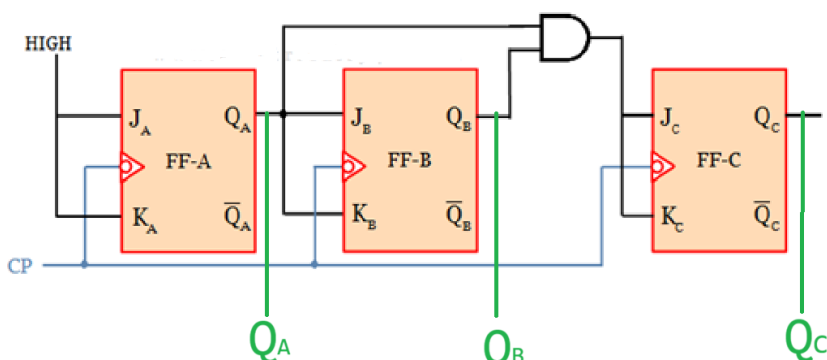
1.	Solve $(10110.1011)_2 = (?)_8 = (?)_{16}$	2 Marks	L3	C01
2.	Solve $(52)_{10} = (?)_8$	2 Marks	L3	C01
3.	Simplify $F(X,Y,Z) = X'Y'Z' + XY'Z' + XYZ' + XYZ$ using Boolean Theorems.	2 Marks	L3	C01
4.	Convert to Canonical SoP form and then write F as Sum of Minterm. $F(a,b,c) = ab+bc'$	2 Marks	L3	C01
5.	Write expression for Difference and Borrow for Full Subtractor.	2 Marks	L1	C03
6.	Comparator circuit is used to compare between two number. Draw circuit to find $A > B$ and $A < B$ where A and B are single bit number.	2 Marks	L1	C03
7.	Define Encoder and draw the block diagram for a typical Encoder.	2 Marks	L1	C03
8.	Define Demultiplexer and draw the block diagram for a typical Demultiplexer.	2 Marks	L1	C03
9.	Draw Block diagram of Sequential circuit.	2 Marks	L1	C04
10.	List any two differences between Latch and Flip Flop?	2 Marks	L1	C04

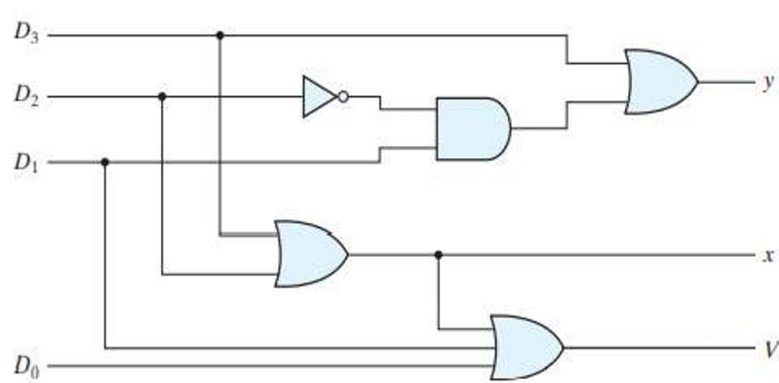
Part B

Answer the Questions.

Total Marks 80M

11.	a.	Simplify the following Boolean function using a 4-variable Karnaugh Map with Don't Care conditions and obtain the minimal SOP and POS expression: $F(A,B,C,D)=\Pi(0,2,5,7,8,10,13,15)$	10 Marks	L3	C02
Or					
12.	a.	Minimize the following Boolean function using the Quine-McCluskey Method. Show all steps clearly. $F(A,B,C,D)=\Sigma(4,8,10,11,12,14,15)$	10 Marks	L3	C02
13.	a.	Multiplexers function as switches to control the flow of data between different sources. Implement the given Boolean function using 4*1 multiplexers, showing all the involved steps: $F(A,B,C,D)=\Pi(1,3,4,10,11,12,14,15)$	10 Marks	L3	C03
Or					
14.	a.	Adder is a circuit that adds two bits of digital data along with the carry generated from the previous addition. Implement a full adder circuit using half adder circuits. Also write equation for outputs of full adder and construct truth table for Full adder.	10 Marks	L3	C03
15.	a.	Illustrate working of a 3-bit asynchronous counter using T flip-flops. Also draw the timing diagram.	20 Marks	L2	C04
Or					
16.	a.	Illustrate working of JK Flip Flop. Also write the Truth table, characteristic table, excitation table, and Characteristic equation.	20 Marks	L2	C04
17.	a.	Develop Verilog code for a full subtractor using (i) Gate Level modeling (ii) Behavioral modelling and (iii) Dataflow modeling. Also, write the Boolean expressions for all the outputs.	20 Marks	L3	C05
Or					
18.	a.	2-out-of-3 voting (Majority Voting) logic produces an output HIGH when any two or more of the three inputs are HIGH. Design a Majority Voting system using Verilog (i) Gate Level modeling (ii) Behavioral modelling and (iii) Dataflow modeling. Also, write the Boolean expressions for all the outputs.	20 Marks	L3	C05
19.	a.	Mr. Chan Lie thinks of employing flip flops to create a sequential circuit. He builds a circuit shown below using three JK flip flops whose clock inputs are connected to a common clock, the counter will increment by 1-bit for every 1 clock	20 Marks	L4	C06

		pulse and reaches a maximum of $(111)_2$. Once counter output reaches $(111)_2$, the cycle repeats. Analyze this idea with the help truth table, state diagram, excitation table of the flip flop used, circuit excitation table, K map, output equations and name the resultant counter. 			
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Or					
20.	a.	Mr. Dsouza implements a circuit containing 4-bit inputs (D_0 to D_3) and valid bit indicator (V) and bits x and y as outputs. The valid bit indicator should go high only if at least one input is high. These circuits are used extensively in digital and computer systems as microprocessor interrupt controllers, where they detect the highest priority input and give output based on this prioritized input. Analyze the following circuit to obtain the truth table, output expressions using K-map, and identify the given circuit. Also comment and justify which type of digital circuit is this: A combinational or sequential? 	20 Marks	L4	CO6