

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

U.G. DEGREE EXAMINATION – ALLIED
THIRD SEMESTER – NOVEMBER 2022
UPH 3405 – DIGITAL ELECTRONICS

Date: 01-12-2022

Dept. No.

Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

SECTION A**Answer ALL the Questions**

1.	Answer the following	(5 x 1 = 5)	
a)	Convert $(50)_{16}$ into a decimal number	K1	CO1
b)	What are the basic logic gates?	K1	CO1
c)	Write any one of the Boolean laws.	K1	CO1
d)	What is a latch?	K1	CO1
e)	What is meant by a shift register?	K1	CO1
2.	Fill in the blanks	(5 x 1 = 5)	
a)	The right most bit of a binary number is called _____ bit.	K1	CO1
b)	$A(A+B) =$ _____.	K1	CO1
c)	When the set is enabled in S-R flip flop then the output will be _____.	K1	CO1
d)	If a signal passing through a gate by sending a LOW into one of the inputs, and the output is HIGH, the gate is a _____.	K1	CO1
e)	A _____ is defined as the group of flip-flops suitable for storing a binary data.	K1	CO1
3.	MCQ	(5 x 1 = 5)	
a)	What is the sum of the binary numbers $101001 + 010011 = ?$ 010100 b) 111100 (c) 000111 (d) 101110	K2	CO1
b)	How many methods of shifting of data are available? (a) 2 (b) 3 (c) 4 (d) 5	K2	CO1
c)	The clear input is used to make output _____ (a) $Q=1$ (b) $Q=0$ (c) invalid (d) No Change	K2	CO1
d)	The hexadecimal representation of the binary number 1110 is _____ (a) 0111 (b) E (c) 15 (d) 14		CO1
e)	The sum of products of canonical forms also known as _____ (a) Maximum term expansion (b) Minimum term expansion (c) Both a and b (d) None of the above.	K2	CO1
4.	State True or False	(5 x 1 = 5)	
a)	All JK flip flops are taken as negative edge triggered flip flops in mod counters.	K2	CO1
b)	The output of an exclusive-OR (XOR) gate is 1 only when the inputs are different.	K2	CO1

c)	The 8-bit binary representation of A3 is 10100010.	K2	CO1
d)	A shift register can be constructed using D flip – flops and JK flip flop.	K2	CO1
e)	A truth table gives the output state for each possible input state combination.	K2	CO1

SECTION B

Answer any TWO of the following in 100 words (2 x 10 = 20)

5.	Draw the diagram of AND, OR, NOT, NAND, NOR gates and illustrate their working with the truth table.	K3	CO2
6.	Apply the laws of Boolean algebra and solve (a) $Y = [A\bar{B}(C+BD) + \bar{A}\bar{B}]C$ (6 marks) (b) $F(A, B, C, D) = BC + A\bar{C} + AB + BCD$ (4 marks)	K3	CO2
7.	Using the NAND Latch, explain the working of a clocked RS flip flop.	K3	CO2
8.	What is a counter? Illustrate the working of mod 4 and mod 8 counters.	K3	CO2

SECTION C

Answer any TWO of the following in 100 words (2 x 10 = 20)

9.	Explain briefly: SOP, POS, minterm & maxterm.	K4	CO3
10.	Convert (a) $(200)_8$ into its equivalent binary number. (b) $(120)_8$ into a decimal number. (5+5 marks)	K4	CO3
11.	Analyse the working of a D flip flop with a neat diagram.	K4	CO3
12.	(a) Simplify using K – map: $F(A, B, C) = \Sigma(1,2,5,6)$ (b) Simplify $Y = [AB(C + BD) + A\bar{B}]$ (5+5 marks)	K4	CO3

SECTION D

Answer any ONE of the following in 250 words (1 x 20 = 20)

13.	(a) Evaluate using K map $Y = F(A, B, C, D) = \Sigma(0,2,3,5,7,9,11,12,14,15)$. (b) Convert the decimal number 567 to base 2, base 8, base 16. (10 + 10 marks)	K5	CO4
14.	(a) How can we convert a JK flip flop into D and T flip flops? (b) Discuss the operation of 3-bit up ripple counter. (10 + 10 marks)	K5	CO4

SECTION E

Answer any ONE of the following in 250 words (1 x 20 = 20)

15.	With the relevant circuit diagrams demonstrate that the NAND and NOR gates are universal gates.	K6	CO5
16.	(a) Explain the working of a JK flip flop and give its truth table. (b) Explain the working of shift right and shift left shift register with a neat diagrams. (10+10 marks)	K6	CO5

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