LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

U.G. DEGREE EXAMINATION – **ALLIED**

THIRD SEMESTER – **NOVEMBER 2023**

UPH 3405 – DIGITAL ELECTRONICS

Date: 08-11-2023 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

	SECTION A - K1 (CO1)
	Answer ALL the Questions **(10 x 1 = 10)**
1.	**MCQ**
a)	Which input values will cause an AND logic gate to produce a HIGH output? (a) At least one input is HIGH (b) At least one input is LOW (c) All inputs are HIGH (d) All inputs are LOW
b)	In S-R flip-flop, if Q = 0 the output is said to be _____ (a) Set (b) Reset (c) Previous state (d) Current state
c)	The Boolean expression X = (A + B)(C+D) represents (a)Two ORs AND ed together (b)Two ANDs OR ed together (c) A 4 – input AND gate (d) A 4 – input OR gate
d)	A shift register is defined as _____ (a). The register capable of shifting information to another register (b). The register capable of shifting information either to the right or to the left (c.) The register capable of shifting information to the right only (d). The register capable of shifting information to the left only
e)	A 2-input NOR gate has 4 input, how many of those input will result in a HIGH output? (a) 1 (b) 2 (c) 0 (d) 3
2.	**Fill in the blanks**
a)	Ripple counters are also called …….
b)	Flip flop is also called as …….
c)	The inputs of a NAND gate are connected together. The resulting circuit is……
d)	The octal equivalent of the decimal number $(417)_{10}$ is ……
e)	The output of Y= F(A,B) = $\sum(0,2)$using K-Map is ……..
	SECTION A - K2 (CO1)
	Answer ALL the Questions **(10 x 1 = 10)**
3.	**Match the following**
a)	Octal - one bit memory cell
b)	Counters - 8 cells
c)	3 variable K-map - A
d)	Flip flop - base 8
e)	A + A - flip flops

4.	**True or False**
a)	Both OR and AND gates can have only two inputs
b)	The standard form of S-R flip flop is Set-Reset
c)	All the rules for Boolean algebra are exactly the same as for ordinary algebra
d)	A + 0 = 0
e)	Mod-N counter is a counter that goes through a repeated sequence of N counts
	SECTION B - K3 (CO2)
	Answer any TWO of the following in 100 words **(2 x 10 = 20)**
5.	$(29)_{10} = (X)_8 = (Y)_{16} = (Z)_2$, Find X,Y,Z
6.	Apply the laws of boolean algebra Show that (i) $\overline{(A+B)}(\bar{B}+C)(\bar{C}+A) = (A+\bar{B})(B+\bar{C})(C+\bar{A})$ (5 marks) (ii) $AB + \bar{A}C + BC = AB + \bar{A}C$ (5 marks)
7.	Design a K-map and give the expression. (i) Y = F(A,B,C,D) = ∑(0,2,4,6,7) (5 marks) (ii) Y = F(A,B)= ∑(2,3) (5 marks)
8.	Draw and explain the working of a UP counter and give its truth table
	SECTION C – K4 (CO3)
	Answer any TWO of the following in 100 words **(2 x 10 = 20)**
9.	Draw the logic gates AND, OR , NOT , NAND and NOR and explain it with appropriate truth tables
10.	Evaluate using K map Y = F (A, B, C, D) = Σ (0,1,3,5,7,9,11,12,13,14,15)
11.	Analyse the working of a D- Flip flop with the circuit diagram using NAND gate
12.	Define (i) positive and negative logic (4 marks) (ii) SOP with an example (3 marks) (iii) Flip flop (3 marks)
	SECTION D – K5 (CO4)
	Answer any ONE of the following in 250 words **(1 x 20 = 20)**
13.	(i) Explain the working of a shift left shift register with a neat diagram and truth table (10 marks) (ii) Draw the circuit diagram of Mod 4 and Mod 8 counters and explain its working (10 marks)
14.	Convert (Each carries 4 marks) (i) $(10011.1011)_2$ into decimal. (ii) $(65.534)_{10}$ into hex. (iii) $(1F.2B4)_H$ to binary (iv) $(23.625)_8$ to decimal. (v) $(1011.11)_{10}$ to binary
	SECTION E – K6 (CO5)
	Answer any ONE of the following in 250 words **(1 x 20 = 20)**
15.	(i) Describe the working of JK flip flop with a neat diagram and truth table. (10 marks) (ii) Explain the circuit of NAND latch with neat circuit and truth table. (10 marks)
16.	With the suitable circuit diagrams, show that NAND and NOR gates are universal gates.

		(10+10 marks)

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