LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **COMPUTER SCIENCE**

THIRD SEMESTER – **APRIL 2023**

UPH 3405 – DIGITAL ELECTRONICS

Date: 12-05-2023 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

SECTION A			
Answer ALL the Questions			
1.	**Answer the following** **(5 x 1 = 5)**		
a)	Convert 10_{10} into a binary number.	K1	CO1
b)	Draw the symbol of EX - OR gate.	K1	CO1
c)	Write any one of the Boolean laws.	K1	CO1
d)	What is a flip flop?	K1	CO1
e)	What are registers?	K1	CO1
2.	**Fill in the blanks** **(5 x 1 = 5)**		
a)	The symbol D in hexadecimal number system represents _____ in decimal.	K1	CO1
b)	The inverter is a ____________ gate.	K1	CO1
c)	$(A + B).(\bar{A} + \bar{B})$ = ____________	K1	CO1
d)	A modulus 10 counter must have ____________flip flops.	K1	CO1
e)	The full form of SIPO is ___________	K1	CO1
3.	**State True or False** **(5 x 1 = 5)**		
a)	ABC is a valid hexadecimal number.	K2	CO1
b)	An AND gate has input A and B. The input B is always low, the state of input A can affect the output.	K2	CO1
c)	Logic gates are the building blocks of all circuits in a computer.	K2	CO1
d)	When both set and reset are disabled in S-R flip flop then the output will change.	K2	CO1
e)	In an UP-counter, each flip-flop is triggered by the normal output of the preceding flip-flop.	K2	CO1
4.	**MCQ** **(5 x 1 = 5)**		
a)	The octal equivalent of the decimal number $(417)_{10}$ is _____ $(641)_8$ (b) $(619)_8$ (c) $(640)_8$ (d) $(598)_8$	K2	CO1
b)	The NOR gate is OR gate followed by ___________ (a) AND gate (b) NAND gate (c) NOT gate (d) None of the above	K2	CO1
c)	In Boolean algebra, the OR operation is possesses which property? (a) Associative property (b) Commutative property (c) Distributive property (d) All of the above.	K2	CO1

d)	When both inputs of a J-K flip-flop cycle, the output will ___________ (a) Be invalid (b) Change (c) Not change (d) Toggle	K2	CO1
e)	A shift register is a digital circuit that _____________ . (a) Stores data (b) Shifts the data from left to right (c) Shifts the data from right to left (d) all of the above.	K2	CO1

SECTION B

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

5.	(a) Convert 1020_{10} into a hexadecimal number. (b) Convert 107_{16} into a binary number. **(5+5 marks)**	K3	CO2
6.	Draw the circuit of the invert gate and give its truth table. Explain positive and negative logics.	K3	CO2
7.	(a) Simplify using K – map Y=F (A, B, C, D) = Σ (0,1,2,4,5,10,11,14,15) (b) Explain NAND latch. **(5+5 marks)**	K3	CO2
8.	With relevant diagrams discuss 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.	(a) Convert the hexadecimal numbers $(B6)_H$ and $(440)_H$ to decimal numbers. (b) Convert $(68)_{10}$ into an octal number. **(5+5 marks)**	K4	CO3
10.	What are logic gates? Explain the basic logic gates with a neat diagram.	K4	CO3
11.	With a neat diagram, explain the working of D and T flip flops.	K4	CO3
12.	Explain the working of a clocked SR flip flop using NAND gates	K4	CO3

SECTION D

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

13.	(a) With the required diagram explain, the working of a 4-bit up ripple counter. (b) Simplify Y= [$A\bar{B}$(C+BD) +$\bar{A}\bar{B}$]C **(14+6 marks)**	K5	CO4
14.	(a) What is a shift register? Explain with a neat logic diagram the working of parallel-in serial- out and parallel-in parallel-out shift registers. (b) Simplify using K –map F (A, B, C) = Σ (1,2,5,6) **(15+5 marks)**	K5	CO4

SECTION E

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

15.	(a) Explain in detail the working of a JK flip flop with a neat circuit diagram. (b) Add 94_{10} and 125_{10} using binary addition. **(14 +6 marks)**	K6	CO5
16.	(a) Explain NAND and NOR as universal gates. (b) Simplify using K map F(A, B, C, D) = Σm(0, 1, 3, 5,7,8,9,11,13,15) Draw the logic circuit for the simplified expression. **(10+10 marks)**	K6	CO5

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