University of Mumbai

Examinations Summer 2022

Time: 2 hour 30 minutes Max. Marks: 80

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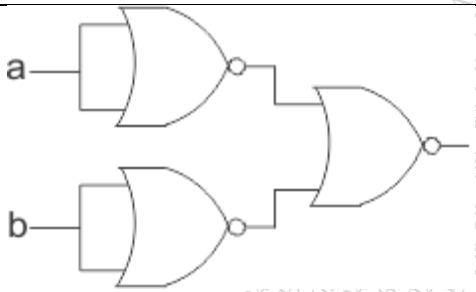
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which of the following gates is known as Universal Gate?
Option A:	XOR
Option B:	NOT
Option C:	AND
Option D:	NAND
2.	 If Y is the output for the above figure, determine the output expression for the given logic diagram.
Option A:	Y=AB
Option B:	Y=A'B'
Option C:	Y=A+B
Option D:	Y=A⊕B
3.	Which of the following law is not correct?
Option A:	A + 1 = 1
Option B:	A + A = A
Option C:	A.A = A
Option D:	A + A'= 0
4.	Which of the following is NOT considered for forming groups in K-map?
Option A:	Rolling
Option B:	Diagonal
Option C:	Vertical
Option D:	Horizontal
5.	Which of the following is not an example of sequential circuit?
Option A:	Flip flop
Option B:	Counter
Option C:	Magnitude Comparator
Option D:	Shift Register
6.	2's complement representation of 23 is_____.
Option A:	1101000
Option B:	1101001
Option C:	1100100
Option D:	1101010

7.	A ____is composed of a group of flip flops to store a group of bits.
Option A:	Counter
Option B:	Decoder
Option C:	Demultiplexer
Option D:	Register
8.	Shift register application includes____
Option A:	Ring counter
Option B:	Decade counter
Option C:	Bounce elimination switch
Option D:	BCD to 7-segment decoder
9.	Which of the following is true about PAL?
Option A:	Both OR & AND array are programmable.
Option B:	AND array is programmable & OR array is fixed.
Option C:	AND array is fixed & OR array is programmable.
Option D:	Both OR & AND array are fixed.
10.	A declaration of a module's inputs and outputs in VHDL is ____
Option A:	VHDL entity
Option B:	VHDL architecture
Option C:	VHDL Interface
Option D:	VHDL Conceptual Model

Q2 (20 Marks)	**Solve any Four out of Six** **5 marks each**
A	Perform the given conversion, $(FBE6)_H = (?)_{10} = (?)_2 = (?)_8$
B	What are universal gates? Why they are called universal gates? Justify with example.
C	Write basic laws for Boolean algebra.
D	Give Comparison for TTL and CMOS logic families.
E	Compare decoder and demultiplexer.
F	List different types of flip-flops with their characteristic equations.

Q3 (20 Marks)	**Solve any Two Questions out of Three** **10 marks each**
A	Get the minimal expression using Quine McClusky method for the following logic function: $f(A,B,C,D) = \Sigma m\,(1, 3, 5, 8, 9, 11, 15) + d(2,13)$
B	Design & implement 4-bit Binary to Gray code converter.
C	What is modulus of a digital counter? Design a synchronous counter with irregular binary count sequence 1----2----5----7. Use JK flips flop.

Q4 (20 Marks)	**Please delete the instruction shown in front of every sub question**
A	**Solve any Two** **5 marks each**

i.	Convert D flip flop to T flip flop
ii.	Write a VHDL code for 4:1 MUX.
iii.	Give classification of semiconductor memories and explain about DRAM in brief.
B	**Solve any One** **10 marks each**
i.	Draw the block diagram of BCD adder using IC 7483 and show with example the addition of two BCD numbers
ii.	Explain different application of sequential circuits with relevant diagrams.