PAPER ID-311625

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM III) THEORY EXAMINATION 2024-25
DIGITAL SYSTEM DESIGN

TIME: 3 HRS **M.MARKS: 70**

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 07 = 14**

Q no.	Question	CO	Level
a.	What is race around condition in JK flip-flop?	CO3	K1
b.	Distinguish between Latch and Flip Flop.	CO3	K1
c.	The solution to the quadratic equation k^2-11k +22=0 are x=3 and x=6. What is the base of the number system?	CO1	K2
d.	Differentiate between encoder and decoder.	CO2	K1
e.	What is PLD?	CO4	K2
f.	Implement 2- input NAND gate by using CMOS inverter.	CO5	K3
g.	Describe figure of merit and noise Immunity of TTL and CMOS.	CO5	K1

SECTION B

2. Attempt any *three* of the following: **07 x 3 = 21**

Q no.	Question	CO	Level
a.	Convert the following in their corresponding base (i)$(ABC)_{16}$ = $()_2$ (ii)$(100010100.110101)_2$ =$()_8$ (iii)$(2230)_4$ =$()_3$	CO1	K3
b.	What is multiplexer? Design 16:1 multiplexer using 4:1 multiplexer.	CO2	K2
c.	Explain SR, D and JK flip flop in detail.	CO3	K3
d.	Write a short notes on (i)Fan-in (ii)Propagation delay (iii)Noise margin	CO4	K3
e.	Differentiate between PROM, PLA and PAL.	CO5	K3

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SECTION C

3. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Minimize the logic function using K-MAP Method $F(A,B,C,D,E)=\sum m(8,9,10,11,13,15,16,18,21,24,25,26,27,30,31)$	CO1	K3
b.	What do you mean by Universal logic gate? Imlement XOR gate using minimum number of NAND gate.	CO1	K3

4. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Design 4 bit priority Encoder.	CO2	K3
b.	What is a comparator? Design and implement a 2-bit comparator.	CO2	K3

5. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Explain 3-bit Johnson counter with circuit diagram. Also draw its waveform and show that this counter can be used as Multiphase clock generator for controlling the specific light pattern of LED's.	CO3	K3
b.	Prove that the characteristics equation for the complement output of JK Flip Flop is: - $\overline{Q(t+1)}=\overline{J}\overline{Q}+KQ$	CO3	K3

6. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Differentiate between asynchronous counter and synchronous counter? Explain the working of 4-bit Synchronous counter using suitable circuit diagram and timing diagram.	CO4	K2
b.	What do you mean by Hazards? Explain the different method by which hazard can be eliminated.	CO4	K2

7. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Explain the working of TTL inverter using suitable diagram.	CO5	K2
b.	What do you mean by CMOS Inverter? Draw and explain the working of CMOS inverter using VTC.	CO5	K2