PAPER ID-311629

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

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

TIME: 3 HRS **M.MARKS: 100**

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

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

Q no.	Question	CO	Level
a.	Define cyclic codes.	1	K1
b.	State the Demorgans theorem.	1	K1
c.	Construct half adder using logic gates.	2	K5
d.	Define barrel shifter.	2	K1
e.	Write down the difference between Synchronous and Asynchronous Counters.	3	K4
f.	Define the race around condition.	3	K1
g.	Define the term ECL and TTL.	4	K1
h.	Define logic family with its classification in brief.	4	K1
i.	Write down the advantages and disadvantages of flash type ADC.	5	K5
j.	Write down the application of SAR ADC.	5	K1

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

Q no.	Question	CO	Level
a.	Simplify the Boolean function using K-map: $F = \sum m(0,1,3,5,6,7,9,11,16,18,19,20,21,22,24,26)$	1	K3
b.	Draw and explain 4-bit magnitude comparator.	2	K2
c.	Design a 3 bit up/down ripple counter.	3	K6
d.	Draw and explain the operation of TTL NAND gate.	4	K2
e.	Explain the working of counter type ADC with neat diagram.	5	K2

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

Q no.	Question	CO	Level
a.	Design a binary to gray code converter.	1	K4
b.	Define prime implicant and essential prime implicant. Simplify the Boolean functionusing K-Map and identify them. $F(A,B,C,D) = \sum m(0,1,2,5,6,7,8,9,10,13,14,15)$	1	K3

4. Attempt any *one* part of the following: **10 x 1 = 10**

Q no.	Question	CO	Level
a.	Draw a decimal adder to add BCD numbers.	2	K4
b.	Implement the below function using 8 x 1 multiplexer: $F = \sum(0,1,3,4,7,8,9,11,14,15)$	2	K5

PAPER ID-311629

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

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

TIME: 3 HRS **M.MARKS: 100**

5. Attempt any *one* part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Design a universal shift register that performs HOLD, SHIFT RIGHT, SHIFT LEFT and LOAD.	3	K5
b.	Write the truth table of the SR, JK, D & T flip-flops.	3	K1

6. Attempt any *one* part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Explain the operation and draw the basic circuit of the TTL NOR gate.	4	K2
b.	Differentiate between the PLA and PAL and realize the full adder circuit using PAL.	4	K4

7. Attempt any *one* part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Explain the operation, merits, and demerits of successive approximation ADC using a neat diagram.	5	K5
b.	Draw and explain the workingof R-2R DAC.	5	K2