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LNCT UNIVERSITY, BHOPAL

Enrollment No. .....

CS- 203
B.TECH I & II SEMESTER
EXAMINATION [DEC-2024]
DIGITAL CIRCUITS &EMBEDDED SYSTEMS

Maximum Marks: 70 **Time Allowed: 3 Hours**

Note:- Attempt all questions. Internal choices are given.

(SECTION –A)

Q1 Short Answer Type Questions (Attempt Any Five) [5x6=30]

i. What are don't care conditions in Karnaugh maps? Explain with an example.

ii. Design a half subtractor and provide its truth table and Boolean expression.

iii. Explain the function of a carry look-ahead adder and its advantage over ripple carry adders.

iv. Describe the operation of a master-slave flip-flop with a neat diagram.

v. What are races and hazards in asynchronous sequential circuits? How can they be mitigated?

vi. Discuss the various addressing modes of the 8051 microcontroller.

vii. Discuss the classification of embedded systems based on performance and functional requirements.

SECTION –B)

Q2.Long Answer Type Questions (Attempt Any Four) [4x10=40]

i. Design a 4-bit parallel binary adder using full adders and explain its working with a block diagram

ii. Design a synchronous 3-bit up-down counter using JK flip-flops. Provide the state diagram and timing diagram.

iii. Explain the working of an 8051 microcontroller, focusing on its architecture, registers, and instruction set.

iv. For a given asynchronous sequential circuit, the transition table is as follows. Perform state reduction and provide the new transition table.

Present State	Next State	Output
A	B	0
B	C	1
C	D	0
D	A	1
E	C	1

v. Discuss the structure of embedded systems, comparing them with general-purpose computing systems. Include examples from different application areas.

vi. Write a basic assembly language program for the 8051 microcontroller to add two 8-bit numbers stored in registers R1 and R2, and store the result in register R0.
