DSM
IIIT Hyderabad

September 2024

Time: 90 min | *MID Exam* | Maximum Marks: 30

Answer all the questions. Answer in the space provided only. All the best

Roll Number:

Seat Number:

Room Number:

Invigilator signature:

Question number	Marks (a)	Marks (b)	Marks (c)	Marks (d)	Name of TA corrected
1					
2					
3					
4					
5					
6					
Total					

No reading material is allowed to use in the exam hall.
No exchange of material during exam.

Use back sheets for rough work. No additional papers for rough work / answers.

Answer in the space provided only.

No electronics/calculator/smart watch allowed.

1. (a) Simplify below Boolean function and implement using minimum NOR gates.
   $F = \prod(1, 3, 6, 9, 11, 12, 14)$ [4 M]
   (b) Implement above Boolean function using multiplexer. [3 M]

Question 1 continues on the next page...

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2. A binary-coded-decimal (BCD) message appears in four input lines of a digital circuit. Design an NAND gate network with minimum possible gates that produces an output value 1 whenever the input combination is 0, 1, 3, 5, or 8. [4 M]

Question 2 continues on the next page...

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3. (a) Design one digit octal numbers comparator with minimum possible number of gates. [3 M]
   (b) What is the need for priority encoder? [2 M]
   (c) Perform $(546)_8 - (342)_8$ using 8's complement. [2 M]
   (d) Compare usage of encoder and multiplexer. [2 M]

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4. You are incharge of a spaceship and need to send messages to other ships (buddy-ship) in your team without letting the enemy knowing your plans. Write a simple excess 5 code for numbers if you can only use 4 bits at a time.
   (a) Implement using half adders. [4 M].
   (b) Draw a parity generator schematic if you plan to use odd parity. [5 M].
   (c) How can your buddy-ship check if there has been any message interruption/corruption. [1 M].

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Rough work

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Rough work