DSM
IIIT Hyderabad

November 2024

Time: 180 min | *END Exam* | Maximum Marks: 60

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) What is the need of microcontrollers over general purpose microprocessor? [2 M].
   (b) Explain using the example of call instruction 'cd S B7' when [SP] = A9 and [PC]= 06. S is a Sign flag. [4 M]
   (c) How is 'call' different from 'jump'. [2 M]

Question 1 continues on the next page...

2. (a) Write the steps needed for 'add R4' including the select signals in a single bus processor and draw the timing diagram. [5 M]
   (b) Draw and explain function of each block of complete architecture of simple single bus processor designed in the class. [8 M]

Question 2 continues on the next page...

3. (a) What is ROM? How does fusing connections help in ROM. [2 M]
   (b) What is address multiplexing? Using 64 * 8 ROM chips with an enable input, construct a 512 * 8 ROM with eight chips and a decoder. [4 M]
   (c) How can you use ROM to express a function giving a multiplication table of 7 for three inputs? [4 M]

Question 3 continues on the next page...

4. (a)Implement Boolean function F(A,B,C,D) =S (2, 4, 5, 7, 9, 11) using
   (i) NAND gates [3 M]
   (ii) Decoder [3 M]
   (b) How to convert SR latch into memory cell? [3 M]

Question 4 continues on the next page...

5. (a) What is a Johnson counter? [2 M]
   (b) How many output states are possible for a 5 output Johnsson counter vs Binary counter? [2 M]
   (c) Implement a circuit for synchronous counter counting in the following sequence: 00 $\rightarrow$ 11 $\rightarrow$ 01 $\rightarrow$ 10 $\rightarrow$ 00 using JK Flip Flop. [6 M]

Question 5 continues on the next page...

6. (a) Convert the (A69.8)16 to base 10 and 7. [3 M]
   (b) Perform the decimal subtraction using 9's complement
   i) Subtract 79 from 26 ii) Subtract 748 from 983. [4 M]
   (c) Draw the logic diagram of a 4-to-1 line multiplexer with logic gates. [3 M]

Question 6 continues on the next page...