

(3 Hours)

[Total Marks : 100

- N.B. :** (1) Questions No. 1 is compulsory.  
(2) Attempt any four out of remaining six questions  
(3) Assume any suitable data whenever required and justify the same.

1. (a) Give and explain the routing capacitance with fringing field effect. 5  
(b) Give and explain carry save adder. 5  
(c) Write specification of Row Decoder, Column Decoder and MUX/DMUX used in 64K X 8 SRAM. 5  
(d) Give and explain two techniques to improve the minimum frequency requirement of clock signal. 5
2. (a) Draw and explain full adder using dual rail complementary pass transistor logic. 10  
(b) Give various important parameters affecting switching performance of CMOS inverter. Suggest methods to improve it. 10
3. (a) Explain in detail sizing of routing conductor with respect to metal migration and ground bounce /power supply drop. 10  
(b) Draw 1T DRAM cell and explain its write, read, hold and refresh operation. 10
4. (a) Draw and explain CMOS two-stage OP-AMP. 10  
(b) Explain various technique of clock generation. Discuss "H" tree clock distribution. 10
5. (a) Draw three variable-three output PLA and programme it with following functions: 10  
$$f_x = ac + be$$
$$f_y = abc + abc$$
$$f_z = ab + ab$$
  
(b) Give and explain interconnect scaling. 10
6. (a) Give and explain single phase clock system and explain its drawback. 10  
(b) Explain need of input protection and give the input protection circuits. 10
7. Write short note on (any three) 20
  - (a) Switch Capacitor amplifier
  - (b) Sense amplifier
  - (c) Low power design consideration
  - (d) Floating gate MOSFET.



QP Code : MV-19123

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 (2) Solve any four questions from the remaining six questions.  
 (3) Assume suitable data wherever required.

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|----|-----|--|----|
| 1. | (a) | Explain different types of activation functions.   | 5  |
|    | (b) | Explain k.means of algorithm.  | 5  |
|    | (c) | Explain any two types of Defuzzification techniques.   | 5  |
|    | (d) | How many hidden layers are necessary to approximate a continuous function.   | 5  |
| 2. | (a) | Write an algorithm for back propagation training and explain about updation of weight.   | 10 |
|    | (b) | Explain Hopfield networks in detail.   | 10 |
| 3. | (a) | Using perceptron learning rule, find the weights required to perform following classifications. Vector (1 1 1 1) and (-1 1 -1 -1) are the members of first class. Vectors (1 1 1 -1) and (1 -1 -1 1) are the member of second class. Use two output neurons. Assume learning rate parameter as 0.9 and initial weight of 0.25. Using training vectors, test the response of net. | 10 |
|    | (b) | What is meant by simulated annealing. Explain procedure of Boltzman machine with its training phase.   | 10 |
| 4. | (a) | Explain the method of solving EX-OR problem using RBF and MLP.   | 10 |
|    | (b) | Compare supervised learning with unsupervised learning. Explain with suitable examples.  | 10 |
| 5. | (a) | Explain the operation of fuzzy logic control with process inference block.   | 10 |
|    | (b) | Write the properties of fuzzy set theory and explain in detail.  | 10 |



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