

Q5. Attempt any two Questions of the following:- 2x10=20

- (a) Explain how shift register can be used as
- (i) serial to parallel data converter, and
 - (ii) parallel to serial data converter.
- (b) Explain following terms briefly w.r.t. semiconductor memories:
- (i) Memory cell
 - (ii) Memory capacity
 - (iii) Access time
 - (iv) Dynamic memory
 - (v) Read operation
 - (vi) Write operation
 - (vii) Erasable memory
 - (viii) Static memory
 - (ix) Random Access
 - (x) Memory bank

(c) Reduce the function $f(0,1,5,7,8,10,14,15)$ using Quine Mcclusky method

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TEC-302

Printed Pages : 4

Roll No. to be filled in your Answer Book

Roll No.

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B. Tech

THIRD SEMESTER UTU EXAMINATION, 2013-14

Digital Electronics and Design Aspects

Time : Three Hours] [Max. Marks : 100

Note:- Attempt All Questions. All Questions carry equal marks.

Q1. Attempt any four Questions of the following:- 4x5=20

523

- (a) Which are the factors that determine the operating speed of a logic gate? How can the speed performance of a TTL be improved?
- (b) Describe the realisation of the Boolean function, $f(x, y, z) = \sum m(0, 2, 3, 5)$ using an 8-to-1 line multiplexer.
- (c) Explain, using example, a fault table. Discuss the advantages and disadvantages of fault-table method.
- (d) Design Mod-3 Counter
- (e) Convert the following hex into octal
- (i) F (ii) DF (iii) 15.AC (iv) 18FFC (v) 53

(4) TEC-302 / 4660 / 4

(1) TEC-302 / 4660 / 4

(f) Enumerate the features of Hamming code? How error correction is possible using that code?

Q2. Attempt any four Questions of the following:- 4x5=20

(a) When do you use NMOS logic circuits? Write a brief note on CMOS logic

(b) Implement the Full Adder using 8 x 1 Multiplexers

(c) Explain the following with example

- (i) static-0 hazard (ii) static-1 hazard

- (iii) Dynamic hazard (iv) Essential hazard

(d) Convert the following binary number into

- (i) Gray code, (ii) Excess-3 code

- (j) 110 (ii) 1011 (iii) 11100 (iv) 1010110 (v) 100001

(e) simplify the expression using K Map

$$s = \Sigma(0,1,2,3,8,9,10,11,15) + d(4,5,14)$$

(f) What is finite state machine? Explain its significance.

Q3. Attempt any two Questions of the following:- 2x10=20

(a) How do you compare a PAL device with the PLA? Illustrate the structure of a simple four-input, three-output PAL device and mention its features. Explain how the PAL device can be used to realise the two Boolean functions given below:

$$f_1(x,y,z) = \Sigma m(1,2,4,5,7) \text{ and } f_2(x,y,z) = \Sigma m(0,1,3,5,7)$$

(2)

TEC-302

(b) What is the principle on which ECL operates? Based on this, what is the other name given to ECL? Draw the circuit of a two-input ECL OR/NOR gate and briefly explain.

(c) With the help of a block schematic diagram and neat wave forms, explain a clocked J-K flip-flop that is triggered by the positive-going edge of the clock signal.

Q4. Attempt any two Questions of the following:- 2x10=20

(a) Which are the saturated bipolar logic families of interest? Write the circuit of an unloaded BJT inverter and explain briefly its transfer characteristics.

(b) What is an encoder? Draw the schematic of a general encoder with X inputs. Explain briefly its operation. Give the logic circuit and truth table for an octal-to-binary simple encoder with active-low inputs.

(c) How does a static RAM cell differ from a dynamic RAM cell? What are the main drawbacks of dynamic RAM compared to a static RAM? List the advantages of dynamic RAM compared with static RAM.

(3)

P.T.O.