

2021

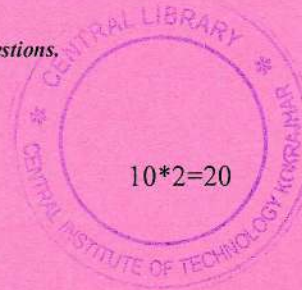
DIGITAL ELECTRONICS AND LOGIC DESIGN

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

Answer any five questions.



1. Answer the following questions:
 - a) What is Excess-3 code? Give one example.
 - b) What is K-map? What is the use of it?
 - c) Give the full form of EPROM and EEPROM.
 - d) Convert $(10110.011)_2$ to decimal number.
 - e) Convert $(ABAB.1F)_{16}$ to binary number.
 - f) Perform subtraction $(10-27)$ using 2's complement method.
 - g) Perform addition $(37+45)$ using BCD addition.
 - h) Convert $(89.75)_{10}$ to octal number.
 - i) What is the difference between Analog signal and Digital signal?
 - j) Write the steps involved in Binary to Gray code conversion.

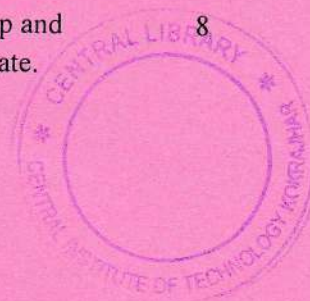
2. a) A 7-bit Hamming code is received as 1011011. 7
Assume Even parity & state whether the received code is correct or not, if wrong locate the bit in error.

- b) Why NAND gate and NOR gates are referred as Universal gate? Implement EX-OR logic gate using only NOR gate. 2+3=5
- c) Describe the basic theorems and properties of Boolean Algebra. 8
3. a) State and prove both the laws of De-Morgan's theorem. 5+5=10
- b) Minimize the following logical function using K-map. 10
 (Note: Show each and every step and also give justification for each step)

$$Y = A'B'C'D' + A'BC'D' + A'BC'D + A'BCD' + ABC'D' + ABC'D$$
4. Verify the following using truth table method: 2.5*2=5
- a) i) $(AB+B' + (AB)')' = 0$
 ii) $(A'+B).(A+B') = (AB+A'B')$
- b) Expand $(A'+B')$ to minterms and maxterms. 8
- c) Explain 16:1 Multiplexer using 4:1 multiplexers only and explain its operation. 7
5. a) Using don't care condition find reduced SOP equation and draw the circuit diagram using **basic gates**

$$F(P,Q,R,S) = \sum(1,2,3,6,12,14) + d(0,11,13)$$
- b) Reduce the given POS function using K-map and draw the circuit diagram using **only NOR gate**. 8

$$F(A,B,C,D) = \prod(0,1,2,3,7,8,9,10,11)$$



- c) Explain S-R flip-flop and J-K flip-flop in details with diagrams. 5
6. a) Explain the full adder circuit with the help of function table and circuit diagram. 10
- b) With Logic diagram and truth table explain the working of 8 to 3 line encoder. 10
7. Write short notes on any five of the following: 5*4=20
- a) Multiplexer and Demultiplexer
 - b) Encoder and Decoder
 - c) RAM and ROM
 - d) Primary Memory and Secondary Memory
 - e) Half subtractor
 - f) Even Parity and Odd Parity

