

9. (a) What is Ripple Counter ? Discuss about the propagation delay in Ripple Counters. 8
(b) Compare and contrast Static RAM and Dynamic RAM. 8

Roll No.

67008

**MCA 1st Semester (Current)
CBCS Scheme w.e.f. 2016-17
Examination – December, 2018**

DIGITAL DESIGN

Paper : 16MCA-31C3

Time : Three Hours]

[Maximum Marks : 80

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all. Question No. 1 is compulsory. In addition to compulsory question, attempt four more questions selecting one question from each Unit.

1. Write short answer to the following : $8 \times 2 = 16$
- (a) What is the effect of single left shift operation on a binary number ?
 - (b) What is the full form of ASCII and EBCDIC in terms of codes ?
 - (c) Write the Truth Table for $F(X,Y,Z) = X+Y.Z$
 - (d) Build a device that behaves like an OR gate from AND and NOT gates.
 - (e) Draw the diagram of a half adder circuit.

- (f) What is a flip flop ? What is the memory storage capacity of a flip flop ?
- (g) What is use of Counters in digital electronics ?
- (h) Name the register(s) used to provide time delays.

UNIT – I

- 2. (a) Encode the decimal digits 0, 1, 2, 9 by means of weighted codes 3321 and 731-2. 10
- (b) What are Hamming codes ? How is the Hamming code word tested and corrected ? 6
- 3. (a) What are Gray codes ? What are they used for ? Are Gray codes useful for mathematical operations ? 6
- (b) Encode data bits 0011 into the 7-bit even parity Hamming code. 6
- (c) Convert $(C20)_{16} = (?)_2$. 4

UNIT – II

- 4. (a) Explain the significance of De Morgan's Law of Boolean algebra. 4
- (b) Minimize the following multiple output functions : 12
 - (i) $f_1 = \sum m(0, 2, 6, 10, 11, 12, 13) + d(3, 4, 5, 14, 15)$
 - (ii) $f_2 = \sum m(1, 2, 6, 7, 8, 13, 14, 15) + d(3, 5, 12)$
- 5. (a) Reduce the expression : $(A + (BC))'(AB' + ABC)$ 4

- (b) Without reducing, implement $(1 + A)(ABC)$ expression to NAND logic. 4
- (c) Reduce using K-map the expression $\pi M(2, 8, 9, 10, 11, 12, 14)$ and implement it in Universal logic. 8

UNIT – III

- 6. (a) Design a Full Adder circuit using only two-input NAND gates. 6
- (b) What are flip-flops ? What are the uses flip-flop ? Discuss the working of a J-K flip-flop. 10
- 7. (a) How S-R flip-flop can be converted to J-K flip-flop ? 4
- (b) Differentiate between MUX and DEMUX. Draw a basic 2-input Multiplexer circuit. 6
- (c) Define the following : 6
 - (i) Hold time
 - (ii) Setup time

UNIT – IV

- 8. (a) Write short notes on the following : 8
 - (i) Buffer register
 - (ii) Static shift register
- (b) Differentiate between Ripple counter and Synchronous counter. 8