Unit-IV

8. (a) Write short notes on the following : 2×4=8

(i) Buffer register

(ii) Static shift register

(b) What is a Ripple Counter ? Discuss about the propagation delay in Ripple Counters. 8

9. (a) Differentiate between : 2×4=8

(i) Ripple Counter and Synchronous counter

(ii) Static RAM and Dynamic RAM

(b) What are buffer shift registers ? Discuss the applications of shift registers. 8

67008

MCA 1st Semester (current) CBCS Scheme

w.e.f. 2016-17 Examination,

November/December-2019

DIGITAL DESIGN

Paper-16MCA31C3

Time allowed : 3 hours] *[Maximum marks : 80*

Before answering the questions, candidates shuld 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, students have to attempt **four** more questions selecting **one** from each unit.*

1. Write short answer to the following : 8×2=16

(a) What are parity bits? How are they used for error detection ?

(b) $(10101)_2 = (?)_8$

(c) If one of the inputs to an AND gate is permanently kept LOW, what would be the shape of the output waveform when the remaining inputs are applied?

(d) What are the possible size of K-map for a Boolean expression involving 3 literals ?

(e) Comment on the statement 'In the two's complement number representation, a negative number with more leading ones is larger than a negative number with fewer leading ones'.

(f) What is ROM ?

(g) What are pre-settable counters ?

(h) What are different types of registers ?

Unit-I

2. (a) Subtract 1100.10 – 111.01 4

(b) Convert $(C20)_{16} = (?)_2$ 4

(c) Express -73.75 in 12-bit 2's complement form. 4

(d) What are Hamming codes ? How is the Hamming code word tested and corrected ? 4

3. (a) Encode data bits 1001 into the 7-bit odd parity Hamming code. 8

(b) What are BCD codes ? Discuss its usefulness in computer science. Compare it with Excess-3 codes. 8

Unit-II

4. (a) What are the logic levels used in TTL logic system? 4

(b) What is a Boolean Expression ? Name all the laws used to reduce the expression :

(A+ (BC)') ((A'B)' + (AB'C)') 6

(c) Minimize the following multiple output function:

$f_1 = \sum m(0,2,6,10,11,13) + d(1,3,14,15)$ 6

5. (a) Expand A(A'+B)(A'+B+C') to maxterms and minterms. 6

(b) How many possible combinations of input variables can be there for a six-variable expression ? 2

(c) Write the working, expression and truth table of the X-NOR gate. Also draw its logic circuit. 8

Unit-III

6. (a) Design a Full Adder circuit using only two-input NAND gates. 6

(b) What is a Ripple Carry Adder ? 4

(c) What are flip-flops ? What are the uses of a flip-flop ? Discuss the working of a J-K flip-flop. 6

7. (a) Differentiate between MUX and DEMUX. Draw a basic 2-input Multiplexer circuit. 6

(b) Draw the half subtractor. What are its limitations? 4

(c) How S-R flip-flop can be covered to J-K flip-flop ? 6