1477/II

B.C.A. (PART-I) 2nd Semester Examination-2022

B.C.A.

(Digital Circuit and Logic Design)

Paper : BCA-203

Time : Three Hours] [Maximum Marks : 70

Note: (i) Answer **five** questions in all.

(ii) Question **No. 1** is compulsory.

(iii) Answer two questions from section **A** and **B** each.

(iv) All question carry equal marks.

1. Answer any **four** parts of the following:

(a) $(324)_{10} = (?)_2$

(b) State De Morgan's theorem

(c) Briefly explain Universal logic gates

(d) Using K-Map, solve the following expression:

$F - \sum_m(2,5,7,8)$

Section-A

2. What is full adder? Give its logic realization and truth table.

3. Using Boolean Algebra simplify the following:

$$F = ABCD + ABC + AB + A\bar{B}$$

Implement the simplified function using NAND/ NOR gates.

4. What its J K flip-flop? Draw its logic circuit, truth table and timing diagram. Explain the operation of J K flip-flop with all input combinations.

5. Using K-map find the simplified SOP from of:

$$F = \sum_m(0,3,12,15) + d(7,11)$$

Section-B

6. (a) Using Boolean Algebra prove the following:

$$A'BC + AB'C + ABC = AB + BC + CA$$

(b) Define a Microprocessor system. Explain its function.

7. (a) What is multiplexer? Draw 8×1 Mux using suitable logic gates.

(b) Draw the diagram of 4-bit parallel adder and explain its working.

8. (a) Convert the following binary number in to equivalent decimal and hexadecimal numbers:

(i) $(101101.111)_2$

(ii) $(11011011.011)_2$

(b) What is four variable K-map? Give different simplification rules for it.

9. Write notes on any **two** of the following:

(a) Encoder and Decoder

(b) Architecture of Micro computer

(c) Counter

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Anand Kumar

1477/II

B.C.A. (PART-I) EXAMINATION, 2022-23

0107

(Second Semester)

Paper : III

BCA-203 : Digital Circuit and Logic Design

Time : Three Hours] [Maximum Marks : 70

Note: (i) Answer **Five** Questions in all.

(ii) Question **No.1** is **Compulsory**.

(iii) Answer remaining **four** questions, selecting **two** questions from each Section A and B.

(iv) All questions carry equal marks.

1. Answer all parts of the following :

(a) What do you mean by basic and universal gate ?

(b) What is difference between JK flip flop and SR flip flop ?

(c) How many 2×1 Mux will be required to implement 8×1 Mux ? Explain.

(d) What is Demorgan's Law ?

SECTION – A

2. What are SOP and POS form of Boolean expression ? Convert following expression in equivalent POS.

$F = X'Y'Z + XY'Z' + XYZ$

3. What is K-map ? Give K-map for four variable. Simplify the following Boolean function in K-map.

$F = A'B'C' + B'CD' + A'BCD' + AB'C'$

4. Explain Binary, Octal and Hexadecimal number and find the value of x in following :

(i) $(139)_{10} = (x)_2$

(ii) $(1542)_8 = (x)_2$

(iii) $(DAD)_{16} = (x)_8$

5. What do you mean by flip-flop ? Explain JK flip-flop with functional table and circuit diagram. Give the characteristics equation also.

SECTION – B

6. (a) What do you mean by r and $(r-1)$'s complement of a number where r is the base of that number.

(b) Represent the following using 2's complement :

(i) $16 + (-24)$

(ii) $16 + 24$

7. (a) Convert the decimal number 3.248×10^4 to a single precision floating point binary number.

(b) Implement the following function with NAND gate :

$$F(x, y, z) = \sum(0,6)$$

8. (a) Implement MOD-7 up counter using D Flip Flop.

(b) What do you mean by BCD code ? Give the procedure for addition and subtraction of BCD number using example.

9. Write notes on any two of the following :

(a) Minterm and Maxterm

(b) ASCII Code

(c) Register

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