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B. C. A. (First Year) Examination, March-April 2018

(Group-I)

Paper : BCA-12

DIGITAL ELECTRONICS

Time Allowed : Three hours

Maximum Marks : 40

Note : *All sections as directed. All questions carry equal marks.*

Section-'A'

(Objective Type questions) **5×1=5**

Note : *Attempt all questions. Each question carries 1 mark.*

1. Choose the correct answer :

(i) Which of these sets of logic gates are designated as universal gates?

(a) XOR, NOR, NAND

(b) OR, NOT, AND

(c) NOR, NAND

(d) NOR, NAND, XNOR

(ii) How many bits are required to store one BCD (Binary Coded Decimal) digit?

(a) 1

(b) 2

(c) 3

(d) 4

(iii) In the toggle mode a JK flip flop has :

(a) J = 0, K = 0

(b) J = 0, K = 1

(c) J = 1, K = 0

(d) J = 1, K = 1

(iv) I/O Interface is a kind of :

(a) Software Program

(b) Hardware circuit

(c) Firmware

(d) None of these

(v) The storage element for static RAM is the ..... .

(a) Diode

(b) Capacitor

(c) Register

(d) Flip flop

Section-'B'

(Short Answer Type Questions) **5×2=10**

Note : Attempt all questions. One question from each unit is compulsory. Each question carries 2 marks.

Unit-I

2. Convert the following :

(i) $(1101101 \cdot 1101)_2$ into hexadecimal

(ii) $(125 \cdot 125)_{10}$ into octal

Or

Write the difference between overflow and underflow of arithmetic operation.

Unit-II

3. Short and prove De-Morgan's law.

Or

What are Basic Logic Gates? Explain their with help of Truth Table.

Unit-III

4. What is Encoder? Explain.

Or

What do you understand by sequential circuit? Explain its type.

Unit-IV

5. Write short notes on I/O processor.

Or

Explain any one data transfer mode.

Unit-V

6. What is Auxiliary memory?

Or

Write short notes on Virtual Memory.

Section-'C'

(Long Answer Type Questions) **5×5=25**

Note : Attempt all questions. One question from each unit is compulsory. Each question carries 5 marks.

Unit-I

7. Design and Implement BCD to Excess-3 code converter.

Or

Do as directed :

(i) $(375{\cdot}525)_{10}$ to hexadecimal

(ii) $(11010011)_2$ find 2's complement

(iii) 110110 – 100010 substract using 2's complement

Unit-II

8. Simplify the given Boolean function using K-map.

$$F(A, B, C, D) = \Sigma\ (0, 2, 4, 5, 8, 10, 11)$$

Or

Convert the given Boolean Function into :

(i) $Y = F(A, B, C) = (A + B)\ (A + C)$

Minterm canonical form.

(ii) $Y = F(A, B, C) = (A + B) \cdot (B + C) \cdot (\bar{C} + A)$

Minterm canonical form.

Unit-III

9. Derive the characteristics equation for JK and T flip flop.

Or

Implement the following Boolean function using 8 : 1 multiplexer :

$$Y = F(A, B, C, D) = \bar{A}B\bar{D} + ACD + B\bar{C}\bar{D} + \bar{A}\bar{C}D$$

Unit-IV

10. What is I/O interface? Explain its characteristics.

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Or

Explain in detail Asynchronous serial transfer.

Unit-V

11. Write short notes on : (any **three**)

(i) Page Replacement

(ii) Magnetic Disc

(iii) Hit Ratio

(iv) Physical Address

(v) Cache Memory

(vi) Associative Memory