

Roll No.

Total Pages : 3

311103

December 2023

BCA/BCA(DS) 1st SEMESTER

Digital Electronics-I (BCA-23-105)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.
2. Answer any four questions from Part-B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.
4. Assume relevant data, if required.

PART-A

1. (a) Implement EXOR gate using NOR gate. (1.5)
(b) Convert the following : - $1010101 = ()_{16}$ (1.5)
(c) What is the decimal equivalent range of 8 bit Binary number? (1.5)
(d) Explain don't care condition. (1.5)
(e) State and prove De Morgan's theorem. (1.5)
(f) Name any one 1-bit Memory element/device. (1.5)
(g) What are the uses of Shift registers? (1.5)

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 [P.T.O.]

- (h) What is the weight associated with LSB in 3 bit weighted DAC? (1.5)
- (i) Which type of clock is preferable for JK flip flop? (1.5)
- (j) Explain Sample and Hold Circuit. (1.5)

PART-B

2. (a) Discuss a simple logic system, incorporating an AND gate, for control of an elevator motor. (05)
- (b) Prove the following using Boolean Algebraic theorems :
- (i) $\bar{A}BC + A\bar{B}C + AB\bar{C} + ABC = AB + BC + CA$
- (ii) $\bar{A}\bar{B} + AB + \bar{A}B = \bar{A} + B$
- (c) Perform the following : (05)
- (i) $4F + 2D$
- (ii) $A05C - 24CA$
- (iii) $(1E.53)_{16} = ()_8$
- (iv) $10101_2 \times 101_2$ (05)
3. (a) Minimize the following using Karnaugh MAP : (10)
- $$f(A, B, C, D) = \sum m(1, 3, 5, 8, 9, 11, 15) + d(2, 13)$$
- (b) Explain the working of 3 to 8 decoder. (05)

4. (a) Draw the diagram of serial in parallel out Shift Register. (10)
- (b) Make a SR flip flop using JK flip flop. (05)
5. (a) A 12 bit DAC has full scale analog voltage of 5 V. Determine step size, percentage resolution and analog output voltage to input of 1101 0000 0001. (10)
- (b) Explain the working of R-2R ladder network type DAC. (5)
6. (a) What are the specifications for D/A converters? (8)
- (b) Draw the output waveform of a 4 bit shift register. (7)
7. Minimize the following function using Boolean algebra.
- $$f(A, B, C, D) = \pi M(1, 3, 5, 8, 9, 11, 15) \quad (15)$$
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