

Digital Electronics (KOE-049)

CO Number	Course Outcome
CO1	Define the concepts of Digital system (logic gates, Combinational Logic, Sequential Logic, Synchronous & Asynchronous Sequential Circuits and memory).
CO2	Explain the concepts of various digital devices and logic families.
CO3	Apply the concepts of digital devices on various applications.
CO4	Analyze various digital circuits, Sequential Logic, Synchronous & Asynchronous Sequential of different configuration.
CO5	Design various digital circuits, Sequential Logic, Synchronous & Asynchronous Sequential of different configuration.

Time: 1.5 Hrs.

M. M. 15

Section A

Q1. Attempt all questions:

(1x3=3 Marks)

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|--|-----|
| a) Draw Ex-OR gate using NOR gate only., | CO1 |
| b) Differentiate between combinational circuit and sequential circuit. | CO1 |
| c) Explain one bit magnitude comparator circuit. | CO2 |

Section B

Q2. Attempt all questions:

(2x4=8 Marks)

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| a) (i) Convert $(986.32)_{10} = ()_8 = ()_H$ | CO1 |
|--|-----|

Or

- | | |
|---|-----|
| (ii) Convert $(10101010.10)_2 = ()_8 = ()_{16}$ | CO1 |
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- | | |
|--|-----|
| b) (i) Design full subtractor circuit using two half subtractor and one OR gate. | CO5 |
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Or

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| (ii) The input to combinational logic circuit is a 4-bit binary number. Design the logic circuit with two outputs (Y_1, Y_2) for the following condition. | CO5 |
|---|-----|

- $Y_1 = 1$ if the input binary number is 5 or less than 5
- $Y_2 = 0$ if the input binary number is 9 or more than 9

- | | |
|---|-----|
| c) (i) Construct the circuit using NOR gate only with its steps for given function. | CO4 |
|---|-----|

$$Y = ABC + \bar{A}\bar{C} + \bar{B}D$$

Or

- | | |
|---|-----|
| (ii) Construct the binary multiplier circuit for multiplication of two bit numbers A and B. The multiplicand bits are B_1B_0 and the multiplier bits are A_1A_0 and the product is $C_3C_2C_1C_0$. | CO4 |
|---|-----|

d) (i) Simplify the given function using Mc-Cluskey minimization technique.

CO3

$$F(A,B,C,D) = \sum m(1,5,6,12,13,14) + d(2,4)$$

Or

(ii) Simplify the given function using tabular method.

CO3

$$F(A,B,C,D) = \sum m(0,1,3,7,8,9,11,15) \quad CP + CB$$

Section C

Q3.

(4x1 = 4 Marks)

(i) Solve the given function using K-map in SOP form also construct the minimized expression using NAND gate.

CO4

$$f(x,y,z,w,p) = \prod M(0,3,4,5,6,7,8,9,10,11,14,16,22,26,28,30) + d(1,2,12,24)$$

Or

(ii) Construct look ahead carry adder with proper circuit diagram also enlist the advantage of using this adder over normal parallel adder.

CO4