School of Engineering and Technology

Subject: BEEE **Subject Code: 24BEELY104**

UNIT 5

Sample Questions: **2 Marks**

- ✓ Convert the hexadecimal numbers to decimal.

a. 10D

b. 345

c. BABE d.ADC6

- ✓ Convert the binary numbers to hexadecimal.

a. 1010 0101

b. 0011 0000 1101 1111

c. 1001 0111 0110 1000 d.111100001010

- ✓ Convert the decimal numbers to binary.

a. 86

b. 131

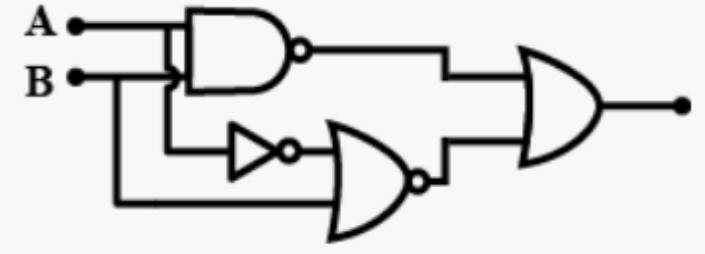
c. 5148 d.66152

- ✓ Convert the following:

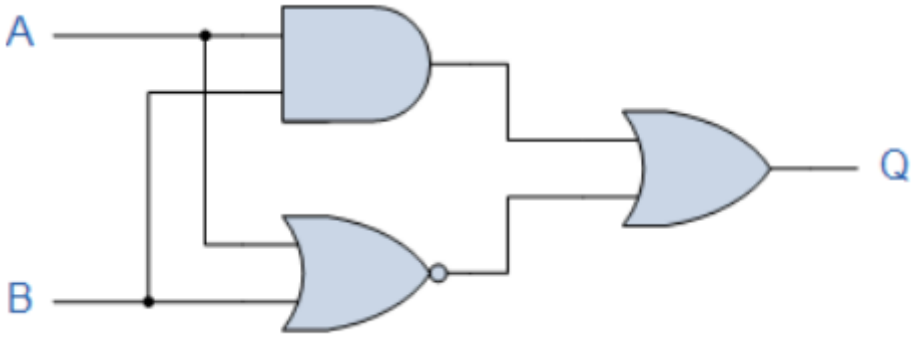
- $(725.25)_{10} = (?)_2 = (?)_{16}$
- $(111100111110001)_2 = (?)_{10} = (?)_{16}$
- $(111110101101)_2 = (?)_{16}$
- $(ABCD)_{16} = (?)_2 = (?)_{10}$
- $(1010111011110101)_2 = (?)_{16}$
- $(FA876)_{16} = (?)_2$
- $(1170.4)_8 = (?)_{16} = (?)_{10}$

- ✓ Convert the octal number 56 to its decimal form.
- ✓ Determine the binary equivalent of the octal number 246 .
- ✓ What is the binary representation of the hexadecimal number 1A?

- ✓ The logic circuits whose outputs at any instant of time depends only on the present input but also on the past outputs are called _____
- ✓ In S-R flip-flop, if Q = 0 the output is said to be _____
- ✓ In S-R flip-flop, if Q = 1 the output is said to be _____
- ✓ Total number of inputs and outputs in a half adder is _____ and _____
- ✓ Total number of inputs and outputs in a full adder is _____ and _____
- ✓ If A, B and C are the inputs of a full adder then the sum is given by _____
- ✓ If A, B and C are the inputs of a full adder then the carry is given by _____
- ✓ How many AND, OR and EXOR gates are required for the configuration of full adder?
- ✓ The Boolean expression for the given circuit is:



- ✓ Find the Boolean algebra expression for the following system:



- ✓ Which of the following Boolean equation is/are incorrect? Write the correct forms of the incorrect ones:

- A + A’ =1
- A + 0 = A
- 1 = A
- AA’=1
- A+ AB = A
- A(A+B)’ = A
- (A+B)’ = A’ + B
- (AB)’=A’B’
- A + 1 =1
- A + A =A
- A + A’B = A +B
- X +YZ = (X + Y)(X + A)

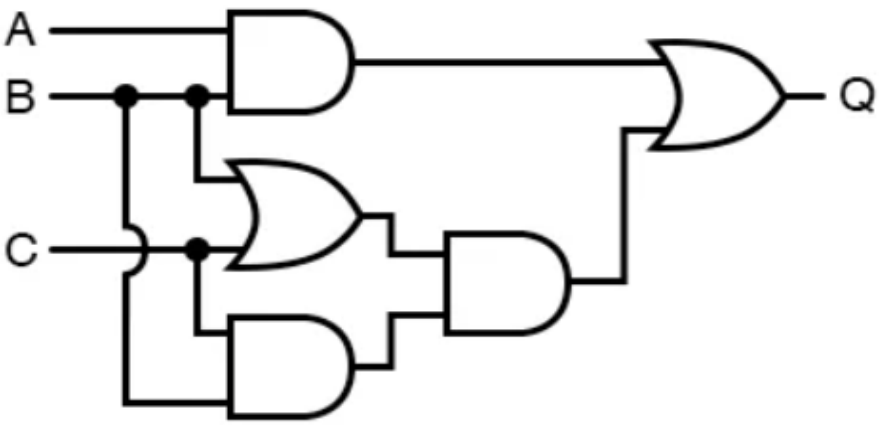
✓ Find the complement of the following functions applying De’Morgan’s theorem

- F(x,y,z) = x’yz’ + x’y’z
- F(x,y,z) = x(y’z + yz)

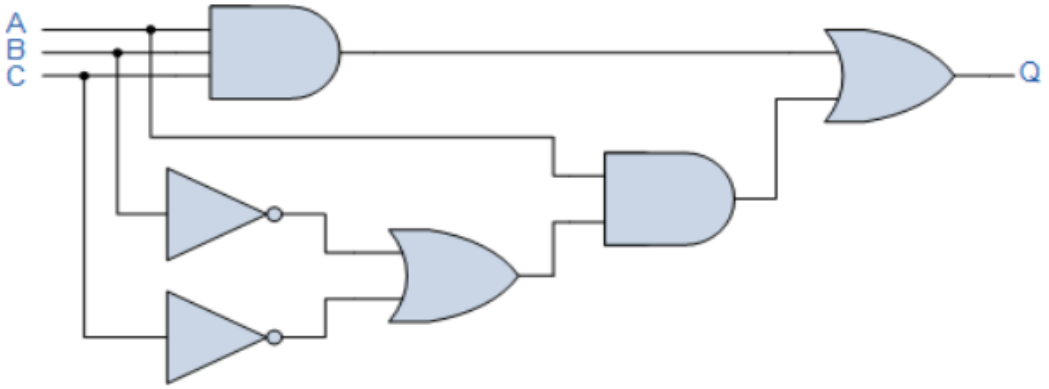
✓ What is a truth table? What is its significance?

✓ Find the Boolean algebra expression for the following system:

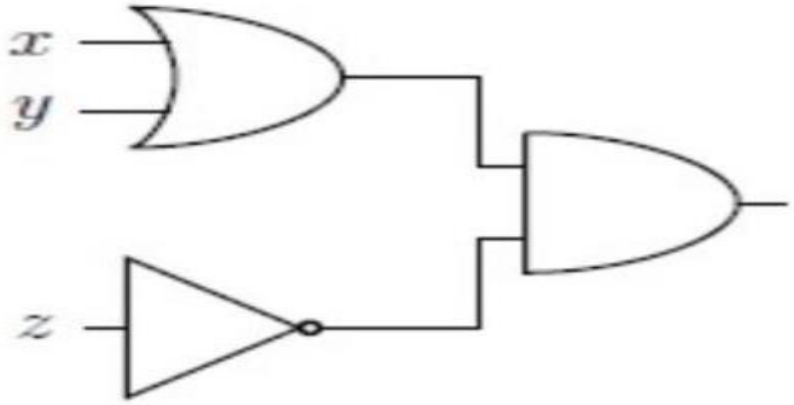
(i)



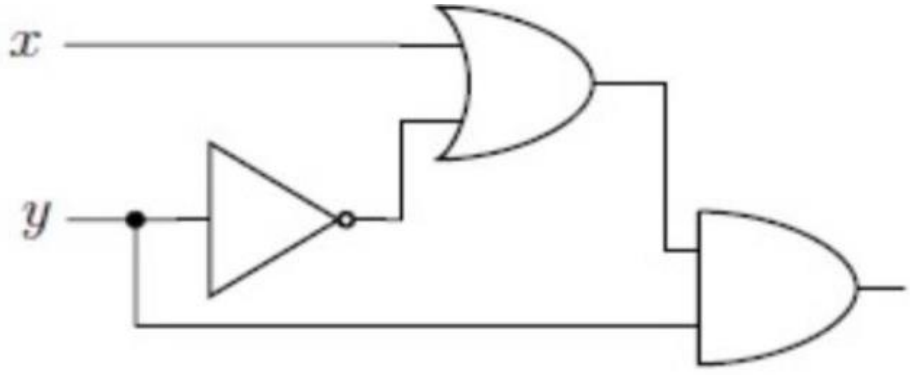
(ii)



(iii)



(iv)



- ✓ What is a combinational circuit? Give two examples.
- ✓ What is a sequential circuit? Give two examples.
- ✓ Mention two applications of Multiplexer?
- ✓ Give algebraic proof of Absorption law.
- ✓ Mention two applications of De-Multiplexer?
- ✓ What is principal of duality? Give an example.
- ✓ What is a Flip-Flop? Mention two application of Flip-Flops.
- ✓ What is the other name of NOT gate?
- ✓ What is a logic gate? Name three basic logic gates.
- ✓ How many input combination can be there in the truth table of a logic system having (N) input binary variables?
- ✓ Which gates implement logical addition, logical multiplication and complementation?

Sample Questions: **5 Marks**

- ✓ Draw the truth table for the following equations:
  (1) M = N (P + R)
  (2) WZ(X+Y)Z
- ✓ Draw logic circuit diagrams for the following:

(i) xy + xy’ + x’z

(ii) (A + B) (B + C) (C’ + A’)

(iii) A’B + BC

(iv) xyz + x’yz’

(v) xy + xy’ + x’z

(vi) (A + B) (B + C) (C’ + A’)

(vii) A+AB+ABC+ABCD

- ✓ Define universal gates? Realize OR, AND, NOT and NOR gates using NAND gates only.
- ✓ Define universal gates? Realize OR, AND, NOT and NAND gates using NOR gates only.
- ✓ With examples differentiate between analog and digital circuits.
- ✓ State and prove de Morgan's theorem for 2 variables with truth table.
- ✓ State and prove de Morgan's theorem for 3 variables with truth table.
- ✓ State and prove de Morgan's theorem for 4 variables with truth table.
- ✓ Simplify the following:

  i. AA'C

  ii.ABCD+ABD

  iii.ABCD+AB'CD

  iv.A (A+B)

  v.AB+ABC+AB (D+E)

  vi.X (X'YZ+X'YZ

- ✓ Prove that:
  - (I) A+A'B+AB'=A+B
  - (II) AB+A'B+A'B'=A'+B
  - (III) (X+Y)(X+Z)=X+YZ
  - (IV) (X+Y)(X+Y')=X
  - (V) X+XY=X
  - (VI) $\left(x+y+z\right)\left(\bar{x}+y+z\right)=y+z$
- ✓ Design Half Adder circuit and implement it using logic gates.
- ✓ Design Half Adder circuit and implement it using only NAND gates.
- ✓ Define multiplexer and realize 2:1 multiplexer using logic gates.
- ✓ Define multiplexer and realize 4:1 multiplexer using logic gates.

- ✓ Define De-multiplexer and realize 1:2 multiplexer using logic gates.
- ✓ Define De-multiplexer and realize 1:4 multiplexer using logic gates.
- ✓ Draw logic circuit diagrams for the following :
  - (i) xy + xy' + x'z
  - (ii) (A + B)(B + C)(C' + A')
  - (iii) A'B + BC
  - (iv) xyz + x'yz'
  - (v) xy + xy' + x'z
  - (vi) (A + B)(B + C)(C' + A')

Sample Questions: **10Marks**

- ✓ Realize Full Adder circuit using two Half Adders with necessary expressions for sum and carry.
- ✓ Design 4X1 multiplex using 2X1 multiplex.
- ✓ Design Full Adder circuit and implement it using logic gates.
- ✓ Design Full Adder circuit and implement it using only NAND gates.
- ✓ Illustrate the working of SR flip flop with the help of truth table and logic diagram.
- ✓ Illustrate the working of JK flip flop with the help of truth table and logic diagram.
- ✓ Illustrate the following flip flop with the help of truth table and draw logic diagram.

  (1) D flip flop

  (2) T flip flop

- ✓ Draw the Block diagram of the communication system explain and names its main components.
- ✓ Explain the evaluation of cell phone standard from 1G to 5G standards.
- ✓ Prove:
  - (i) Commutative law
  - (ii) Associative law
  - (iii) Distributive law using truth table and logic diagram.