SAPTHAGIRI NPS UNIVERSITY
BE 1st Semester 2024-25
Second Internal Assessment Test

Course Code: 24BEELY104 **Semester:** I

Course: Basics of Electrical & Electronics Engineering **SRN**:

Time:10.30AM-12.00PM **Max Marks**:50

PART –A

Answer any Ten of the following: **2x10=20**

1. What will happen if the back e.m.f. of a D.C. motor vanishes suddenly?
2. According to Fleming's right-hand rule for finding the direction of induced e.m.f. when middle finger points in the direction of induced e.m.f., forefinger will point in the direction of _____.
3. Mention the main purpose of the commutator & brushes on a DC generator?
4. Why a series resistor is necessary when a diode is forward biased?
5. What are the types of extrinsic semiconductor?
6. The logic circuits whose outputs at any instant of time depends only on the present input but also on the past outputs are called _____.
7. Write the Boolean algebra expression for the circuit shown in figure(1):

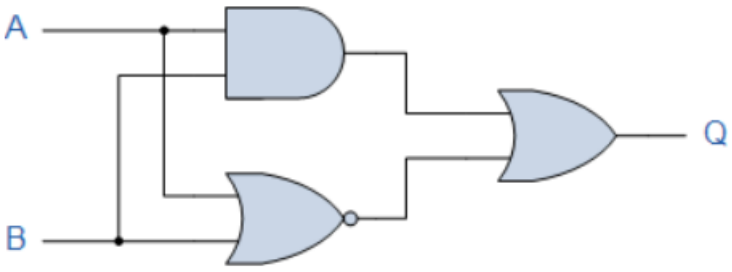

Figure (1)

8. Convert the following:
   i. $(FA876)_{16} = (?)_2$ ii. $(111100001010)_2 = (?)_{10}$
9. Which of the following Boolean equation is/are incorrect?

   i. (A+B)' = A' + B ii. AA'=1 iii. A + A' =1 iv. X +YZ = (X + Y) (X + A)

10. A 6-pole generator has a lap-wound armature with 40 slots with 20 conductors per slot. The flux per pole is 25 mWb. Calculate the speed at which the machine must be driven to generate an e.m.f. of 300 V.
11. In S-R flip-flop, if Q = 1 the output is said to be _____.
12. For a D.C. generator when the number of poles and the number of armature conductors is fixed, then which winding will give the higher e.m.f.?

PART –B

Answer any Four of the following: **5 x 4 =20**

1. Derive the e.m.f equation of the dc generator?
2. With truth table state and prove De Morgan's theorem for two variables.
3. A 4-pole 1500rpm DC generator has lap wound armature having 24 slots with 10 conductors per slot. If the flux per pole is 0.04wb, calculate the EMF generated in the armature. What would be the generated EMF if the winding is wave wound.
4. Design Half Adder circuit and implement it using NAND gates only.
5. Explain the forward characteristics and reverse characteristics of a PN junction diode.

PART – C

Answer any One of the following: **10 x 1 =10**

1. (i)Define multiplexer and realize 4:1 multiplexer using logic gates.
   (ii)Calculate the value of torque developed by the armature of a 4 pole motor having 774 conductors, two paths in parallel, 24mWb flux per pole, loaded the total armature current is 50 A.
2. (i)Illustrate the working of SR flip flop with the help of truth table and logic diagram.
   (ii)Draw logic circuit diagrams for the equation: (A + BC) (B + C) (C' + A')
   (iii)Draw the truth table for the equation: WZ(X+Y) +WXY