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

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

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

Time:3.15PM to 4.45PM **Max Marks**:50

PART –A

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

1. Mention the main purpose of the commutator & brushes in a DC generator?
2. Mention any two applications of DC motors.
3. Convert $(BABE)_{16} = (?)_{10}$
4. What is biasing? Mention the types of biasing.
5. Prove that:(A+B)(A+C)=A+BC
6. Convert $(1010111011110101)_2 = (?)_{16}$
7. In JK flip-flop, if Q = 1 the output is said to be _____.
8. What is a truth table? Mention its significance?
9. 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.
10. Write the truth table for AND gate.
11. Convert $(246)_8 = (?)_2$
12. The Boolean expression for the given circuit in figure (1) is:

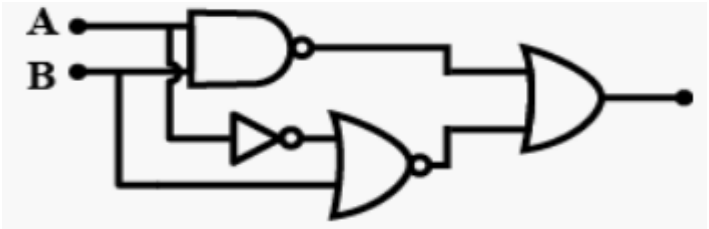

Figure (1)

PART –B

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

1. Define torque in a DC motor? With usual notation obtain the expression for torque equation for DC Motor.
2. 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.
3. With truth table state and prove De Morgan's theorem for 2 variables.
4. Design Half Adder circuit and implement it using basic gates.
5. Explain the working of a transformer with necessary diagrams.

PART – C

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

1. (i)With a neat diagram explain the working of DC generator.
   (ii)A single-phase 111-V, 50-Hz supply is connected to a coil with 200 turns of a coil-core assembly. Find the magnitude of maximum flux in the core.
2. (i)Illustrate the working of JK flip flop with the help of truth table and logic diagram.
   (ii)Draw logic circuit diagrams for the equation: (A + B) (B + C) (C' + A')