University School of Automation and Robotics
GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY
East Delhi Campus, Surajmal Vihar
Delhi - 110092

http://ipu.ac.in/eastcampusmain.php

Subject Name: Switching Theory and Logic Design
Subject Code: ARI 209

Max Marks: 30
Duration: 1.5 hr

Mid Term 3rd Semester Examination
December 2022
(AR Batch 1, AR Batch 2 and IIOT Batch 1)

Group A-

Question 1: **Compulsory question of 10 marks and each sub-part carries 2 marks. Attempt all questions.**

A. Convert $(24.125)_{10}$ to $(?)_2$
B. Evaluate using 2's Complement: $(1111)_2 - (1001)_2 = (?)_2$
C. Multiply $(11001)_2 * (1001)_2$
D. State the difference between combinational and sequential logic circuits
E. Convert $(110101010)_{Gray}$ to $(?)_2$

Group B-

This section comprises of 3 questions. Attempt any 2 questions from this section. Every question carries 10 marks each.

Question 2 Minimize the following Boolean function using Quine McCluskey Method:

$$f(A,B,C,D)=\sum m(5,7,8,10,13,15)+\sum d(0,1,2,3).$$

Question 3 Draw all the basic gates using NAND and NOR gates

Question 4: Every part carries 2 marks each.

(a) How can a circuit remember anything, when it's just a bunch of gates that produce outputs according to inputs?
(b) Why is D flip-flop called a data flip flop
(c) Formulate a characteristic table for JK flip flop
(d) What is a race-around condition? Name the methods to avoid race-around condition
(e) Name and briefly define the asynchronous inputs in Flip flops.