Name:

Enrolment No:

UPES
UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2021

Course: Digital systems and applications **Semester: III**
Program: BSc (H) Physics **Time 03 hrs.**
Course Code: PHYS 2003 **Max. Marks: 100**

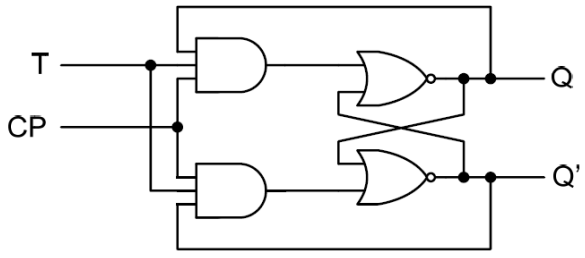
SECTION A (20 Marks)

1. Each Question will carry 4 Marks
2. Instruction: Attempt all the questions.

S. No.	**Question**	**Marks**	**COs**
Q1	Calculate the speed of electron (mass=9.1×10^{-31} kg, charge=1.6×10^{-19} C)) after it has moved through a potential difference of 5000 volt in a CRT.	**4**	**CO1**
Q2	Convert the $(154)_{10}$ to Binary system, Octal system and Hex system.	**4**	**CO3**
Q3	List the various registers of an 8085 microprocessor.	**4**	**CO2**
Q4	Define a bus.	**4**	**CO1**
Q5	Draw a circuit diagram of a full adder logic circuit with its inputs, outputs and truth table.	**4**	**CO4**

SECTION B (40 Marks)

1. Each question will carry 10 marks
2. Instruction: Write short/brief notes (maximum 150 Words).

Q1	Analyze a given circuit as shown below as an asynchronous sequential circuit. Obtain the transition table and show that the circuit is unstable when both T and CP are equal to 1 (high). 	**10**	**CO2**
Q2	Digital system in our daily life: At your working place, there is a bell sound to signal quitting time. The bell should be activated when either of the following	**10**	**CO3**

	conditions is met: 1. it is after 5 o'clock and all employees leave the working place. 2. it is Friday and the work for the day is complete, and all employees left work place. Design a logic circuit that will control the bell sound.		
Q3	A Sensor monitors blood pressure and temperature of your body. Each sensor produces a HIGH voltage when a specified maximum value is exceeded. An alarm requiring a LOW voltage input must be activated when either pressure or temperature is excessive. Design a LOGIC circuit for this application.	**10**	**CO1**
Q4	How do you construct a D-flip flop from SR flip-flop? Draw the circuit diagram of a D flip-flop using NAND configuration. Also, make its truth Table.	**10**	**CO2**
SECTION-C (40 Marks) **1. Each Question carries 20 Marks.** **2. Instruction: Write long answer (maximum 250 Words).**			
Q1	What is a microprocessor? Describe any ten main features of 8085 IC.	**20**	**CO2**
Q2	What are counters? Differentiate between synchronous and asynchronous counters. Draw a circuit diagram of Ring counter using D-flip flop.	**20**	**CO3**