Name: **Enrolment No:**	UPES UNIVERSITY OF TOMORROW

UPES

End Semester Examination, May 2024

Course: Digital Systems and Applications — **Semester: IV**

Program: B.Sc. Physics (H) — **Time : 03 hrs.**

Course Code: PHYS 2029 — **Max. Marks: 100**

Instructions: Use is scientific calculator is allowed.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Transform each of the following canonical expression into its other canonical form in decimal notation. (i) f(x,y,z) = ∑m(2,4,6) (ii) f(w,x,y,z) = ΛM(1,3,5,7,8,9,11,12,13)	**4**	**CO2**
Q2	Using suitable example, explain how a XOR gate can be used as a parity checker.	**4**	**CO4**
Q3	Draw the circuit diagram of an asynchronous counter.	**4**	**CO2**
Q4	Differentiate between main memory unit and auxiliary memory unit.	**4**	**CO1**
Q5	Convert the hexadecimal number DF8.28 into decimal number.	**4**	**CO2**

SECTION B
(4Qx10M= 40 Marks)

Q6	Minimize the expression $Y = A + \bar{A}B + AC$ using K map.	**10**	**CO3**
Q7	A 555 timer is used as an astable multivibrator. If R_A=4.7kΩ, R_B=10kΩ and C=680pF, determine its frequency and duty factor.	**10**	**CO3**
Q8	Draw the schematic of a 4 bit right shift register with parallel loading using D Flip-Flops. Also demonstrate its working.	**10**	**CO4**
Q9	Draw the circuit diagram of 16-to-1 multiplexer and briefly explain its operation. OR Differentiate the different types of Integrated Circuits based upon the scale of integration.	**10**	**CO1**

SECTION-C
(2Qx20M=40 Marks)

Q10	Explain in detail the instruction set of the 8085 microprocessor. (20) OR	**20**	**CO2**

	a) Draw a labelled pin out diagram of a 8085 microprocessor and explain the function of each pin. (15) b) Describe the various flags used in 8085 microprocessor and show their bit positions (5)		
Q11	a) Draw an edge triggered J-K Flip Flop system. With the help of a timing diagram and truth table, explain the various operation stages. (10) b) Explain the working of 555 timer as monostable multivibrator with the help of circuit diagram. (10)	**20**	**CO1**