


Name:			
Enrolment No:			
<b>UPES</b> <b>End Semester Examination, May 2023</b>			
<b>Course: Digital Systems and Applications</b> <b>Program: B.Sc. Physics (H), Int. B.Sc Msc Physics</b> <b>Course Code: PHYS 2029</b>		<b>Semester: IV</b> <b>Time : 03 hrs.</b> <b>Max. Marks: 100</b>	
<b>Instructions: Use is scientific calculator is allowed.</b>			
<b>SECTION A</b> <b>(5Qx4M=20Marks)</b>			
S. No.		Marks	CO
Q 1	Transform each of the following canonical expression into its other canonical form in decimal notation. (i) $f(x,y,z) = \sum m(1,3,5)$ (ii) $f(w,x,y,z) = \Lambda M(0,2,5,6,7,8,9,11,12)$	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 a decade counter.	4	CO2
Q4	Differentiate between ROM and RAM.	4	CO1
Q5	What negative value does the binary number 10011011 represent?	4	CO2
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
Q6	Using a K-map, simplify the following function and realize it using NOR gate: $f(A, B, C, D) = \sum (0,1,2,4,5,6,8,9,12,13,14)$	10	CO3
Q7	A 555timer is used as an astable multivibrator. If $R_A=4.7k\Omega$ , $R_B=10k\Omega$ and $C=680pF$ , determine its frequency and duty factor.	10	CO3
Q8	Draw the schematic of a 4 bit left shift register with parallel loading using D Flip-Flops. Also demonstrate its working.	10	CO4
Q9	Draw the block diagram of a CRO and explain the function of each block?  OR Differentiate the different types of Integrated Circuits based upon the scale of integration.	10	CO1
<b>SECTION-C</b> <b>(2Qx20M=40 Marks)</b>			

Q10	<p>a) Draw a labelled pin out diagram of a 8085 microprocessor and explain the function of each pin. (15)</p> <p>b) Describe the various flags used in 8085 microprocessor and show their bit positions (5)</p> <p style="text-align: center;">OR</p> <p>Explain in detail the instruction set of the 8085 microprocessor. (20)</p>	<b>20</b>	<b>CO2</b>
Q11	<p>a) Draw a master-slave J-K Flip Flop system. Explain the various operation stages. How is the race around condition eliminated by using this Flip Flop? (10)</p> <p>b) Explain the working of 555 timer as monostable multivibrator with the help of circuit diagram. (10)</p>	<b>20</b>	<b>CO1</b>