

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC**Course:** Information technology**Course Code:** BEX238911**Subject:** Basic Electronics**Semester:** II

Q. 1	Define the following terms:	4
	a) Signals b) Digital Signals c) Analog Signals d) Bit	
Q. 2	Convert the following number into decimal number system	4
	a) $(01101)_2 = ()_{10}$ b) $(123)_8 = ()_{10}$ c) $(FC)_{16} = ()_{10}$	
Q. 3	Convert the following decimal number into its equivalent number system	4
	a) $(12.59)_{10} = ()_2$ b) $(345.37)_{10} = ()_8$ c) $(45.76)_{10} = ()_{16}$	
Q. 4	Convert the following	4
	a) $(12.59)_{10} = ()_{16}$ b) $(345.37)_8 = ()_2$ c) $(45.76)_{16} = ()_8$	
Q. 5	Perform the following binary addition	4
	a) $(1100)_2 + (1011)_2 = ()_2$ b) $(12)_{10} + (34)_{10}$	
Q. 6	Perform the following binary subtraction	4
	a) $(1100)_2 - (1011)_2 = ()_2$ b) $(52)_{10} - (32)_{10}$	
Q. 7	Perform the following binary subtraction using 1's Complement	4
	a) $(1100)_2 - (1011)_2 = ()_2$ b) $(52)_{10} - (32)_{10}$	
Q. 8	Perform the following binary subtraction using 2's Complement	4
	a) $(1100)_2 - (1011)_2 = ()_2$ b) $(52)_{10} - (32)_{10}$	
Q. 9	Obtain the 1's and 2's Complement of following number.	4
	a) 101101 b) 0111010	
Q. 10	Add $(57)_{10}$ and $(26)_{10}$ in BCD	4
Q. 11	Perform $(52)_{10} - (89)_{10}$ using 9's complement	6
Q. 12	Perform $(52)_{10} - (89)_{10}$ using 10's complement	6
Q. 13	State the following laws:	6
	a) Commutative law b) Associative law c) Distributive law	
	d) AND law e) OR law f) Inversion law	
Q. 14	Draw the logic symbol and truth table of following gates	8
	a) AND gate b) OR gate c) NOT gate	
	d) NAND gate e) NOR gate f) EX-OR gate	
Q. 15	State and prove De Morgan's Theorem	6
Q. 16	Prove the following logic expression using Boolean algebra	6
	a) $(A+B)(A+C) = A + BC$	
	b) $A + A'B + AB = A + B$	
Q. 17	For the Function $F = A'B + AB'$ find the complement of F'	4
Q. 18	Explain the working of NAND as a Universal Gate	8

Q. 19	Explain the working of NOR as a Universal Gate	8
Q. 20	Construct logic circuit for following expression using basic gate $Y = AB + BC + AC$	4
Q. 21	Realize the following expression using (universal gates) NAND and NOR gates a) $(ABC + B'C')C$	8
Q. 22	Convert the expression $Y = AB + AC' + BC$ into the canonical SOP form	4
Q. 23	Convert the expression $Y = (A + B)(A + C)(B + C')$ into the canonical POS form	4
Q. 25	Define minterm and maxterm with example	4
Q. 26	Define K-map and its structure	6
Q. 27	Using K-map realize the following expression using minimum number of gates a) $Y = \sum m(1,3,4,5,7,10,15)$ b) $Y = \prod M(2,4,5,6)$	8
Q. 28	Draw and explain the half adder circuit	6
Q. 29	Design full adder circuit using K-map technique	8
Q. 30	Design full adder circuit using half adder. Give the applications of full adder	4
Q. 31	Explain the rules to simplify Boolean equation using K-Map	6

	Flip Flops	
1.	Compare Combinational circuits and Sequential Circuits	4
2.	Define Flip flop ,clock signal	4
3.	Explain the working of Positive Edge triggered SR flip flop with Preset and Clear inputs	6
4.	Differentiate between latch and flip flop	4
5.	Describe various methods of triggering a flip flop	4
6.	Draw the logic diagram of clock D flip flop and write truth table	4
7.	Explain the working of Positive Edge triggered JK flip flop	6
8.	Define race around condition. How can it be avoided	4
9.	Describe the working of JK master slave truth table	6
	Registers and Counters	
10.	Design a 3 bit asynchronous ripple counter with timing diagram	6
11.	Design ripple counter using a 3 bit ripple counter	6
12.	Draw the logic diagram of 4 bit up down ripple counter	4
13.	Design a 3 bit synchronous up counter with timing diagram	8
14.	Compare synchronous and asynchronous counter	4
15.	State all Possible modes of operations of registers	4
16.	Describe the function of 3 bit SISO / SIPO / PIPO / PISO registers	6
17.		
18.		

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