Shri Vile Parle Kelavani Mandal's

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

Course: Information technology **Course Code:** BEX238911

Subject: Basic Electronics **Semester: II**

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