OR

Q. 11 a) What are draw backs of RS FF ? Explain JK FF. 4
b) Draw and explain decade counter. 5
c) What is T FF ? Explain. 2

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SCD - 4643

# First Year B.C.A. (Semester - I) Examination
# Paper - 15BCA103
# Digital Techniques

Time : Three hours] [Full Marks - 60

**N.B. :** i) All questions carry equal marks
ii) Due credit will be given to neatness & adequate dimensions.
iii) Assume suitable data wherever necessary.
iv) Diagrams & Equations should be given wherever necessary.
v) Use Blue/Black ink/refill only for writing the answer book.

Q. 1 Select the correct alternative & rewrite the sentence. 5

a) Radix of binary number system is _____
i) 2 ii) 4
iii) 8 iv) 16

b) ____ is the universal gate.
i) NAND ii) Ex-OR
iii) NOT iv) OR

c) 4-variable K-map has ____ squares for output.
i) 2 ii) 8
iii) 16 iv) 32

d) 8 : 1 Mux has _____ select/control lines.
i) 1 ii) 2
iii) 3 iv) 4

e) Modules of a decade conunter is _____
i) 2 ii) 5
iii) 10 iv) 16

Q.2 a) Find the value of x. 5

i) $(100.75)_{10} = x_2$

ii) $(1067.25)_8 = x_2$

iii) $(AAA.A)_{16} = x_2$

iv) $(11101.101)_2 = x_{10}$

v) $(101111011.111)_2 = x_8$

b) Perform following subtraction by using 1's complement method. 4

i) $(1101)_2$ - $(1001)_2$

ii) $(11101)_2$ - $(10111)_2$

c) What are various types of number systems ? Explain. 2

OR

Q.3 a) Explain subtraction by 2's complement method with example. 4

b) Explain conversion of decimal number to binary number. Give suitable example. 4

c) What is BCD code? List its advantages. 3

Q.4 a) NOR and NAND gates are called as universal gates. Explain. 4

b) Explain various boolean laws. 4

c) Prove following identity. 3

i) $A + \overline{A}B = A + B$

ii) $\overline{A \oplus B} = AB + \overline{A}\,\overline{B}$

OR

Q.5 a) State and prove DeMorgan's theorem. State gate equivalence of DeMorgans theorems. 5

b) Write short note on Ex-OR gate. 3

c) What are different basic gates ? Explain with truth table, logic equation, logic symbol and logical statement. 3



Q.6 a) Explain pairs, quads and octet with respect to K-map. 3

b) Draw 2 , 3 and 4 variable K-map. 3

c) Convert following equations in to standard SOP form. 5

i) $Y = AB + \overline{B}C + A\overline{C} + A$

ii) $Y = A\,B\,C + A\,\overline{B}\,D + \overline{B}\,C\,D + \overline{A}\,C\,D$

OR

Q.7 a) Explain the concept of SOP and POS with suitable example. 5

b) Minimize the following functions using K-map and realise using universal gates. 6

i) $f(A,B,C,D) = \sum m(0, 2, 3, 6, 7, 10, 11, 14, 15)$

ii) $f(A,B,C,D) = \sum m(1, 3, 5, 7, 10, 14, 15)$

Q.8 a) What is Full Adder? Explain the construction and working of full adder with neat diagram. 4

b) What is encoder? Draw and explain Decimal to BCD encoder. 4

c) What is Multiplexer? Explain 4 : 1 multiplexer. 3

OR

Q.9 a) Draw & explain 4 BIT parallel Adder/ subtractor. 4

b) What is demultiplexer? Explain 1 : 4 demultiplexer. 4

c) What is Half Adder? Explain. 3

Q.10 a) Draw and Explain clocked RS FF using NOR gates. 4

b) With neat block diagram explain 4 - BIT ripple counter. Also draw timing diagrams. 5

c) What is Counter? What is modulus of a counter? Explain with example. 2