**DSD Questions**

1. A. Simplify the following non-canonical expression using K-map

a) T = a’b’c’de + a’bc’de + abcde + ab’c’de

b) P = v’w’ + v’w’z

c) G = y’z + w’xy’ + w’xy + xy’z

B. Identify the prime implicant and essential prime implicant for the given

Boolean function using k-map. Implement the simplified equation using the

gates as indicated.

a) f(a,b,c,d) = Σ(0,1,2,5,6,7,8,9,10,13,14,15) using NAND gates only.

b) f(A,B,C,D = ∏(0,3,4,7,8,10,12,14)+d(2,6) using NOR gates only.

c) f(a,b,c,d,e) = Σ(3,7,11,12,13,14,15,16,18)+d(24,25,26,27,28,29,30,31) using

basic gates.

1. A. Design a keypad interface to a digital system using 10 line BCD encoder.
2. Explain the operation of following flip-flops with logic diagram, timing diagram and function table:

i) Master-slave D flip-flop ii) Master-slave JK flip-flop

3. A. Design a synchronous mod n counter to generate the given sequence using

i) SR FF ii) JK FF

B. Explain 4-bit universal shift register using 4:1 MUX with the help of logic

diagram. Write a mode control table.