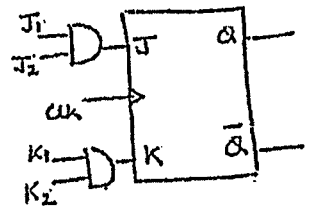


(b) Draw and explain the working of a SR flip flop. Using the excitation tables convert SR flip flop to a JK flip flop. (6)

(c) Draw the block diagram of a bidirectional shift register, explain the operation using the truth table. (6)

6. (a) Draw the circuit of a 4 bit presettable counter. Also draw the state diagram if the counter starts from the state of 1001. (6)

(b) Draw and explain the circuit of a 3 bit synchronous UPcounter with positive edge triggered T Flip Flops. (6)

(c) Design a counter with the following binary sequence: 0,4,2,1,6 and repeat. Use JK Flip Flops. (6)

7. (a) Explain the working of successive approximation Analog to Digital converter. (6)

(b) What is RAM? How does a Static RAM cell differ from a Dynamic RAM cell? (6)

(c) With the help of a diagram explain the working of a two input CMOS NAND gate. What are the merits and demerits of various logic families? (6)

**(1000)**

[This question paper contains 4 printed pages.]

**Your Roll No.....**

**Sr. No. of Question Paper : 4115** **H**

Unique Paper Code : 2512011202

Name of the Paper : Digital Electronics

Name of the Course : **B.Sc. (H) Electronics (Core)**

Semester : II

Duration : 3 Hours Maximum Marks : 90

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all, including Question No. **1,** which is compulsory.
3. Use of Scientific Calculator is allowed.

1. (a) Convert the Decimal number $(25.625)_{10}$ to Octal number. (3)

(b) Perform the addition in Excess-3

$(2)_{10} + (5)_{10}$ (3)

(c) Obtain the canonical product of sum form of the function :

$Y = A + \bar{B}C$ (3)

P.T.O.

(d) What is the difference between serial and parallel transfer? What type of register is used in each case? (3)

(e) Define memory. Discuss the classification of memories on the basic of their operation. (3)

(f) A 6 bit DAC has a step size of 50 mV. Determine the full scale output voltage and the percentage resolution. (3)

2. (a) Simplify the following expression using Boolean algebra

(i) $Z = [\overline{A}\,\overline{B}(C + BD) + \overline{A}\,\overline{B}]C$

(ii) $Z = \overline{A}\,\overline{B} + AB\,\overline{C} + A\,\overline{B}\,\overline{C}D$ (6)

(b) Implement the following expression using minimal NOR gate only (6)

$$Y = AB + \overline{A}\,\overline{B}$$

(c) (i) Perform the binary subtraction using both 1's and 2's complement $(0110)_2 - (1011)_2$.

(ii) Multiply the binary numbers by the computer method $11111 \times 100$ (6)

3. (a) Obtain the :

(i) minimal sum of product

(ii) minimal product of sum expressions

for the function given below : (6)



$F(A, B, C, D) = \Sigma m(0, 1, 2, 5, 8, 9, 10)$

Which of the two are less expensive?

(b) Design a four input SOP circuit that will output a 1 anytime the input is the binary equivalent of 0, 1, 5, 9, 11, 13 or 15 decimal. (6)

(c) What is a controlled inverter? Design a 4-bit Adder/Subtractor circuit using a controlled inverter and explain its working. (6)

4. (a) Design a 3-bit Binary to Gray Code converter. (6)

(b) Construct a 4 to 16 line decoder with five 2 to 4 line decoders with enable. Use block diagrams only. (6)

(c) Implement the following Boolean function using 8 to 1 Multiplexer : (6)

$F(A, B, C, D) = \Sigma m(0, 1, 3, 4, 8, 9, 15)$

5. (a) What are the asynchronous inputs in a flip flop? Why are they called overriding inputs? The following serial data are applied to the JK Flip Flop shown in the figure. Determine the resulting serial data that appears on the Q output. There is one clock pulse for each bit time. Assume that Q is initially 0. The right most bits are applied first.

$J_1 = 1011$ $J_2 = 1101$

$K_1 = 1001$ $K_2 = 1101$ (6)