B.E. PRINTING ENGINEERING SECOND YEAR FIRST SEMESTER – 2019

Subject : PRINTING ELECTRONICS   Time : 3Hr   Full Marks : 100

Answers should be supported with required diagrams, symbols, truth tables, state tables, timing plots, etc. wherever applicable.

1. Answer any 2 questions   2 X 10 = 20
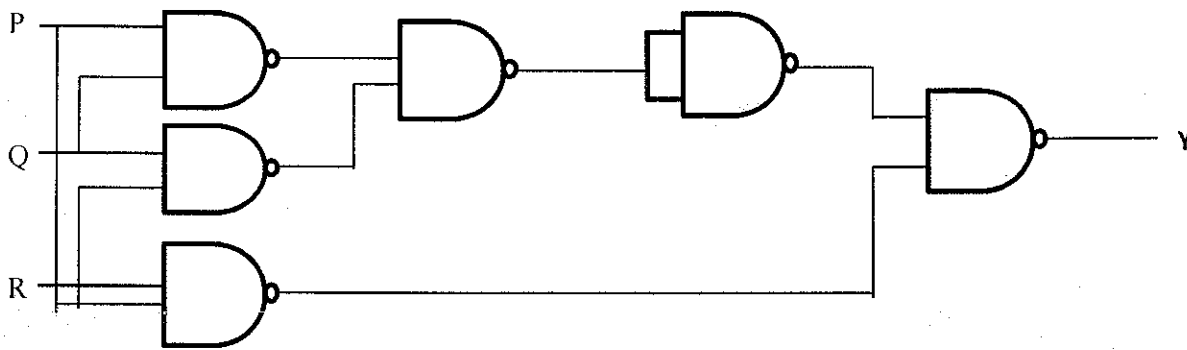
1a.   i. Describe the working principles of XOR gate.   5

  ii. Describe the implementation of NOT gate using XOR gate.   5

1b.   i. Describe the realization of AND gate using NOR gate.   5

  ii. Describe the realization of NOT gate using NAND gate.   5

1c. Describe the operating principle of following circuit with the truth table.   10

2. Answer any 2 questions   2 X 25 = 50

2a.   i. Explain the working principle of Full Adder.   7

  ii. Explain the working principle of JK Flip-flop.   10

  iii. Show the realization of JK Flip-flop using D Flip-flop   8

2b.   i. Explain the working principle of 8-3 encoder.   8

  ii. Explain the realization of following Boolean expression using appropriate Multiplexer. 8

$$F(ABCD)=\sum(1,2,5,7,8,10,11,13,15)$$

  iii. Explain the working principle of Binary Ripple Counter.   9

2c.   i. Explain the processing of 1101 through SIPO register.   8

ii. Explain the working principle of PISO register.   9

iii. Explain PLA programming for implementing the Boolean functions

$F_1(ABCD) = \sum(0,1,2,3)$ $F_2(A,B,C,D) = \sum(4,5,6,11)$ 8

3. Answer any 2 questions   2 X 10 = 20

3a. Perform following conversions   2.5 X 4 = 10

$(456)_{10}$ to octal $(101111)_2$ to BCD $(1110.11)_2$ to Hex $(-24)_{10}$ to 2's compliment form

3b.   i. Minimize the following expressions using K-map.   6

F(ABCD)=A'B'C' + B'CD'+A'BCD'+AB'C'

ii. Show the minimization of the above K-map including don't care at 11, 12 and 13.   4

3c.   i. Represent the following Boolean function in SOP and POS form.   7

F(xyz)=x'z' + y'z' + xy

ii. Represent the $(101.11)_2$ in IEEE 754 single precision representation.   3

4. Answer any 1 question   1 X 10 = 10

4a. Relate the PROM designing to realize following scenario that represents only the cases where press will run, rest in all the cases press will be stopped from printing.

Parameters	Status	Status	Status	Status
Ink pump control is ok?	Yes	No	No	Yes
Fountain solution control is ok?	Yes	Yes	Yes	Yes
Paper moisture content is ok?	Yes	Yes	Yes	No
80% of press operators are present?	Yes	Yes	No	No
Decision	Print	Print	Print	Print

4b. Relate the application of SISO flip-flop and Full Adder to perform pixel wise addition between LSB and LSB+1 plane of the following 4 bit image.

2	3	0	0
3	2	0	4
5	6	10	0
6	2	10	0