d) See Topic: MEMORY DEVICE, Long Answer Type Q~~~~~~~

QUESTION 2005

1. Answer all questions:
a) Determine decimal equivalent for $(1011.101)_2$.
b) What do you mean by tristate logic gate?
c) Represent 38 in 1's complement representation for a 8-bit word.
d) Design a 2-input XOR gate using 2-input NOR gate.
a) See Topic: NUMBER SYSTEM, Short Answer Type Question No. 4.
b) See Topic: LOGIC GATES, Short Answer Type Question No. 2.
c) See Topic: NUMBER SYSTEM, Short Answer Type Question No. 1.
d) See Topic: BOOLEAN ALGEBRA, Short Answer Type Question No. 1.

e) ~~Draw a module 2 counter circuit using basic gates.~~

f) Difference between Binary code and Gray code.

g) How is demultiplexer used as a data distributor?

h) Determine 8's complement of $(47.23)_8$.

i) Subtract 10110 from 01011 using 2's complement method and state the sign of the result.

f) See Topic: CODES, Short Answer Type Question No. 1.

g) See Topic: COMBINATIONAL CIRCUIT, Long Answer Type Question No. 3(a).

h) See Topic: NUMBER SYSTEM, Short Answer Type Question No. 2.

i) See Topic: NUMBER SYSTEM, Short Answer Type Question No. 3.

2. a) Prove the following Boolean functions:

   i) $x + \bar{x}y = x + y$

   ii) $\overline{\overline{cd + a} + a + cd} + ab = a + cd$

b) A 5-input NAND gate has one logic 0 input which is fed to 4-input NOR gate with one logic input. Explain the output in detail.

See Topic: BOOLEAN ALGEBRA, Long Answer Type Question No. 3.

3. a) Define excitation table? Derive the excitation table for RS flip-flop. What do you mean by forbidden inputs?

b) Design a 4 to 1 line multiplexer using basic logic gates.

a) See Topic: FLIP-FLOP, Long Answer Type Question No. 3.

b) See Topic: COMBINATIONAL CIRCUIT, Long Answer Type Question No. 3(b).

4. Design and explain the logic diagram of a Master-Slave JK flip-flop using NAND gates only.

See Topic: FLIP-FLOP, Long Answer Type Question No. 2(a).

5. Distinguish between JK flip-flop and SR flip-flop with their logic diagrams and truth table.

See Topic: FLIP-FLOP, Long Answer Type Question No. 4.

6. Derive a Binary to Gray code converter and write down the truth table.

See Topic: KARNAUGH MAP, Long Answer Type Question No. 1.

7. a) Sketch a parity checker circuit for a 5-bit word. Explain with example for odd and even parity.

b) Using K-map method to obtain the minimized form for the following function:

$$f(A, B, C, D) = \sum(0, 2, 3, 6, 7, 12, 13, 14) + \sum d.c.(1, 4, 11, 15)$$

c) Why is Gray code used in K-map minimization?

d) Convert JK flip-flop to T and D flip-flop.

e) Application of XS — 3 code with example.

f) Design a circuit of Gray to Binary code converter for 5-bit word.

a) See Topic: COMBINATIONAL CIRCUIT, Long Answer Type Question No. 4.

b) See Topic: KARNAUGH MAP, Short Answer Type Question No. 2.

c) See Topic: KARNAUGH MAP, Short Answer Type Question No. 3.

d) See Topic: FLIP-FLOP, Short Answer Type Question No. 2.

f) See Topic: CODES, Long Answer Type Question No. 1.

8. Write short notes of the following:
   a) Shift register.
   b) Dynamic RAM
   c) Tristate logic
   d) Open collector gate

a) See Topic: RESISTER & COUNTER, Long Answer Type Question No. 10(a).
b) See Topic: MEMORY DEVICE, Long Answer Type Question No. 3(b).
d) See Topic: LOGIC GATES, Long Answer Type Question No. 4(a).