

NOTE: 1. Figure should be Neat and labeled.

2. All Questions are compulsory.

3. Right side indicates marks.

Q.1 Answer any 3 from following.

(15)

1. Convert the following numbers

$$(17E.C5)_{16} = (?)_2$$

$$(1101010100011.1101010001)_2 = (?)_8$$

2. i) Perform the addition of following Binary number

$$(11001010 + 1000101)$$

ii) Perform the addition of following Binary number

$$(110011 - 10001)$$

3. Solve:

$$i) (67)_8 + (70)_8 = (?)_8$$

$$ii) (331)_8 = (?)_2 = (?)_{16}$$

4. Convert:

$$i) (101100)_2 = (?)_{\text{gray}}$$

$$ii) (456)_{10} = (?)_{\text{bcd}}$$

$$iii) (64)_{10} = (?)_{\text{excess 3}}$$

5. Write a short note on Number system.

6. What are codes? Where are they used? Differentiate between weighted and non weighted codes. Give one example of each.

Q.2 Answer any 3 from following.

(15)

1. Prove the following

$$A + A'.B + A.B' = A + B$$

2. Using Don't care condition find reduced SOP equation

$$f(A, B, C, D) = \sum m(1, 3, 7, 11, 15) + d(0, 2, 5)$$

3. State and proof DeMorgans Law.

4. Describe how NAND gate is used to build NOT, OR and AND gates.

5. Describe the AND gate and XOR gate with the symbol, the logical statement, Boolean Expression and truth table.

6. Simplify the expression and draw the circuit diagram

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

Q.3 Answer any 3 from following.

(15)

1. Design Half Adder using K-map. Draw the circuit diagram & truth table for same.

2. What is comparator? Explain.

3. Describe the working of Multiplier.

4. Describe the working of 2-bit half subtractor.

5. Explain with an example code conversion from binary to gray.

6. Describe the working of BCD subtractor.

Q.4 Answer any 3 from following.

(15)

1. Draw the logic diagram of 4 to 1 multiplexer. Explain its working.
2. What is meant by race around condition? Explain master slave flip flop.
3. Describe with a truth table the working of clocked RS flip flop.
4. Differentiate between Encoder and Decoders.
5. Describe with a truth table the working of D flip flop.
6. Differentiate between Multiplexer and Demultiplexer.

Q.5 Answer any 3 from following.

(15)

1. Explain the working of four bit Ring counter.
2. Write a short note on shift register.
3. Describe the functioning of presettable counter.
4. Describe the working of Johnson counter.
5. Explain the difference between serial shifting and parallel shifting of data in shift register.
6. Explain the operation of SIPO shift register.

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