

9. Write notes on the following : 5+5+4=14

- (a) Monostable multivibrator using 555 timer
 (b) RAMs
 (c) ECL

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B.Tech 4th Semester Exam., 2016

DIGITAL ELECTRONICS

Time : 3 hours akubihar.com Full Marks : 70

Instructions :

- (i) The marks are indicated in the right-hand margin.
 (ii) There are **NINE** questions in this paper.
 (iii) Attempt **FIVE** questions in all.
 (iv) Question No. **1** is compulsory.

1. Fill in the blanks (any seven) : 2×7=14

- (a) The number of rows in truth table of 04 variables is ____.
- (b) The number of 3-input NAND gates in a 14-pin IC is ____.
- (c) The number of characters represented by ASCII code is ____.
- (d) The distance between the code words 10010 and 10101 is ____.
- (e) Power dissipation is negligibly small in ____ devices. akubihar.com
- (f) ____ is the fastest logic family.

- (g) The figure of merit of a digital IC is given by ____.
- (h) ____ code is used for labelling the cells of K-map.
- (i) Subtractors are designed using ____ ICs.
- (j) Registers and counters can be designed using ____.
2. (a) Determine the decimal numbers represented by the binary number
 $(101101.10101)_2$
- (b) Convert $(10.625)_{10}$ in the binary form.
- (c) Subtract $(7 - 5)$ using 2's complement representation of negative number.
 $5+5+4=14$
3. Design 4-bit Binary-to-Gray code converter circuits. 14
4. (a) Implement the following multi-output combinational logic circuit using a 4-to-16 line decoder :
- $$F_1 = \Sigma m(1, 2, 4, 7, 8, 11, 12, 13)$$
- $$F_2 = \Sigma m(2, 3, 9, 11)$$
- $$F_3 = \Sigma m(10, 12, 13, 14)$$
- $$F_4 = \Sigma m(2, 4, 8)$$
- (b) Realize $f_1 = \Sigma m(0, 3, 5, 6, 9, 10, 12, 15)$ using 8 : 1 multiplexers. $7+7=14$

5. (a) Draw master-slave J-K flip-flop using NAND gates.
- (b) Explain a 4-bit bidirectional shift register with neat circuit diagram. $7+7=14$
6. (a) Design a 3-bit binary UP/DOWN counter with a direction control M. Use J-K flip-flops.
- (b) Draw modulo-125 ripple counter. $10+4=14$
7. (a) Draw CMOS NAND gates and NOR gates.
- (b) Draw NOT gate, OR gate and AND gate using RTL.
- (c) Draw TTL with totem pole output and explain its operation. $4+5+5=14$
8. (a) Define the following characteristics of a D/A converter :
- Resolution
 - Linearity
 - Accuracy
 - Settling time
 - Temperature sensitivity
- (b) Draw and explain 3-bit parallel comparator (flash) A/D converter. $7+7=14$