

C.U.SHAH UNIVERSITY

Summer Examination-2016

Subject Name: DIGITAL CIRCUITS

Subject Code: 4TE03DCI1

Branch: IC/EE ENGINEERING

Semester: III Date: 26/04/2016

Time: 02:30 To 05:30

Marks: 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

Q-1

Attempt the following questions:

(14)

- a** What is the octal equivalent of the binary number: 10111101?
 (a) 675 (b) 275 (c) 572 (d) 573.
- b** $(10101)_2$ is
 (a) $(21)_{10}$ (b) $(69)_{10}$ (c) $(41)_{10}$ (d) $(5)_{10}$
- c** The number of Boolean functions that can be generated by n variables is equal to
 (a) 2^n (b) 2^{2^n} (c) 2^{n-1} (d) 2^n
- d** This of the following gate is a two-level logic gate.
 (a) OR gate (b) NAND gate (c) EXCLUSIVE OR gate (d) NOT gate.
- e** The output of an exclusive-NOR gate is 1. Which input combination is correct?
 (a) $A=1, B=0$ (b) $A=0, B=1$ (c) $A=0, B=0$ (d) none of the above
- f** The inverter can be produced with how many NAND gates?
 (a) 1 (b) 2 (c) 3 (d) 4
- g** Which of the following expressions is in the sum-of-products (SOP) form?
 (a) $(A+B)(C+D)$ (b) $(A)B(CD)$ (c) $AB(CD)$ (d) $AB+CD$
- h** The commutative law of Boolean addition states that $A+B=A \times B$.
 (a) True (b) False
- i** The inverter can be produced with how many NAND gates?
 (a) 1 (b) 2 (c) 3 (d) 4
- j** When grouping cells within a K-map, the cells must be combined in groups of _____.
 (a) 1, 2, 4, 8, etc. (b) 4s (c) 3s
- k** A Karnaugh map is a systematic way of reducing which type of expression?
 (a) product-of-sums (b) exclusive NOR (c) sum-of-products (d) those with over bars
- l** In a parallel in/parallel out shift register, $D_0 = 1, D_1 = 1, D_2 = 1,$ and $D_3 = 0$. After three clock pulses, the data outputs are _____.
 (a) 1110 (b) 0001 (c) 1100 (d) 1000



- m How many clock pulses will be required to completely load serially a 5-bit shift register?
 (a)2 (b)3 (c)4 (d)5
- n What is the difference between a shift-right register and a shift-left register?
 (a)There is no difference. (b) The direction of the shift

Attempt any four questions from Q-2 to Q-8

- Q-2 Attempt all questions (14)**
 A State and prove De Morgan's theorem.
 B Realize X-OR operation using a) only NAND logic b) NOR logic c) AOI logic
- Q-3 Attempt all questions (14)**
 A i) Convert $(98.72)_{10}$ to binary.
 ii) Convert $(1101.101)_2$ to decimal.
 iii) Convert $(214)_{10}$ to octal.
 iv) Convert $(3509)_{10}$ to Hexadecimal.
 v) Convert $(111011100)_2$ to octal.
 vi) Convert $(634)_8$ to binary.
 vii) Convert $(3FD)_H$ to binary.
 B i) Prove $A+B = (A+B)(A+C)$
 ii) Simplify $Y=(A'+B+C)(A+B'+C)$
- Q-4 Attempt all questions (14)**
 A Describe the operation performed by the following arithmetic circuits
 (a)Half Subtractor d) Full Subtractor
 B Simplify the following Boolean function using K-map and realize using basic gates.
 $F(A,B,C,D) = \sum m(0,1,4,8,9,10)$
- Q-5 Attempt all questions (14)**
 A Explain with diagram Ex-3 code to Grey code converter.
 B Explain with diagram a BCD to 7-segment decoder.
- Q-6 Attempt all questions (14)**
 A With neat sketch explain the operation of clocked RS flip flop.
 B Draw and Explain the working of JK flip flop.
- Q-7 Attempt all questions (14)**
 A With neat diagram explain the operation of 4-bit serial-in-parallel out Shift register.
 B What is the difference between decoder and demultiplexer?
- Q-8 Attempt all questions (14)**
 A Comparison of Counters and Registers.
 B Explain Asynchronous ripple Counter.

