



Digital Logic & Design/Digital Systems

Programs: BS (CS)/BS (SE)/BS (TELC)
Course Codes: CSC-201/SEC-201/TSC-201
EDP Codes: 102007016
Instructor: Muhammad Amin
Examination: Mid Term
Semester: Summer 2020
Total Marks: 30
Date: August 22, 2020
Timing: 2:00 pm - 6:00 pm

Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Total Marks
0.5 x 8 = 4	1 x 4 = 4	1 x 2 = 2	3 x 2 = 6	3 x 3 = 9	3 + 2 = 5	30

- Q.1** Convert each of the following:
- (a) $45.25_{10} = (?)_2$ (b) $01111111.1010_2 = (?)_{10}$ (c) $3A6F_{16} = (?)_2$
 (d) $10101010_2 = \pm (?)_{10}$ (e) $-1_{10} = (?)_2$ (f) $156_{10} = (?)_{BCD}$
 (g) $1001010_2 = (?)_{Gray}$ (h) $111000 = (?)_{101001}$ Even parity
- Q.2** Calculate each of the following:
- (a) $9B_{16} + 8A_{16}$ (b) $F7_{16} - D6_{16}$ (c) $1100_2 + 1011_2$ [Use modulo-2]
 (d) $01111111_2 - 00000111_2$ [use 2's complement]
- Q.3** Determine the output waveforms for the XOR and XNOR gates, given the input waveforms, A and B, in Figure 01.
- Q.4** (a) Draw the logic circuit for the following expression:

$$X = \overline{A}BC + A\overline{B}\overline{C} + \overline{A}\overline{B}\overline{C} + A\overline{B}C + ABC$$
 (b) Using Boolean algebra, simplify the expression given in part (a).
- Q.5** (a) Convert the following expressions to standard SOP form: $A = \overline{\overline{X+Y+Z}}$
 (b) Convert the standard SOP expression obtained in part (a) to standard POS form.
 (c) Develop a single truth table for the standard SOP and standard POS expressions obtained in part (a) and part (b) respectively.
- Q.6** (a) Use a Karnaugh map to find the minimum SOP form for the following expression: $X = \overline{A}\overline{B}\overline{C} + A\overline{B}\overline{C} + \overline{A}B\overline{C} + AB\overline{C} + ABC + A\overline{B}C$
 (b) Determine minimum POS form the Karnaugh map used in part (a).

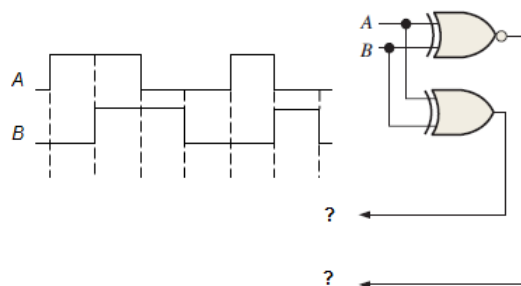


Figure 01