PGT104 – Assignment 1

Name: _____

Student ID: _____

Answer all questions.

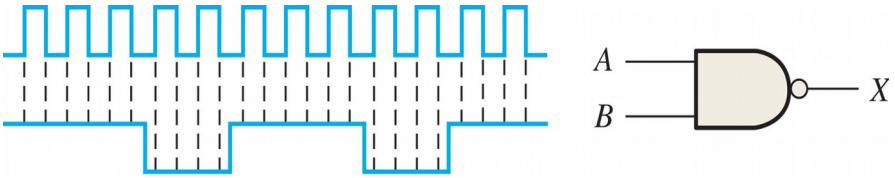
(1) Perform each given binary arithmetic operation in 2's complement form:
(a) 11011001 + 11100110 (b) 00110011 – 00011001
(c) 01100100 X 11111011 (d) 10001000 ÷ 00100010
All procedures used to obtain the answer must be clearly shown. Answer for (c) should be in 16-bit. Answer for (d) should be ONE signed 8-bit quotient and ONE unsigned 8-bit remainder.

[8 marks]

(2) Perform the following 8-bit BCD arithmetic (provide the answer in both decimal and BCD):
(a) 00011000 + 00010010 (b) 01100100 + 00110011
(c) 01001000 + 01000111 (d) 10000101 - 00010101
All procedures used to obtain the answer must be clearly shown.

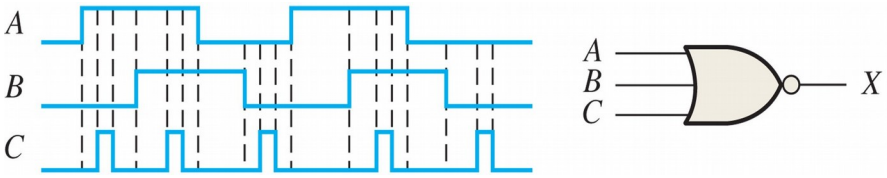
[8 marks]

(3) Determine the output for the gate shown and draw the timing diagram showing output X.



[8 marks]

(4) Determine the output for the gate shown and draw the timing diagram showing output X.



[8 marks]

(5) Construct a truth table for the following Boolean expressions:
(a) $\overline{X}\,Y + \overline{Y}\,Z + \overline{Z}\,X$ (b) $(P+Q)(Q+R)(R+\overline{P})$
All procedures used to obtain the answer must be clearly shown.

[8 marks]

(6) Use Karnaugh Map to find the minimum SOP form for the following expression:
$\overline{Q}\,\overline{P}\,\overline{R} + P\,\overline{Q}\;R + \overline{P}\,R\,\overline{Q} + P\,Q\,\overline{R}$
All procedures used to obtain the answer must be clearly shown.

[5 marks]

(7) Explain what a parity bit is. Discuss its use in digital applications.
Your answer (not more than 1 page):
- should explain a parity bit in detail (type, how it is generated or use, etc.)
- should provide example in discussing its usage
- will be given a zero if there is a duplicate answer

[5 marks]