THE UNIVERSITY OF BRITISH COLUMBIA

Department of Electrical & Computer Engineering

October 26, 2006

EECE 256 – Sections 101 & 102

Student name:_____ S#: _____

Midterm – 50 minutes

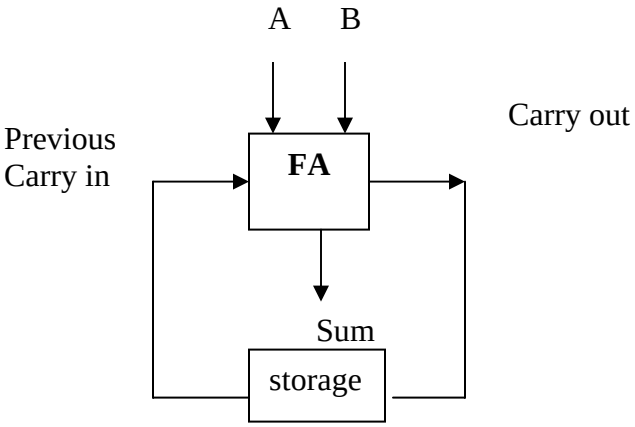
Closed book – No calculators are allowed

1. Design a 4-input priority encoder with D_0 having the highest priority and D_3 the lowest. Your design should also include a "correct" input signal C which is set to 1 when the inputs are correct and it is 0 when all inputs are 0 (not valid input). Use the minimum number 2-input gates (to generate all 3 outputs) *(30%)* - ***show all your work***

D3	D2	D1	D0	X	Y	C
0	0	0	0	X	X	0

2. Design a serial adder using only one FA (as shown in the figure below, assume the FA has storage for the previous carry). Two signals S0 and S1 govern the operation as shown in the truth table. Block diagram(s) of devices may be used in your design. *(20%) – **show all your work***

S1	S0	Operation
0	0	A0+B0
0	1	A1+B1
1	0	A2+B2
1	1	A3+B3



3. Design the **simplest** circuit that determines how many of the bits in a 3-bit unsigned number are equal to 1. Block diagram(s) of devices may be used in your design. *(10%) - **show all your work***

4. Design a binary adder which can perform the operation A+B. Assume that A and B are two binary numbers stored in sign magnitude (4-bits total – like the table shown in the lectures). The locations A and B (shown in the figure below) store signed numbers. Your result should be stored in signed magnitude in location C (see figure below). If at any point there is an OVERFLOW make the contents of C equal to zero. Use Full-Adders and external gates. *(40%)* - ***show all your work***