SIMON FRASER UNIVERSITY
Department of Economics
Final Examination

ECON 818: **Advanced Derivative Securities** 07-1

Rules for Submitting Final Exam: Answers to questions are to be typed, single spaced, of length 1 page ***each*** for all questions, 8"x11" standard paper, with 1" margin and type point not less than 12. (This assignment is typed in 12 point.) For questions with a) and b) parts, answer both parts. Violations will be subject to deductions. Assignment is due in my office no later than 9AM on Apr. 11, 2007.

REQUIRED QUESTION
Compare and contrast the risk management practices from the oil and gas companies, airlines, and chartered bank examined in the student group presentations. Be sure to identify and contrast the risk management techniques, risk reporting techniques and the amount and type of derivative usage. In addition, provide an assessment of the risk management strategies and suggest possible avenues for improvement.

CHOOSE TWO OF THREE: (All parts of each question selected need to be answered)

1. a) Outline the continuous time derivation of the Black-Scholes option pricing model. What assumptions are being made to derive the results?
b) What are the limitations of applying the model to actual options prices (being sure to identify what amendments have to be made to the Black-Scholes formula to, say, incorporate dividend paying stocks or permit a different distributional assumption for stock prices)?

2. a) "A call option benefits from increases in the stock price and these increases can be very large. A put option benefits from stock price declines, but the stock price can only fall to zero. Therefore, if we have a put and a call on the same stock with the same terms, the put must sell for less than the call." Do you agree or disagree? Explain making sure that you identify relevant restrictions on the underlying arbitrage.
b) Use the Black-Scholes option pricing model to value both the European call and put options on a non-dividend paying stock. Be sure to state the formula and provide sufficient information about the calculations performed to arrive at the solution: $S(t)$ = \$30; X = \$40; time to expiration is 3 months; the risk free interest rate is 5% per year; and the variance of annual stock returns is 0.25.
c) What is meant by the delta, gamma and theta of a call option?

3. a) A long stock position can be "protected" by buying a put. How can the payoff on this portfolio of a stock and option be replicated using "dynamic hedging" strategies involving portfolios which combine only stock and bond positions? (Hint: Be sure to identify the difference between path dependent and path independent strategies.)
b) Describe the various forms of portfolio insurance. How would these various forms of portfolio insurance perform in the face of discontinuous movements in equity prices such as the October 1987 market break?