EXAMINATION GUIDE

MATH3075 Financial Mathematics (Normal)

- You should know the basic results and computational methods of Financial Mathematics. You should be ready to answer questions regarding general single-period market models, the CRR model and the Black-Scholes model.

- The best preparation is to go through the lecture notes, tutorial sheets and assignments for MATH3075.

- No aids other than standard non-programmable calculators are permitted. There will be no formula sheet. You should memorise formulae, concepts and computational techniques needed to answer typical questions, as listed below.

1. General single-period market model: (Week 6, Exercise 1)
   (a) verify the arbitrage-free property and completeness of a model,
   (b) describe the class of all attainable contingent claims,
   (c) find the set of all risk-neutral probability measures,
   (d) compute the replicating strategy and arbitrage price for a given contingent claim.

2. The CRR market model – European contingent claims: (Week 9, Exercise 1)
   (a) compute the risk-neutral probability measure,
   (b) compute the replicating strategy for a given contingent claim,
   (c) compute the price process of a given European claim.

3. The CRR market model – American put and call options: (Week 10, Exercise 1)
   (a) find the risk-neutral probability measure,
   (b) compute the arbitrage price for a given American option,
   (c) find the rational exercise time for the holder of an American option,
   (d) compute the replicating strategy for the issuer of an American option.

4. The Black-Scholes model – European contingent claims: (Week 11, Exercise 2)
   (a) apply the Black-Scholes formula to price European call and put options,
   (b) compute the price of a given European claim in the Black-Scholes model using a decomposition into put and call options,
   (c) analyse the asymptotic properties of the Black-Scholes price of a call (put) option.