You should know the pertinent results and understand the general principles of Financial Mathematics. You should be ready to answer questions regarding general discrete-time 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 and MATH3975.

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 contingent claim,
   (e) analyse the properties of a general single-period model.

2. Multi-period market model – European contingent claims: (Week 8, Exercise 1)
   (a) find the class of all risk-neutral probability measures,
   (b) describe the replicating strategy for a given European contingent claim,
   (c) compute the arbitrage price of a given European contingent claim,
   (d) verify the martingale property of the discounted price process.

3. The CRR market model – American contingent claims: (Week 10, Exercise 2)
   (a) find the risk-neutral probability measure,
   (b) compute the arbitrage price of a given American contingent claim,
   (c) find the rational exercise time for the holder,
   (d) compute the replicating strategy for the issuer,
   (e) analyse the martingale property of the price of a general American claim.

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 price of a European claim.