MAS224, Actuarial Maths: Key Objectives Spring 2008

To obtain a pass in the examination, you should be able to do all of the following.

(1) Understand the meaning of: the force of interest δ; the nominal rate of interest convertible $p$thly $i^{(p)}$; the annual equivalent rate of interest i; the annual rate of discount d; the nominal rate of discount convertible $p$thly $d^{(p)}$; the present value of an annuity-due $\ddot{a}_{\overline{n}|}$; the present value of an immediate annuity $a_{\overline{n}|}$.

(2) Calculate the accumulated value of a single investment when one of the following is given: δ, i, $i^{(p)}$, d or $d^{(p)}$;

(3) State and apply the relationships between: i, $i^{(p)}$, δ, d, $d^{(p)}$ and V;

(4) Be able to calculate the present value of a single investment and of annuities payable annually and use these to cost annuities and determine premiums.

(5) Define the survival function $S(x)$ in terms of the random variable X measuring the lifetime of a newborn. Define the instantaneous death rate $\mu(x)$. Know how to use the survival function to calculate probabilities for the non-curtate further lifetime $T(x)$ and the curtate further lifetime, $K(x)$ for a life aged x.

(6) Define the meaning of the life table functions l_x, ${}_tp_x$, ${}_tq_x$, ${}_{t|u}q_x$ and calculate them on the basis of a life table.

(8) Express ${}_tp_x$, ${}_tq_x$ and ${}_{t|u}q_x$ in terms of l_x and $S(x)$ and calculate them when $S(x)$ has a simple form.

(9) Understand the concept of select mortality. Use life tables to find select and non-select (ultimate) values of the life table functions.

(10) Understand what is meant by the benefit payment under a pure endowment policy. Calculate the expected present value of the benefit payment on the basis of ELT-12 and A1967-70.

(11) Understand what is meant by the benefit payment under whole-life assurance and n-year endowment and endowment assurance policies. Calculate the expected present value of the benefit payment on the basis of A1967-70.

(12) Understand what is meant by a life annuity. Calculate the expected present values of whole-life annuities ($\ddot{a}_x$ and a_x) and temporary annuities ($\ddot{a}_{x:\overline{n}|}$) payable annually on the basis of A1967-70.

(13) Understand how the benefit premiums for life assurance policies are calculated. Calculate these on the basis of A1967-70.