INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

16 April 2012 (am)

Subject CA1 – Actuarial Risk Management

Paper One

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*

2. *You have 15 minutes before the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*

3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*

4. *Mark allocations are shown in brackets.*

5. *Attempt all seven questions, beginning your answer to each question on a separate sheet.*

6. *Candidates should show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.

1 An insurance company offers two related life assurance policies.

The first policy is a standard five-year term assurance.

The second is a special five-year term assurance with an option at the end of the five year term for the policyholder to renew for a further five years without further underwriting. The premium rate at renewal will be set at the start of the special policy.

Discuss how the special initial and renewal premium rates applying under the second policy might differ from each other and from the standard premium rate for the first policy. [6]

2 (i) Discuss why a pension scheme would carry out a review of its investment strategy. [4]

The investment strategy for the equity portfolio of a large pension scheme for the last three years has been to invest 50% in a passively managed equity fund and 50% in an actively managed equity fund. The funds are run by different investment management companies and over the last three years have achieved the following annual returns, which have been calculated consistently.

Year	*1*	*2*	*3*
Active benchmark	8%	20%	7%
Active fund return	7%	15%	7%
Passive benchmark	5%	10%	5%
Passive fund return	5%	9%	6%

(ii) (a) Comment on the performance of the investment funds; and,

(b) Suggest the main reasons why actual returns may have differed from the respective benchmark returns. [4]

The pension scheme carries out due diligence of the investment managers.

(iii) Outline the features of an investment management company's practices, which the pension scheme should consider as part of this assessment. [3]

[Total 11]

3 (i) Discuss the characteristics which will influence the credit rating of a new bond issue. [5]

An investor is evaluating fixed interest bonds to add to their bond portfolio. The bonds being evaluated are:

- a bond issued by the national government.
- a corporate bond issued in the local currency by a large multi-national firm, which has extensive overseas operations.
- a corporate bond issued by a small firm, which only has local operations.

(ii) Explain why the redemption yield on the bond issued by the small firm may be higher than the redemption yields on the other two bonds. [3]

(iii) Outline the main factors which may influence the investor's decision as to which of the three bonds above to invest in. [3]
[Total 11]

4 (i) Outline why companies in the financial services sector have moved to using more complex models when designing and monitoring products. [3]

A large financial institution is about to launch an investment fund designed for experienced investors. The fund will invest directly in a large number of markets and investment classes.

The institution also intends to offer an insurance policy linked to the new fund. The insurance policy will provide protection against large falls in the value of an investor's holding in the new fund.

The institution will know what assets the fund will invest in. Hence the team responsible for designing and managing the fund believe that the insurance policy premiums can be invested in derivatives so as to hedge the risks faced by investors in the fund.

Therefore, by charging an appropriate premium, the design team says that there should be little risk to the institution in offering the insurance policy and guaranteed profits could be made.

The specific investments for the insurance policy will need to be determined by the design team using a complex model.

(ii) Explain why the need to use a complex model may make it difficult for the directors of the institution to understand the actual financial risks associated with the investment of the insurance policy premium. [5]

(iii) Discuss why the proposed hedging arrangement may not result in guaranteed profits for the institution. [4]
[Total 12]

5 A country has a large horseracing industry. Horses generally start racing between the ages of two and five. Most horses are retired from racing when they reach the age of thirteen. A very small number of horses are retired at younger ages for breeding. Revenues from breeding fees can be very high but are very volatile.

It has been proposed that a proportion of all breeding fees should be used to provide contributions to a general fund that will be invested in order to provide benefits to look after horses in retirement.

All horses actively involved in racing would be covered by the fund.

Benefits would normally only be payable when horses retire from racing aged thirteen.

Benefits would only be available in respect of retirement before age thirteen if the horse is certified as injured by a registered vet.

No benefits would be payable on the death of the horse either before or after retirement.

(i) Outline the demographic information that would need to be considered when determining the cost of any retirement benefits. [5]

Two possible forms of benefits have been proposed:

(a)

Benefits for each horse will be paid out of the general, overall resources of the fund

Benefits will be calculated as a cash amount for each year of a horse's racing career to be paid as an annual income from retirement until the horse dies. This amount will be the same for all horses and will be increased each year, both before and after retirement, in some way to allow for inflation.

(b)

Benefits for each horse will be provided from individual accounts held within the overall fund

A proportion of each year's contributions will be allocated to each horse. These contributions will form individual accounts for each horse. The value of these accounts will grow in line with investment returns earned by the general fund. On retirement, the accumulated individual accounts will be used to provide appropriate benefits.

In both cases, any proceeds would be payable to the horse's owner who would use them on behalf of the horse. Measures would be taken to ensure that any payments are actually used to provide care for horses and not taken by their owners.

(ii) Discuss the relative attractions of each proposal in terms of providing suitable benefits for horses retiring at age thirteen or on earlier certified retirement. [10]

As an alternative to proposal (a), it has been suggested that instead of paying income until the horse dies, the fund will reimburse the cost of housing the horse at a "retirement farm" approved by the fund.

(iii) Describe the additional risks that the fund may face if this alternative were adopted. [4]
[Total 19]

6 High Power is a domestic construction firm specialising in the energy sector. Over the last ten years it has built a number of traditional power plants (which rely on fossil fuels). With increased consumer demand for green energy High Power is currently bidding for a contract to construct a dam and hydro-electric plant project for the government.

Under the terms of the project contract one quarter of the project fee will be payable to High Power upon exchange of contracts. The balance of the fee will be paid as a lump sum on completion and handover of the dam and hydro-electric plant. It is expected that the project will be completed within three years.

As part of the bidding process High Power will prepare a written strategy document.

(i) List the particular items, which should normally be included in such a strategy document. [6]

(ii) Describe four distinct non-financial risks that High Power could be exposed to under this project. Your description should include of a way of mitigating each risk. [8]

Most of the fee will be paid on completion of the project. Hence High Power believes that a key financial risk will be maintaining company cash flows for the three-year term of the contract.

(iii) Discuss options for managing the cash flow problems arising from the staggered project payments. [5]
[Total 19]

7 The Wetsock music festival has been running for 25 years. The festival is open air and based in a remote location. Popularity has increased in the last five years with a large number of visitors choosing to camp at the site over the weekend. Although the acts at the festival are known in advance, late changes to scheduled performances are common.

There are two kinds of ticket and both require wristbands to be worn for the duration of the festival:

Silver band

Provides access to the festival and campsite.

Gold band

Provides access to the festival, campsite and VIP areas. In addition mobile text message alerts are provided when scheduled performances are confirmed or altered.

Next year, an insurance company will sponsor the festival. The insurance company has negotiated with the organisers to provide free insurance to gold band ticket holders. The insurance company will receive a share of the gold band ticket price in return for providing the insurance.

(i) List the perils a visitor may wish to insure against during the festival weekend. [4]

The cover the insurance company decides to offer to gold band holders includes two key benefits:

- Mobile phone cover: a compensation payment if a visitor has their mobile phone stolen or damaged at the festival; and
- Cancellation cover: a full refund of the ticket price if the entire festival is cancelled due to poor weather.

(ii) Discuss the factors that would need to be considered when determining the cost of providing the mobile phone cover at this particular festival. Your description should include possible sources of data. [8]

(iii) Explain why the claims experience for the cancellation cover is likely to be markedly different and more difficult to predict compared to that for the mobile phone cover. [4]

(iv) Outline the factors, which could lead to the price the insurance company would charge the organisers being different to the expected cost of claims. [6]
[Total 22]

END OF PAPER