INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

10th May 2011

Subject CA1 – Core Application Concept (Paper I)

Time allowed: 3 Hours (9.45* - 13.00 Hrs)

Total Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. *Please read the instructions on the front page of answer booklet and instructions to examinees sent along with hall ticket carefully and follow without exception*
2. *Attempt all questions, beginning your answer to each question on a separate sheet.*
3. **You have 15 minutes at 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 3 hours to complete the paper.*
4. *You must not start writing your answers until instructed to do so by the Supervisor.*
5. *Mark allocations are shown in brackets.*

AT THE END OF THE EXAMINATION

Please return your answer book and this question paper to the supervisor separately.

Q. 1) A general insurance company is planning to offer a new product providing comprehensive cover to valuable "vintage cars" (i.e. old luxury cars).

a) Outline the difficulties the company may face in determining a suitable risk premium for this product (2)

b) Set out the information the company may request in order to determine the risk premium (3)

[5]

Q. 2) a) State equations for the expected return and the required return for both equity and conventional government bonds. (2)

b) Define the yield gap used to compare investment in equities and conventional government bonds. Derive an equation for the reverse yield gap. (2)

c) Describe the factors that could account for the reverse yield gap being relatively higher than normal (2)

[6]

Q. 3) a) Describe the influences that could cause a difference in redemption yields between government and corporate bonds of the same nature and term. (3)

b) Discuss the circumstances where conventional corporate debt could be a suitable investment for a defined contribution retirement benefit scheme. (5)

[8]

Q. 4) a) Define, in the context of health insurance, the terms waiting period and pre-existing conditions (2)

The insurance regulator of a developing country is considering implementation of the following regulatory measures to increase the attractiveness of health insurance products to customers and to develop the health insurance market.

- Elimination of waiting period i.e. change the current practice where each insurer is allowed to decide its own waiting period

- Make it mandatory for all health insurance policies to cover pre-existing illness after three years from date of commencement of a policy

b) Explain, using suitable examples, how in general, such measures could increase the attractiveness of health insurance products to customers (3)

c) Describe the issues that could arise from such changes and how insurance companies may react (3)

[8]

Q. 5) A small life insurance company's product portfolio comprises the following 2 products-

i. A without profit term insurance plan

ii. A unit linked plan with a guaranteed maturity benefit equal to Number of units * Unit price at maturity or accumulation of premiums paid @ 5% pa compound, whichever is higher.

The benefits payable on death or surrender are number of units * unit price with a penalty in the case of surrenders.

The regulatory solvency capital requirement is currently (factor k1 * gross reserves (non-unit reserve in respect of unit linked product)) + (factor k2 * gross sum at risk).

a) Set out the disadvantages of a factor based approach to solvency with respect to the 2 products mentioned above. (4)

b) Discuss the principal risks that need to be considered in developing an economic capital model for the 2 products. (8)

[12]

Q. 6) A life insurance company has recently introduced an equity release policy for senior citizens who own their own home with no outstanding mortgage or other loan secured on it. This product has the following features. –

i. A home owner signs over his residential property to the insurance company.

ii. In return, the home owner /policyholder gets an annuity for life. The policyholder/homeowner can continue to live rent free in the premises till his death. On the death of the policyholder, physical possession of the property is taken by the life company. They are then free to sell or otherwise use the property

a) Set out the net cash flows from this product. (2)

b) Discuss the reasons why a home owner would consider taking out this policy rather than selling his property and living of the proceeds. (5)

c) Discuss the risks to the life company from this product. (5)

[12]

Q. 7) An employer provides a defined benefit medical insurance plan to his employees. The benefits are linked to medical costs actually incurred. The employer now wishes to offer the same benefits to retired employees. Such employees will have to pay 10% of their last monthly salary as a regular monthly contribution to the employer to cover the expected costs. The new arrangement will be offered on a voluntary basis and will not be funded in advance.

a) State the general definition of a defined benefits scheme. (2)

b) Outline the risks to which the employer is exposed as sponsor of the scheme. (10)

c) State measures the employer could introduce to mitigate these risks (3)

[15]

Q. 8) A large general insurance company writes significant volumes of employer's liability business.

a) Specify the main areas of uncertainty inherent in the gross claims experience of this particular insurer. (4)

b) Outline the other business risks to which this insurer may be exposed. (3)

c) The current asset allocation strategy of the company is

i) Fixed Interest Government/Corporate Bonds - 50%

ii) Index Linked Government Securities – 50%

iii) Equities- Nil

Discuss the appropriateness of the current investment strategy. (4)

d) In a recent Management committee meeting a proposal has been put forward by the Investment department to change the asset allocation strategy to

i) Fixed interest securities- 25%

ii) Index Linked Government Bonds- 25%

iii) Equities- 25%

iv) Direct Property Investments- 25%

Outline the advantages and disadvantages of the proposal for the company.

You may assume that currently there are no regulatory restrictions on asset allocation. (5)

[16]

Q. 9) The Government of a developing country currently provides monthly pension of 1000 CU (local currency) to all members of population aged 70 and above. The monthly pension is available till death of the individual.

The Government is considering increasing the monthly income from CU 1000 to CU 2000 per month and to bring down the eligibility age to 65 from the current 70 years.

a) Outline the reasons why the Government would consider making the above mentioned changes to the current State pension scheme. (3)

At the same time the Government is also considering the introduction of a new defined contribution unit linked National Pension Scheme (NPS) for those below 60, with the following features–

i. It is voluntary and available to members of population below age 60.

ii. Contributions to the extent of CU 25,000 pa made to the NPS are exempt from tax.

iii. A Central depository Company owned by the Government will be responsible for record maintenance and administration of scheme.

iv. Three fund houses licensed by the Government will act as fund managers for the scheme funds.

v. The fees charged by fund houses and the Central Depository will be set by Government and reviewed annually.

vi. Each fund manager can offer only a domestic debt fund, a domestic equity fund and a life style fund (where the exposure to domestic equity will reduce as the member approaches retirement age) to customers.

vii. Customers have the option to either choose one fund manager/fund or split his contribution between 2 or more fund managers/funds. Switch options are also available to customers.

viii. No money can be withdrawn from the fund on any contingency. On death of member fund goes to dependent of member.

ix. On a member attaining age 65 the proceeds of the NPS has to be mandatorily invested in a life annuity provided by one of an authorised number of life insurance companies operating in the country.

x. Any income received from the life annuity will be offset against the fixed pension provided by the State. Thus a member who gets a life pension of CU 2000 or more is not eligible for any State Pension benefit.

b) Outline the reasons why the Government would introduce a National Pension Scheme. (4)

c) Discuss the attractiveness or otherwise of the proposed NPS for members of the population. (11)

[18]

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