INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

18th November 2010

Subject ST5 - Finance and Investment A

Time allowed: Three hours (14.45* – 18.00 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. **** 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 three hours to complete the paper.***

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

4. ***The answers are not expected to be any country or jurisdiction specific. However, if Examples/illustrations are required for any answer, the country or jurisdiction from which they are drawn should be mentioned.***

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

6. ***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) i) Describe the following concepts from behavioural finance:

a) Myopic Loss Aversion
b) Prospect Theory
c) Estimating Probabilities. (3)

ii) With reference to bond portfolio management, describe three techniques for identifying a policy switch. (3)

iii) Describe the limitations of classical immunization theory. (2)

[8]

Q. 2) A fixed interest swap market denominated in £ (pounds) has a yield curve defined by the following interest rates (all rates are shown with annual compounding)

Term (years)	Zero Coupon Yield
1	3.8%
2	2.9%
3	2.7%
4	2.6%
5	2.5%

A financial institution called Banco has two interest rate swap contracts (A&B) with the same counterparty:

- Swap A is a standard 3 year annual fixed – floating swap, where Banco _receives 3.15% p.a fixed. The notional principal is £100m.
- Swap B is a forward starting fixed-floating swap commencing in 2 years time. Payments are exchanged for a further 3 years and Banco pays 2.6% fixed. The notional principal is £120m.

In both swaps, the payments are exchanged annually.

i) Calculate the total value of Banco's position in these swaps. (4)

A life insurance company has a block of in-payment index linked annuities. The insurer wishes to work exclusively with a AA- rated investment bank to hedge most of its asset and liability risks in this business. Therefore, the insurer plans to gradually enter a series of swap transactions with the bank over time.

ii)
a) Explain the circumstances when the insurer will have credit exposure on a particular swap. (1)

b) Explain suitable terms that the insurer may negotiate with the bank to mitigate credit risk in these transactions. (3)

[8]

Q. 3) a) Outline the main areas that need to be focused on by financial regulators. (5)

b) Explain corporate governance and its importance in current times. (3)

[8]

Q. 4) You are an independent investment consultant. The trustees of an India based superannuation scheme (DB) are concerned following a big decline in share prices on the Indian stock market. The scheme invests in the superannuation fund of an insurer. Half of the assets are invested in a traditional superannuation fund wherein the assets are valued at book value, but the other half of the assets are invested in a unit linked equity fund.

As per the scheme rules, the pension payable is final salary linked and annuities in payment are increased in line with a published inflation index. The current average age of the employees is around 35 years.

The trustees are concerned about the funding level of the scheme due to the fall in equity share prices. One of the trustees has proposed a switch from the unit linked equity fund to the unit linked fixed interest corporate bonds fund of the insurer.

The Board of Trustees wants you to:

a) comment on the trustee proposal to switch to UL corporate bonds fund and also on overall asset liability management position if the switch is made. (6)

b) list the main points to be considered if the proposal is accepted. (4)

[10]

Q. 5) A well reputed and well known company ABC that offers actuarial consulting is considering acquiring another company XYZ that offers similar services in order to increase the efficiency of operations of the combined entity. The financial particulars of ABC are:

Last financial year revenue	:	INR 1 billion
Current share price	:	INR 250
Market capitalization	:	INR 10 billions

Current market price of XYZ is INR 1000 and company has 11 millions of outstanding shares with last financial year revenue of INR 0.8 billion.

Outline the key points that ABC Board should deliberate before making a serious bid to acquire XYZ.

[7]

Q. 6) A life insurance company is based in Country X and writes business in that country only. It has recently invested some of its assets in a diversified portfolio of overseas investments. It now wishes to develop a programme to manage the currency risk in these exposures.

i) Describe the issues that the company needs to consider when developing this programme. (9)

The life insurance company wishes to substantially increase its equity allocation to overseas countries Y and Z. This will be financed by selling externally managed equities in country X of an equivalent value. Derivatives will not be used in the switch.

ii) Explain some of the practical problems which may be encountered when conducting the switch. (6)

[15]

Q. 7) You are an investment consultant and have been asked to design an index for private equity investments.

Describe the issues you will need to consider when designing a suitable index.

[4]

Q. 8) i) Explain how an increase in correlation of defaults affects the value of a Collateralized Debt Obligation (CDO) (2)

ii) A bank is planning to securitize part of its residential mortgage portfolio and package the cash-flows into mortgage backed securities (MBS). These securities will then be sold to investors.

Explain how the securitization may be structured to reduce prepayment risk for the investors. (2)

[4]

Q. 9) When the stock market closes on November 10, 2010, company Y makes a cash offer of Rs 11 a share for the outstanding stock in company X. The price represents a 25% premium over X's closing price on the previous day. Company Y plans to finance the acquisition using debt and wishes to complete the takeover within a few months.

During November 11 2010, stock in company X is heavily traded, the opening price is Rs10.25 and drifts upwards towards a closing price of Rs10.90. During the afternoon session, a particular hedge fund manager buys some stock in company X, using a combination of his own capital and a bank loan.

Describe how the hedge fund hopes to profit from this action, and describe the risks it will encounter in this strategy

[4]

Q. 10) i) List four principal uses of options. (2)

A life insurance company has a loan which it has to repay in 1 year. The final repayment moves exactly in line with the BSE SENSEX. Assume that the current level of the SENSEX is 17000.

ii)

a) Describe an option strategy that limits the insurer's liability on the loan to a 9% increase in the SENSEX. In addition, describe how the cost of this strategy can be financed by another suitable transaction designed to remove any upside potential. (3)

b) Describe another option strategy that limits the insurer's gain on the loan to a 20% decrease in the SENSEX (2)

The life insurance company also sells a 5 year single premium investment bond to policyholders. The policyholder payout is linked to the level of the FTSE 100 index (a UK index of leading shares). The final payout to the policyholder is the greater of a minimum guarantee, or the full increase in the FTSE 100 over the 5 years. The minimum guarantee on the bond is equal to 75% of the single premium accumulated at 2% interest over the policy term.

iii) Outline two methods involving derivatives which the insurer can use to hedge this benefit. (4)

You are an options trader. The price of ABC stock is Rs. 58, and you are convinced that the stock price will not move over the next 1 year. You are only allowed to trade the European Put Options on ABC listed below (all of which have a term of 1 year):

Strike Price	Option premium
Rs 65	Rs 11
Rs 60	Rs 8
Rs 49	Rs 3
Rs 45	Rs 1

iv)

a) Using options from the above list, describe an option strategy which:

- involves more than 1 option
- is consistent with your views on ABC
- maximises your profit if your views are proved correct,
- produces a non-negative payoff if the stock price falls below Rs 40.

Draw a diagram illustrating the payoff from your strategy at maturity, allowing for the effect of the option premiums. You may ignore any other transaction costs (3)

b) If the stock price finishes at Rs 59 in 1 year's time, calculate the extra return delivered from the option strategy compared to simply purchasing the stock. (1)

[15]

Q. 11) A life insurance company has substantial annuity business portfolio. Some of the annuities are linked to inflation (some directly linked to RPI and some linked to RPI with floors and caps) while some of the annuities increase at a fixed rate while in payment. The country in which it is domiciled places no restriction on investments, but prescribes adequate liabilities reserves and very prudent margins for investment risks. Based on the current estimates of longevity, the annuity payments are expected to last for 50 years.

The country runs a budget surplus and based on strong estimated GPD growth is expected to have budget surpluses for many years. Almost 50% of the country's GDP depends on exports and the country's central bank follows an aggressive monetary policy to provide incentive for exporters.

The country has a very active equity and debt market. International rating agencies have provided 'A' as the country's sovereign rating for international market, but central government bonds are considered as 'risk-free' in domestic market. The remaining tenure of the longest maturity fixed interest and index linked bond in the country is 25 years. The country also has a very well developed derivatives market.

You are the investment director of the company responsible for an effective asset liability matching (ALM) strategy.

1) List the assets you will be considering for investment purposes bearing in mind the need for a matching ALM strategy. (6)

2) Outline the risks for the insurer from the annuity book and how various asset classes help to mitigate those risks. (8)

3) Explain the challenges faced by you in producing an effective ALM strategy. (3)

[17]

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