INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

26th November, 2012

Subject SA6 – Investment

Time allowed: Three 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. **** 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 expected to be India Specific application for the syllabus and corresponding core reading. However, substantially the core reading material is still taken from material supplied by Actuarial Education Company which are meant for UK Fellowship examination. The core reading also contains some material which is India Specific, mostly the IRDA regulation. In view of this, it should be noted that focal point of answers is expected to be India Specific application. However if application specific to any other country is quoted in the answer the same should answer the question with reference to Indian environment.***

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

6. ***Mark allocations are shown in brackets.***

7. ***Please check if you have received complete Question Paper and no page is missing. If so, kindly get new set of Question Paper from the Invigilator.***

AT THE END OF THE EXAMINATION
Please return your answer book and this question paper to the supervisor separately.

Q.1) You work in the Investment department of a firm of Consulting Actuaries.

A) The capital market regulator of an immature emerging market country in South East Asia is considering how to promote its equity market and your company has won the mandate to provide the regulator with advice.

[i] Describe possible modern dealing and settlement systems giving examples from either India or United Kingdom and give examples of the type of dealing costs which may arise (12)

[ii] Describe how equity stock lending operates, and the risks associated with stock lending (6)

[iii] Describe the issues that an immature emerging market might encounter in developing a stock exchange (5)

[iv] Describe the advantages and disadvantages of allowing equities derivatives to be traded on a regulated exchange (3)

B) An international conglomerate has sought advice on whether or not to hedge its currency risk.

[i] Why would a company wish to hedge its currency risk exposure? (2)

[ii] What instruments could a company use to hedge currency risk? (1)

[iii] A colleague has commented “that for a company with currency risks not hedging means the company is a speculator”. Explain the comment (2)

C) A friend, based in USA, is thinking about investing in a retail commodity structured product and has asked your advice on the product (for purposes of this question you may ignore professional /legal responsibility considerations about whether you are authorised to give advice to individuals). The product under consideration is a two year product sold by an insurance company which invests in a basket of three commodities: gold, silver and wheat. There is a capital guarantee.

Let S(k,t) be the price of commodity k at time t, measured daily. For a policy sold at time 0, at maturity T, the payout is the capital guarantee plus a coupon based on the average over the 3 commodities k of S(k,T)/S(k,0) . However, if on any day during the life of the contract for a commodity k S(k,t)/S(k,0) >150% then S(k,T)/S(k,0) =7%. If a policy is surrendered then the market value at the last weekly valuation is paid out less a 4% surrender penalty.

[i] Explain how the insurance company might structure this product. (2)

[ii] Explain the suitability of this product to a retail investor (5)

[iii] Explain how the retail investor could take advantage of the surrender value (2)

[iv] Explain contango and backwardation in commodity futures and sketch a graph of future commodity price versus time to maturity illustrating these situations (2)

[v] Describe the economic function of commodity futures and give an example of a producer and a consumer who may wish to use commodity futures (4)

[vi] Describe the suitability of commodity futures for institutional investors (4)

[50]

Q.2) A large public sector bank has a trust which manages a defined benefit (DB) retirement pension scheme for its employees (DB scheme, with an actuarial valuation of liabilities).The company scheme is applicable to only those employees who stay in the organisation for 20 or more years. However the benefit should also be paid on death or critical illness before 20 years. Thus the scheme pays annual pension post retirement or resignation (after at least 20 years of service) or on death/critical illness. The quantum of pension is linked to the last drawn salary and the number of years of service.

The company trustees want to consult an actuary seeking his/her help in managing the scheme. The trustees inform you that the scheme does not have an appropriate investment policy. They also inform you that the scheme is currently underfunded wherein assets are valued Rs 500 crores. However the interest rate decline has led to the liabilities being valued at Rs 575 crores. The employees are relatively old with an average age of 47 years. Retirement age is 60 years. 80% of the total employees have completed 20 years and above. The current ratio of retired employees to the employees on payrolls is 2:5. The Bank has recently announced a Voluntary Retirement Scheme (VRS) wherein they will give additional Rs 5 lacs to employees who opt for the scheme, apart from protecting their retirement benefits. Many employees are contemplating participation in the scheme.

On the asset side it is informed that in the current portfolio the government securities (g-secs) comprise 60% of the portfolio, 20% of assets is in equities and 20% in 10 years corporate bond. The current regulations require at least 50% of the total assets to be invested in g-secs (irrespective of the duration of the g-secs available).

After meeting the trustees and understanding their requirements you set up a meeting with the Chief Investment Officer (CIO). The CIO explains that given the underfunded status of the scheme the investment team is contemplating sale of the assets invested in long term government securities (g-secs), since their value has appreciated and invest the sale proceeds in short term government securities. The CIO says he is quite confident that interest rate decline is a temporary phenomenon and the interest rates will again go up in the near future and that is the reason why he wants to park the money in short term g-secs so that when the interest rates again go up he can sell the short term instruments and re-invest into the long term g-secs. He also wants to shift a part of the portfolio from corporate bonds into equities to bolster the long term returns of the fund.

[i] [a] What are the major risks in creating and managing such retirement schemes? Are there any hedging mechanisms against such risks (4)

[b] What can be an alternative retirement scheme? (1)

[ii] The trustees have requested you to frame an investment policy stating clearly the goals and the constraints. The goals or investment objectives should be clear in terms of both risk tolerance and investment returns. It should be written with appropriate clarity to enable a professional investment manager to effectively manage the same and the trustees should be able to fully understand it and agree to it.

[a] What are the different investment constraints which should be considered while drafting any investment policy? (2)

[b] State the major differences in the return objectives, risk tolerance and/or investment constraints (liquidity, time horizon etc) of a DB scheme vis-a-vis a DC scheme? (5)

[c] Draft an appropriate investment policy highlighting the risk tolerance and investment return objectives of the above defined benefit scheme. (4)

[d] State all the investment constraints of the above defined benefit scheme given the current background (4)

[e] You are further required to advise on the investment strategy for the scheme. In general what are the important decisions which are required to be made while formulating an investment strategy? (2)

[f] As part of the asset allocation decision, the trustees want your view on whether equities should be part of the DB scheme asset portfolio. What would be your advice in this case? (2)

[g] On bonds the trustees have been contemplating whether they should take the credit risk by allowing investments in less than AAA rated securities. In this context explain what Credit VAR is and what are the difficulties in calculating the Credit VAR? (3)

[iii] [a] What is the risk in the approach suggested by the Chief Investment Officer (CIO) to switch to short term g-secs (2)

[b] What are the risks in switching from corporate bonds to higher percentage of equities and attempting to enhance returns in the context of an underfunded scheme? (2)

[iv] You have met the analysts in the investment team managing the funds and discussed whether the expected investment returns should be linked to systematic risk or total risk. The analysts have varied views. A section of the analysts is of the view that only systematic risk should be driving the risk premium whereas the other section believes that total risk [including financial risk, liquidity risk, business risk and country risk] is the relevant metric.

[a] What is the relation between the required investment returns and the real risk free rate? (2)

[b] What is the relationship between the expected return and systematic risk? What does the Capital Market Line (CML) postulate? (2)

[c] What does the change in the slope of the Security Market Line (SML) signify? What are the factors which can cause the SML to make a parallel shift? (4)

[d] The current risk free rate is 8% pa and the expected market return is 14% pa. A stock is selling at Rs 200 and is expected to go up to Rs 225 by the end of the year. The expected dividend on the stock is Rs 15. If the beta of the stock is 1.1 would you recommend investing in that stock? (2)

[v] The investment team is contemplating investments in high investment grade (AAA) Mortgage Backed Securities (MBS). They calculate the cash flow yield of the MBS which is nothing but the discount rate which makes the present value of the cash flows of the MBS equal to the price of the MBS. There are two (AAA rated) MBS securities which they are contemplating to buy. One of them is a MBS security where the underlying assets are residential mortgages offering a cash flow yield of 9.00% pa and the other MBS is one where the underlying assets are commercial mortgages offering a cash flow yield of 9.50% pa. There is another opportunity to invest in AA rated corporate bond which offers a redemption yield of 8.75% pa. Compared to these the government securities (G-secs) are offering a redemption yield of 8% pa. The investment team feels that they should take some exposure to the MBS.

[a] Compare the investment in MBS vis-a-vis the corporate bond highlighting the risks which the investment team needs to consider while investing in MBS vis-a-vis the corporate bond. (3)

[b] Why do you think the residential mortgages backed security offers lower yield than the commercial backed mortgage security though they carry the same credit rating? (2)

[vi] The investment team has a view that the current government will push for reforms and hence the equity markets may perform better in the future. The investment team is evaluating the following portfolio rebalancing strategies for the future. These strategies would be used to adjust the proportion of funds allocated between g-secs (long term) and equities.

- Buy and Hold Strategy
- Constant Proportion Portfolio Insurance
- Constant Mix

If the assumption is that the equities will continue to outperform in the near future, which of the above strategies is most appropriate and why? (2)

If there is a view that the reforms push will not be supported by the other parties in the parliament thus leading to lack of direction in the equity markets (it is likely to be highly volatile due to the uncertainties and may not move clearly in either direction) then which of the above 3 strategies would be most appropriate and why?. (2)

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