INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

17th May 2010

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.*

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

Q 1) You have been appointed as Secretary to the Investment Committee of a life insurance company. The terms of reference of the investment committee indicate that the committee has responsibility for overseeing the investment process of the committee to ensure that appropriate assets are selected to meet the company's liabilities in a risk controlled manner and in compliance with regulation but also to give top quartile performance return to policyholders.

The company has five lines of business:

i) Individual unit linked policies

ii) Immediate annuities, including escalating annuities

iii) Pure term insurance policies (no return of premium)

iv) Watermark unit linked product guaranteeing policyholders, at the end of ten years, the highest NAV in the first seven years

v) Universal life contract where the earned rate less a margin is credited to the policyholder, with a guaranteed minimum crediting rate of 2%pa.

As part of your role, you have been asked to prepare a number of papers to be presented to the investment committee

(a) Prepare an overview of the current Indian economy and financial markets. (5)

(b) The necessary regulatory changes have been made to allow outsourcing of fund management activities. The company has decided to consider such an approach and wish to issue a request for proposal to various fund managers. The company is considering outsourcing both equity and bond fund management, though discussions are independent. Set out the procedure you would recommend to the investment committee for selecting and appointing a fund manager. (12)

(c) The investment committee has asked you to explain the following terms

- Growth investment style
- Value investment style
- Momentum investment style
- Contrarian investment style
- Rotational investment style
- Top –down approach
- Bottom –up approach
- Passive investing (tracker)

Write brief notes to explain each of these terms (8)

(d) The investment committee has asked you to produce a summary report on the in-house investment mandate compliance and violations. List the compliance reports you would review to produce your summary report. (6)

(e) The investment committee has also asked for an Asset Liability Management (ALM) report on the assets and liabilities of the life office.

i) Explain what is meant by ALM (2)

ii) How you would implement an ALM approach (4)

iii) How will you apply the ALM for each of the life office's lines of business ? (7)

(f) The RBI/Finance Ministry has issued a joint consultation paper proposing to issue long term index linked government securities and asking for responses from the banking, insurance & financial services sector . Draft a response on behalf of your company setting out the features of an index linked government security and the advantages and disadvantages to the company of the government issuing such a security.

(6 marks including 1 for drafting)

[50]

Q2) You work in the investment team of an insurance company as an Investment Actuary. The company has a significant portfolio of Unit Linked Insurance Policies (ULIPs) providing various fund options. The company is trying to compete by providing higher return performance through better investment strategies (both long term and short term). The company is constantly trying to understand the investment opportunities in Indian Equities and Debt markets and available derivatives to make the best out of such opportunities.

You're presented with various issues which the investment team likes to consult with you before taking a decision.

The company has a traditional group retirement portfolio (consisting of gratuity and superannuation funds) of employees in various companies. This being a traditional portfolio, the company invests the same as per IRDA regulations. The company management has decided to invest some amount of the portfolio in equities so as to enhance the returns on the portfolio and be more competitive. There is an argument in favour of equities citing that the equity risk premium in India has been historically around 6.5 % and is likely to be maintained. You feel that the equity risk premium, which is the extra return expected over the debt returns, is likely to come down in future and a very high equity exposure may not be warranted. As an investment actuary you have suggested that the expectations of the customers from this portfolio is to have a smoothed return and equity component will create volatility, hence the equity component needs to capped. You're comfortable with a maximum of 20% of equity exposure which is well within the maximum allowed by IRDA but you've suggested that the range of equity in the group retirement portfolio should be varied between 2% to 20% to give appropriate equity exposure depending on the market expectations.

You've been thinking as to what should be the main criterion to change the equity proportion from 2% to 20% trying to optimise the value. You have found that Indian markets have been moving in a P/E ratio range of 11 -25 and have suggested that if the P/E ratio drops to 12 then the investment should be 20% into equities and when it is 24 it should be reduced to 2% and a table based on P/E like one given below may be used (the relevant column for Group Retirement portfolio needs to be considered for the same).

Your company also does a significantly large business through Unit Linked products sold to Individual policyholders through agents and bank channel. Amongst many funds offered to your policyholders one is an Index Fund based on Nifty Index and another is a money market fund.

Your company is contemplating offer a new "fund of fund" option to policyholders purchasing Individual life policies. In such "fund of fund" option the policyholder's money would partly be invested in Index Fund and partly in the Money Market Fund depending on the P/E ratio of the Equity Index. The Index Fund exposure at different levels of P/E is given below. Please read the column relevant for the Individual business from the table based on P/E as given below.

P/E Ratio	Recommended Equity Exposure for Group Business	Recommended Equity Exposure for Individual Business
24 and above	2%	2%
22	5%	18%
20	8%	34%
18	11%	50%
16	14%	66%
14	17%	82%
12 and below	20%	98%

1)

a) Over the last 10 years, assuming a dividend yield of 2.2%, inflation rate of 6.2% , EPS growth rate (real terms) to be 4.0%, the 10 year government securities (g-sec) yields to be 8.1% (nominal yield) calculate the Equity Risk premium in Indian markets. (2)

b) However if you're told that the P/E ratio has improved over the last 10 years such that the new P/E valuation (repricing) has contributed another 1.2% to the Expected Equity return. Calculate the Equity Risk Premium after allowing for the new information. (2)

c) If you're also told that some companies have used the profits to repurchase their shares. Had the repurchase not happened the dividend yield would change by 0.5%. What would be the Expected Equity return and the Equity Risk Premium after factoring both the additional information together i.e. the P/E repricing in (b) above and the repurchase of shares? Apart from the impact on dividend yield, assume no other effect of repurchase decision on the Expected return or market price. (2)

d) In future it is expected that there will be more transparency in reporting statements due to IFRS norms being followed by all the companies and equity markets will have less specific risks for investors due to high level of diversification by ULIP and Mutual Fund schemes. Under such conditions what would be the impact on the Equity Risk Premium? (2)

2) Equity Derivatives are not allowed for insurance companies though the regulator has been seriously contemplating to allow such instruments for hedging purposes. Currently the debt derivatives are allowed to be used for hedging purposes and Interest rate futures are traded on stock exchanges. Though the derivative is known as Interest rate futures the contracts are essentially bond futures. The details of the Interest rate futures contract are given below.

Minimum Lot Size and Tick Size	2000 bonds of face value Rs 100. Thus Rs 200,000 per contract is the minimum lot size. The underlying bonds are 10 year notional bonds with coupon payment of 7%. The stock exchanges allow a minimum price change of Rs 0.0025 on the face value i.e. Rs 5 on one contract.
Contract Duration / Contract Cycle	Duration can be from one month to one year and there are four contract expiry dates which are the last business days in the month of March, June, September and December The last trading day would be two business days before the expiry date.
Trading and Settlement	Trading is allowed on all working / business days (Monday to Friday) from 9.00 am to 5.00 pm. Mark to market settlement happens on a daily basis and physical delivery based settlement can be done on any day in the expiry month. The positions taken in futures contract can be squared off till the last trading day. For all open position the delivery is to be made and / or received on the expiry date.
Closing Price	It is the volume weighted average price of trades in the closing hours of each day. If sufficient trades are not executed then a theoretical price based on the price of the basket of deliverable bonds is given by the exchange
Physical Delivery of Bonds	A set of bonds are identified for delivery in lieu of the notional bond. The seller can choose between the bonds identified for delivery. The bonds which are identified must be government securities maturing after 7.5 years and before 15 years and the value of outstanding bonds should be Rs 10000 crores. The seller may choose the bonds which he wants to deliver from amongst the set of bonds identified.
Accrued Interest Convention	30/360 European style for the bonds. Thus each month is considered to be 30 days and the year as 360 days.

You are also given the details of the index futures contract on NIFTY Index futures (Large-cap) and Nifty mid-cap futures as below:

Information on Futures (Expiry after 1 month)	Large Cap Futures	Mid Cap Futures
Name / Symbol	NIFTY Futures	NFTYMCAP 50
Underlying	Underlying is large cap stocks in the NIFTY Index	Underlying mid-cap stocks where market capitalisation varies from 1000 crores to 5000 crores
Beta of the Futures	1.1	1.3
Lot size	50	300
Current Futures Price	5075	2550
Value of the underlying	5070	2625

(a) You feel the transaction cost of changing the equity proportions frequently based on P/E ratios might be very high given the market volatility in India. You may have an instance when P/E ratio drops temporarily and then goes up again involving two transactions wherein we may buy Equity (when P/E ratio drops) and sell it in a short period of time (when the P/E ratio goes up once again).

Assume that you are allowed to change Equity exposures by using Index Futures and you want to use the same to reduce the transaction cost for temporary adjustments in Equity proportions due to change in P/E ratios. The lot size of one Nifty Index Futures contract is 50. Your group retirement portfolio comprises of large cap shares only picked from the Index. The size of the Equity portfolio is 220 crores and the overall portfolio is 2000 crores. The P/E ratio has moved down from 18 to 16 but you feel it is temporary and is likely to go back to 18.

The average beta of the Equity portfolio held is 1.05 and the beta of the index futures is 1.1. The modified duration of the bond portfolio is 7.8 years, for cash the duration is 3 months (0.25 years) and the modified duration of bond futures is 7.2 years. You are also given that the yield beta for the interest rate futures contract is 1.

i) What would be your strategy using Nifty Index Futures and the bond futures as given in the tables above. (5)

ii) Explain what is mean by yield beta. (2)

(b) You want to increase exposure to mid-cap stocks in the group retirement portfolio using the futures market and have been provided the following information. You want to shift 80 crores worth of Large-Cap Equity position to Mid-cap. Currently you do not hold any mid cap shares in the portfolio. The beta of mid-cap stocks is 1.25. The average beta of your portfolio is 1.05. Explain how you can increase the mid-cap exposure using the Large-cap and mid-cap futures as given in table above. (5)

(c) For the Individual policyholders the dynamic fund of fund offering shows high medium and long term historical performance vis-a-vis Index Fund. Please see the table given below:

Period	P/E based fund of funds performance (annualised return)	Index Fund performance (annualised return)
Last 3 years	12%	9%
Last 5 years	21%	20%
Last 7 years	28%	26%
Last 10 years	14%	13%

Can you identify a situation when the P/E based fund would underperform the Index (2)

(d) What do you mean by Index tracking error? Why is an Index fund expected to underperform the returns delivered by the total returns index? (3)

(e) In the money market fund, your portfolio invests in both call money market and repo market. Explain the difference between the two markets. (3)

(f) You are facing difficulty on the Asset liability Management side in the annuity portfolio of the company, though the size of the portfolio is small at Rs 50 crores. The liabilities in the annuity portfolio are of very large duration since annuities are allowed to vest at an early age of 40 years and expected life span of annuitants is around 85 years. The bonds which are available for investment do not have tenures of more than 20 years. You are contemplating to make the best use of the flexibility provided by futures market. Please refer to the details of interest rate futures contract given in the table at the beginning of the question.

i) Why do you think we have notional bond as the underlying for Interest Rate futures? (3)

ii) What do you understand by the phrase by “Cheapest to deliver bonds”? Assume that the futures settlement price is 92.Consider the following table for the quoted spot prices for different bonds at settlement and the corresponding conversion factors.

Quoted Spot Price	Conversion Factor
95.70	1.01
97.20	1.03
99.20	1.05

Calculate which would be the cheapest bond to deliver. (4)

iii) You have closely tracking the movements in the cash and futures markets and you notice that at one point of time the notional futures contract with face value of Rs100 is currently quoting at Rs 98 and the spot price for a deliverable bond with coupon of 7.5% is at Rs 101. You also observed that the remaining time till to settlement of the futures contract is 45 days and the conversion factor for the 7.5% coupon bond is 1.04. If the money market rate of interest is 4.5% then determine the cost of carry for the futures contract. You are also required to find out if there is any arbitrage opportunity between cash and futures market. (5)

(g) The Life council of India is preparing a case for allowing Life Insurance companies to participate in Exchange traded Equity derivatives market.

i) If you are asked to give suggestions to make the case for allowing derivatives stronger what would you like to highlight as the benefits of using Equity derivatives? (5)

ii) Why do you think only exchange traded derivatives have been recommended? (2)

iii) What are the main risks which you may like to highlight for exchange traded derivatives? (3)

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