

# INSTITUTE OF ACTUARIES OF INDIA

## EXAMINATIONS

29<sup>th</sup> May 2014

**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 you are required 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.*
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)**
- i) For valuation of a pension scheme involving current ‘beneficiaries’ and current ‘active members’ what are the two different approaches that can be taken for holding the funds against liability. (2)
- ii) Why do you need special regulations for pension funds and also describe why it is impossible to diversify one’s pension arrangements. (4)
- iii) A pension scheme’s financial balances are as follows.

Particulars	Financial Year 2013
Investment income	3,554
Change in MV of equity investments	2,500
Administrative expenses	267
Other income of the scheme	385
Contribution received	4,041
Transfer in	378
Benefits Payable	6,954
Leavers	7,452
Change in MV of debt investments	13,006
Other Payments from scheme	255
Brokerage on equity	250
Fund balance as on beginning of 2013	89,474
External investment advisers remuneration paid	1,250

Prepare the following statements for the scheme

- a) Return on investments for the year 2013 (2)
- b) Fund statement for the year 2013 (2)
- c) Fund value at the start and end of the year 2013. (1)

**[11]**

**Q. 2)** During a recent presentation to a committee of pension scheme trustees, an investment consultant used deflators to analyse which of a range of investment strategies offered the best “value” for the pension scheme.

- i) Explain why, following an ALM study, it can often be difficult to make a judgement between the possible outcomes under different investment strategies. (3)
- ii) Explain the advantages of using deflators compared to using discounted cash flow techniques for helping to make this judgement. (5)

**[8]**

- Q. 3)** A small country Chinee (with currency Chi) has only three sectors represented in overall stock market index. Each of the sectors performance is analysed through respective sector specific index. Their relative weights and performance over a quarter is as follows.

	<b>Index %</b>	<b>Index-1<sup>st</sup> January</b>	<b>Index-1<sup>st</sup> April</b>
IT	65%	6,400	6,900
Financial	26%	3,200	3,400
Infra	9%	1,600	1,750

An overseas institutional investor which invests in the country has employed Ms. Jason Patel as fund manager who has history of outperforming the stock market consistently. Though the trustee recommends a mix of investment in the three indices, Ms. Jason Patel has liberty to vary the mix and also to actively manage stocks within the sector also to give superlative returns and justify the hype and salary against her name.

	<b>Trustee's-Mix</b>	<b>Actual Mix</b>	<b>Actual return</b>
IT	60%	77.5%	7.10%
Financial	20%	20.0%	5.90%
Infra	20%	2.5%	8.50%

At the beginning of the period the fund invested was 250 Million Chi and on 15<sup>th</sup> February, fund has additional contribution of 10 Million Chi which is invested in IT index. Actual return is expressed per quarter.

Assume uniform investment returns for all the three indices over the period. Ignore dividends and taxes.

- i) Estimate the fund value at the end of period. Also estimate the money weighted rate of return and linked rate of return during the period for the year, similarly also calculate the overall index returns. (6)
- ii) Allocate the difference between the fund's performance and overall index which is attributable to:
  - a) Actual index makeup and trustees recommended mix, assuming that all money is invested in the same mix as original (3)
  - b) Fund managers variation from the benchmark performance in terms of index selection (3)
  - c) Fund manager's sector selection abilities (2)
- iii) Comment on results. What additional information that may be required before finalising the view on the fund managers strategy and skills. (9)
- iv) What are the two major behavioural biases that the fund manager should guard herself against? (2)

[25]

- Q. 4)** Portie is the stock index of Antonia. Antonia has a healthy mix of public sector and private sector undertakings in the listed space. Private sector undertakings have significant shareholding by the promoter families and PSUs are promoted by the government. The following are its constituents with weights in accordance to the free float market capitalization. The current level of the index is 6,500.

Company	Share Capital (Cr)	Face Value	Promoter Stake	Current Market price
<b>A</b>	39.94	2.00	39.92%	2016
<b>B</b>	4,277.76	5.00	69.23%	323
<b>C</b>	601.14	10.00	68.43%	488
<b>D</b>	684.03	10.00	58.60%	1694
<b>E</b>	139.37	2.00	61.75%	1445

The following adjustments need to be effected in one go.

Company	Action
<b>A</b>	Company buys back 5% of shares outstanding at a price of 2500 per share through a tender route. Promoters did not take part in the buyback.
<b>B</b>	A public sector undertaking – company declared a one-time special dividend of 50 per share to help the government bridge its fiscal deficit.
<b>C</b>	Another public sector undertaking where the government sells 10% of its stake to the public at a rate of 450 per share to meet its disinvestment target.
<b>D</b>	All shareholders subscribe proportionately to a 1 for 10 rights issue at 1000 per share
<b>E</b>	Promoters make a preferential allotment of 6 Cr shares to themselves at 750 per share

- i) What will be the value of the index immediately after effecting all these changes? Explain. (3)
- ii) On the next day of trading after effecting all the changes the following is change in the adjusted stock price

Company	Change in price %
<b>A</b>	2.0%
<b>B</b>	2.0%
<b>C</b>	3.0%
<b>D</b>	-5.0%
<b>E</b>	5.0%

Calculate the new level of index. (Ignore taxes and assume that all the above transactions are approved by the regulator instantaneously and effective immediately). (17)

[20]

- Q. 5)** i) Define the term Value at Risk (VaR) (2)
- ii) What are the limitations of using VaR as a risk measure (5)
- iii) A portfolio has the following stocks

Name	No. Of shares	Current Price per share	Annualised Std. Deviation
<b>A</b>	1200	234	20%
<b>B</b>	1350	178	18%

The correlation coefficient between A and B is 0.80

Find the daily VaR of the portfolio at a confidence level of 95%. (4)

- iv) The fund has received fresh inflows and the company is evaluating an additional investment to buy 1800 shares of company C which has an annualised std. deviation of 14% at a price of 136 per share. If this transaction happens what will be the daily VaR and comment on the results. The correlation coefficients are as follows:

	A	B	C
A	1.00	0.80	0.70
B		1.00	0.60
C			1.00

- v) Will your answer to question (5.4) above change if the investment in C is made out of borrowed funds carrying a rate of interest of 12% per annum? Explain. (3)

Make appropriate assumptions wherever needed and state them clearly.

[20]

- Q. 6)** What are the disadvantages of using Price to Book Value as valuation metric? [6]

- Q. 7)** You are the Appointed Actuary (with an investment background) of a General Insurance Company which writes Health, Liability and Fire policies. The CFO of the company has presented a note to the Senior Management that the Liability policies are loss making and the company should consider going slow on this line of business. The snapshot of their latest financial statement is as follows:

In INR Crores	Health	Liability	Fire	Total
<b>Earned Premium</b>	1000	500	500	2000
<b>Incurred Claim</b>	900	500	450	1850
<b>Commission</b>	50	25	25	100
<b>Technical Reserves</b>	100	850	150	1100

The operating expenses are 150 Crores and investment yield is 10% pre tax. The CFO has apportioned the expenses and investment income on the basis of earned premium. The CEO has sought your opinion on the workings. Prepare a report for your CEO. Also explain what kind of asset classes you will consider for each line of business.

[10]

\*\*\*\*\*