INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

12th September 2018

Subject ST5 – Finance and Investment A

Time allowed: Three Hours (10.15* – 13.30 Hours)

Total Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. ***Please read the instructions inside the cover 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 have then three hours to complete the paper.***
3. ***You must not start writing your answers in the answer sheet unless 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 a new set of Question paper from the Invigilator.***

AT THE END OF THE EXAMINATION

Please return your answer booklet and this question paper to the supervisor separately. You are not allowed to carry the question paper in any form with you.

Q. 1) **i)** Explain forward guidance. (3)

ii) Give a real life example of forward guidance. (1)

iii) Why is forward guidance used and who is it useful to? (4)

[8]

Q. 2) In a large emerging economy with widespread geography, there are about 20 public sector banks (PSBs). The larger PSBs have nationwide presence while smaller ones focus on regional areas. Most of these banks are laden with the problem of increasing NPAs (Non-Performing Assets) - bad loans.

The high level of NPAs of PSBs is attributable to the general business cycle—the downswing in economic climate following the boom years of 2007–08. PSBs are accused of lending to the infrastructure sector without building proper risk assessment and project monitoring capabilities. A large chunk of NPAs at PSBs relate to projects that have remained incomplete for several extraneous reasons, such as problems in land acquisition and environmental clearances.

Several PSBs are not in a position to do fresh lending as their net worth eroded due to NPAs. Moreover, Central bank regulations on capital adequacy, in line with global norms, are restricting their ability to lend. Many PSBs are not generating any shareholder value threatening their own survival.

For the past few years, the Government had employed PSBs, with an objective of financial inclusion, in implementation of many social welfare schemes.

The Government plans to partly recapitalize PSBs as a temporary fix. Within a couple of years, it is imperative for the Government to merge PSBs to create 4 - 5 strong big banks.

i) Discuss whether merger of PSBs will help in solving current banking crisis. List and discuss Advantages, disadvantages with final recommendations with reasons. (12)

ii) Discuss any challenges in the merger of PSBs. (3)

Recently, in one of the PSBs, called NP bank, a fraud came to light. In one of the NP bank branch, more than 1,000 fraudulent Letters of Undertaking (LOUs) of aggregate amount 140 billion was issued to an importing firm, making NP bank liable to pay the amount. Based on a complaint by NP bank, immediately after the fraud became known, by the next day, the Government agencies confiscated assets of fraudsters for an amount of 60 billion and it was given to NP bank. Next day, as per recapitalization plan, the Government infuses an amount of 30 billion in to NP bank.

NP bank details just before the fraud came to light:

Share price	150
P/E ratio	25
Government shareholding	60%
Number of shares outstanding	2 billions

iii) What is a letter of undertaking (LOU)? (1)

iv) Calculate the theoretical share price of NP bank just after the fraud becomes known assuming 140 billion losses. (1)

v) Calculate the theoretical share price of NP bank just after owning confiscated assets worth 60 billion. (1)

vi) Calculate the Government shareholding (in %) in NP bank post recapitalization. List the assumption made if any. (2)

[20]

Q. 3) **i)** An investor is comparing two possible investment strategies at start of the day on the date of expiry of futures and options on an equity index at current level of 11,000.

Strategy A
Short an Index future.
Short a European put at strike price 10,900 (option premium = 15).
Long two European put at strike price 10,700 (option premium = 5).
Long a European call at strike price 11,300 (option premium = 10).

Strategy B
Short a European call at strike price 10,900 (option premium = 120).
Long a European call at strike price 10,950 (option premium = 80).
Long a European put at strike price 11,050 (option premium = 70).
Short a European put at strike price 11,100 (option premium = 110).

Assume that:

- Basis of the future is zero
- Contract (Market lot) size is 75 units.

The investor plots a chart for each of the strategies that show the value of the portfolio against the settlement price of the index (over a range 10,500 – 11,500).

Any point (X, Y) = (Index level; Portfolio value) is considered as a key point if the point is an end-point or a turning (kink) point or a break-even point.

The investor observed six key points on chart of Strategy A and eight key points on chart of Strategy B.

Determine all the key points on the chart of Strategy A and Strategy B.
(You are not expected to draw charts). (8)

ii) Suggest why the investor might choose the above strategies for the day. (2)

iii) A second investor, intending to deal in an un-margined forward rate agreement, speculates on the direction of interest rates over the coming two years. She has obtained the following table of short-term interest rate futures (STIRF) quotes:

STIRF Contract	Quotation
3-month contract	94.4
6-month contract	94.2
9-month contract	94.0
12-month contract	93.8

15-month contract	93.4
18-month contract	93.0
21-month contract	92.6
24-month contract	92.2

Volatility of short interest rates: $\sigma = 0.04$

Calculate the quarterly compounded forward rate for the 90-day period from 12 months to 15 months from now. (4)

[14]

Q. 4) Discuss the factors that you should consider when analyzing the outlook for shares in a firm that provides road transportation services. **[8]**

Q. 5) **i)** Define Systematic Risk (2)

ii) Discuss Synthetic Portfolio management. (10)

[12]

Q. 6) **i)** A friend of yours has requested for your help in selecting between the equity fund of two life insurance Companies. He has collated the NAVs of these funds and the market equity index return.

Date	NAV of Equity fund of ABC	NAV of Equity fund of XYZ
31-Mar-11	14.00	42.00
31-Mar-12	14.71	43.25
31-Mar-13	15.88	45.41
31-Mar-14	16.93	49.28
31-Mar-15	15.35	53.07
31-Mar-16	15.81	49.85
31-Mar-17	16.15	54.28
31-Mar-18	17.69	56.89

The market equity index return is given below:

Financial Year	Market Equity Index return (%)
2010-11	7.20
2011-12	2.43
2012-13	1.18
2013-14	1.27
2014-15	1.55
2015-16	2.44
2016-17	2.38
2017-18	1.78

Calculate the information ratio for both Companies. (6)

ii) Comment on your results. (4)

iii) Describe the significance of Information ratio in comparing performance of funds. (4)

[14]

Q. 7) XYZ is a pension fund managing defined benefit pensions. Its benchmark is to invest 70% in bonds tracking a "Bond" Index and 30% in residential properties tracking a “Residential Properties” Index, with rebalancing of asset classes at the end of each Financial year (FY).

The fund manager believes that return on residential properties would remain stagnant whereas there is significant growth potential in commercial properties. Accordingly, she invests 75% of the INR 2000 crore fund into bonds and the remaining INR 500 crore into commercial properties. Any income (rents and coupons) of the fund is invested immediately as they are received in the respective sectors. New contribution is invested in the 75:25 proportion and the fund is rebalanced at the end of each FY. You have the following data:

FY	Fund Value (in INR crore) at the start of Financial Year (FY)		Net New contribution in the middle of FY
	Bonds	Commercial properties	
2015-16	1,500	500	240
2016-17	1,823	613	-160
2017-18	1,853	644	400

FY	Annual Benchmarks returns		
	Bonds	Residential Properties	Commercial properties
2015-16	5.00%	5.10%	8.00%
2016-17	5.20%	4.50%	9.00%
2017-18	6.00%	5.00%	8.20%

As on 31/03/2018, the fund value in Bonds is INR 2,357 crore and in Commercial Properties is INR 883 Crore.

i) Calculate the excess return over benchmark for all the FYs and in aggregate attributable to the following:
a) Sector selection (Bond vs. Properties),
b) Commercial Properties vs. Residential Properties
c) Stock selection (12)

ii) Comment on the fund manager’s performance. (6)

iii) Explain how an ALM exercise can be carried out to help the XYZ pension fund in deciding investment strategy. (6)

[24]

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