EXAMINATION

10 November 2017 (am)

Subject F105 — Finance and Investment Fellowship Principles

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1.   Use the instructions and password provided at the examination center to log in.

2.   Submit your answers in Word format only using the template provided. You MAY NOT use any other computer program (e.g. Excel) during the examination.

3.   Save your work regularly throughout the examination on the supplied computer's hard drive.

4.   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.

5.   You must not start typing your answers until instructed to do so by the supervisor.

6.   Mark allocations are shown in brackets on exam papers.

7.   Attempt all nine (9) questions, beginning your answer to each question <u>on a new page</u>.

8.   Candidates should show calculations where this is appropriate.

Note: The Actuarial Society of South Africa will not be held responsible for loss of data where candidates have not followed instructions as set out above.

AT THE END OF THE EXAMINATION

Save your answers on the hard drive AND hand in this question paper.

> *In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.*

QUESTION 1

    i.   State the principal aims of financial market regulation.

[2]

Income earners of a developing country have traditionally protected their dependants against loss of income due to their death by contributing a percentage of their salary to an informal community fund, managed and administered by a respected member of the community. These funds are not regulated in any way. Due to the importance and size of this industry, the government has proposed that some form of regulation is needed, and it has proposed that this industry adopt a voluntary code of conduct.

    ii.   Outline the areas that could be covered by such a code.

[5]
[Total 7]

QUESTION 2

    i.   For each of the industry characteristics below, provide one example, with a brief explanation, of an industry that displays that particular characteristic:

        (a) Labour intensive
        (b) Monopolistic
        (c) Highly competitive
        (d) Exposed to regulation

[4]

After a period of high inflation and high short-term interest rates, an investor is of the opinion that inflation is about to be brought under control and that a period of lower interest rates and increased economic growth may lie ahead.

    ii.   Discuss which industries and sub-sectors the investor should invest in to express her investment view.

[4]
[Total 8]

QUESTION 3

An insurance company is in the process of developing an investment product for defined contribution pension funds. The product will allocate annual non-negative bonus rates based on the inflation rate plus a constant X%. The constant X% has been chosen such that it is not expected to change over time, and the company expects its underlying investment returns to exceed the bonus rate over long periods. Investment surpluses or deficits will be for the shareholder account.

PLEASE TURN OVER

You have been tasked with developing an investment strategy for this product and decide to construct a stochastic asset liability model (ALM).

i. Outline the two key investment objectives of this product for the insurer, and discuss why they are in conflict.

[3]

ii. Give an example of a well-defined investment objective function for the ALM of this product.

[1]

The insurer decides to set up and maintain a mismatch reserve for the product.

iii. List two reasons for maintaining such a reserve.

[2]

iv. Describe how the ALM can be used to determine the level of the reserve, given a fixed level of X%.

[5]
[Total 11]

QUESTION 4

The Securities Exchange in a developing country recently published the following indices. Their All Equities Index covers large-, medium- and small-cap shares and the All Bond Index covers the 20 largest bond instruments by market capitalisation:

	31/12/2015	30/06/2016	31/12/2016
All Equity Capital Index	1,435.1	1,503.6	1,528.3
Ex-dividend (XD) adjustment	41.4	20.9	47.3
All Bond capital Index	95.43	95.94	96.55
All Bond accrued interest (ACC)	0.19	0.11	0.24
All Bond ex-div (XD) adjustment	8.14	4.27	8.59

Local residents are subject to tax at rates of 20% on dividends and 30% on income, both deducted at source.

i. Write down the general formulae, for both equities and bonds, that link the Net Total Return Index from one time-point to the next.

[2]

ii. Calculate net total returns for All Equity and All Bond indices for 2016.

[6]

PLEASE TURN OVER

ABC Investment Company offers both equity and bond index-tracker funds to local investors.

iii.   Outline why the tracker fund returns for 2016 might differ from the net returns calculated in part (ii).

[4]
[Total 12]

QUESTION 5

i.   Define "behavioural finance".

[1]

A well-established defined contribution pension scheme for employees of a financial services company offers its members a choice between a wide range of actively-managed funds for the investment of their retirement savings. Default investment funds per age group are also in place for members that do not wish to make fund choices. Members may change their investment choices once a year. The scheme issues annual benefit statements to its members that show the value and growth of the member's accumulated fund value, the fund value projected to retirement date based on expected fund returns, targeted retirement benefits based on projected earnings at retirement, and annualised historic returns and volatilities for all the funds available to members. Newly-appointed trustees have replaced outgoing trustees, and the new trustees have identified a number of concerns relating to the choices made by some scheme members, including:

(a)   Member A is within 5 years of retirement and his latest annual statement shows that the projected fund value is unlikely to meet targeted benefits at retirement. Subsequently to receiving his statement the member switched his fund investments from the default fund (for his age group) to a high-equity fund.

(b)   Member B is 35 years old and recently chose a cash fund, despite the lowest historic returns experienced from cash and the long period to retirement.

(c)   In a recent survey of members' preferences, Member C indicated that she would not make use of passively-managed funds if introduced, despite the lower fees associated with these funds.

ii.   Explain the types of behaviour biases exhibited by scheme members in each of the above situations.

[9]

The fund manager of one of the funds has underperformed his benchmark for each of the last seven years, however the previous trustees voted not to replace the fund manager.

iii.   Explain the types of behaviour biases exhibited by the prior scheme trustees in the above situation.

[3]
[Total 13]

PLEASE TURN OVER

QUESTION 6

An iron ore mining company, Ironstar Limited (Ironstar) recently decided to take out a loan to fund the construction of a new distribution centre. They obtained a floating rate note with annual interest payments due at the end of each year based on the Johannesburg Interbank Average Rate (JIBAR) at the start of the year.

Analysts have since advised management of a potential increase in the yield curve. Ironstar management, being particularly risk averse, have decided to enter into an interest rate cap arrangement to protect the company against possible future interest rate increases.

The interest rate cap was purchased on 1 January 2017 to provide cover over the remaining two years of the loan, capping interest rate payments at 5% of the nominal value of the loan.

  i.   Treating each payoff as an option on the JIBAR, value the interest rate cap arrangement on 1 January 2017 using the following information:

       Nominal value of the floating rate loan: R500m
       1 year JIBAR annual effective spot rate: 5%
       2 year JIBAR annual effective spot rate: 6%
       Interest rate volatility: 20% p.a.

[5]

Ironstar primarily operates in SA and is thinking of expanding its customer base to clients in the USA. This would involve selling iron ore in exchange for US dollars (USD) typically in the form of annual payments.

  ii.   Outline derivative strategies that the company may use to hedge against a deterioration in the value of the USD relative to the Rand.

[3]

  iii.   Comment on the appropriateness of Over-the-Counter (OTC) versus exchange traded contracts for the company.

[2]
[Total 10]

QUESTION 7

Alfa Investment House is in the process of developing an alternative investments fund. The mandate of this fund will be to identify and invest in infrastructure projects that should have a positive developmental impact on the country and that are profitable for its investors.

A valuation model for the assets of this fund needs to be developed and a multifactor model is being proposed.

i. Compare absolute and relative approaches for the valuation of assets, and explain which approach a multifactor model would be classified as.

[4]

ii. Identify some of the problems likely to be encountered in using a multifactor model to value infrastructure projects.

[5]
[Total 9]

QUESTION 8

Super Life Insurance Company (SLIC) is developing an endowment policy which aims to generate investment returns for policyholders that are in line with the returns on the JSE All Share Index (ALSI).

The company is considering using an independently-managed investment fund, in addition to its own internal investment team, for the investment of the assets backing the endowments. You were able to source the following information regarding the performance of two independently-managed investment funds being considered, as well as the ALSI over the last 10 years:

	Mean returns	Standard Deviation of returns	Covariance to Index
Oakmont Investments	9%	5%	0.45%
Infinity Investments	13%	20%	2.7%
ALSI	10%	15%	

The risk free rate can be assumed to be 7%.

i. Calculate four different risk adjusted performance measures for each fund.

[4]

ii. Discuss briefly which of the two investment funds SLIC should choose to invest in on the basis of the mean, standard deviation and risk adjusted measures calculated above.

[4]

iii. State any limitations of your analysis above that you would highlight to management.

[2]
[Total 10]

PLEASE TURN OVER

QUESTION 9

    i.   In the context of bond portfolio management, explain the difference between anomaly switching and policy switching.

[2]

    ii.   Describe three techniques that can be used to identify bond anomaly switching opportunities.

[5]

A major metropolitan municipality in a developing country has announced that it will issue a large tranche of "green" bonds. Green bonds are common in developed international markets and are issued by governments, municipalities and companies to finance projects that have positive environmental and/or climate benefits. As an incentive to all investors, income and capital gains from these bonds are not taxable.

You are an investment advisor to a medium-sized pension fund that has recently adopted socially responsible investment (SRI) principles as part of its investment policy. The trustees have decided to allocate a percentage of fund assets to "green" bonds, and they have asked you to advise them on whether to participate in the municipality's "green" bond issue.

    iii.   Discuss the issues you would address in your response.

[7]

The trustees decide to invest in the "green" bond despite some concerns about the financial status of the municipality and the success of the green project underlying the bonds. You suggest that they consider credit insurance against the bond, such as a credit default swap (CDS) purchased from a bank.

    iv.   Describe how a CDS would operate in this case.

[6]
[Total 20]

END OF PAPER