EXAMINATION

29 October 2019 (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.

7.   Attempt all eight (8) questions, beginning your answer to each question <u>on a new page</u>.

8.   Show calculations where this is appropriate.

9.   If answer booklets are used for any question(s) start each question <u>IN A SEPARATE ANSWER BOOKLET</u>, entering all candidate and examination details on EACH.

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.   List four financial risks that an institutional investor in corporate bonds is exposed to.

[2]

A financial institution wishes to invest a large amount in order to meet a fixed local-currency liability falling due sometime during the next 36 months, with the exact date not being known.

ii. Discuss the suitability of bonds issued by the government of the particular country for purposes of this investment.

[4]

An asset manager in a developed country is considering an investment in long-term bonds issued by a developing country.

iii. Give four possible reasons for this interest.

[2]
[Total 8]

QUESTION 2

i.   Outline, with reference to hedge fund features where appropriate, reasons why a pension fund's trustees might want to place a limit on the fund's exposure to hedge funds.

[4]

ii. Explain how a hedge fund manager can create a market-neutral strategy by investing exclusively in credit default swaps.

[3]
[Total 7]

PLEASE TURN OVER

QUESTION 3

    i.   Explain what is meant by an insurance-linked security.

[1]

ABC Insure is a short-term insurer based in a developing country. Due to a long absence of catastrophic events in the country, ABC has over time reduced its reinsurance for such events. Last month however a large hurricane swept through the country, causing large claims for ABC. ABC management has now decided that they need to increase reinsurance cover for future catastrophic events.

    ii.   Explain possible behavioural biases exhibited by ABC management in relation to their reinsurance decisions.

[4]

ABC has decided to issue a catastrophe bond. The catastrophe bond structure will incorporate a special purpose vehicle (SPV).

    iii.   Explain the role of the SPV in the catastrophe bond structure.

[1]

    iv.   Explain the process for creating the catastrophe bond.

[2]

    v.   Outline the main factors that a global bond investor should consider prior to investing in the catastrophe bond issued by ABC.

[6]
[Total 14]

PLEASE TURN OVER

QUESTION 4

A high proportion of the adult population in a developing country is unbanked, including many immigrant workers who have a need for remittance mechanisms to transfer funds earned in the developing country to their country of origin. A growing number of people in the country have started to use global digital currencies instead of traditional banking products and services. A digital currency account, which is needed to make digital currency payments, is obtained from local companies providing access to digital currency trading platforms. The financial services regulator is now considering regulating these local digital currency companies.

    i.   Discuss the main reasons why there is a need to regulate local digital currency companies.

[2]

    ii.   Suggest ways that local companies providing access to digital currency trading platforms could be regulated under a statutory regulatory regime.

[5]

    iii.   Discuss the direct and indirect costs associated with regulating digital currency companies in the developing country.

[5]
[Total 12]

PLEASE TURN OVER

QUESTION 5

    i.   Explain the differences between anomaly and policy switches in the context of bond portfolio management.

[2]

An investor holds US dollar 1 million nominal of a South African government bond denominated in US dollars, paying annual coupons of 7.5% p.a. and with two years to maturity. The investor believes that the Rand is undervalued relative to the US dollar and decides to enter a swap agreement which entails exchanging the scheduled coupons and maturity proceeds from the US dollar bond held for the scheduled proceeds from a Rand-denominated South African government bond which has a nominal value of R15 million, paying annual coupons of 12% p.a. and with two years to maturity.

The current exchange rate is R15/US dollar, and the current annual effective 1-year forward rates in South Africa are 7% p.a. (for the next year) and 6% p.a. (for the following year), and the corresponding US forward rates are 3% p.a. and 3.5% p.a. respectively.

    ii.   Calculate the initial value of the 2-year swap to the investor in Rands, assuming that coupon payments have just been paid on both bonds.

[4]

The investor enters into a credit default swap (CDS) on the US dollar South African bond.

    iii.   List four events that may trigger payments under the CDS.

[2]
[Total 8]

PLEASE TURN OVER

QUESTION 6

i. List the primary uses of options in portfolio management.

[2]

ii. Explain how options on futures can be used to protect a borrower whose loan repayments are linked to short-term interest rates.

[4]

XYZ (Ltd) is a listed company and it has traded options available on its shares. Its current share price is 106c per share and the table below shows European call and put option premiums (in cents) for three exercise prices (in cents) and three expiry dates in the same year.

Exercise Price	Call option expiry dates			Put option expiry dates		
	May	August	November	May	August	November
100	19	26	32	11	17	21
110	15	22	27	16	22	26
120	10	17	22	20	26	31

iii. Calculate intrinsic values for each of the options in the table above, ignoring expenses.

[3]

iv. Using the data, sketch and label the overall profit at maturity for each of the two strategies below:

   a. Buy one August 110 put, and buy two August 110 calls;
   b. Buy one August100 call, sell two August 110 calls and buy one August 120 call.

[8]

v. Explain the circumstances justifying each of the strategies in part (iv) for an investor with no current exposure to XYZ.

[2]
[Total 19]

PLEASE TURN OVER

QUESTION 7

You are the consulting actuary to a large pension fund with a well-diversified portfolio of assets. The trustees of the fund are reviewing the fund's investment strategy and considering closer matching of the fund's assets to its liabilities.

    i.   Define Liability Hedging and explain how this can be achieved for the fund's pensioner liabilities using synthetic portfolio management.

                                         [2]

    ii.   Compare deterministic versus stochastic asset liability modelling.

                                         [2]

You perform an asset-liability modelling exercise (ALM) on the fund and prepare a report to the trustees explaining the process and the results.

    iii.   List the main topics that your report is likely to cover.

                                         [4]

While finalising your report, the government announces that pension funds will, from a specified future date, be liable for Capital Gains Tax on the sale of listed equities.

    iv.   Discuss how the results of your ALM are likely to change if the model is re-run allowing for the new tax.

                                         [4]
                                     [Total 12]

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QUESTION 8

    i.   Outline briefly the main characteristics of the Financials industry under the FTSE industry classification system.

[4]

A developing country uses the FTSE industry classification system to calculate investment indices for companies listed on the local stock exchange. An equity fund manager comments that a better way to classify local companies is to use the proportion of foreign revenues earned by them and develop indices based on "high", "medium" and "low/no" foreign revenues.

    ii.   Discuss the fund manager's suggestion, including practical difficulties of implementing the proposed method.

[4]

You are an investment consultant to the trustees of a trust that has used two equity fund managers (Managers A and B) since 1 January 2018. You are given information below about the market value of the trust's funds with Managers A and B. You are also given data on the capital index for their benchmark for 2018. You are further told that in addition to the initial investments made by the trust on 1 January 2018, Managers A and B received a further R100 million and R50 million of new money respectively from the trust on 1 July 2018. The dividend yield on the benchmark capital index is 3% p.a. on 31 December 2018.

	Manager A Fund R millions	Manager B Fund R millions	Benchmark Capital index
1 January 2018	200	100	1150
30 June 2018	130	90	920
31 December 2018	400	180	1262

A trustee observes that "Manager A has produced a gain of 33.3% on funds invested (i.e. R100 million on R300 million invested) compared to Manager B's 20% (i.e. R30 million on R150 million invested)". The trustee suggests that the fund should only use Manager A.

    iii.   By calculating returns earned by the fund managers, and the total return for the benchmark, comment on the trustee's suggestion.

[5]

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The trustee furnishes you with additional information for risk-adjusted returns to be calculated for Managers A and B. The data is for the three years 2016-2018, and the risk-free rate of return over this period was 6% p.a.

	Manager A	Manager B	Benchmark
Annual return (% p.a.)	12.0	10.5	10.0
Standard deviation SD (% p.a.)	15.0	7.5	9.5
Correlation coefficient with benchmark	0.75	0.45	1.00
Tracking error (% p.a.)	2.5	0.5	0.0

    iv. Using the above information, calculate four different risk-adjusted performance measures for Managers A and B.

[4]

    v. Comment briefly on the results from part (iv), stating any limitations that apply to them.

[3]

[Total 20]

END OF PAPER