EXAMINATION

28 October 2016 (am)

Subject F105

Finance and Investment 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 computers' 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

The government of a country suffering from high inflation has influenced the central bank to lower short-term interest rates shortly before a national election.

Discuss how this is an example of the principal-agent problem by considering the likely effects on the principal and agent of the interest rate cut.

[5]

QUESTION 2

On 1 January 2017 two parties enter into a 3-year credit default swap (CDS) based on a notional principal of US$10 million, in terms of which the buyer agrees to pay 90 basis points per annum semi-annually in arrears for protection against a credit event on a reference bond. Any protection pay-out is cash settled.

i. State examples of credit events that could trigger a payment under the CDS.

[2]

ii. State the cash-flows and the timing of the cash-flows for the seller of the CDS where:

  a. There is no credit event for the duration of the CDS; and

  b. A credit event occurs on 1 March 2019, at which time the reference bond is worth 30% of its face value.

[6]
[Total 8]

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QUESTION 3

An analysis of the 3-year investment performance of a market-neutral hedge fund and a global equity portfolio is as follows:

	Hedge fund	*Equity portfolio*
Annualised return	10.32%	7.18%
Annualised standard deviation	6.97%	15.72%
Sharpe measure		0.23

i. Briefly describe the investment strategy of a market-neutral hedge fund.

[2]

ii. Calculate the Sharpe measure for the hedge fund and comment on its investment performance relative to the global equity portfolio.
(Assume a risk-free rate of return of 3.5% p.a.)

[4]

iii. Outline any limitations of the investment performance analysis in part (ii) that may apply.

[4]
[Total 10]

QUESTION 4

i. State the approximations implied by Black's model for valuing a European option on a bond.

[1]

ii. A European call option is being written for a 6-month option on a bond with a 15-month term to maturity from the option expiry date. Calculate the price of the call option, given the following information:

   a. The bond pays a semi-annual coupon of 8% p.a.;

   b. The term structure of continuously-compounded zero-coupon yields is given by the following relationship, where t is the term in years:

      $\delta(t) = 0.05 + 0.01t$

   c. The price volatility parameter $\sigma = 0.12$; and

   d. The strike price is R100.

[8]

iii. In relation to a call option, define the term "in-the-money" and comment on whether or not this option is in-the-money.

[2]
[Total 11]

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QUESTION 5

A mobile network provider that been operating in an emerging economy for the last five years recently identified a need to expand its infrastructure. The company is unlisted and intends to raise the necessary funds through a listing of its equity on the local stock exchange via a public offer.

An investment analyst has been tasked to advise an institutional investor whether or not to subscribe for shares issued by the company through its public offer.

i. List the economic and financial factors that the analyst should consider to determine a fundamental value for the company.

[4]

ii. Outline potential difficulties that the analyst may encounter in determining a fundamental value for the company.

[7]

Following the listing, global economic growth slows and a global recession is expected in the next year.

iii. Discuss how the company's profits and the price-earnings ratio (PER) of its shares might be affected over the next year.

[3]
[Total 14]

QUESTION 6

An investor holds a well-diversified portfolio of US equities.

i. State the key advantage and disadvantage of assessing the performance of the investor's portfolio relative to a published index.

[2]

ii. State the main characteristics of the following published indices:

a. Dow Jones Industrial Average (DJIA)
b. S&P500

[2]

iii. State, with reasons, whether or not each published index in part (ii) is an appropriate benchmark for assessing the performance of the investor's portfolio.

[3]
[Total 7]

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QUESTION 7

An institution offers investors an equity portfolio in a developing country which is managed by a third party value manager. The institution is disappointed by the performance of the value manager and has decided to replace her and change to a core-satellite investment strategy.

i. Briefly describe the types of companies and measures a value manager would look at.
[4]

ii. Briefly describe three ways in which index tracking can be implemented and state the key advantage and disadvantage of each.
[6]

iii. Discuss the considerations involved in implementing the passive component of the proposed core-satellite strategy using index tracking.
[4]

iv. State the challenges associated with performance measurement and client reporting during the transition period of implementing the core-satellite strategy.
[3]

[Total 17]

QUESTION 8

The table below shows the annualised investment returns of an actively managed investment portfolio and its benchmark over the last year:

Quarter	*Portfolio*	*Benchmark*
1	7.0%	7.4%
2	14.4%	13.9%
3	5.9%	6.1%
4	5.0%	5.3%

i. For the period, calculate the following:

a. annualised tracking error
b. annualised information ratio

[4]

ii. Comment on the results of the calculations in part (i).
[4]

[Total 8]

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QUESTION 9

The Investment Committee of a financial services company is considering a few different strategic asset allocations that should enable it meet its return objectives over the next 5 years. You have been directed to conduct an Asset Liability Modelling (ALM) exercise to determine the optimal asset portfolio allocation that minimises strategic risk.

The company uses Value at Risk (VaR) to measure risk and you have been provided with projected liability values at the end of each financial year during the projection period.

i. Define strategic risk.

[2]

ii. Describe the ways in which you might set up an ALM exercise using the following headings:

   a. Specifying the problem;

   [4]

   b. Developing a solution; and

   [8]

   c. Monitoring the experience.

   [4]

iii. Explain why a dynamic liability benchmark may be more appropriate for the company.

[2]

[Total 20]

[Grand Total 100]

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END OF PAPER