INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

18 April 2023 (am)

Subject SP5 – Investment and Finance
Specialist Principles

Time allowed: Three hours and twenty minutes

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

If you encounter any issues during the examination please contact the Assessment Team on T. 0044 (0) 1865 268 873.

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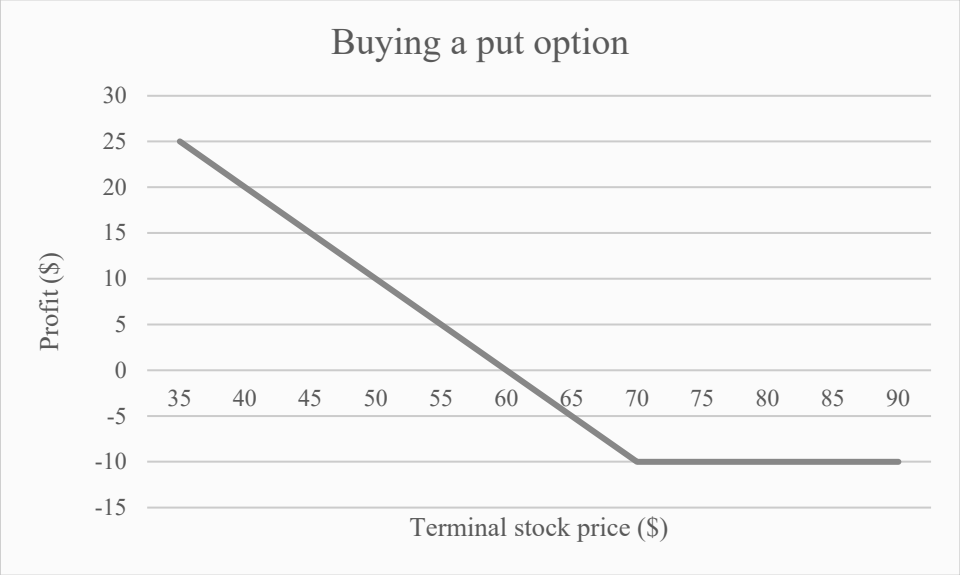
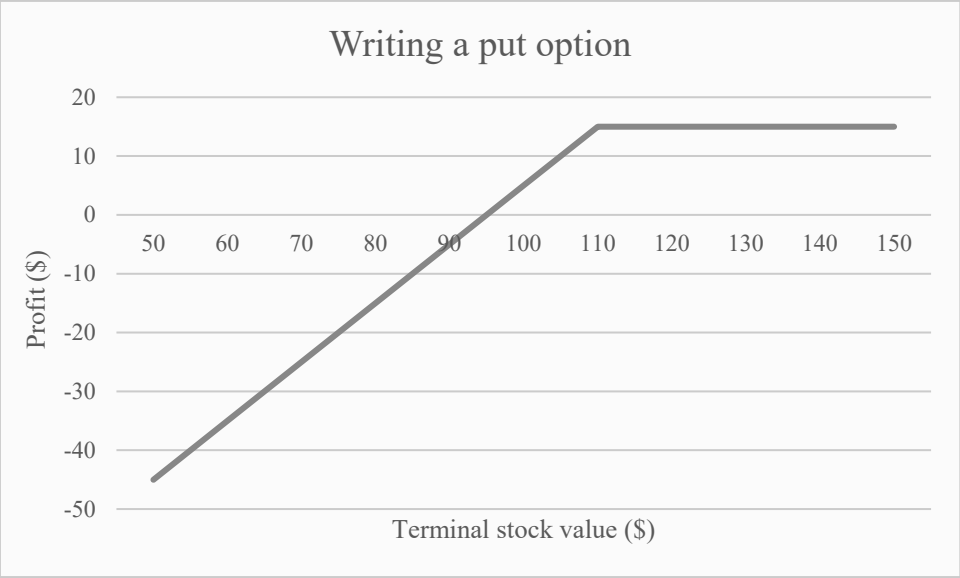
1 (i) State the difference between an American option and a European option. [1]

(ii) State the strike price and the option price for the European put option purchase in the graph below. [2]



(iii) State the strike price and the amount received for the European put option that is written in the graph below. [2]



An oil producing company is looking to hedge their exposure to the oil price over the next year, either by using forwards or futures.

(iv) Describe the factors the oil company should consider when choosing between these two options. [4]

(v) (a) Describe the characteristics of an investor that may be willing to take the opposite side of a forward contract with the oil company.

(b) Give an example of such an investor.

[3]

The oil company hedges their exposure to the oil price by means of a series of forward contracts. The details of these contracts are as follows:

Delivery date	*01/04/2024*	*01/04/2025*	*01/04/2026*
Oil to be sold (barrels)	1,000,000	1,050,000	1,100,000
Contracts sold	1,000	1,050	1,100
Spot price ($) per barrel	50	50	65
Risk-free rate on US government bonds (p.a.)	2.0%	2.2%	2.4%

The risk-free rate on US government bonds is continuously compounded.

The spot price of oil on 1st April 2023 was $70 per barrel.

(vi) Calculate, showing all workings, the profit or loss at the expiry of each of these contracts compared with the case in which the oil company had not hedged the oil price. [3]

[Total 15]

2 An Equity Analyst working for an institutional Fund Manager is responsible for researching companies in the tobacco sector. The Equity Analyst is currently assessing the case for investing in a major international cigarette manufacturer.

(i) Outline the factors (both internal and external to the company) that the Analyst should consider when assessing the future profitability of the cigarette manufacturer. [10]

(ii) (a) Outline how the Analyst could assess the value of the cigarette manufacturer's shares.

(b) Comment on the difficulties the Analyst is likely to encounter in estimating the value of the shares.

[4]

The Analyst observes that the market price of the cigarette manufacturer's shares is 40% below the value they have calculated.

(iii) (a) Suggest possible reasons why this valuation differential may exist.

(b) Comment on whether the Analyst should recommend that the Fund Manager buys the shares.

[5]

[Total 19]

3 (i) Explain, in relation to modern portfolio theory, the meaning and application of the concepts below:

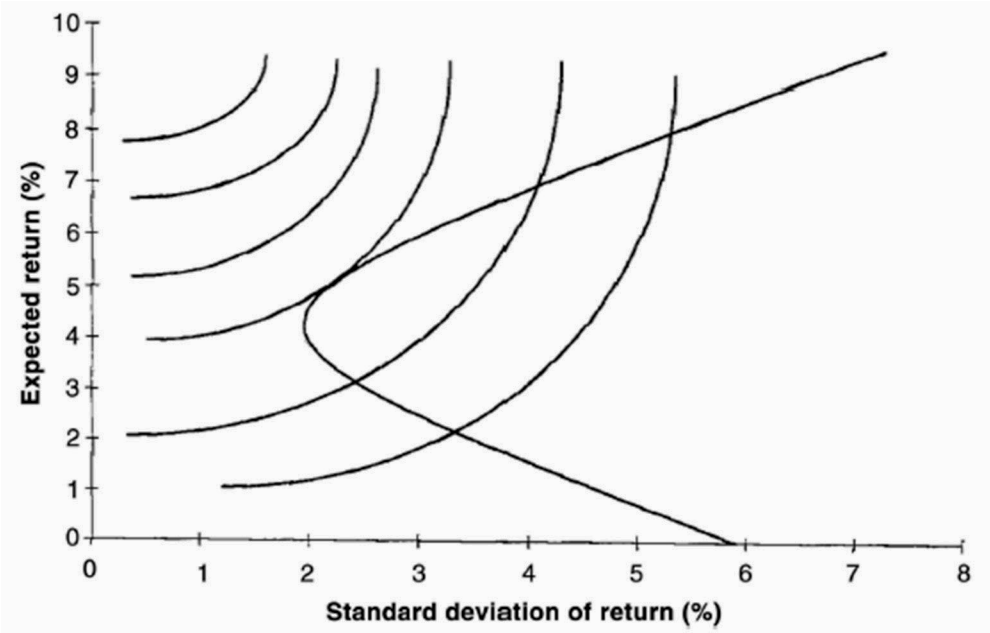
(a) opportunity set

(b) efficient frontier

(c) indifference curve.

[4]

The diagram below shows a set of utility curves and an efficient frontier:



(ii) (a) State how the optimal portfolio for a particular investor is identified using the diagram above.

(b) State the co-ordinates of the optimal portfolio on the diagram above.

[2]

The Fama–French three-factor model may be presented by the following expression:

$$R = R_f + ß_1(R_m - R_f) + ß_2(\text{SMB}) + ß_3(\text{HML}) + \alpha$$

where:

- R is the expected total return of a stock or portfolio.
- R_f is the risk-free rate of return.
- R_m is the total market portfolio return.
- $ß_{1,2,3}$ are factor coefficients.
- α is risk.
- SMB is Small Minus Big and measures the excess returns of small market capitalisation stocks over large market capitalisation stocks.
- HML is High Minus Low and measures the excess returns of stocks with high book/price values compared with stocks with low book/price values.

(iii) Compare the Fama–French three-factor model with the traditional capital asset pricing model. [3]

(iv) Discuss the disadvantages of a Portfolio Manager using the Fama–French three-factor model as the basis for selecting stocks for a small market capitalisation value portfolio. [4]

[Total 13]

4 (i) Describe the possible actions that the government of Country C, with a large open economy, could adopt in order to achieve the following goals:

(a) Reduce the level of consumer price inflation.

(b) Increase the level of taxation from large profitable multi-national corporations that generate revenues in the country, but pay little tax in Country C.

(c) Attract inward investment to Country C's film industry.

[10]

(ii) Discuss the possible disadvantages of the actions identified in part (i). [7]

[Total 17]

5 A Fund Manager managing the assets of a wealthy family is reviewing the family's invested assets for environmental, social and governance issues.

(i) (a) Set out the steps of a review process to determine whether or not to retain each of the invested assets.

(b) Outline the issues the Fund Manager will face in performing the review.

[5]

(ii) Discuss the issues they should consider in making any changes to the portfolio. [7]

[Total 12]

6 As part of a presentation to UK investors, a Fund Manager gives the following figures:

Total return	*Portfolio return (%)*	*Market return (%)*
Japan	8.20	7.50
UK	4.20	3.60

The Fund Manager concludes by saying that they are pleased that the funds have outperformed the market in both Japan and the UK.

An investor questions the Fund Manager, stating that the Nikkei rose by 10% and the FTSE 100 by 5%, so the Fund Manager was incorrect when they said the funds had outperformed in both these countries.

(i) Describe the Nikkei and FTSE 100 indices. [4]

(ii) Suggest possible points the Fund Manager could make in answering the investor's question. [5]

[Total 9]

7 The taxation authorities of a particular country are keen to increase the country's tax revenue and have observed that investors have avoided either income or capital gains tax by converting income into capital gains or vice versa, depending on their taxation status. The taxation authorities are therefore looking at two possible policies. The first policy is to introduce a tax based on the total return generated by an investment over the tax year.

(i) Discuss the advantages and disadvantages of this policy. [10]

The second policy is to introduce a tax based on the value of all investment transactions, which is collected by the intermediary (e.g. the broker) conducting the transaction.

(ii) Discuss the advantages and disadvantages of this policy. [5]

[Total 15]

END OF PAPER