

INVESTMENT

EXAM MARKING GUIDE SEMESTER 2 2022

29 NOVEMBER 2022



Marking Guide

This examination represents 80% of the available marks for the Investment subject. The remaining 20% comes from the assignment.

There are four questions in the examination. Each question has several parts. The table below summarises information relating to each part of each question:

- The modules from which material relating to the question was drawn
- The learning objectives to which each question relates
- The apportionment of the marks for the question across the three main skill levels: knowledge, application, and higher-order

						Marks (out of 80)			
Year	Semester	Examination question	Part	Modules from which material drawn	Learning objectives to which the question relates	Simple application (formerly Knowledge)	Application	Higher order	Total for question
2022	2	1	a	2,4	1.1, 3.1, 3.2	3			
		1	b	2	1.2		2		
		1	c	2	1.2,		2		
		1	d	7	6.1		2		
		1	e	5	4.2	1			
		1	f	2	1.2		2		
		1	g	4	3.2		4		
		1	h	6,7	5.1, 5.3, 6.1		4		
									20
		2	a	4	3.1, 3.2	4			
		2	b	4	3.2		4		
		2	c	3, 4	2.1, 2.2, 3.2			4	
		2	d	7	6.2		4		
		2	e	6	5.3			4	
									20
		3	a	4	3.1, 3.2			5	
		3	b	5,6	4.3,5.1			5	
		3	c	6	5.2		4		
		3	d	7	6.1	3			
		3	e	4	3.2	3			
									20
		4	a	2	1.2		6		
		4	b	2,6,10	1.2,5.2,9.3	4			
		4	c	6,10	5.3,9.4			6	
		4	d	10	9.4		4		
									20
		TOTAL				18	36	24	80
						Simple application (formerly Knowledge)	Application	Higher order	
					% of total	22.5%	47.5%	30.0%	100%
		% of total assessment for the subject including the Assignment				22.0%	48.0%	30.0%	100%

The target allocation across the three skill levels of the overall assessment for the Subject (Assignment and Examination) is:

- SA – Simple application (formerly Knowledge) 20%
- A – Application 50%
- H – Higher order/ Judgment/Evaluation 30%



In the pages below the questions are set out in black font.

Marking guide information is presented in blue font.

The sample answers are not the only possible answers.

Note to Markers:

An overarching principle is that marks should be awarded for necessary work undertaken by a student to arrive at an answer to a question. This may be considered as telling a story to answer the question that is being asked. When marking, please award marks for defining terms, describing background and context that is relevant to 'telling a story' to answer the question.

Guidance has been given to students that copying and pasting is allowed but they need to address the specified scenarios set out in the questions to pass the examination. The marking guide for each question generally states whether marks can be awarded for generic points or whether the points given must be linked to the context set out in the question. If the marking guide does not specify otherwise, marks SHOULD be awarded for relevant comments that may appear to have been copied and pasted from either the modules or another resource, such as a prudential or professional standard.

Marks should also be awarded for any other relevant point even if it is not included in the marking guide.

As a rule, a complete sentence should be awarded 1 mark.

A complete sentence includes a clause and a connecting clause. An example sentence is 'The insurer pays a benefit on death' (½ mark for the clause) provided the premiums are paid (½ mark for connecting clause)'.

The exam questions each start with a 'command verb' that provides information to students and markers about what is expected in an answer to the question. Please watch the following short video for information about the learning levels and command verbs used by the Institute: https://www.youtube.com/watch?v=g1Oyv_RpfU4. Definitions of each of these command verbs are also provided within this marking guide.

Please note that some of the answers in this marking guide identify more worthwhile points than any one candidate may make. The marks indicated for all of the points go beyond what is required to gain full marks in the question. This is done deliberately to give markers a sense of the wide range of acceptable answers that students might give to a question. In some questions or parts of questions, it has been indicated that certain critical points need to be made to achieve full marks for the question or question part



QUESTION 1

(20 marks)

- a) Describe: (*Command verb: Describe (Level 2 – Understand): Provide information about specific items, showing that you understand what those items mean. A description is not a list; each item needs supporting information.*)

- i. what an asset is in terms of its characteristics; LO1.1 [M2]

An **asset** is an entitlement to returns in the form of income and/or the payment of an amount of capital at some future time. **(0.5 mark)** **(This point must be made to achieve full marks for this question sub-part).** There is a wide variety of assets that can be part of an investment portfolio and they have different return prospects **(0.5 mark)** as well as different risks and uncertainties associated with those return prospects. **(0.5 mark)**

Some candidates may provide more detailed points as set out below.

The return and risk characteristics of assets are usually described in terms of:

- Total rates of return (income and capital growth)
- Volatility of total returns (standard deviation)
- Correlation of total returns with the returns of other assets or with inflation

(0.5 mark for each point made)

Each of these may be measured over various periods and the relationships between different assets can appear to change over time. **(0.5 mark)**

Assets also have different marketability or liquidity from each other **(0.5 mark)**, due to differences in the frequency of transactions in the relevant market **(0.5 mark)** for example:

- many corporate bonds have less liquidity than government bonds **(0.5 mark)**
- small cap equities generally have less liquidity than large cap equities **(0.5 mark)**
- private equity assets are less liquid than listed equities **(0.5 mark)**
- unlisted property assets are less liquid than listed property securities **(0.5 mark)**

Maximum of 1 mark for this question subpart

- ii. how an asset can be valued; LO 3.1[M4]

Assets are generally expected to provide cash flows to the investor **(0.5 mark)** and so can be valued using methods such as discounted cash flow models. **(0.5 mark)** There are also market-based or customary asset valuation methods that are often used by experienced investors, **(0.5 mark)** such as the capitalisation method of valuing a property or the Price Earnings Ratio method of valuing a listed equity. **(0.5 mark for an example)**

Maximum of 1 mark for this question subpart



iii. the difference between the value of an asset and its price. LO 3.2 [M4]

The value of an asset is the investor's opinion of what the benefits of holding the asset are worth **(0.5 mark)** whereas the price of an asset is determined by transactions or bids and offers made by market participants. **(0.5 mark)**

Maximum of 1 mark for this question sub-part. Both of the points must be made to achieve the full mark for this question subpart

Maximum of 3 marks for this question part

- b) Distinguish between the yield to maturity of a fixed income asset and the total return from holding a fixed income asset. LO 1.2 [M2] (2 marks) (*Command verb: Distinguish (Level 4 – Analyse)*: Perceive and describe a difference between two or more things such that the implications of the difference are made clear.

The yield to maturity of a fixed interest asset is a function of its price in the market. **(0.5 mark)** The yield is the internal rate of return that equates the current market price to the value of the future cash flows from coupon payments and repayment of capital by the time of maturity **(0.5 mark)**

(Maximum 1 mark for explaining yield)

The total return from holding a fixed income asset is the internal rate of return derived from the amount paid for the purchase of the asset, the coupon payments received while the asset is held, and the amount received when the asset reaches maturity or is sold. **(1 mark)**

- c) Explain what an asset class is, and how assets are classified based on their return and risk characteristics. LO 1.2 [M2] (2 marks) (*Command verb: Explain (Level 4 – Analyse)* Give an account of something with the goal of clarifying it to someone or making something easier to understand. Calls for even more information than describe, showing that you can convey 'why' or 'how' or 'so what'. A connection is expected between the item(s) and something else.)

An asset class is a category of investments that exhibit similar return and risk characteristics in various market conditions. **(0.5 mark)** **(This point must be made to achieve full marks for this question sub-part).**

Assets are classified into asset classes on the basis of their similarities. The similarities may be in:

- The form of income return that is paid, such as interest coupons on fixed interest securities, dividends on listed equities or rent on property; **(0.5 mark)**
- The factors that influence the rate of income and how it can change over time, such as inflation linking in property rental rates or growth in dividends of listed equities or loss of interest income due to credit defaults on fixed interest or vacancies in property; **(0.5 mark)**



- A return in the form of capital gain or growth over the period of holding an asset such as increases in the price of equities due to increases in the earnings per share **(0.5 mark)** and /or in the Price Earnings ratio determined by the market **(0.5 mark)**
- The factors that influence the rate of return from capital growth and how it can change over time, such as shifts in the capitalisation or discount rates applied to similar properties, **(0.5 mark)** or shifts in the level and the shape of the yield curve for fixed interest with similar credit ratings **(0.5 mark)** or the effect of changes in economic growth rates on earnings of equities **(0.5 mark)**;
- The rate of total return (income and capital growth) from holding the type of asset over a period of time **(0.5 mark)**
- The volatility of the rate of total return over a period of time **(0.5 mark)** which simply describes the instability of returns rather than risk **(0.5 mark)**
- The observed correlation of total returns of assets within an asset class over a period of time **(0.5 mark)** and how this can be used to decide on asset allocation within a portfolio **(0.5 mark)**

These similarities of returns and risks within an asset class may change over time. **(0.5 mark)**

Assets are typically allocated to one of two groups; growth assets (such as equities that are characterised by volatile shorter term returns and higher long-term returns) **(0.5 mark)** and defensive assets (characterised by more stable returns that typically underperform the return on growth assets over the long-term). **(0.5 mark)**

Maximum of 2 marks for this question part

- d) Explain two advantages and two disadvantages of having a portfolio of assets. LO6.1 [M7] (2 marks) (*Command verb: Explain (Level 4 – Analyse) Give an account of something with the goal of clarifying it to someone or making something easier to understand. Calls for even more information than describe, showing that you can convey 'why' or 'how' or 'so what'. A connection is expected between the item(s) and something else.*)

Advantages

- Forecasting returns of asset classes over various time periods is very difficult due to the uncertainty in asset market behaviour, so allocating to a number of asset classes that behave differently in various market conditions may reduce the probability and the degree of shortfalls of the portfolio return relative to the investment objective. This is called diversification. **(0.5 mark)**
- This advantage of diversification applies to assets within asset classes as well, so that the risk of a portfolio of assets within an asset class underperforming a market index or benchmark, will usually reduce as the number of assets in the portfolio is increased. **(0.5 mark)**
- Portfolio returns may tend to become less volatile relative to the investment objective as the number of assets in the portfolio is increased **(0.5 mark)**



- Diversification: a portfolio of assets may include a variety of different asset classes, which produces a blended return that can be less volatile than a single asset class. **(0.5 mark)**
- Access to a range of characteristics of different asset classes, which is suitable and can be adjusted based on investors' different investment needs and objectives. E.g. investors who require stability of return can choose more defensive assets rather than growth assets. **(0.5 mark)**

Disadvantages

- Portfolios may have a large number of assets such that there is a diminishing marginal addition to the diversification benefit as more assets are added to the portfolio **(0.5 mark)**
- The expense of managing a portfolio may increase in line with the number of assets in the portfolio so that beyond a certain number of assets, the additional costs outweigh the additional benefits of adding more assets **(0.5 mark)**
- Portfolios of assets will have lower returns over time than the returns of some of their constituent assets **(0.5 mark)** causing the portfolio manager's judgment to be questioned by stakeholders. **(0.5 mark)**
- Portfolios comprising varied types of asset require more extensive data bases to support decision making **(0.5 mark)** and more complex performance reporting **(0.5 mark)**
- Complexity: It is difficult to manage a portfolio of assets given its wide ranges of variety and difficulty to forecast return and risk characteristics of different asset classes. Significant judgement and skills are required to manage a portfolio of assets. **(0.5 mark)**
- Costs: Given the complexity to manage a portfolio, it is common to hire professional portfolio managers to manage the portfolio with additional service costs. It has been argued in numerous studies that many active portfolio managers fail to deliver positive returns net of costs, and the skills and experience of active managers vary across the market, which require experience to select the good active managers. **(0.5 mark)**

Maximum 2 marks for this question part

- e) Define risk as it relates to a portfolio of investments. LO4.2 [M5] (1 mark) (*Command verb: Define (Level 1 – Remember): Give the meaning of a word or phrase.*)

Risk as it relates to a portfolio of investments is the probability that the portfolio fails to meet its investment objective (1 mark)

- f) Distinguish between the concepts of risk and uncertainty. LO1.2 [M2] (2 marks) (*Command verb: Distinguish (Level 4 – Analyse): Perceive and describe a difference between two or more things such that the implications of the difference are made clear.*)

Risk is measurable and therefore can be estimated (or forecast), **(0.5 mark)** and then



managed or mitigated by actions that can reduce it **(0.5 mark)**

Uncertainty is generally not measurable or forecastable **(0.5 mark)** and therefore cannot be directly managed or mitigated **(0.5 mark)**

- g) Explain how to allow for uncertainty in the valuation of: LO 3.2 [M4] (4 marks) (*Command verb: Explain (Level 4 – Analyse) Give an account of something with the goal of clarifying it to someone or making something easier to understand. Calls for even more information than describe, showing that you can convey ‘why’ or ‘how’ or ‘so what’. A connection is expected between the item(s) and something else.*)

i. A listed equity security; and

Use sensitivity testing when projecting the cash flows in a discounted cash flow valuation process or the earnings per share if using a market-based method such as the PE ratio method **(0.5 mark)**. Sensitivity testing is carried out by varying one assumption at a time and observing the change in the valuation resulting from each change. **(0.5 mark)**

Use sensitivity testing when setting the discount rate in a discounted cash flow valuation process **(0.5 mark)** or when estimating the market PE ratio if using a market-based method such as the PE ratio method **(0.5 mark)**

Alternatively, candidates may refer to the use of stochastic models instead of sensitivity testing but need to reference the application of these to both the cash flows (or earnings per share) **(0.5 mark)** and the discount rate (or PE ratio) **(0.5 mark)** as well as the need to specify the distributions for each variable to be sampled, **(1 mark)** to achieve 2 marks.

ii. A floating rate note. LO 3.2 [M4]

Use sensitivity testing when projecting the factors to which the interest payments are linked:

- any rate floor for the reference rate of interest, for example a minimum of 100 basis points– which may come into effect as a result of shifts in broader market conditions **(0.5 mark)** such as monetary policy changes **(0.5 mark)**
- the spread or margin above the reference rate – which will normally be stable but may change due to factors affecting the issuer **(0.5 mark)** such as a change in credit rating **(0.5 mark)**
- Any provisions relating to prepayments **(0.5 mark)**

Use sensitivity testing when setting the discount rate in a discounted cash flow valuation process or the credit spread if using a market-based yield method **(1 mark)**

Alternatively, candidates may refer to the use of stochastic models instead of sensitivity testing but need to reference the application of these to both the interest



payments **(0.5 mark)** and the discount rate (or the credit spread) **(0.5 mark)** as well as the need to specify the distributions for each variable to be sampled, **(1 mark)** to achieve 2 marks.

Maximum 4 marks for this question part

- h) Explain how to allow for uncertainty in the management of a portfolio of assets. LO 5.1,5.3, 6.1 [M6] and [M7] (4 marks) *(Command verb: Explain (Level 4 – Analyse) Give an account of something with the goal of clarifying it to someone or making something easier to understand. Calls for even more information than describe, showing that you can convey ‘why’ or ‘how’ or ‘so what’. A connection is expected between the item(s) and something else.)*

There is uncertainty in the future rate of return of all assets **(0.5 mark)**. The level of uncertainty in the returns varies depending on the type of asset **(0.5 mark)**

A portfolio is a combination of assets which differ from each other in terms of their return and risk characteristics **(1 mark)** There is therefore uncertainty in the rate of return of the portfolio which will be a function of the returns of the assets in the portfolio. **(1 mark)** Returns on different assets have been observed to be less than perfectly correlated over time. **(0.5 mark)** Correlations between asset class returns have also been observed to change over time **(1 mark)**. Holding a diversified portfolio of assets that are likely to have very low or negative correlations between their returns, may reduce the uncertainty in the portfolio return over time **(0.5 mark)**. Diversification of the types of assets held in a portfolio is the primary method of reducing uncertainty in the return on the portfolio **(1 mark)** and reducing the risk of the portfolio not meeting its investment objective. **(1 mark)**

Uncertainty is not directly measurable or manageable so allowance for it in the management of a portfolio takes the form of:

- diversification across a range of asset classes **(0.5 mark)** which are likely to exhibit low or negative correlations of their total returns. **(0.5 mark)**
- diversification within each asset class **(0.5 mark)** by holding a sufficient number of assets such that the adverse effects of uncertainty (low or negative returns) for any single asset will have a limited adverse effect on the portfolio return **(0.5 mark)**

Some students may make the following points for which marks should be given as indicated:

- There may also be uncertainty in the way in which the investment objective is stated if it is not well documented such that it clearly reflects the agreed needs of the investor. **(0.5 mark)**
- A clearly documented investment objective allows a clear investment mandate to be given to the portfolio managers **(0.5 mark)** so that they understand the how the portfolio should be managed **(0.5 mark)** and how their performance versus the investment objective is to be measured. **(0.5 mark)**



- Having well-defined limits for the allocation to each asset class. **(0.5 mark)** This reduces the extent of any adverse effect of allocating to an asset class which subsequently has negative returns. **(0.5 mark)**
- Stress testing the portfolio to assess how the portfolio return will respond to various investment market environments. **(0.5 mark)** For example, historical stress tests could be used to see how the portfolio returns would have responded in 2001 (dot-com bust), 2008 (GFC) or 2020 (COVID). **(0.5 mark)**
- Having more than one investment manager in each asset class. **(0.5 mark)**

Maximum 4 marks for Question 1 (h)

END OF QUESTION 1: MARKING GUIDE



QUESTION 2

(20 marks)

Many investment advisers consider that it is worthwhile employing active managers of equity or fixed income portfolios because they attempt to achieve total returns above a stated benchmark, such as the S&P 500 index or a well-known bond market index. In relation to how active managers try to achieve this, please answer the following questions.

- a) Describe the two main types of methods used to estimate the value of an equity security LO3.1 LO3.2 [M4] (4 marks) (*Command verb: Describe (Level 2 – Understand): Provide information about specific items, showing that you understand what those items mean. A description is not a list; each item needs supporting information.*)

The two most common methods used to value equities are:

- discounted cash flow (DCF) methods; (0.5 mark) and
- market-based or capitalisation methods. (0.5 mark)

A discounted cash flow method incorporates three main factors:

- the definition and the amount of the cash flows to be valued and their timing; (0.5 mark)
- the probability of the cash flows occurring (0.5 mark); and
- the valuation rate of interest (also referred to as the discount rate) used to calculate the present value of the cash flows being valued (0.5 mark).

The cash flow being valued may be:

- dividends;
- earnings (Net after-tax profit or NATP);
- earnings before interest, tax, depreciation and amortisation (EBITDA); or
- free cash flow to the firm (FCFF) or to the equity holders (FCFE) (operating profit less the net investment required to maintain current profitability).

(0.5 mark for stating one of these)

Estimating the size and the probability of the cash flows will require a detailed understanding of the business of the company whose equity is being valued (0.5 mark) and of the company's financial statements over a number of years (0.5 mark)

The discount rate used in the valuation is often considered to comprise, for the expected holding period of the equity security:

- the required real return; plus
- an inflation premium; plus
- an inflation risk premium to allow for uncertainty in the inflation forecast; plus
- an equity risk premium (ERP) to compensate for the uncertainty in the cash flows that are being valued.



(1 mark for a complete description of discount rate as shown above)

Capitalisation methods operate by applying a forecast of a ratio or a rate that is applied to a forecast of a quantity derived from the financial statements, **(0.5 mark)** such as:

- A price-earnings ratio (PER) i.e. price per share divided by earnings per share (EPS); **(0.5 mark)** which is multiplied by the forecast Net After Tax Earnings **(0.5 mark)** or
- An EBITDA multiple (price per share divided by EBITDA per share) which is multiplied by the forecast EBITDA **(0.5 mark)**; or
- A price to book (P/B) multiple i.e. price per share divided by net tangible assets (NTA) (also referred to as the shareholders' funds or the book value) per share which is multiplied by the forecast NTA **(0.5 mark)**; or
- A dividend yield i.e. Dividend per share divided by price per share **(0.5 mark)**.

Maximum 4 marks for question 2 part (a)

- b) **Analyse the valuation assumptions that rely on fundamental analysis in the Discounted Cash Flow method for the valuation of equities LO3.2 [M4] (4 marks) (Command verb: Analyse (Level 4 – Analyse): Separate information into components and identify their characteristics.)**

Fundamental analysis refers to the analysis of the historical and likely future economic and financial performance of a company. **(0.5 mark)** The aim is to make estimates of future revenue and expenses (and hence profit) **(0.5 mark)**. Setting these assumptions requires an understanding of:

- what the company is trying to do, how is it organised to achieve its aim (its business model) and how it makes money (the drivers of profitability); **(0.5 mark)**
- the factors that affect a company's business and its future prospects; **(0.5 mark)** and
- the quality of management because a sound business model is insufficient to generate value if the leaders of the company fail to properly execute the business plan; **(0.5 mark)**

Once these aspects are understood, a quantitative analysis is usually conducted of key information drawn from the company's financial statements comprising:

- an analysis of historical trends in items such as:
 - Revenue, sometimes by product or operating division
 - Fixed and variable expenses, sometimes by product or operating division
 - Profit or earnings before interest and tax (EBIT)
 - Interest costs on debt used to finance operations
 - Tax
 - Profit or earnings after interest and tax (NATP)
 - Dividends paid out of NATP

(1 mark for identifying at least 4 of these components 0.5 mark if only 2 are identified, otherwise 0 mark)



- a forecast of these items over an initial forecast period, usually up to 10 years **(0.5 mark)**
- a forecast of growth rates for each of these items for the period beyond the initial forecast period, i.e. in perpetuity. **(0.5 mark)** These are called the terminal growth rates. **(0.5 mark)**

Some important Issues that need to be considered in fundamental analysis are:

- the difficulty of forecasting each of the components which lead to the net cash flow that is being valued. **(0.5 mark)**
- whether past trends in each component are a good guide to future trends **(1 mark- important point- this point must be made in order to achieve full 4 marks for this question part 2 (b))**
- how to allow for variations from past trends or uncertainty in the future assumptions for each component **(0.5 mark)** by using sensitivity analysis **(0.5 mark)** or employing a stochastic model using distributions for each component **(0.5 mark)** – the need for an allowance for uncertainty is greater for some components than others (usually revenues are more uncertain than fixed costs) **(0.5 mark)** and for some companies or industry sectors (e.g., mining company revenues are often more variable than those of many other sectors) **(0.5 mark)**
- the Importance of the terminal growth rate assumptions for each component because the valuation of the company and its equity securities is usually very sensitive to small changes in the terminal growth rates. **(1 mark) (this point must be made to achieve full 4 marks for this question part 2 (b))**

Maximum 4 marks for question 2 part (b)

- c) Evaluate the main arguments as to why fundamental analysis may not be able to consistently achieve returns in excess of an equity market index. LO 2.1, 2.2, 3.2 [M3] [M4] (4 marks)

(Command verb: Evaluate (Level 5 – Evaluate): Judge or assess the worth of.)

The main arguments as to why fundamental analysis may not be able to consistently achieve returns in excess of an equity market index, together with comments on whether they are valid arguments are:

- Equity markets are efficient, (the Efficient Markets Hypothesis or EMH is valid), which means that they incorporate information that can affect the perceived value into the market prices for equities quickly and completely **(0.5 mark)** so that it is not possible to identify a 'mispriced' equity that can be bought at a price less than its intrinsic value or sold at a price above its intrinsic value **(0.5 mark)** There is a lot of evidence that new information is usually incorporated rapidly into equity prices, **(0.5 mark)** although there are some exceptions:
 - In the short term equities with high returns continue to produce high returns (there is a momentum effect) **(0.5 mark)**; and



- in the long run, shares with low price-earnings ratios, high book- to-market-value ratios outperform the equity market (there is a 'value' effect). **(0.5 mark)**
- Equity markets may not be efficient but not by enough to allow excess returns to be earned which are sufficient to cover the costs of analysis and transactions needed to exploit mispricing opportunities (i.e., buy at a price less than its intrinsic value or sell at a price above its intrinsic value) **(0.5 mark)** There is a lot of evidence across several major equity markets and different periods that the performance of equity portfolios that are actively managed employing fundamental analysis is broadly supportive of the Efficient Markets Hypothesis because many active portfolio managers fail to earn excess returns. **(0.5 mark)** After deducting management fees, most actively managed equity portfolios usually do not outperform the market indices. **(0.5 mark)**
- Even if equity markets are not efficient, the ability of many equity portfolio managers to successfully use fundamental analysis to outperform the equity market has not been established by historical evidence so far. **(0.5 mark)** There is evidence across a range of equity markets in several countries that a portfolio based on the EMH—the index portfolio —is difficult to beat for most active fund managers which use various processes and techniques such as fundamental analysis. **(0.5 mark)** This does not preclude the possibility that a minority of active managers are able to achieve excess returns. **(0.5 mark)**

Maximum 4 marks for question 2, part (c) Candidates should make clear their judgment about each of the arguments to obtain the full 4 marks.

- d) Explain how active fixed income managers try to outperform the benchmark bond market index, commenting on the two main sources of risk that they seek to minimise. LO6.2 [M7] (4 marks) *(Command verb: Explain (Level 4 – Analyse) Give an account of something with the goal of clarifying it to someone or making something easier to understand. Calls for even more information than describe, showing that you can convey 'why' or 'how' or 'so what'. A connection is expected between the item(s) and something else.)*

Active fixed income managers try to outperform the benchmark bond market index, by using one or more of the following strategies:

- 1) Investing more of their portfolio in longer dated bonds so that their portfolio has a longer duration than that of the benchmark bond index, when they expect the level or shape of the yield curve to change such that the yield on longer bonds falls; **(0.5 mark)**
- 2) Investing less of their portfolio in longer-dated bonds so that their portfolio has a shorter duration than that of the benchmark bond index, when they expect the level or shape of the yield curve to change such that the yield on longer bonds rises; **(0.5 mark)**
- 3) Investing more of their portfolio in bonds with lower expected default risk so that their portfolio has less exposure to credit risk than that of the benchmark bond index,



when they expect credit spreads to rise; **(0.5 mark)**

- 4) Investing less of their portfolio in bonds with lower expected default risk so that their portfolio has more exposure to credit risk than that of the benchmark bond index, when they expect credit spreads to fall; **(0.5 mark)**

The first two strategies listed above depend on achieving superior forecasting of the level and shape of the yield curve. **(0.5 mark)**

The next two strategies listed above depend on achieving superior forecasting shifts in credit spreads. **(0.5 mark)**

In each strategy the active fixed interest manager is trying to identify a 'mispriced' fixed interest security that can be bought at a price less than its value as assessed by the manager or sold at a price above its value as assessed by the manager. **(0.5 mark)**

The valuation method used to support the decision to buy or sell select a debt or fixed interest security, therefore, needs to deal with the two main risks that can affect the value of a debt security:

- Interest rate risk, which is the potential for loss of capital if the security is sold before maturity at a price below its purchase price, due to the fall in the price of the security that is caused by an increase in yield when the yield curve changes its level or shape. **(0.5 mark)**
- Credit risk, which is the risk of the issuer failing to make the agreed payments of interest or repayment at maturity (credit default) or, if the security is sold before maturity at a price below its purchase price, due to an increase in the credit spread of the security that is caused by either a general increase in credit spreads due to economic conditions or a change in the financial position of the issuer that makes default more likely. **(0.5 mark)**

When making these valuations of the debt securities the active manager will use a valuation interest rate or discount rate that will appropriately compensate for the risks being borne. **(0.5 mark)** The active manager will be effectively forming a view about the level and the shape of the yield curve that is appropriate for the credit risk and the interest rate risk of the security being valued. **(0.5 mark)**

In practice, active fixed interest managers consider and analyse several factors that can affect the future level and shape of yield curve, such as:

- The potential supply of the securities from issuers such as governments and corporates; **(0.5 mark)**
- demand for securities from market participants, who sometimes confine their attention to particular parts of the yield curve (maturities) or securities with specified credit ratings assigned by credit rating agencies; **(0.5 mark)**
- changes in the perceived credit risk of issuers; **(0.5 mark)**
- the expected rate of inflation; **(0.5 mark)** and
- the potential degree of uncertainty of inflation. **(0.5 mark)**



When assessing these factors, active fixed interest managers use a variety of approaches to forecast the term structure of interest rates (the yield curve) and possible shifts in credit spreads, such as:

- technical analysis as a means of forecasting changes in the level and shape of the yield curve over time; **(0.5 mark)**
- time series analysis as a means of forecasting changes in the level and shape of the yield curve over time; **(0.5 mark)**
- macroeconomic modelling that aims to find a relationship between the yield curve and certain economic variables such as GDP growth, inflation; **(0.5 mark)**
- recommendations and rating reports on issuers of fixed interest securities from rating agencies such as S&P, Moody's and Fitch. **(0.5 mark)**

In practice none of the approaches to forecasting the yield curve and credit risk has been perfect in the past **(0.5 mark)** and so active fixed interest managers often use several approaches to provide inputs to their assessments **(0.5 mark)** which then rely on their professional judgment, built up over many years of experience in changeable market conditions. **(0.5 mark)**

Maximum 4 marks for question 2 part (d)

- e) Propose, with reasons, how an investment portfolio can be structured to mitigate the effects of inflation on its real purchasing power by including two types of asset which may act as a hedge against inflation. LO 5.3 [M6] (4 marks) *(Command verb: Propose (Level 6 – Create): Select and communicate a solution, action or range of possible solutions/actions. Rationale, reasons or justification must be included.*

An investment portfolio can be structured to mitigate the effects of inflation on its real purchasing power by including an allocation to one or more assets which have been described as inflation hedges. **(0.5 mark)**

An inflation hedge is an asset which has a total return (from income and capital gain) that exceeds the rate of inflation, as measured by an index such as the Consumer Price Index, over a **nominated period**. **(0.5 mark)**

Inflation is measured in different ways across countries, and it also varies across countries and currencies. Therefore, the currency, the inflation index and the period for measurement should be specified. **(0.5 mark)**

Investing in an asset as an inflation hedge is effectively setting an investment objective for that asset to outperform the rate of inflation. **(0.5 mark)**

To mitigate the effects of inflation on its real purchasing power it is proposed that an allocation of part of the portfolio to the following asset types should be considered:



- Inflation-linked government bonds where the interest coupons and /or the principal are linked to a well-known index and are issued by a government with a high credit rating. **(0.5 mark)** These types of government bonds are more common in the USA and the UK than elsewhere and there is a liquid market in them, with prices and yields being continually available. Note however that the governments usually control the calculation of the inflation index which can be changed (at a cost to investors). In addition, over much of the last 5 years the real yields on inflation linked bonds have been very low or negative. **(0.5 mark)**
- Unlisted Commercial Real Estate or Property with rents explicitly linked in the tenancy agreements to a well-known inflation index. **(0.5 mark)** Note that not all commercial properties have this in the tenancy agreements. **(0.5 mark)** In addition, even if a rise in the inflation rate leads to a rise in the rental income, rises, it may also lead to a rise in bond yields **(0.5 mark)** and hence to a rise in the discount or cap rate used for valuation of the property so that the beneficial effect of inflation linkage is at least partially offset. **(0.5 mark)**
- Unlisted Infrastructure assets which often have long term contracts whereby the rent or income paid to the owner is linked to a well-known inflation index (for example toll road fees). **(0.5 mark)** This is similar to some unlisted commercial real estate. Another similarity is that even if a rise in the inflation rate leads to a rise in the infrastructure income, it may also lead to a rise in bond yields and hence to a rise in the discount rate used for valuation of the infrastructure, **(0.5 mark)** so that the beneficial effect of inflation linkage is at least partially offset. **(0.5 mark)** In addition, the infrastructure asset may be politically sensitive (such as toll roads or water supply) so that a regulator or government may have an incentive to change the rules and the inflation linkage in a time of high inflation. **(0.5 mark)** Therefore, the capacity of infrastructure to act as a hedge against inflation may be imperfect or impaired. **(0.5 mark)**
- Investing in inflation linked swap derivatives where the investment portfolio enters into a contract where it receives cashflows that are linked to inflation, while making fixed payments in return. **(0.5 mark)** The contract is a financial instrument which swaps cash flows whose purchasing power will decline with inflation for cash flows which are contractually linked to inflation **(0.5 mark)**. The contract is subject to default risk by the party guaranteeing the inflation-linked cash flows. **(0.5 mark)**
- Listed equities. A hypothesis has been advanced over many years that the total returns on listed equities should provide a hedge against inflation **(0.5 mark)** because revenues and profits of companies grow in the long run, in line with real GDP and inflation in the economy. **(0.5 mark)** Evidence suggests that over longer-term periods such as rolling ten-year periods the total return on equities exceeds not only the rate of inflation **(0.5 mark)** but also the return on cash which has been historically closely correlated with inflation over longer periods **(0.5 mark)** and it also exceeds the return on government bonds. These excess returns are known as the Equity Risk Premium. **(0.5 mark)**
- Precious metal commodities (such as gold) are often considered as an inflation hedge. **(0.5 mark)** Although the returns on commodities are not contractually linked to inflation in any way, they have historically had returns in excess of inflation over many periods **(0.5 mark)**



Note to markers: Maximum of 1 mark for each type of asset considered

Before concluding whether a particular type of asset will help mitigate the effect of inflation there is a need to assess or forecast:

- future inflation prospects over various periods; **(0.5 mark)**
- the likely impact of inflation on interest rates and bond yields; and **(0.5 mark)**
- whether the particular assets are likely to achieve total returns in excess of the forecast rate of inflation **(0.5 mark)**

Note to markers: Maximum of 4 marks for Question 2 (e)

END OF QUESTION 2: MARKING GUIDE



QUESTION 3

(20 marks)

You are an investment adviser to a successful musician and composer who receives royalties of \$US 3 million per annum from various streaming services and other sources. The royalties have been growing at a rate of 6% p.a. for the last 20 years. The musician has been offered \$US 60 million to sell the royalties. You have been asked to advise on:

- how to evaluate the offer; and
- if the offer is accepted, how to invest the proceeds in a multi-asset class portfolio with an investment objective of achieving a total return which is 4% p.a. in excess of the rate of inflation in the USA, before investment management costs, when measured over any 8-year period;
- whether quantitative approaches to active equity portfolio management should be favoured over more traditional judgmental processes; and
- how all investments could be made subject to a set of ESG criteria.

To provide this advice:

- a) Prepare a set of notes that will assist the client in understanding how private (unlisted) assets can be valued and the assumptions that need to be made in valuing the royalties. LO 3.1 and 3.2 [M4] (5 marks) (*Command verb: Prepare (Level 6 – Create): Make or get ready for use with a specific intention.*)

The assessment of the offer to buy the royalties for \$60 million is essentially the valuation of a private equity asset- what is a fair price in return for giving up a revenue stream that is subject to several sources of future uncertainty. (1 mark)

Private equity assets can be valued using:

- 1) a discounted cash flow (DCF) approach: or
- 2) a market multiple valuation method if it is customary for the particular type of asset. (0.5 mark)

The key requirement for using a market multiple method is that there are frequent sales of the type of asset and that the assets that are transacted are reasonably similar. (0.5 mark)

For example shares in unlisted tech companies that are not yet profitable are also often bought and sold at a price based on a multiple of revenue. (0.5 mark for an example)

The sale of music royalties is not as common as the sale of unlisted tech firm shares. (0.5 mark).

Transactions are relatively infrequent and there are few buyers. (0.5 mark)



The nature of the assets that give rise to the royalties may also be dissimilar to those where recent sales have taken place. **(0.5 mark)**

Therefore it may be preferable to use a DCF valuation method. **(0.5 mark)**

The DCF will value the net income from the royalties, which is likely to be close to the gross income, as there will be minimal operating expenses (mainly accounting and legal fees). **(0.5 mark)**

The assumptions that need to be made when using a DCF method for valuation are:

- the likely period over which the royalties will continue **(0.5 mark)**
- the gross revenue from the royalties and its future growth rate over time **(0.5 mark)**
- the expense of collecting the royalties and its future growth rate over time **(0.5 mark)**
- the rate of interest at which the net income from the royalties (gross revenue less expense) will be valued (called the discount rate as it discounts future net income in each future period back to its present value today) **(0.5 mark)** (The discount rate is effectively the required rate of return) **(0.5 mark)**

The uncertainties in the continued growth of the net income from the royalties need to be considered **(0.5 mark)**. The uncertainties may comprise:

- The potential impact of new distribution technology (past examples include the invention of the CD, the ipod and the introduction of streaming services) **(0.5 mark)**
- The impact of changes in laws or regulations that may reduce the protection of intellectual property rights or copyright **(0.5 mark)**
- Potential shifts in fashion and taste of consumers, especially if the fan group is ageing and shrinking **(0.5 mark)**
- The impact of an increase in inflation on the level of revenue upon which the royalties are based **(0.5 mark)**

Once the sources of uncertainty have been identified and considered, the potential future growth rate of the royalty income needs to be considered; for example, will it continue at 6% p.a. in the future or will it be less or more? **(0.5 mark)** This will be difficult to judge so the valuation needs to be carried out testing different assumed growth rates, showing the sensitivity of the valuation to changes in the assumed future growth rate. **(0.5 mark)**

There will be some credit risk related to the sources of income, but it is likely to be small. **(0.5 mark)**

There is a version of the DCF valuation model called the Gordon Growth Model that can be adapted to conduct the valuation. **(0.5 mark)**

It is:

$$F=R/(Y-G)$$



Where:

- F is the Fair Price received for giving up the royalties
- R is the current annual royalty income
- Y is the required yield or rate of return that is effectively given up by receiving the Fair Price in exchange for the future royalties- it includes an allowance for the credit risk that attached to receiving the royalties. In practice setting $Y = 12\%$ p.a. may be reasonable in an environment where interest rates are expected to rise.
- G is the assumed long-term rate of growth in the royalties that are being sold. The Fair price should be assessed assuming (a) a continuation of $G = 6\%$ p.a. and (b) a lower rate of 3% p.a. to test the sensitivity of the Fair Price to the assumed growth rate:

(0.5 mark for each component of the model which is defined)

The candidates should indicate how they would test the sensitivity of the Fair Price assessment to changes in the growth and discount rate assumptions. The table below is an example, but candidates are not expected to produce such a presentation.

Scenario	Discount rate (% p.a.)	Assumed growth rate of royalties (% p.a.)	Fair price \$million
Continued growth of royalties, higher inflation	12	7	60.0
Continued growth of royalties, lower inflation	9	6	100.0
Slower growth of royalties, higher inflation	12	4	37.5
Slower growth, lower inflation	9	3	50.0

The model used for the valuation may seem simplistic and it could be replaced by a more detailed DCF model, (0.5 mark) but it is unlikely to reduce the scale of the challenge of setting the two main assumptions: The discount rate at which the sale price is calculated and the assumed rate of growth in the royalties being given up. (0.5 mark)

A higher discount rate will lead to a lower price being acceptable. (0.5 mark) A more conservative view of the growth in royalty income being given up will also lead to a lower price being acceptable. (0.5 mark)

Finally, it should be noted that the royalty income is a single undiversified asset class portfolio with limited liquidity. To make allowances for these aspects of the asset, the potential seller should consider being prepared to accept a higher yield or discount rate at which the sale takes place. (1 mark)



It is for the seller to judge the appropriate level of the rate of return on the royalties and the growth rate of the royalties that is being given up. (0.5 mark)

- b) Prepare a set of notes that will assist in setting the strategic asset allocation to the traditional asset classes equities, bonds, property securities and cash, that will support the achievement of the stated investment objective. LO 4.3 [M5] LO 5.1 [M6] (5 marks)
(Command verb: Prepare (Level 6 – Create): Make or get ready for use with a specific intention.)

The strategic asset allocation (SAA) of a portfolio is the asset allocation designed to meet the investment objective of the portfolio: a total return which is 4% p.a. in excess of the rate of inflation in the USA, before investment management costs, when measured over any 8-year period. This is a challenging objective for most multi-asset class portfolios, when judged against historical experience. (0.5 mark)

It is noted that there is no specified objective for risk or for the volatility of the portfolio return (0.5 mark) and the absence of such a constraint means that the portfolio can have a very high allocation to growth assets (global and domestic equities) (0.5 mark) which will increase the probability of achieving the stated investment objective (0.5 mark) because the short term volatility of returns on global and domestic equities is not relevant. (0.5 mark)

Note to markers: All of the points in the highlighted section above must be included in the answer to achieve a full 5 marks for this question part.

The process of setting the SAA is:

- defining the asset classes to be included for consideration – in this case equities, bonds, property securities and cash;
- forecasting the long-term asset class returns and risk characteristics for each asset class;
- modelling the proposed asset allocation using the forecast asset class characteristics;
- testing whether the proposed asset allocation meets the objectives.
- Establishing a process for rebalancing the portfolio back to its strategic asset allocation because over time the effect of changes in the relative returns of the asset classes will shift the allocation away from the SAA.

(1 mark for setting out all steps of the SAA process because it is explaining the method to the client but is using material readily accessible in the Module)

Note to markers: All of the points in the highlighted section above on the SAA process must be included in the answer to achieve a full 5 marks for this question part.



Long-term return forecasting for each asset class is a key process and the main methods that are available for this comprise:

- Using historical data calculated over a long period (e.g., 20 years or more) that is deemed to include a variety of financial market conditions considered representative of conditions that may be expected to be repeated in the forecast period.
- Using historical data adjusted for changes in financial market conditions that are expected over the next 20 years or more, such as a shift in inflation or interest rate expectations. The adjustments are usually made based on qualitative and subjective assessments of likely economic and financial market conditions.
- Developing scenario analyses, where a number of distinct scenarios for economic and financial market conditions are developed, including forecasts for returns on various asset classes as well as variables such as inflation.

(0.5 mark for each method identified)

Most of the methods used in practice include an element of judgment. The key judgments required are:

- whether past conditions are a reliable guide to the future and
- to what extent adjustments need to be made to arrive at forecast assumptions.

(0.5 mark for each matter of judgment identified)

In practice:

- all three methods are used by major multi-asset class investment managers;
- there is no compelling evidence that any particular method produces better insights or outcomes
- although SAA is intended to be a long term policy, often for ten years or more, it is usually reviewed annually, although not necessarily changed.

(0.5 mark for each point on what is done in practice)

The key decision in building a portfolio is the proportion in equity or growth assets versus the proportion in fixed interest or defensive assets, because it is the main driver of both long-term returns and short-term volatility of returns. **(0.5 mark)**

Given:

- 1) the required margin above inflation which is substantial and approaching the historical level of the Equity Risk Premium;
- 2) the term related to the objective (a medium to longer term rolling 8 years)
- 3) the historical record of asset returns of the four asset classes versus inflation over medium to longer term rolling periods (of 8 years or more);
- 4) the lack of a constraint on volatility of the portfolio return.
- 5) it is likely that the risk of not meeting the objective will be minimised by adopting a very high allocation to equities – 90% or more.



(0.5 mark for each point made above- 2.5 in total)

Some candidates may refer to risk budgeting which is a method whereby the portfolio assets are allocated to asset classes according to their relative contribution to the total volatility of the portfolio return. **Given that there is no specified objective for risk or for the volatility of the portfolio return the use of risk budgeting the set strategic asset allocation would not be appropriate.**

The reference to risk budgeting as a method of setting the strategic asset allocation that “will support the achievement of the stated investment objective” (as required by the question) should therefore be awarded no marks.

The candidates may go on to describe the risk budgeting process as follows:

The process requires assumptions to be made about the risk of the various asset class returns and the correlations between returns of the various asset classes over the forecast period. It does not require assumptions about the expected returns and so is different from the standard mean variance optimisation method. This avoids one of the more difficult forecasting tasks under the mean variance approach. Different investors have different definitions of the risk they are allocating. For example, some investors use volatility of return while others use tracking error as the measure of risk.

This level of detail does not deserve any marks either, given the context set out in the question.

Maximum 5 marks for question 3 (b)

- c) **Analyse the arguments for and against the adoption of a dynamic asset allocation process between the traditional asset classes, as a means of reducing the risk that the investment objective is not met. LO 5.2 [M6] (4 marks) (Command verb: Analyse (Level 4 – Analyse): Separate information into components and identify their characteristics.)**

The potential impact of DAA on the portfolio return depends on two things:

- the direction and magnitude of the asset allocation shifts between the DAA and the SAA **(0.5 mark)**
- the dispersion of returns between the asset classes in which an asset allocation shift has been made. **(0.5 mark)**

Arguments for the use of DAA are that the DAA process:

- assumes that asset classes are often mispriced compared with their long-term valuation and there is evidence that this is the case **(0.5 mark)**
- can, most of the time, take advantage of this mispricing to achieve additional returns **(0.5 mark)** by using:
 - skills in assessing which markets are mispriced and by how much **(0.5 mark)** and
 - judgment based on experience to translate the assessment of mispricing into successfully overweighting and underweighting different asset classes **(0.5 mark)**



- can adjust the asset allocation to capitalise on events and shorter term fluctuations in investment market that may be impossible to predict prior to the event occurring such as the effects of the war in Ukraine started. **(0.5 mark)** This can help to minimise the risk of returns being below 4% + inflation. **(0.5 mark)** The long term strategic asset allocation weights do not consider such events and effects. **(0.5 mark)**

Arguments against the adoption of DAA are that:

- there is a lot of variation between investment managers in:
 - the methods of analysis used in dynamic asset allocation and many of them have not demonstrated that they are based on a plausible investment philosophy or evidence. **(0.5 mark)**
 - the level of skills and experience of the managers employed in the process and some have not had experience that encompasses a variety of investment conditions **(0.5 mark)**
 - the outcomes achieved with a significant proportion of DAA processes not matching or exceeding their benchmarks over many time periods. **(0.5 mark)**
- it can lead to investors 'chasing returns' and tending to buy highly priced assets and sell low priced assets. **(0.5 mark)**. For example, an investor may use momentum to change asset weights, by allocating a higher proportion to assets that have recently performed well. **(0.5 mark)**. However, there is no guarantee that the recent short-term performance is representative of future performance. **(0.5 mark)**.
- It often has a short term focus **(0.5 mark)** and investors are subject to human bias, and emotions can be involved when making short-term investment decisions. **(0.5 mark)**.
- It may be used by portfolio managers to charge higher fees to the detriment of their customers. **(0.5 mark)**.
- There is evidence going back over more than 30 years that:
- active multi-asset class investment, have, on average, subtracted returns through DAA. **(0.5 mark)**
- only a minority of multi-asset class investment managers add value through DAA processes. **(0.5 mark)**

Note to markers: Students need to provide at least two arguments for and two against DAA to achieve the maximum 4 marks for Question 3, part c.

- d) Describe how quantitative processes for active equity management, known as equity multi-factor models, are designed, and operated. LO 6.1 [M7] (3 marks)

(Command verb: Describe (Level 2 – Understand): Provide information about specific items, showing that you understand what those items mean. A description is not a list; each item needs supporting information.)

Equity multi-factor models are quantitative models used to derive the portfolio weights in an equity portfolio. **(0.5 mark)**

Multi-factor models estimate multivariate relationships between historical returns on individual equity securities and historical data on a range of factors **(0.5 mark)** which



are incorporated into a linear model. **(0.5 mark)**

Factors that are often used in these models are:

- valuation indicators (dividend yield, earnings yield, or its reciprocal, the price to earnings ratio, price to book ratio) **(0.5 mark)**
- momentum of equity security price movements **(0.5 mark)** such as a measure of the price relative to a moving average of the price **(0.5 mark)**
- indicators such as the recent volatility of the equity security price **(0.5 mark)** or the movement in interest rates which may have an impact on equity security prices **(0.5 mark)**
- the industry sector of the equity security **(0.5 mark)**

The coefficients relating to each factor are usually estimated using multiple regression analysis applied to historical data. **(0.5 mark)**

The models usually estimate the expected contributions to excess return for the portfolio from factors in the model. **(0.5 mark)** A greater expected excess return from a factor will lead to higher weighting being assigned in the portfolio to that factor. **(0.5 mark)**

The security weightings in the portfolio are then derived from the factor weightings. **(0.5 mark)** The weightings will be subject to any portfolio weighting limits, such as a maximum weighting for any security **(0.5 mark)** either in absolute terms or relative to its weight in the benchmark index **(0.5 mark)**. There may also be portfolio weighting limits placed on portfolio weightings to industry sectors or factors. **(0.5 mark)** Portfolio weighting of securities may also take into account:

- portfolio return volatility constraints (such as portfolio level tracking error) **(0.5 mark)**
- implementation costs; **(0.5 mark)**
- turnover constraints; **(0.5 mark)** and
- the liquidity of each security. **(0.5 mark)**

In practice, when using a multi-factor model to derive equity portfolio weights, the key steps are:

- identify the significant factors which are those where high levels of R-squared over time are obtained. **(0.5 mark)** R-squared is the coefficient of determination measuring how much of the historical data is explained by a model fitted to represent the data. **(0.5 mark)** An R-squared of zero means that there is no explanatory effect in the model. **(0.5 mark)** An R-squared of 100% means that there is a high degree of apparent explanatory effect in the model fitted to the historical data. **(0.5 mark)** We say 'apparent' because we are observing a correlation effect in the data that relates to a particular period rather than a cause-and-effect relationship. **(0.5 mark)**



- assign future expectations to the factor returns in order to forecast security returns. **(0.5 mark)** These expectations are subjective but could be based on macroeconomic or other qualitative analysis. **(0.5 mark)** The securities with the highest expected returns are then assigned higher weights within the portfolio. **(0.5 mark)**

In practice widely used models such as Barra have achieved an R-squared of 30% to 40% which indicates relatively weak explanatory power relating to past data. **(0.5 mark)**

There is no logical reason to believe that a multi-factor model will explain the data in a future period to the same degree as it has in the past. **(0.5 mark)**

Note to markers: students may go on to discuss the advantages or disadvantages of using quantitative methods such as multi-factor models for portfolio weighting decisions. This is not required to answer the question. Maximum of three marks for this question part.

- e) Discuss how ESG criteria could be incorporated in the investment process to be used for managing the portfolio LO 3.2 [M4] (3 marks) (*Command verb: Discuss (Level 2 – Understand): Write about a subject or topic in detail taking into consideration issues and ideas. Provide more than one fact or observation relevant to the topic.*)

Candidates may cite some examples of ESG factors from the following list but should not be given any marks for doing so as this list is readily accessible to them in Module 4.

- environmental
 - climate change and carbon emissions
 - air and water pollution
 - energy efficiency
 - waste management
 - water scarcity
 - biodiversity and deforestation
- social
 - gender and diversity policies
 - human rights
 - labour standards
 - employee engagement
 - customer satisfaction
 - community relations
- governance
 - board composition
 - executive compensation
 - audit committee structure
 - bribery and corruption policies
 - lobbying activities



- o political contributions

ESG factors are often incorporated into the asset selection process by using them to set criteria for either the exclusion (negative screening) or inclusion (positive screening) of assets in the universe of assets to be considered for investment. **(0.5 mark)**

Exclusion or negative screening has so far been more common than inclusion or positive screening. **(0.5 mark)**

Consideration of ESG factors may also influence the assessment of cash flows or discount rates used in the asset valuation process, (called ESG integration) **(0.5 mark)** but this is a less frequent practice **(0.5 mark)**.

Some investors integrate ESG considerations more fully into the valuation of either equity or fixed interest securities. **(0.5 mark)** This is sometimes done by making explicit allowances or adjustments to the cash flows being valued to take into account the increased or decreased risk of the loss of cash flow due to, for example, customer purchasing behaviour changing as a result of an ESG issue. **(0.5 mark)** It may also be done by adjusting the valuation factors used to value the cash flow such as the discount rate in a DCF method or the PE ratio or Price to Book ratio where a market multiple-based method of valuation is used **(0.5 mark)**

For example, poor customer satisfaction policies may have an adverse impact on revenue growth **(0.5 mark)** and, therefore, reduce the value of an equity security or increase the risk of default on a debt security. **(0.5 mark)**

Some investors have used the term 'ethical investing' to refer to investment processes that take into account what are also known as ESG factors. **(0.5 mark)** The emphasis on ethical investing has mainly been directed towards excluding investments in equity or debt securities of issuers that fail to meet one or more defined ESG criteria. **(0.5 mark)** This emphasis places importance on the consideration of the values of the investor, **(0.5 mark)**. In practice it is often difficult to achieve consensus on which ethical or ESG factors should be given more significance in the asset selection process. **(0.5 mark)**

Other descriptive terms which overlap with ESG investing (and need to be well defined in order to be understood) are:

- responsible investing
- socially responsible investing
- sustainable investment which may allow a shift in emphasis away from simple inclusion or exclusion, towards the impact of ESG factors on the valuation of the investment. For example, a company that has employment practices that are considered unacceptable by a large proportion of consumers may suffer adverse reactions, which leads to reduced revenue growth and reduced profitability.
- impact investing", which refers to attempts to measure the positive environmental or social outcomes of a given investment.

(0.5 mark for the mention of any of these terms and 0.5 mark for indicating the need for a clear definition of what they mean)



It is a measure of how much the use of ESG factors has grown and is likely to continue growing that there are now a number of commercially available services that offer assistance to investors by establishing an ESG or sustainability rating on equity and debt securities and for managed funds that invest in them. **(0.5 mark for this sort of point)**

Investors often incorporate external ESG ratings into scoring and ranking systems that assist with decisions on positive or negative screening on ESG grounds. **(0.5 mark)**

As the trend towards applying ESG factors has accelerated, there has been an increase in the number of investment products labelled ESG. Some of this involves what is called 'greenwashing', where investment managers overplay the ESG aspects of what they are actually doing in the management of portfolios in order to enhance the marketing appeal of the product. **(0.5 mark for this sort of point)**

END OF QUESTION 3: MARKING GUIDE



QUESTION 4

(20 marks)

You are the investment consultant to the Board of Trustees of a Fund. It is a \$50 billion defined contribution superannuation and pension fund. It offers its members a life-stages range of multi-asset class investment options where:

- the asset allocation to growth assets such as equities and property reduces with age
- the allocation to defensive assets such as cash and fixed interest increases with age.
- the investment policy of the Fund requires all of the allocation to growth assets to be invested in listed equities
- the allocation to listed equities is 50% in domestic equities and 50% in global equities.

The asset allocation to growth by age group and the proportion of members in each age group is currently as follows:

Member age last birthday	Strategic asset allocation to growth assets	Proportion of members	Proportion of member funds	Proportion of members in the age group who are drawing pension payments
Under 50	90%	40%	24%	0%
50-59	70%	30%	29%	5%
60-69	50%	20%	33%	60%
70 and over	30%	10%	14%	90%
All members		100%	100%	22.5%

A new law has been introduced whereby the Trustees of the Fund must assist the members who are drawing pensions (defined as "in retirement") to balance the following objectives:

1. To maximise expected retirement income over the entire period of retirement (defined as the period during which they are drawing a pension from the Fund);
2. To manage expected risks to the sustainability and stability of expected retirement income over the period of retirement (i.e., make the pension last as long as possible while reducing its variability from year to year); and
3. To have flexible access to expected funds over the period of retirement (i.e., be able to withdraw lump sums.)

In response to the new law, the Trustee has surveyed the members of the Fund and it is now known that members have requirements for income in retirement and lump sum



withdrawals that differ according to their overall circumstances and are not a simple function of age.

- a) Relate how the expected returns of each of the four life-stages investment options may be affected by expected inflation and interest rates and conditions in equity and bond markets over the next three years. LO 1.2 [M2] (6 marks) (*Command verb: Relate (Level 3– Apply): Find or show the connection between two or more things.*)

The candidate needs to set out a view on the outlook for each of inflation, interest rates, bond markets and equity markets over the next three years and then relate how the outlook may impact the returns on each of the four life-stages investment options of the fund. One way of answering this question would be to set out a scenario that contains 8 inputs and 4 outputs. The growth assets of all four investment options are stated to be invested in global and domestic equities. The candidates may use the Australian equity market as the domestic market and the US equity market as a proxy for global equities (given that it comprises over 60% of global equities). An example of how the inputs and outputs could be summarised is set out in the following tables:

Outlook 2022-2025	USA	Australia
Inflation % p.a.	Falling from 9% p.a. to 5% p.a. due to a recession in 2023	Falling from 7% p.a. to 5% p.a. due to a recession in 2023
Interest rates % p.a.	Fed Funds Rate rises from 1.5% p.a. to 3.50% p.a.	RBA cash rate rises from 1.25% p.a. to 4% p.a.
10 year Bond: yield and return over the period	Yield rises from 2.8% p.a. to 3.6% p.a. Return over three years averages 0.7% p.a.	Yield rises from 3.4% p.a. to 4.0% p.a. Return over three years averages 0% p.a.
Equity market return over 3 years % p.a.	3% pa.	1% p.a.

Award 2 marks for a clear summary of the inputs.

The outputs, i.e., the expected returns could be summarised as follows:

Outcomes for Life-Stages returns over 2022-2025 (% p.a. return)	Strategic asset allocation to growth assets	Estimated or Forecast Return % p.a, 2022-2025
Under 50	90%	1.8%
50-59	70%	1.4%
60-69	50%	1.0
70 and over	30%	0.6



Award 2 marks for a clear summary of the outputs.

If the candidates outline a scenario such as that set out in the tables above, then they should relate the input to the outputs and make comments such as:

- Low returns on all Life-Stages investment options **(0.5 mark)**
- Negative real returns on all Life-Stages options – loss of purchasing power for all members. **(0.5 mark)**
- Declining returns as the defensive allocation is increased – affecting older members more adversely **(0.5 mark)**
- The rigidity of the Life-Stages framework **(0.5 mark)** and its potential adverse impacts on older members **(0.5 mark)**
- Possible divergence of economic conditions and equity market returns in the USA and Australia as has happened previously in 2000- 2001 (USA< AUS) and in 2016-2019 (USA> AUS) **(0.5 Mark)**
- the weighting to the domestic equities may make the return outcome of the investment option dependent on a single equity market **(0.5 mark)**

Note to markers: Award maximum of 2 marks. If the candidate outlines a different scenario for inflation, interest rates, equity markets and bond markets, then a different set of comments which logically and reasonably follow the scenario should be made and marks awarded as long as the candidate explains the scenario and its effect on each of the four life-stages investment options.

As an example, another, more concise way of answering the question is set out below:

- Current Market Conditions in USA and Australia are as follows:
 - High inflation, which is eroding the purchasing power of income
 - Rising central bank interest rates to reduce inflation
 - Rising bond yields due to inflation concerns
 - Equity prices have fallen significantly in the last 6 months due to rising inflation and bond yields

(No marks for stating current conditions)

- Conditions in the next three years
 - Inflation may continue to be higher than in the last ten years.
 - Bond yields may stabilize at a higher level
 - Equity market returns may be more volatile with larger drawdowns than in the past ten years.

(2 marks for stating conditions in the next three years)

- The impact on individual members will depend on which life stage they are in i.e., mainly due to their allocation to equities.
- For younger members (below 50), the conditions generally favourable for them as:
 - They are still earning income and saving towards their retirement



- o Effectively investing in equities at reduced prices and into bonds at higher yields means that their future returns may be high
- o If so, they will have higher retirement balances in the future
- o Rising inflation may have less impact to them as wages may rise in tandem with inflation, preserving their purchasing power

(1 mark for relating conditions to outcomes for this type of member in this amount of detail)

- For the older members above the age of 60, the conditions are unfavorable for them:
 - o Likely are no longer working or have fresh fund to invest
 - o Recent increase in interest rates and bear market for equities would have significantly impacted their account balances as prices for both equities and bonds have fallen
 - o This means that pension payouts have to decrease to ensure sustainability
 - o In addition, inflation will further erode their purchasing power both in the near and long term

(1 mark for relating conditions to outcomes for this type of member in this amount of detail)

4 out of 6 for this type of answer at this standard

- b) Describe with reference to return and risk the advantages and disadvantages of the life-stages structure of the investment options. LO 5.2 [M6] LO 1.2 [M2] LO 9.3 [M10] (4 marks)
(Command verb: Describe (Level 2 – Understand): Provide information about specific items, showing that you understand what those items mean. A description is not a list; each item needs supporting information.)

Advantages are:

- The Life-Stages structure of the investment options provides a predictable path for the reduction in the asset allocation to assets with more volatile short term returns as the member gets older
- The rationale for this conforms with concept of reducing risk as measured by the volatility or standard deviation of annual portfolio returns, for older people, who do not have the capacity to restore wealth from income as they have left the workforce.
- The structure and its rationale fit comfortably with widespread views among financial advisers and actuaries

Disadvantages:

- The assumption that older people have a greater need to reduce the volatility or standard deviation of annual portfolio returns may not be valid.
- The volatility or standard deviation of annual portfolio returns may not be a valid measure of the risk as people age



- The automatic reduction in the allocation to growth makes it more difficult for older members to achieve the objectives of maximising their retirement income over the whole period of retirement and sustaining their retirement income over a long period as set out in the new law.

Note to markers: 1 mark for each advantage or disadvantage that is clearly described. The candidates need to set out at least 2 advantages and 2 disadvantages. Maximum 4 marks for question 4 (b)

- c) **Propose an alternative way of offering members a choice of investment options that will assist them to meet the objectives referred to in the newly enacted law. LO 5.3 [M6] LO 9.4 [M10] (6 marks) (Command verb: Propose (Level 6 – Create): Select and communicate a solution, action or range of possible solutions/actions. Rationale, reasons or justification must be included.**

An alternative way of offering the members a choice of investment options would be to offer members the capacity to choose the investment option that meets their needs and matches their long-term risk tolerance, and balances the competing and conflicting objectives of:

- Maximising their expected retirement income over the period of retirement (defined as the period during which they are drawing a pension from the Fund);
- Managing expected risks to the sustainability and stability of expected retirement income over the period of retirement (i.e., make the pension last as long as possible while reducing its variability from year to year); and
- Providing flexible access to expected funds over the period of retirement (i.e., be able to withdraw lump sums.)

(The candidates should set out an alternative that addresses the objectives set out in the new law. Maximum 3 marks)

This approach would comprise a range of investment options with an increasing proportion allocated to growth assets- as exists in the current Life-Stages structure, but it would decouple the members from automatic assignment to an option based on their attained age.

(1 mark for specifying the new structure of the investment options)

There would be a need to assist members in the choice of the investment option using an education and planning tool that allows them to make an informed choice of investment option **(1 mark)**

As every Member has their own circumstances, risk preferences, needs and wants, the Fund would need to provide a retirement income strategy projection model (RISP model) which could be used by the member, to balance the three competing objectives by taking into account:



- the member's age, gender, and account balance
- the member's social security entitlements
- the expected rates of return for each asset classes over the lengthy periods of time envisaged for the payment of the retirement incomes
- the asset allocation of the available investment objectives
- assumed mortality rates for men and women
- the impact of taxation upon returns and retirement income.

(0.5 mark for each element of the RISP model)

The RISP model needs to be user friendly for members to use **(0.5 mark)** and could have either a deterministic or stochastic structure. **(0.5 mark)**

Note to markers: Another way of answering this question part is set out below:

An alternative way of offering members investment options is for members to specify their preferred method of drawing down funds in the retirement phase. **(0.5 mark)** Some members may not draw down any funds until they are much older and well beyond the traditional retirement age of 65, some may start drawing a pension as soon as they reach the age of 60, while others may simply take a lump sum as soon as possible. **(0.5 mark for an example of two different member preferences)**

When a member specifies their retirement drawdown plan, the investment funds can be appropriately structured to meet the 3 objectives of the new law: **(1 mark for this type of point)**

For example, someone who does not plan to draw funds until the age of 70 will have a higher allocation to equities relative to the life-cycle option for their age as set out in the table. This is as their funds have a longer investment time horizon and there is further time for equities to recover in the event of a drawdown. This helps to meet the first objective of the new law by maximising the investment balance of the member which will probably lead to a larger total income in retirement. **(1 mark for this type of point)**

Alternatively, if the member expects to use their superannuation as a source of income that is less affected by equity market fluctuations, a high allocation to fixed interest assets may make the retirement income more stable from year to year. A 30% allocation to equities, as per the life stages table, may not be low enough for a member who wants to use their superannuation in this way. This helps to meet the second objective of the new law by managing the risks to the sustainability and stability of retirement income. **(1 mark for this type of point)**

Meanwhile, someone who plans on taking a full lump sum at age 60 may want a high allocation to defensive assets such as cash, leading up to the age of retirement. This will ensure that their lump sum balance does not suddenly drop due a decrease in equity prices at the time of retirement. This helps to meet the third objective of the new law by providing flexible access to lump sums. **(1 mark for this type of point)**

Note to markers; there is more than one way to answer this question part.



Maximum 6 marks for Question 4 (c)

- d) Explain the parts of the Fund's investment policy and process that may need to be changed to implement the proposal that you have made. LO 9.4 [M10] (4 marks)

(Command verb: Explain (Level 4 – Analyse) Give an account of something with the goal of clarifying it to someone or making something easier to understand. Calls for even more information than describe, showing that you can convey 'why' or 'how' or 'so what'. A connection is expected between the item(s) and something else.)

The main change required to the investment policy is providing members with a choice of investment options and removing the automatic linkage between the member's attained age and the investment options. **(1 mark)** to instead provide for their assessed needs such as the meeting the three key objectives required by the new law. **(1 mark)**

There may be a need to change the Strategic Asset Allocation (SAA) of the Investment options, if it is considered range of choices could be improved **(0.5 mark)** or if there has been a significant shift in the expected long term returns of the various asset classes. **(0.5 mark)** If the SAA needs to be changed, the rationale for the change should be set out in the revised Investment Policy of the Fund. **(1 mark)**

No changes within each asset class are expected **(0.5 mark)** but some candidates may propose some, and if so, the rationale for the change should be set out in the revised Investment Policy of the Fund. **(0.5 mark)**

Given the importance of the Strategic Asset Allocation (and the choice of Investment Option) and its impact on each member's long-term well-being, **(1 mark)** the Investment Policy Statement should provide for the preparation and maintenance of up-to-date educational material on investment decision making. **(0.5 mark)** This should include case studies based on last 40 years return patterns **(0.5 mark)** but a with a caution that historical patterns of return on different asset classes are seldom repeated. **(0.5 mark)**

An alternative way of expressing an answer to this question part is as follows:

The investment policy will need to be changed to state that the goal of the investment process is to meet the 3 objectives of the new law. **(0.5 mark)**

The strategic asset allocations of the investment options will be changed to meet the retirement needs of members. **(0.5 mark)**

The fund's investment process will need to be changed by no longer having the investment allocations linked to age. **(0.5 mark)**

As found by the survey, there is not a simple relationship between age and ideal asset allocation. **(0.5 mark)**



Instead, the members preference for income in retirement should be used in conjunction with age to determine the appropriate strategic asset allocation. **(0.5 mark)**

For example, the current table can be the starting point for the SAA. **(0.5 mark)**

The member's preferences can then be used to select the investment option with the SAA appropriate to their identified needs. **(0.5 mark)**

These changes in investment policy and investment process will need to be clearly communicated to members to ensure that they are aware of the changes being made, and why they are being made. **(0.5 mark)**

Members will need to understand why the asset class weights of the investment options may have been changed. **(0.5 mark)**

END OF QUESTION 4: MARKING GUIDE

END OF MARKING GUIDE