

Actuarial Society of South Africa

EXAMINERS REPORT

12 May 2026

Subject F205 - Investment

Fellowship Applications

The paper was written in online format, using the ASSA platform and the exam setting and marking process was undertaken as normal.

The paper's three questions explored practical investment challenges relevant to investment actuaries and included a mix of longer sub-questions carrying higher marks and shorter sub-questions with smaller mark allocations. Question 1 (36 marks) provided a company balance sheet and dealt with currency hedging as well as outsourcing of a substantial PRMA liability. Question 2 (36 marks) delved into recent gains in precious metal prices and the impact on smoothed bonus and structured products. Question 3 (28 marks) focused on a retirement village's life rights scheme and the investment strategy for the village's investment fund.

The exam covered various investment concepts, requiring candidates to have a solid understanding of the F205 syllabus to be able to comment on the impact of economic scenarios, evaluate and manage liabilities, analyse and compare investment products and strategies and solve practical challenges that investment actuaries might encounter.

A handful of high quality scripts, deserving of a pass, were submitted by well-prepared candidates. Another script was in the region of the pass mark but fell short of the level required to merit a pass, so achieved FA. The majority of candidates scored FB, with a few scoring FC and none at FD. The average mark for this exam was lower than previous sessions. The overall result was that 17% of candidates passed.

Please note that this examiner report presents one possible model solution to the questions. Alternative solutions provided are considered and marks awarded where correct points are well motivated.

QUESTION 1

Examiner Comments:

Question 1 provided a company balance sheet and asked candidates about currency hedging and then delved into the PRMA liability on the balance sheet and the implications and options in terms of outsourcing the liability to an insurer as well as the investments required to back such liabilities.

Part (i) asked for the merits of hedging currency risk. This was generally well answered.

Part (ii) needed a simple method of hedging currency using borrowing and was surprisingly poorly answered.

Part (iii) explored derivative-based strategies for hedging the currency risk. Candidates mostly had a good idea of these strategies. Marks were awarded for alternatives, but their shortcomings needed to be mentioned as not all strategies make sense for this specific case.

Part (iv) asked for considerations to include in a report on outsourcing the PRMA liability. Some solid answers from candidates, but many only dealt with the basic issues and so missed out on most of the available marks.

Part (v) was a short question about the practical challenges related to the policy of insurance. Most candidates did not have a good grasp of the practical matters.

Part (vi) quizzed candidates about the insurer's investment strategy to back the liabilities. The question was well answered, with most candidates showing a good understanding of the investments required.

Part (vii) considered an alternative solution and the investment strategy that would be appropriate. Given the good answers to part (vi) the answers to this question were mostly disappointing as candidates failed to consider the nuances associated with this slightly more unusual type of structure.

i.

- If there are no USD liabilities on its balance sheet, the company is "long" the US Dollar, i.e. ZAR value of USD is "locked in", meaning it benefits if the Rand weakens, but faces a financial threat if the Rand strengthens.
- With only R50 million in equity, a significant appreciation of the Rand could negatively impact the company's net worth.
- The cost of hedging needs to be considered relative to the risks / potential downside of remaining unhedged.
- Inherent hedging – it's possible that some of the company's liabilities are denominated in USD.
 - A portion or all of its "Long Term Loans" of R100m may be denominated in USD.
 - It could be sourcing its inventory from the US, with the USD receivable being used to meet these payables.
 - Some portion of the Trade payables might relate to this Receivable i.e. input costs - with aligned terms.
 - It could be sourcing its Property, Plant and Equipment from the US, with the USD receivable being used to meet these payables.
 - Some of the PRMA obligation may relate to medicines priced in USD.

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ii.

- Borrow USD today (at an amount that, with interest, equals \$5 million in two years).
- Convert that USD to ZAR immediately at the current spot rate.
- Invest the ZAR in a South African interest-bearing account or use it to pay down high-interest ZAR debt.
- In two years, use the \$5 million received from the US company to repay the USD loan.

The "cost" of this hedge is primarily determined by the **interest rate differential** between South Africa and the USA.

To estimate this, make the following assumptions (using typical market rates for 2026*):

- **Spot Rate:** R16.00 / \$1
- **USD Borrowing Rate:** 5% per annum
- **ZAR Deposit Rate:** 7% per annum
- **Time:** 2 years

The company needs to borrow the present value of the \$5m = $5m / (1.05^2) = \text{USD } 4\,535\,147$

The company will convert the borrowings to Rands and deposit it in ZAR and in 2 years' time will have $4\,535\,147 * 16 * (1.07^2) = \text{R}83\,076\,644$

Since the exchange rate hasn't moved, this equals USD 5 192 290

The hedge has generated a profit of USD192 290.

[4]

iii.

Since the payment is due in two years, the company needs a hedging solution with a similar term.

Forward Exchange Contract (FEC)

- A FEC is a binding agreement to sell the \$5m at a fixed ZAR exchange rate on a specific date two years from now.
- The company contacts a bank and "locks in" a forward rate today.

Pros:

- With the exception of credit risk, it provides absolute certainty for cash flow planning.
- There is usually no upfront cost.

Cons:

- The company cannot benefit if the Rand weakens further (e.g. if the USD/ZAR goes to 20).
- It is also a binding obligation; if the US client defaults and doesn't pay the receivable, the company still owes the bank the Dollars.
 - Also credit risk on FEC counterparty.
- Margin requirements with impact on cash flow.
- Roll over risk of contracts with shorter terms than required.

Currency Options (Put Option on USD)

- Buying a Put option gives the company the right, but not the obligation, to sell the \$5m at a pre-determined "strike price."
- It acts like an insurance policy. If the Rand strengthens (USD falls), you exercise the option to sell at the higher strike price. If the Rand weakens (USD rises), you let the option expire and sell the Dollars at the better market rate.
- Pros: Protects against the "downside" (Rand appreciation) while allowing the company to profit from "upside" (Rand depreciation).
- Cons: Requires an upfront premium payment. Given the company only has R50m in cash, a large premium might be a liquidity strain.

[Other solutions like currency swaps and cross-currency swaps require the upfront exchange of principal, so are structurally invalid for the purpose outlined in the question. Partial marks may be awarded for mention of these together with their weaknesses. Marks may also be awarded for other valid options.]

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iv.

For and against:

- Beyond just the valuation numbers, there are several practical and strategic drivers for this decision:
 - Transfer of actuarial risk: The company is likely an expert in its core business (e.g. manufacturing or services), not in predicting healthcare inflation or human longevity. An insurance company is better equipped to manage these specific risks.
 - Management focus: Administering a PRMA scheme requires significant internal resources, HR time and legal compliance. Outsourcing allows management to focus 100% on core operations.
 - Tax efficiency: The premium payment made to an insurer to take over the liability may offer immediate or structured tax deductions, depending on how the deal is structured under the Income Tax Act. The tax benefits may influence the decision and impact the company's valuation.
 - Certainty / security for retirees: Employees and retirees often prefer their benefits to be backed by a regulated insurer rather than the balance sheet of a single company, which could face insolvency. The opposite is also true i.e. employees trust the company who promised the benefits and may raise concerns about an unknown outsourced provider, even if it's an insurer. There is thus reputation risk.

Factors to consider:

- There are different types of outsourcing arrangements to consider – full outsource (buy out) where the insurer takes over the obligation to retirees or insuring the liability (buy in) where the company retains the liability but backs it with a matched insurance policy.
- Practical issues like whether to close the benefit to new employees, active employees or pensioners or only a subset of these.
- Outsourcing a PRMA liability is a significant strategic move, especially for this company where the PRMA obligation (R350m) represents nearly 64% of total liabilities.
- Current price of annuities – may be favourable due to interest rates or mortality assumptions or insurer competitiveness / price war.

- If the company's retirement fund has an Employer Surplus Apportionment, then it is possible to utilise this surplus, in line with certain provisions, to compensate employees through an injection into their retirement fund credits (utilising the surplus) in exchange for removing the PRMA benefit. This may be used to reduce the impact on the company's finances / cashflows.

Impact on Company Valuation:

- Valuation of the company is generally driven by the Discounted Cash Flow (DCF) model or Earnings Multiples. Outsourcing PRMA impacts both.
- PRMA liabilities are subject to annual actuarial valuations, which can change significantly in response to changes in:
 - interest rates
 - medical inflation
- Relative actuarial valuation bases – if the company's actuary is very conservative and the insurer is less so, then some reduction in the liability may emerge. The opposite may also occur and give rise to a liability increase.
- The "actuarial gains or losses" of PRMA can swing earnings or Other Comprehensive Income (OCI) wildly.
- Removing the volatility of PRMA adjustments makes the company's future profit become more predictable; resulting in:
 - Reduction in cost of equity
 - PRMA liability is a "debt-like" obligation. It carries significant actuarial risk (longevity risk and medical inflation risk).
 - By transferring this risk to an insurer, the company's "beta" (riskiness relative to the market) likely decreases.
 - A lower risk profile leads to a lower Cost of Equity, increasing the DCF valuation.
- Because the company is less risky, it may be able to negotiate lower long-term borrowing interest rates.
 - The company currently has a very thin equity "cushion" (R50m).
 - A large R350m liability sitting on the balance sheet makes the company look highly leveraged.
 - Removing the PRMA liability improves solvency ratios, potentially improving the company's credit rating and lowering the cost of future debt.
 - This improves earnings and thus the valuation.
- An insurance company will want to make a profit in exchange for taking on this R350m risk. They will likely demand a premium higher than the R350m book value;
 - resulting in an immediate reduction in the company's reported profit and valuation.

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v.

Liquidity

- The Funding Gap: The balance sheet reflects only R50m in cash. To "buy out" a R350m liability, the company would likely need to:
 1. Issue new shares (diluting current shareholders).
 2. Take on new Long-Term Loans (simply swapping one liability for another).
 3. Sell PPE (Property, Plant, and Equipment); but this would likely impact operations.
 - Unless it's something like a physical property, which the company could then rent back after it's sold.
 4. Potential CGT implications triggered by any sale of assets to pay the premium(s).

- Note: The activist shareholder's suggestion is theoretically sound in relation to valuation considerations, but practically difficult given the company's current cash position.

Clean Data

Before an insurer provides a quote, they require detailed and accurate data.

- Any gaps in this data can lead to the insurer increasing the premium to cover the uncertainty i.e. a risk reserve.
- The practical challenge is that companies may lack historical records for some retirees, such as the health status of dependents, or even complete lists of dependents.

Affordability

- Premiums may be too high.

[3]

vi.

Before buying assets, the insurer must project the cash flows.

- Projecting exactly when payments will be made over the next 30 to 50 years based on:
 - Appropriate mortality tables.
 - Medical inflation historically runs **2% to 4% above CPI**.
 - Allowance for new entrants – as well as active members (not yet in payment) vs pensioners (in payment).
- **Duration Calculation:** Determining the sensitivity of the R350m liability to interest rate changes. If interest rates drop, the present value of the PRMA obligation rises; the assets must do the same.

Matching Portfolio

- There are no investment securities that match medical inflation:
 - **Government Inflation-Linked Bonds (ILBs)** provide the closest match for PRMA liabilities.
 - Whilst an allowance/assumption must be built in for medical inflation being higher than CPI inflation (e.g. x% higher), there will still be profits or losses every year, resulting from medical aid inflation being lower or higher than $CPI+x\%$.
- **Interest Rate Swaps** may alternatively be used,
 - but they are also only available for CPI inflation (not medical).
- The swaps or bonds will be used to match the **duration** of the liability to cancel out interest rate risk.
- **Cashflow matching:** The assets should also be set up to produce cash flows to meet the monthly medical aid contributions of current retirees.
 - This may require some assets to be invested in short-term cash and money market assets, to meet short-term needs.
- Include small allocation to corporate bonds for higher yield to (partially) match medical inflation (although default risk higher and limited issuance of ILBs).
- Include small allocation to equities (potentially medical suppliers, hospitals, pharmacies and other medical stocks) and property to attempt to match longer dated liabilities and medical inflation.

[5]

vii.

- This strategy splits the liability into a fixed core (covered by level annuities) and a variable increase (funded by the growth portfolio).

- Purchasing an inflation-linked annuity is significantly more expensive than a level annuity because the insurer charges a high risk premium to guarantee future medical inflation. This strategy reduces the upfront capital outlay.
- By keeping a portion of the assets in a growth portfolio (equities, property, etc.), the company may achieve returns that exceed medical inflation. This could ultimately lower the total cost of funding the liability compared to a fully insured solution.
- The "base" level of the liability is removed from the company's balance sheet. The insurer takes on the longevity risk for that base amount meaning that if pensioners live longer than expected, the insurer is responsible for those base payments.
- Unlike a full buy-out, the company retains some control over the growth assets. If the portfolio performs exceptionally well, the surplus could potentially be used for other corporate purposes (depending on the legal structure of the fund).
- Medical inflation risk is the most significant drawback. Medical inflation is volatile and often runs several percentage points above standard CPI. If the growth portfolio underperforms while medical costs spike, the company will face a funding shortfall.
- Since the company needs to sell growth assets every year to purchase new level annuities, they are "forced sellers" at the set date each year. If the market crashes in a particular year, the company may have to sell assets at the bottom to fund the required annuity increase.
- While level annuities generally get cheaper as a person gets older, the cumulative effect of purchasing new "slices" of annuities every year can be administratively burdensome and is subject to the interest rate environment at the time of each purchase.
- The investment strategy for the growth portfolio will depend on the company's:
 - risk appetite
 - level of assets it can make available. The more assets available, the less the need to take on investment risk.
- The growth portfolio must likely target a return well in excess of CPI inflation.
- With their high long-term expected real returns, SA Equities are likely to be the primary asset:
 - The insurer might include "natural hedges"—companies like Netcare, Life Healthcare, Aspen or Discovery.
 - If medical costs rise, these companies often see increased revenues, protecting the portfolio's purchasing power.
- Similarly, Global Equities have high long-term expected real returns:
 - Specialised medicines, medical equipment (MRI machines, etc.), and patents are often priced in USD or EUR.
 - By holding global stocks (S&P 500, Euro Stoxx as well as specialist medical stocks, pharmaceutical and other healthcare supplies not available / listed in SA), the portfolio gains value when the Rand weakens, helping to offset the rising Rand-cost of imported medical supplies.
- Property offers a hybrid of equity-like growth and bond-like income.
 - Many commercial leases in South Africa have built-in annual escalations linked to inflation.
 - Listed property would be easier to manage from a liquidity perspective.

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[Total 36]

QUESTION 2

Examiner Comments:

Question 2 explored the recent gains in precious metals prices during 2025 and early 2026 and their impact on the SA economy. The question then considered the impact on smoothed bonus funds. Finally, candidates were asked about the design of a structured product to provide precious metals exposure.

Part (i) asked for the possible reasons behind precious metals price moves and part (ii) questioned the impact on the SA economy. Although some candidates did not fully understand the reasons behind the price moves (especially in relation to PGMs), most candidates did provide good answers to part (ii).

Part (iii) needed candidates to explain the impact of the increased concentration of the stock market index in mining shares on bonus policy for a smooth bonus product. Many candidates did not explain this well.

Part (iv) carried higher marks and considered the impact of changing the index utilised by the insurer. Most candidates understood the link between index construction and underlying constituents, but many candidates only mentioned some of the points and failed to fully explore all the angles.

Part (v) asked about the design of a structured product and then part (vi) followed by enquiring how to improve the participation rate of the product and finally part (vii) covered the risks in offering the product. This section of three sub-questions was very poorly answered, with many candidates demonstrating a very poor understanding of structured products. Only a handful of candidates scored well.

i.

- Geo-political tensions spurring de-dollarisation: following Russia's invasion of Ukraine in February 2022, Western countries froze ~\$300bn in Russian Central Bank assets. This weaponisation of finance essentially broke a fundamental assumption - that sovereign reserves held in Western financial systems were inviolable. The rational response for any central bank worried about potential geopolitical friction with the West was to shift toward gold.
- Central bank buying: gold has now surpassed U.S. Treasuries as a share of central bank reserves for the first time since 1996.
- US fiscal concerns: erosion of US fiscal discipline (the US is forecast to run very large budget deficits for the foreseeable future) has deepened concerns about long-term dollar stability.
- Monetary concerns: the assault on Fed independence is leading to investor fears that the Fed loses its ability to maintain price stability.
- Increase in investor demand: gold-backed ETFs posted a record \$26 billion inflow in Q3 2025 alone.

Platinum group metals:

- Persistent supply deficits. The platinum market has been in deficit for multiple consecutive years, with the 2025 shortfall leading to above-ground stocks falling below a critical threshold.
- The electric vehicle (EV) narrative has reversed. The predicted collapse in PGM demand from electrification hasn't materialized. Hybrid vehicles, now 20% of global sales and the fastest-growing segment, actually require 10–20% more PGMs per vehicle than traditional internal combustion engines (ICE). The EU's policy reversal on its 2035 ICE ban further extends the demand runway.

- Tariffs and Russia risk. US tariffs have had a pronounced impact on PGM markets, and the risk of duties on Russian palladium is a concern. About 90% of global PGM reserves are concentrated in SA and Russia, creating supply concentration risk.
- Platinum substitution for gold in jewellery. Record gold prices have created an unexpected demand driver: jewellery substitution.
- Investor demand for PGMs has also increased reflecting expectations of the valuation gap with gold reducing.

[4]

ii.

- Supports employment in mining sector. Good for SA which has high unemployment.
- Supports fiscal revenues: government benefits from higher mining royalties, corporate taxes from mining companies, personal income tax from mining employees and dividends tax on distributions to shareholders. Thus good for budget deficit.
- Supports current account and balance of payments:
 - Higher export revenues from precious metals improve the trade balance and current account.
 - Foreign investors seeking exposure to SA mining companies may increase portfolio inflows into JSE-listed equities.
- Rand: precious metals are among the country's largest exports. Positive for terms of trade – supportive of rand. Foreign investor portfolio inflows into SA shares (described above) would further support the rand.
- Inflation: mixed impact
 - Demand pull inflation from higher wages and employment.
 - Cost push inflation likely to be minimal.
 - Rand effect likely to be deflationary - a stronger rand reduces the cost of imported goods (incl. petrol), which is a significant disinflationary force in SA, where imports constitute a large share of the CPI basket.
- Interest rates:
 - If the precious metals boom leads to rand strength and lower imported inflation, the SARB may have scope to cut interest rates.
 - Conversely, if the boom generates strong domestic demand growth and demand-pull inflation, the SARB may need to raise rates to prevent overheating.
 - An improved fiscal position and lower government debt could support lower interest rates at longer maturities on yield curve by lowering SA credit risk.

[5]

iii.

- Precious metals shares are among the most volatile on the JSE, driven by commodity price cycles and significant short-term price swings, exchange rate movements and operational risks.
- With the ALSI benchmark now having a quarter of its weight in this single sector, the underlying equity portfolio is significantly more volatile than it was a year ago.
- This makes the smoothing task harder — larger swings in asset values mean the Bonus Stabilisation Reserve (BSR) must absorb greater fluctuations.
- Funding level volatility: The funding ratio of assets to liabilities (vested bonuses) will be more volatile than historically, making it more difficult to manage the funding level within a target range (say for example a 90%–110% corridor).
- A sharp precious metals correction could breach the lower bound rapidly, requiring either shareholder support or benefit reductions through lower future bonuses, neither of which is desirable.

- However, the recent strong bull market, led by resources, is likely to have resulted in bonuses lagging actual underlying returns – meaning the BSR may offer some cushion.
- Managing a smoothed bonus product to ensure policyholders' reasonable expectations are met requires the level of BSR to be managed within reasonable bands to protect investors and limit antiselection. Large market movements up or down may lead to extreme levels of BSR (either positive or negative). In such cases, new series of the smoothed bonus product may be launched to protect and ensure fairness for existing, new and terminating investors.
- There is wider uncertainty in projecting forward returns when setting bonus rates.
 - When performance is driven by a narrow sector rally, it is harder to distinguish between sustainable earnings growth and a cyclical commodity price spike.
 - If precious metals prices continue to rise, the fund accumulates surplus that must eventually be distributed, potentially creating expectations of high bonuses that may not be sustainable.
 - Conversely, if precious metals prices reverse sharply the fund could move rapidly from a well-funded to an underfunded position.
- The method of determining and declaring bonuses will matter:
 - If it is mostly at the discretion of a committee of actuaries, they must therefore be more conservative in declarations during the current period of elevated precious metals prices, potentially frustrating policyholders (and ABC's distribution and retention teams) who see strong headline market returns as well as strong market-linked competitor returns but receive modest bonuses.
 - If it is formula driven, then the formula will drive the level of bonuses, with little or no ability to adjust them to take account of the current volatility or other factors.
- When the market experiences strong returns, especially driven by a narrow sector rally, the returns of smoothed bonus funds tend to lag behind market linked alternatives. This will lead to pressure on sales and pressure to declare higher bonuses.

Solvency challenges:

- Under the solvency framework the capital required for equity risk is partly driven by the volatility and concentration of the equity portfolio.
- A portfolio where 25% of the equity benchmark is concentrated in a single, highly volatile sector may attract a higher capital requirement than a more diversified portfolio.
- Investment guarantee costs / capital charges: the smoothed bonus guarantee (the vested bonus floor) becomes more expensive to honour when the underlying assets are more volatile. The economic cost of the embedded put option (the guarantee that the policy value will not fall below the vested amount) rises with increased volatility, increasing the capital that must be held against the guarantee reserve.
- Mismatch between liabilities and assets: smoothed bonus liabilities are relatively stable (growing at the declared bonus rate), while the asset base has become more volatile and skewed towards a pro-cyclical sector. This asset-liability mismatch may widen, requiring additional capital buffers.

[6]

FTSE/JSE Equally Weighted Top 40 Index

- This index assigns an equal weight to each of the 40 largest JSE-listed companies and rebalances periodically (typically quarterly). No single share or sector can dominate the index at the point of rebalancing.
- This index would reduce precious metals concentration.
- However, the equal weighting introduces a structural overweight to smaller companies within the Top 40 and an underweight to the largest, most liquid counters.
- This can increase trading costs, particularly at rebalance dates.
- The index is less widely used, which may make peer comparison more difficult.
- The derivatives available on this index are more limited, in the event that ABC wishes to hedge the equity exposure at any point, using derivatives.

FTSE/JSE RAFI 40 Index

- This index weights constituents based on economic fundamentals such as revenue, cash flow, dividends and book value rather than market capitalisation.
- This breaks the link between a company's share price and its index weight, meaning that a commodity price-driven surge in the market capitalisation of precious metals companies would not automatically increase their index weight unless accompanied by a proportionate increase in underlying fundamentals (like sales, earnings, dividends).
- This provides a natural dampener against speculative or momentum-driven concentration. In the current scenario, precious metals companies' fundamental weights would likely be lower than their market cap weights, given that the recent price surge may not yet be fully reflected in realised earnings/dividends etc.
- It is possible that the fundamental metrics like sales, earnings, dividends may rise due to the price surge, but only after financials are released and this, together with quarterly rebalancing, may have a delayed effect of increasing weights. If this delayed increase in weights coincides with a subsequent drop in prices (of the commodity and hence the related shares), then this has the potential to amplify volatility.
- The 10% cap on individual stocks may limit concentration risk.
- The drawbacks include higher complexity and lower transparency.
- The methodology for calculating fundamental weights involves subjective choices (e.g. which fundamentals to utilise, what lookback period, how to handle losses or negative cash flows for mining companies).
- The index may also exhibit a persistent value tilt, which can lead to extended periods of underperformance relative to market cap-weighted indices during growth or momentum-driven markets.
- Rebalancing can generate higher turnover and transaction costs.
- The index is less widely used as a benchmark, making peer comparison more difficult.
- The derivatives available on this index are more limited, in the event that ABC wishes to hedge the equity exposure at any point, using derivatives.
- RAFI index is compiled by a US firm, Research Affiliates and licensing fees are payable, depending on whether the index is used as a benchmark for active or for index tracking.

Practical implications:

- The existing equity managers may have been selected specifically for their skill in managing against the ALSI, and their investment process may not translate well to an alternative benchmark.
- ABC may need to re-evaluate whether existing managers are appropriate or whether new managers should be appointed, which involves further due diligence, legal etc.
- The bonus declaration models may need to be recalibrated to the new expected return and volatility characteristics of the new benchmark.

- Would the change need to be communicated to policyholders?
- Both alternative indices comprise only 40 shares. Does this allow sufficient diversification? No exposure to small cap shares that tend to have higher growth potential.

[8]

v.

Structure of product:

- The initial premium is split into two components: capital protection component and upside participation component.
- Capital protection component: zero-coupon bond that will mature at the end of 5 years with proceeds equal to the client investment amount i.e. providing 100% capital protection.
- Upside participation component: the remaining premium is used to purchase at-the-money call options on the JSE Precious Metals Index. These options provide exposure to gains in the precious metals index.
- The amount available to purchase options determines the participation rate achieved.
- Fees also need to be allowed for and are generally taken upfront.

Maximum participation rate:

- State an assumption for the 5-year zero-coupon government bond yield to maturity. REPO is currently 6.75%, the 10-year yield is ~8.5%, the 5-year yield is slightly less than that. Acceptable range: 7% - 9% p.a.
- To guarantee R100 000 at maturity in 5 years, we need to invest an amount today that will grow to R100,000. $PV = 100\,000 / 1.08^5 = R68\,058$.
- The option budget is what remains after setting aside money for capital protection i.e. $100\,000 - 68\,058 = R31\,942$. So R31 942 available to buy call options.
- To buy R100,000 notional exposure (100% participation), we need to pay $R100,000 \times 42\% = R42,000$.
- We only have R31 942 available. Therefore, we can only buy 76% ($31\,942 / 42\,000$) participation.
- So the max participation rate we can offer is 76%.
- Other assumptions: no allowance is made for profit margin, fees, tax.

[5]

vi.

- Offer a reduced level of capital protection (e.g. 90% instead of 100%). This reduces the cost of the zero-coupon bond, freeing up additional funds for call option purchases.
- Add a cap on the participation rate (e.g. 100% participation but upside capped at 50%). ABC could write out-of-the-money call options on the precious metals index at a strike price above the current level (e.g. at 150%). The premium received from selling this call would supplement the budget available for purchasing the at-the-money call options. The effect is to cap the policyholder's maximum return at 150% of the starting index value (a 50% gain), but to increase the participation rate for returns below the cap.
- Extend the product term (to say 7 years). Depending on yield available this might reduce the PV required to fund the capital guarantee (zero-coupon bond) and make more available to buy call options (although the price of call options increase with term).
- Base the starting and closing index levels on averages e.g. 6 months average for starting index level and 3 months for closing index level. From a client's point of view, it may lower the volatility of potential outcome relative to using a single day's index level, but it

also has the effect of reducing the term over which the return is calculated, lowering option prices and boosting participation rate.

- Amend the reference basket / index utilised – rather than the JSE Precious Metals Index, consider a bespoke index consisting of precious metals weighted to achieve a ‘cheaper’ composition in relation to applicable option prices.
- Credit: Instead of a government bond, ABC could use a higher-yielding corporate bond. However, this introduces credit risk that may impact the guarantee provided.
- Run the product at a loss (in the hope of cross-selling other products).
- The participation level is a function of market conditions and prices. Although not always practical, it may be preferable to simply wait for market conditions and prices to improve such that the 80% level is attained.

[4]

vii.

- Hedging Risk: the core risk is that ABC has sold an embedded call option to policyholders - if precious metals prices rise substantially, ABC must pay out the participation in the index gain. If ABC has not perfectly hedged this exposure, it faces potentially unlimited losses on the upside.
 - To manage this, ABC should hedge the embedded option by purchasing matching call options from a bank counterparty or by dynamically replicating the option payoff through delta hedging.
- Credit risk:
 - If ABC purchases call options from a bank to hedge the embedded option, it is exposed to the risk that the counterparty defaults before maturity, leaving ABC unhedged while still owing the payout to policyholders.
 - Margining may reduce the credit risk involving the provider of the call options.
 - The zero coupon bond carries a risk of default, especially if a corporate bond is used rather than government.
 - In both cases above, this risk can be managed by diversifying counterparty exposures across multiple banks.
- Liquidity risk: If ABC needs to delta hedge dynamically by trading in the underlying shares, it may face liquidity constraints - particularly during periods of market stress when liquidity tends to evaporate precisely when hedging activity is most needed.
- Volatility spike before hedging: there is a timing mismatch between when ABC sells the product to policyholders and when it can execute the hedging trades in the market. ABC may not be able to purchase the required call options or establish the delta hedge instantaneously.
 - Banks providing the derivatives usually lock in the terms for a specified period during which sales for the tranche take place and then the product term commences on a set date i.e. ABC should not have to carry this risk if the terms of agreements are set appropriately.
- Sales risk: Based on the above agreement terms, there is usually a tranche amount that ABC needs to meet in terms of sales. If total sales fall short, there may be a penalty or terms may be adjusted.
- Basis risk: FTSE/JSE Precious Metals Index may not be perfectly replicable - there may be basis risk between the index and the options / instruments available for hedging.
- Policyholder behaviour (early surrenders): if the product permits early surrender, ABC faces the risk that policyholders surrender at times that are disadvantageous to the hedging programme. For example, if precious metals prices fall sharply, policyholders may surrender to recover their capital guarantee value, forcing ABC to unwind hedges at a loss.

- To manage this, ABC should either restrict early surrenders or apply a surrender charge.
- Reputational risk: if the product performs poorly for policyholders e.g. should precious metals prices decline and the policyholder receives only their capital back after five years with no growth - ABC may face reputational damage.
 - To manage this, communicate clearly to prospective clients and highlight risks.
- Tax risk: the tax opinions and tax treatment in relation to the taxation of the product (especially the derivatives) may be challenged or change during the term of the product.
 - To manage this, opinions must be obtained and agreements / policies must be correctly worded to deal with the impact of tax and changes in tax.

[4]

[Total 36]

QUESTION 3

Examiner Comments:

Question 3 explored the life rights structure of a retirement village and how its investment fund backing the structure and needs of the village should be invested.

Part (i) required candidates to describe the retirement village's liabilities and comment on whether the investment fund is sufficient. The question was well answered.

Part (ii) assessed the appropriateness of the current investment strategy in relation to the village's needs. Reasonably well answered, although many candidates did not fully unpack all the information provided.

Part (iii) was a short question dealing with a technicality related to tax and reported investment returns and then part (iv) needed a discussion of how relevant it was for the village to compare its returns, which were not in a unit trust, to selected unit trusts. Many candidates did not grasp how dividend withholding tax is applied and specifically that it is withheld and paid to SARS by the company paying the dividend, so performed poorly on part (iii). Part (iv) was poorly answered with many candidates discussing issues not related to the question.

Part (v) required candidates to discuss the factors to consider in an evaluation of two alternative proposals relative to the current investment strategy. There was evidence of time pressure in this and the last sub-question for some candidates and this may have affected the results, which were disappointingly poor for this critical type of investment-related question.

Part (vi) was a short comment on a Regulation 28 compliance issue. Most candidates understood why this was not applicable to the retirement village, but that it may offer some value as a guideline. Many appeared to be out of time to answer the question properly.

i.

- The liabilities are related to:
 - the obligation to pay out life rights on death – this is nominal in nature.
 - the maintenance and repair of properties and supplementing running costs – this is real in nature.
- Timing and amount of the life rights payouts are uncertain due to mortality.
- Rough estimate of amounts to pay out life rights for all 60 homes:

Resident / Owner Type	Number of homes	Average original purchase price	Expected value to be paid out	Average life expectancy of homeowners *	PV assuming 8% p.a.* discount rate
Single female	20	R2m	R30m	6 yrs	R18.9m
Single male	6	R2.5m	R11.25m	3 yrs	R8.9m
Couple	34	R3m	R76.5m	Males: 4 yrs Females: 8 yrs	R41.3m
Total					R69.1m

*Award marks based on other valid estimates

[Max 2 marks for calculations / estimates in table]

- Rough estimate of maintenance and repair costs: R10,000 to R20,000 per unit per annum assuming growth of 5%, discount rate of 8% and average life expectancy of current residents of 6.8 years = R3.5m to R7.0m. [See comment below on future resales].

- Estimate of the present value of liabilities is approx. R69.1m plus estimate of maintenance costs of R5.2m (midpoint) = R74.3m.
- However, the obligation does not crystallise all at once i.e. deaths are very unlikely to happen at the same time, barring a disaster that befalls the retirement village or all its residents.
- The above is the full present value of *current* liabilities for *current* residents. However, the current investment fund does not have to fully back the liabilities in perpetuity because the future resales of homes is effectively a future contribution to assets in the investment fund. There may just be a delay between paying out life rights and the subsequent resale – perhaps 3-12 months depending on the property market at the time. This plays a major role in offsetting the liabilities.
- The above ‘contribution’ or ‘asset’ related to future home resales makes estimating the liability fully and accurately over multiple owners into the future very difficult and this can only be done using stochastic modelling.
- Once the top ups / contributions from future resales are taken into account, the assets are sufficient to support the liabilities and provide this bridging finance / buffer between date of pay out of life rights and date of resale of homes as well as to fund the maintenance and repairs to homes (mostly in the period before new owners take up residence) and provide liquidity for the village’s finances, including unforeseen expenses.

Potential risks:

- Weak housing market with low or no house price growth (caused by general weakness, specific area weakness) – life rights scheme works less well as the 75% payout is not much less than realised resale prices. This gap is the main funding mechanism of life rights for the retirement village and the value of this is therefore lessened.
- Poor management / lack of adequate maintenance and repairs of the retirement village and homes leading to deterioration of homes and resultant lack of attractiveness and hence weak sales / demand for properties.
 - Long delays between paying out life rights and resale of homes – putting pressure on finances.
- Excess deaths of inhabitants / owners e.g. due to potential illness spreading in the village.
- Higher maintenance and repairs costs due to high inflation or neglect of homes.

[7]

ii.

- The life rights scheme is self-sustaining providing it is properly managed and the properties retain their value in real terms.
 - This is because resales of homes at higher market values is more than enough to replenish the investment fund and the difference can be used for the retirement village’s running and maintenance costs.
- The investment fund is therefore used as a stabiliser, for any unforeseen shocks and as a provider of liquidity to pay out life rights prior to reselling the homes – which could be a period of months or even years if demand for properties is low. It is also used to fund maintenance, repairs, refurbishment of homes to ensure they retain their value.
- For this reason, the split into two accounts is a sensible practical segmentation of the funds between those servicing the longer-term objective (balanced) and those providing liquidity (money market).
- The balanced portfolio has a longer time horizon as it predominantly covers the life rights (that have a medium to long term overall time horizon) and gets topped up by future

resales of homes. From time to time there may be a transfer to the money market fund, which is the primary source of liquidity, including for any imminent life rights payments. As such, the risk profile is moderate and the CPI+4% target is therefore a reasonable intermediate level between CPI+2-3% associated with low risk, capital preservation and CPI+5-6% associated with a long-term balanced strategy.

- An alternative view might be that the longer-term liabilities (life rights lump sums paid out on death) could be projected using mortality assumptions and then matched using nominal bonds with similar terms. However, the small size of assets and low number of pensioners / homeowners makes such a strategy difficult to implement in practice.
- To check the reasonableness of the strategic asset allocation in relation to the CPI+ target, need to make some assumptions about expected real returns per asset class (based on long term historical averages), then calculate expected real returns of composite benchmark:

	<u>Long term expected real return</u>	<u>Weighted real return</u>
SA & global equities	6 - 7%	4.2 - 4.9%
SA bonds	2 - 2.5%	0.3 - 0.375%
Global bonds	2 - 2.5%	0.1 - 0.125%
SA cash	1%	<u>0.1%</u>
		4.7 - 5.5%

[1 mark for above or similar estimate]

- Not clear whether the CPI+ target is gross or net of fees. If gross, then the composite benchmark seems to be slightly more aggressive than required for the target of CPI+4% – there is room to reduce equity exposure slightly. If net, then it is reasonably well aligned.
- An allocation of 70% to equities will result in a quite volatile portfolio – based on above there is room for a slight reduction. If not, the committee should understand that the balanced portfolio may be expected to fall by 20% or more over a 12-month period.
- The allocation to global assets does not match the liabilities in terms of currency, but it does provide diversification benefits and may provide more stable returns during periods of low growth of South African assets – this is valuable as the life rights scheme, linked to property values, will also be under pressure during such times.
- There is a behavioural factor to consider in that this is a retirement village, with some or all committee members likely to be owners / residents. Unless they have experience of investments, their age may mean that they cannot stomach volatility – even if the assets are not theirs and the time horizon / objective of the village is longer.
- Potential conflict of interest: the high allocation to equities may perhaps be based on the stockbroking firm's incentive to manage more of the assets as the equities component is where it earns its fees – the other components are effectively outsourced.
- Fees:
 - Base fee reasonable – probably lower than the alternative of unit trusts (especially if retail fees are paid) – it is not clear that the type of client or size of assets would warrant institutional fee class.
 - Need to quantify impact of fees applicable to allocations to underlying unit trusts and ETFs.
 - Performance fees are not substantial.
 - Unusual structure of performance fees
 - Fees not earned on dividends and interest.
 - Limits size of performance fees.
 - Potential incentive problem – may result in high dividend stocks being underrepresented in portfolio or result in higher risk growth stocks being overrepresented due to expected capital growth. Yet, dividend payers expected to be a good match for this more defensive profile of client.

- Check other features such as high-water marks and how often the fee crystallises.

[6]

iii.

- Mostly likely to be Dividends Withholding Tax as the dividends accounted for in the investment are likely to be net of DWT as the entity is not tax-exempt.
- 20% of any SA dividends paid is withheld by the company paying the dividend and hence the investment manager will receive net dividends.
- Offshore withholding taxes may vary.
- Dividend yield on share portfolio is approximately 2.5 to 3%.
- 20% of this is 0.5% to 0.6% p.a.
 - Applied to SA equities component (40%) and part of offshore equities (30%) – roughly 0.35% to 0.42% p.a. of overall return.
- Mention of STT as a potential additional tax (part of transaction costs) also merits a mark. This is applicable to the unit trust competitors too, so is not a source of discrepancy in comparing the returns, which DWT is as the unit trust returns are based on zero DWT.
- VAT on fees also merits a mark. Again, also relevant to unit trusts and very minimal impact.

[2]

iv.

- Both the investment manager and all the unit trust returns are net of fees, so that is consistent.
- The comparison is slightly unfair as the current manager return is lower by DWT on dividends, whereas this does not apply to the reported returns (in fact sheets) for the unit trusts – even though actual returns for investors are net of DWT, reported returns ignore the impact of DWT.
- Relevance of MA High Equity category – is this a fair comparison? This category is arguably higher risk with expected returns in the region of CPI+5% or 6%.
 - Might be more appropriate to consider choices of unit trusts from MA Medium Equity category.
- Cherry picking of these four, seemingly high-performing unit trusts may give a perception of underperformance, when that may be untrue relative to the full universe.
 - However, both active and passive options are included, so the selected unit trusts seem to provide a fairly broad representation, albeit of top performers selected with hindsight bias.
- But median returns of MA High Equity, let alone these four high performers, are still above Old Folks Village manager's returns – and even after adjusting for DWT.
- Important to consider risk as well as return – the bespoke nature of the portfolio and the profile of the client may mean that the portfolio is significantly less volatile / risky than those selected. Chasing better returns without paying attention to risk may have unintended consequences. Data is not provided on risk / volatility.
- Interrogate specific reasons for underperformance – exposure to asset classes / sectors / stocks.

[3]

Current investment strategy:

- Limited to a single manager – manager risk is high as evidenced by past / current underperformance.
- Current strategy has the advantage that it is simple – single portfolio, single manager, single investment report.
- Potential conflicts of interest in allocating to in-house unit trusts as opposed to best of all available unit trusts.
 - But the same might be said of any asset manager who may have strengths in certain asset classes but may be weaker in others, yet all assets are managed by the same business.
 - Also, the unit trust fees being used may be institutional fee classes due to favourable fees offered to an associate.
- Current overall fees are attractive – both advisor solutions entail higher fees – need to weigh these costs up against the value added by, and need for, advice – although this can be difficult to quantify.
 - There is no current advisor – is the committee able to continue managing and monitoring the current strategy and make changes / switches if required? If not then appointing an advisor, without changing strategy, may be another option to consider.

Proposed solutions:

- Need for advisor:
 - Committee is unlikely to have significant governance budget – lack of skills, experience, time, budget and focus.
 - Therefore need to find a trusted advisor.
 - Preferably one with experience of similar life rights schemes.
 - Need to evaluate what the advisors have proposed in terms of ongoing advice and guidance, monitoring and reporting?
- Multi-manager vs single manager – both advisors propose diversifying manager risk. May reduce regret of being in a poorly performing manager, hence better management of behavioural risk i.e. tendency to switch and chase returns.
- Advisor A: Platform
 - Ability and ease of switching (lots of options) in future if needs / objectives change or unit trusts disappoint plus flexibility to create many different strategies,
 - to be weighed against an added layer of cost.
 - The above flexibility does require the services of an advisor to navigate effectively e.g. selecting and blending unit trusts.
 - May offer consolidated reporting that may mitigate the complexity of the new strategy.
- Advisor B: Multi-manager direct
 - Less flexibility to customise a specific strategy.
 - Tied to that multi-manager's range of portfolios – difficult to switch to an alternative multi-manager if needs change or the multi-manager performs poorly – additional paperwork required for any switches.
- The decision-maker for various decisions within the various investment strategies is different and will affect the outcome. The key question for the committee is, “Who is the most appropriate party with the relevant skill and ability to make a specific investment decision?”
 - Decision: Manager / unit trust selection – for the current strategy the committee makes this decision, under A it is the advisor and under B it's the multi-manager.

- Decision: Asset allocation – Advisor (A) vs stockbroker (current) vs underlying asset managers (B).
- Ongoing management – monitoring, switches, rebalancing etc:
 - In the current strategy, the committee needs to monitor and is arguably ill-equipped to select new / replacement manager.
 - In A, the advisor will perform this function – is well equipped.
 - In B, the advisor will monitor the multi-manager and the multi-manager will do the rest – suitable duties based on skill set.
- Fees – advisor B offers better fees – no platform and lower portfolio fees. But still higher than current strategy. Advisor A is expensive – may be due to inclusion of hedge funds.
 - In both cases the important decision for the committee is whether the value of advice will outweigh the extra cost on a sustainable basis.
- It is not exactly clear what the tax status of the Old Folks Village is – is it a normal corporate, or a sectional title scheme? Why does it not qualify as a NPO and hence tax exemption?
 - It may be a good idea to get a tax opinion on this before proceeding with the investment strategy.
 - If CGT is applicable, then need to consider the CGT implications of transferring all assets to a new strategy as this will involve realising gains (or losses).
 - What is the quantum of the current unrealised capital gains or losses?
 - Perhaps a phased approach should be considered to take account of CGT implications.
 - The current strategy entails the retirement village holding the shares directly and hence incurring CGT when they trade. Both of the alternative solutions entail holding unit trusts, which avoids CGT on share trades and only triggers when units are sold.
- Reporting is an important requirement as that will allow the committee to understand and monitor the investment strategy.
 - They know the current investment report – it is likely to contain stock-level details, which may not be well understood by the committee and hence not used or valued. Do they offer online functionality – is the committee using it?
 - Advisor A: the platform is likely to provide useful consolidated reporting and online access to information. Limited information on stock-level positions – unit trusts differ from stockbroker / private securities accounts. The reporting may be a valuable feature of this proposed solution.
 - Advisor B: the multi-manager is likely to provide a fact sheet that will provide a high-level overview of the portfolio, but limited information on stock-level positions, other than maybe a Top 10. Online access likely to be available too.

[8]

vi.

- Regulation 28 is not applicable to the retirement village as it is only applicable to Pension Funds governed by the Pension Funds Act.
- However, the prudential limits inherent in Regulation 28 are broadly relevant for the retirement village, so probably suitable from an investment point of view.
- A common complaint about Regulation 28 is that it limits ability to maximise offshore exposure – but the Rand-denominated liabilities and costs of the Old Folks Village mean offshore exposure should be limited, so not a reason to exceed limits.
- If anything, the 45% offshore limit may be too high for the retirement village, whose liabilities are shorter term, and driven more by local requirements than for pension funds.

[2]

[Total 28]

[Grand Total 100]