



ACTUARIAL SOCIETY
OF SOUTH AFRICA

EXAMINATION

20 October 2023

Subject F205 - Investment Fellowship Applications

Time allowed: Three hours and twenty minutes (which includes five minutes for downloading and uploading your answer document)

Total marks: 100

INSTRUCTIONS TO THE CANDIDATE

1. Ensure that you are logged in and authenticated through Examity before you attempt the examination.
2. The question paper is only available in the ASSA Exam Platform as a PDF download and may not be printed. Copy/paste of questions or parts thereof is allowed from the question paper to your Word answer document only.
3. Download the Word answer document template from the ASSA Exam Platform. Save this Word answer document on your desktop using your Candidate Number as filename. You are required to submit your answers in Word format ONLY using this document. No answers in any other format (e.g., handwritten) will be accepted. Save work regularly.
4. Ensure that your Candidate Number appears in the “header” of your Word answer document. [Double-click on the header at the top of the Word document, input your Candidate Number only in the header, then press “Esc” to close the header.] **Do not use your name or member number anywhere in your Word answer document.**
5. You may not access any file from your computer, use any other computer program (e.g., Email or Excel), or open any other browser during the examination. The use of Grammarly and Grammarly Premium or similar is also not permitted in examinations.
6. You may not use any other material (e.g., a Formulae and Tables book) during the examination. Any such information that may be required will be provided to you within the examination.
7. You are strongly encouraged to use the first 15 minutes as reading time only, however, you may start answering the paper whenever you are ready.
8. Mark allocations are shown in brackets.
9. Attempt all questions.
10. Show calculations where appropriate. You may use blank paper to carry out rough work calculations. You may use a calculator from the approved list only.
11. Upload your Word answer document only into the ASSA Exam Platform. Once you have uploaded your document, you must click on **Finish Attempt** to save your document. You will still be allowed to go back and make changes (**Review Attempt**) if you have time.
12. Once you are satisfied with your uploaded document, click **Finish attempt** and **Finish all and Submit**. Once you have submitted you will not be able to make any changes.
13. **You must submit your Word answer document BEFORE the end of the allotted examination time.** You must stop writing and start uploading during the last five minutes. Take this into account when planning your review and submission. There will be no time announcements.

Note: The Actuarial Society of South Africa will not be held responsible for loss of data where candidates have not followed instructions as set out above.

END OF INSTRUCTIONS

QUESTION 1

Over the past 20 years, a large South African city has experienced severe urban decay in its once vibrant city centre. Property values have fallen as businesses and residents have relocated to more desirable locations. Many buildings are vacant and have fallen into disrepair. The city's municipality has created a redevelopment plan for the city centre, including new roads, a new commuter station, a public park and improvements to roads, sewers and streetlights. The expected cost of the project is R2bn and is expected to take two years to complete.

To finance this project, the municipality is considering issuing a particular type of bond. The bonds will have a term of 30 years and will pay an annual coupon of 5% for the first two years. Thereafter, in addition to the 5% annual coupon, bondholders will be entitled to share in a pre-defined proportion of the incremental property rates raised by the municipality each year (due to improved property valuations). The final bullet payment at the bond's maturity will also be linked to the quantum of incremental property rates raised in the year preceding the bond's maturity. The calculation of incremental rates will reference a specific, pre-defined area of the city centre and the initial property valuations of properties within the defined area will be published at outset. This type of financing is sometimes referred to as tax increment financing (TIF).

[Note that, in South Africa, municipal rates are paid by property owners in relation to the value of the property. The percentages applied to the property valuation to determine the rates are reviewed annually in line with inflation and property valuations are revised every 5 years or so.]

You are the asset consultant to a large South African defined contribution pension fund. The pension fund has been offered the opportunity to subscribe for bonds in the above-mentioned bond issuance.

- i. Discuss the attractiveness of the proposed bond from the municipality's point of view. [7]
- ii. Discuss the factors that the pension fund's trustees would need to consider in assessing the appropriateness of investing in such a bond. [15]

You have been approached by a trustee of the pension fund who is concerned about the risk posed to the fund by a prolonged period of stagflation.

- iii.
 - a. Define stagflation and explain why it poses a dilemma for central banks. [2]
 - b. Compare the expected performance of the following assets during an extended period of stagflation:
 - This specific municipal TIF bond
 - SA nominal government bonds
 - Gold[5]

[Total 29]

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QUESTION 2

You are the asset consultant to a large defined contribution pension fund. The fund has a default life stage strategy consisting of a high-growth balanced portfolio, phasing to a de-risking portfolio, as a member nears retirement, that aims to protect capital and align to the type of annuities selected by members at retirement.

As a result of a recent acquisition by the company, a group of new members will be transferring into the pension fund from another fund. The transferring fund has certain private market (unlisted) assets in its investment strategy. Due to the difficulty in liquidating these assets, the trustees have been requested to consider incorporating the private market assets of the transferring fund into the pension fund's investment strategy.

[Note that the pension fund's current investment strategy does not include any private market assets.]

The private market assets consist of three portfolios:

1. A private debt portfolio
2. A private equity portfolio
3. An unlisted infrastructure fund of funds

The trustees have asked you to evaluate the private market assets and advise on their possible inclusion in the pension fund's investment strategy.

- i. Discuss the key considerations in order to assess the private market assets and their suitability for inclusion into the fund's investment strategy. [6]
- ii. Outline the specific considerations in assessing the investment merits of the three aforementioned private market asset portfolios. [8]

Following your evaluation, you recommend that the pension fund incorporates the private market assets. The trustees ask you to recommend a revised strategic asset allocation for the two portfolios that comprise the pension fund's life stage strategy.

- iii. Discuss the practical challenges associated with incorporating private market or unlisted assets into the setting of the strategic asset allocation for a portfolio. [3]
- iv. Outline the steps you would follow in setting the strategic asset allocation for the two portfolios to incorporate the private market or unlisted assets. [3]

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After investigating the three private market asset portfolios, you discover that the private equity portfolio consists of only one underlying investment as the rest have already been sold and the cash proceeds returned to investors.

v.

- a. Outline the typical methods used to value companies within private equity portfolios.

[3]

- b. Using the information provided in the table, determine a valuation range for the remaining investment in the portfolio, providing reasons for your assessment, as well as any shortcomings of your estimate.

Latest financial results (Rm)	Company to be valued in private equity fund	Listed Co A	Listed Co B	Listed Co C
Revenue	492	4,264	1,053	21,776
EBITDA	21	276	99	1002
Growth in EBITDA over last 5 years (p.a.)	28%	12%	15%	9%
NAV	124	2,215	763	8,992
Dividend	-	120	10	508
Current market capitalisation	To be estimated	1,550	733	6,020

[7]

- c. Outline the additional information (aside from information to determine a more accurate valuation) that you would consider in order to make a recommendation to the trustees on whether to invest in this *specific* private equity portfolio.

[5]

[Total 35]

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QUESTION 3

Rundown Life insurance company has a legacy savings product that was sold as an endowment policy with a smooth-bonus portfolio as the underlying investment. The portfolio declares monthly bonuses, which vest fully and cannot be negative. The product is closed to new policyholders. The book of clients consists of some paid up cases and others where the policyholder is still paying recurring premiums.

The capital charge is 20% of positive, rolling 12-month returns on the underlying assets.

- i. A policyholder has complained that the capital charge is too high. Outline the key points you would consider in drafting your reply.

[8]

- ii. Describe the growing cross-subsidies that arise as the number of policyholders in a closed smooth-bonus portfolio declines.

[7]

The Finance Director is keen to reduce the capital requirements of the insurance company and suggests that Rundown Life makes an offer to the paid up smooth-bonus policyholders. The offer would give policyholders the option to switch to one of three conservative, market-linked portfolios (with no guarantees, no capital charges and no smoothing).

[Note that a separate offer will be made to premium-paying policyholders so they can be ignored in this question.]

The options are as follows:

1. The same underlying portfolio as the smooth-bonus portfolio, but without smoothing.
 2. A market-linked portfolio consisting of fixed-rate government bonds, with duration equal to the average expected duration (allowing for term to maturity as well as other assumed decrements) of the underlying endowment policies.
 3. A market-linked portfolio with a series of zero-cost collars on an SA equity index, designed to at least match the current guaranteed book value outflows to the endowment policies.
- iii. Discuss the advantages and disadvantages of each option from the perspective of a policyholder.

[11]

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Initial results indicate a low take-up of the above options, so the Product Actuary proposes an alternative product to be offered to both paid up and premium-paying policyholders. Current values and future new premiums are invested in a unitized, market-linked portfolio of South African nominal bonds matched to the expected duration of the policy liabilities. Policies held to maturity will earn a guaranteed return of at least 4% p.a., after deduction of fees and tax, on all amounts invested (current value and any future premiums).

iv.

- a. Explain whether it is possible for the value of units to be less than the guaranteed value at maturity.

[5]

- b. Explain how a shortfall between guaranteed value and market value of units at maturity of the policies could be funded and outline how the shortfall should be reflected in unit balances and unit prices.

[5]

[Total 36]

[Grand Total 100]

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END OF EXAMINATION