

Actuarial Society of South Africa

EXAMINATION

12 May 2022

Subject N211 — Communications

Time allowed: Three hours and fifteen minutes, plus an additional five minutes to allow for uploading your file on the ASSA Exam Platform

Total marks: 100

INSTRUCTIONS TO THE CANDIDATE

1. Ensure that you are logged in and authenticated through Examity before you attempt the examination.
2. Ensure that you have your candidate number handy to input as part of the examination.
3. Questions are only available on the ASSA Exam Platform and may not be printed or copied outside of the ASSA Exam Platform.
4. You will be provided with Word and PowerPoint templates to access and use to complete your questions. You may only use the files provided to you. No other files from your PC nor any other browser may be accessed.
5. An Excel template will be available to use if necessary but will not be uploaded and used for the marking process.
6. Ensure that your Candidate number appears in the Header (Word template) and Footer (PowerPoint template). [Select “Insert”, then “Header”/“Footer”, input your candidate number on blank header/footer template and select “Close Header”/“Close Footer”]. **DO NOT USE YOUR NAME OR MEMBER NUMBER ON YOUR ANSWER SCRIPT.**
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. Add your word count to the bottom of Question 1. Include words and numbers in tables and graphs.
10. Attempt all questions. Save your work continuously during the examination.
11. You **MAY NOT** use a Formulae and Tables book during the examination. Any such information that may be required will be provided to you within the examination.
12. Upload your answer files with your solutions to the ASSA Exam Platform. You need to upload your files **BEFORE** the examination time expires.

13. *Once you have added your files, you MUST click on FINISH ATTEMPT to save your files. You will still be allowed to go back and make changes (Review Attempt) if you have time.*
14. *Once you are satisfied with your uploaded file, click **FINISH ATTEMPT and FINISH ALL AND SUBMIT** whereafter you will not be able to make more changes. Consider this when finishing early - once you have submitted, you will not be able to make any more changes to your answers.*
15. *It is the candidate's responsibility to ensure that all work is submitted BEFORE the end of the examination time. Consider this carefully when planning your review and submission. There will be no time announcements.*
16. *You should use blank paper to work on any calculations where this is appropriate.*
17. *An option to opt out of the examination will become available one hour after the official examination start time. If you select the Opt-Out option, you agree and understand that your entire script/answers will be deleted and cannot be retrieved at a later stage and that your script or part thereof will not be put forward for marking.*

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

Thabo is a friend who has recently decided to purchase a house but wishes to know a lot more about how mortgage bonds work. Thabo has told you that he has been offered two alternative structures by his bank.

Bond options

Option One is a bond with a fixed interest rate. The interest rate for the bond is 11% and this is fixed for five years. After five years, a new fixed rate (which may be higher or lower than the current rate) will be set for the next five years, at a set premium over the bank's prime lending rate at the time of the rate review.

Option Two is a bond with a tiered interest rate with interest rates varying depending on the percentage the outstanding balance is of the original loan amount. The base interest rate is 10.5% and the tiers operate as follows:

| Outstanding balance proportion of original loan amount | Interest rate deduction from base rate | Net rate |
|--|--|----------|
| 80% - 100% | 0% | 10.5% |
| 60% - 80% | 0.25% | 10.25% |
| 0% - 60% | 0.5% | 10.00% |

The tiered rate is also linked to the bank's prime lending rate, and the base rate will vary upwards or downwards with the prime lending rate, with 30 days' notice. The interest rate deduction will not change.

The repayment for the tiered rate is calculated initially as if the base interest rate remains constant for the full loan term. Whenever the tier level changes, or there is a change in the base rate the repayment is recalculated assuming that the new interest rate applies to the balance of the loan term.

Under either option, there is an upfront initiation fee of R6 000, which is capitalised into the loan amount, and a monthly administration fee of R60.

The bond amount is R2 500 000, and the term of the bond is 20 years.

All interest rates are annual rates, convertible monthly with repayment in advance.

How the prime lending rate and the base rate are determined

The prime lending rate (commonly called just the prime rate) represents the minimum interest rate that banks are prepared to offer to their most creditworthy clients. Currently, the prime rate is sitting at 7.50% pa.

Banks link interest rates on mortgage bonds to the prime lending rate, by applying a margin over prime according to a borrower's credit profile and the borrower's probability of default on the loan.

Over the last three years, the prime rate has varied as follows:

| Date of change of prime rate | 2018 | | | 2019 | 2020 | | | | | 2021 | 2022 |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 01-Mar | 29-Mar | 23-Nov | 22-Jul | 21-Jan | 20-Mar | 15-Apr | 22-May | 24-Jul | 22-Nov | 28-Jan |
| New prime rate (%) | 10.25 | 10.00 | 10.25 | 10.00 | 9.75 | 8.75 | 7.75 | 7.25 | 7.00 | 7.25 | 7.50 |

The consensus forecast for the prime rate is 8.00% by July 2022 and 8.25% by December 2022, driven by higher inflation and supply chain stresses as the Covid-19 pandemic eases.

REMEMBER TO SAVE

PLEASE TURN OVER

Instructions

Draft an email to Thabo, explaining and illustrating how mortgage bonds work. Include the principles of repayment of capital and interest on reducing balance, using a suitable example. You must also explain how the banks set interest rates and what the effect is of variable interest rates.

In addition, calculate what the monthly repayment would be on each of the two options, using the currently prevailing interest rates, and explain their respective advantages. You are not expected to recommend which alternative is preferable.

The body of the email should be between 650 and 750 words. Do not include the format, salutation or close. Remember to include words in graphs and tables in your word count.

[Total 50]

REMEMBER TO SAVE

PLEASE TURN OVER

QUESTION 2

You are trustee of the Millie Monero Trust that was set up for supporting your cousin who was disabled in a motor car accident two years ago. You were asked by the family to be a trustee because of your actuarial qualification and financial background. Your fellow trustees are an attorney, who provides professional trustee services and Millie's younger brother Keith who designs and creates websites for a living.

Keith has proposed an investment in Bitcoin because new investments like crypto currencies are providing higher returns than old fashioned traditional investments. Bitcoin investment has been topical in the media and Keith suggests it is an alternative asset that allows diversification and therefore reduces the investment risk for the trust.

You agreed at the last meeting to present an assessment of the proposal and make a recommendation for the trustees to consider at the next meeting.

Prepare your presentation of 8 to 10 slides, including the title and concluding slides, in Microsoft PowerPoint. You have been provided with some relevant extracts of documents to use. The drafts of slides 2 and 3 have been given to you, which you are at liberty to change.

Extract from the Millie Monero Trust Deed

“Investment Mandate

The trustees must invest the funds of the trust to provide an income sufficient to meet the ongoing expenses arising for the care and maintenance of Millie Monero. Since expenses are expected to increase at a rate greater than inflation, the fund needs to achieve a return that is related to inflation. The funds of the trust are the only funds available to meet these expenses and the trustees are therefore expected to make prudent investments that don't place the capital of the trust or the income to be derived from it at any unnecessary risk. Millie's life expectancy is greater than 30 years. The funds of the trust are not required for any purpose other than that described here.”

Extract from the Investment Managers report

“The past performance of the fund shown as the quarterly return has been:

| <i>Quarter Ending</i> | <i>Portfolio Return</i> |
|----------------------------------|------------------------------------|
| 30/06/2019 | -2% |
| 30/09/2019 | 3% |
| 31/12/2019 | 1% |
| 31/03/2020 | -6% |
| 30/06/2020 | 1% |
| 30/09/2020 | -4% |
| 31/12/2020 | 13% |
| 31/03/2021 | 5% |
| 30/06/2021 | 0% |
| 30/09/2021 | 5% |
| 31/12/2021 | 2% |
| 31/03/2022 | 3% |

”

REMEMBER TO SAVE

PLEASE TURN OVER

From Wikipedia

“**Bitcoin (฿)** is a decentralized digital currency, without a central bank or single administrator, that can be sent from user to user on the peer-to-peer bitcoin network without the need for intermediaries. Transactions are verified by network nodes through cryptography and recorded in a public distributed ledger called a blockchain.”

Extract from Investment Analyst Report on Bitcoin

“High return, high risk during early adoption”

Bitcoin’s price swings have been particularly extreme, with very high drawdowns and strong rallies within a month. But alongside that high risk, bitcoin delivered strong returns. The high and mostly idiosyncratic volatility of bitcoin can make it an unreliable hedge, especially over short time horizons, and increases the risk to balanced portfolios. With such volatile assets, there is a material risk of the need to buy at a peak and sell at a trough. The change in the price of bitcoin appears uncorrelated with inflation or other asset classes.

The potential for more regulation of digital currencies creates significant uncertainty for investors.

In favour of Bitcoin investment are that costs of trading are low and the investment is highly liquid. Bitcoin provides a capital return and the need for income will need to be met by selling the asset.

Investment in Bitcoin can be compared to an investment in a commodity, such as gold. Gold has lower volatility of returns, but also lower returns. Gold is also a long-term investment with some inflation protection in the long term but with correlation to geopolitical risk in the short term. Gold is quickly and easily converted to cash.

Investment in Bitcoin can also be compared to an investment in a foreign hard currency such as a US dollar. Investment in the US Dollar has lower volatility of returns, but also lower returns than Bitcoin. Currency is also a long-term investment with some inflation protection in the long term but with correlation to country risk in the short term. A US dollar investment is highly liquid.

| Date | Bitcoin price history |
|-------------|------------------------------|
| 31/03/2019 | 4 119 |
| 30/06/2019 | 11 413 |
| 30/09/2019 | 8 246 |
| 31/12/2019 | 7 171 |
| 31/03/2020 | 6 482 |
| 30/06/2020 | 9 150 |
| 30/09/2020 | 10 711 |
| 31/12/2020 | 28 966 |
| 31/03/2021 | 58 932 |
| 30/06/2021 | 34 585 |
| 30/09/2021 | 43 432 |
| 31/12/2021 | 46 322 |
| 31/03/2022 | 39 410 |

”

REMEMBER TO SAVE

PLEASE TURN OVER

Agenda

- Introduction
- Fund's Requirements
- Investment Features of Bitcoin
- Past Performance
- Alternative Investments
- Assessment
- Recommendation
- Questions



Introduction

• Why this presentation?

- Opportunity raised by trustee
-
-
-
-

What is Bitcoin?

- Decentralized digital currency
- No central bank or single administrator
-
-
-
-



[Total 50]

[Grand Total 100]

END OF EXAMINATION