



EXAMINATION

16 October 2024

Subject F207|B200 — Banking 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

Failure to adhere to any of these instructions could incur examination sanctions.

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. Do not use your name and/or member number anywhere on your answer script.
4. 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.
5. 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.
6. You are allowed to access the material uploaded in advance to your personal open book file storage area on the ASSA Exam Platform. Remote access to materials is not allowed, e.g. any other application (incl. Excel), email, cloud storage, internet, LLMs (Large Language Models)/any AI tools or social media. Copy/paste from your uploaded material to your Word answer document is NOT allowed.
7. The use of Grammarly and Grammarly Premium or similar add-ins are not permitted in examinations. Microsoft Word spellcheck is allowed.
8. 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.
9. Mark allocations are shown in brackets.
10. Attempt all questions.
11. Show calculations where appropriate. You may use blank paper to carry out rough work calculations. You may use a calculator from the ASSA-approved list only.
12. 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.
13. 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.
14. **You must submit your Word answer document BEFORE the end of the allotted examination time.** You should 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.

The onus remains on you to read and implement all examination instructions.

END OF INSTRUCTIONS

QUESTION 1

Generative Artificial Intelligence, or GAI, is a branch of AI that focuses on creating new content from training data. GAI systems can learn from data and generate outputs that are novel, realistic, and diverse, without requiring explicit supervision or labels. Examples of ways in which GAI can be used include text generation, synthesis of images from text, voice synthesis and generation of code from natural language.

Yellow Bank is a large, multi-national bank that provides a full suite of banking services to wholesale and retail customers. The executive team at Yellow Bank is excited about the potential for GAI to create significant efficiencies across its banking operations.

- i. Outline potential risks specific to the use of GAI within the bank and suggest ways in which these risks can be mitigated.

[5]

Organisations can create bespoke GAI solutions tailored to specific use cases by procuring an appropriate foundational large language model (LLM) from a third party, training this model on a curated dataset that represents the context and scope of the use case, and performing iterative testing and validation to ensure the model produces accurate and reliable results.

- ii. Describe three ways in which GAI can be used within the bank to improve efficiency, such as credit origination, customer service and financial crime risk management.

For each use case described, include:

- An overview of the use case
- How GAI can be trained on relevant data and incorporated into the associated process
- How incorporation of GAI would improve efficiency

[8]

- iii. Outline potential practical challenges associated with the GAI use cases described and suggest ways in which these challenges can be addressed to ensure that implementation and adoption is successful.

[12]

[Total 25]

REMEMBER TO SAVE

PLEASE TURN OVER

QUESTION 2

You are the new executive head of Retail Unsecured Loans for a bank based in Watopia. The bank is the 3rd largest provider of unsecured loans within the region. You have been provided with summary financial and statistical information for the last 3 financial years. The portfolio seeks to achieve an ROE of at least 30% through the cycle.

Income Statement

Income statement item:	FY '21	FY '22	FY '23
Interest income (\$'m)	5,600	7,245	9,248
Cost of funds (\$'m)	2,400	3,700	5,300
Fee income (\$'m)	740	765	800
Total running costs (\$'m)	850	780	730
Impairment charge (\$'m)	1,925	2,250	3,397
Total profits pre-tax (\$'m)	1,165	1,280	622

Balance sheet for each financial year (FY)

Balance sheet item:	FY '20	FY '21	FY '22	FY '23
Total loan balances (At FY end) (\$'m)	32,174	37,000	42,550	48,933
Average loan balances for the FY (\$'m)		35,000	40,250	46,288
Average number of loans on book		623,000	641,690	673,775
Average loan size (\$)		56,180	62,725	68,699
Overlays held (At FY End) (\$'m)	700	600	300	50
Average capital held (\$'m)		3,500	4,629	5,555

Your assistant has provided you with a few high level ratios:

Income statement items as % of average loan balances

Income statement item:	FY '21	FY '22	FY '23
Interest income	16.0%	18.0%	20.0%
Cost of funds	6.9%	9.2%	11.5%
Impairment charge	5.5%	5.6%	7.3%
Total profits	3.3%	3.2%	1.3%

- i. Calculate further key ratios and comment on trends in these ratios.

[15]

REMEMBER TO SAVE

PLEASE TURN OVER

In addition to the financials above, you have also been provided with the pricing model currently in place. This is the model as it has been implemented and these are the averages priced for in each financial year for the loans disbursed over the last 3 years.

Pricing Model - Pricing expectations for new business written				
		FY '21	FY '22	FY '23
Interest income		16.0%	18.0%	20.0%
Cost of funding		7.0%	9.0%	11.0%
Average Annual PD		7.0%	7.0%	7.0%
Average Annual LGD		80.0%	80.0%	80.0%
Monthly fee per loan (no initiation fees) (\$)		100	100	100
Average running cost per loan per month (\$)		120	110	100
Required capital holding		10%	10%	10%
Total loan value disbursed (\$'m)		7,656	8,875	10,488
Total number of new loans disbursed		116,000	125,000	138,000

- ii. Comment on the pricing model and detail any concerns you identify, specifically when compared to the other financials provided.

[10]

- iii. Based on the information provided give recommendations that you would make to the business to improve the financial results (focus on funding and impairment shortcomings). Detail additional information that might inform your recommendations.

[12]

[Total 37]

REMEMBER TO SAVE

PLEASE TURN OVER

QUESTION 3

Access Finance is a new market entrant that aims to provide access to secured and unsecured credit to individuals and small business owners with no credit history. The country in which Access Finance intends to operate has a mature economy and a well-developed financial services industry. Access Finance plans to use alternative data sources in addition to income and credit bureau data to assess creditworthiness and affordability for applicants.

- i. Suggest types of alternative data that Access Finance could consider using, suggest ways in which such data could be sourced, and explain the potential relevance of such data in assessing creditworthiness or affordability.

[12]

- ii. Outline risks associated with the use of alternative data in credit assessment and suggest ways in which these risks can be mitigated.

[6]

- iii. Outline, using examples, additional ways in which Access Finance could use the alternative data obtained.

[5]

[Total 23]

REMEMBER TO SAVE

PLEASE TURN OVER

QUESTION 4

You are the Impairment modelling lead for CDG Bank based in the Eurozone. You have recently taken over from the previous lead and are reviewing the impairment policy and models currently in place at CDG. Below are details of macroeconomic linkage models that are in place and that have been developed to allow for forward looking economic expectations for PD (probability of default) and LGD (loss given default).

$$PD_{\text{mortgages}} = 0.02 - 0.05 \times \Delta GDP + 0.0001 \times \Delta UE + 0.06 \times \text{Lag}(\text{Interest Rates}) + \xi$$

$$LGD_{\text{mortgages}} = 0.2 - 0.7 \times \text{PPI Inflation} + 0.2 \times \text{Lag}(\text{Interest Rates}) + \xi$$

$$PD_{\text{unsecured loans}} = -0.05 + 3 \times UE - 2 \times \Delta GDP - 0.1 \times \text{Lag}(\text{Interest Rates}) + \xi$$

The following variables have been used within the model:

$PD_{\text{mortgages}}$ is the expected probability of default for a forward-looking period

$LGD_{\text{mortgages}}$ is the expected loss given default for a forward-looking period

$PD_{\text{unsecured loans}}$ is the expected probability of default for a forward-looking period

GDP Growth the annualised change in nominal GDP period on period in the region

ΔGDP is the change in the GDP Growth quarter on quarter in the region

UE is the unemployment rate in the region

ΔUE is the change in the unemployment rate quarter on quarter in the region

PPI Inflation is the property price index inflation for the region

ξ is an error term

$\text{Lag}(\text{Interest Rates})$ is the one quarter lag of the interest rates (base rates from the central bank) for the region

- i. Comment on the appropriateness of the 3 models that have been developed for CDG Bank.

[8]

REMEMBER TO SAVE

PLEASE TURN OVER

The business has supplied you with the following model input data (used previously) as well as some of the forward-looking assumptions to be used within these models:

Feature	Long Run	Q3 - Actual	Q4 - Forecast	Q1 - Forecast	Q2 - Forecast
GDP Growth	2.00%	0.50%	0.25%	-0.25%	-0.50%
Inflation	2.50%	3.50%	5.00%	6.50%	4.50%
Interest Rates	1.00%	1.00%	1.50%	2.00%	2.25%
Unemployment rate	5.00%	5.50%	5.75%	6.00%	6.50%
PPI Inflation	8%	10%	8%	4%	0%

Your assistant has partially complete tabled the table below.

	Long Run	Q3 - Actual	Q4 - Forecast	Q1 - Forecast	Q2 - Forecast
Δ GDP	-	-	-0.25%	-0.50%	-0.25%
Δ Unemployment	-	-	0.25%	0.25%	0.50%
Lag Interest Rates	-	-	1.00%	1.50%	2.00%
PD (Mortgages)	Calculate		2.07%	2.12%	2.13%
LGD (Mortgages)	Calculate		14.60%	17.50%	20.40%
PD (Unsecured Loans)	Calculate		Calculate	Calculate	Calculate

- ii Calculate the outstanding estimates and comment on the inputs and model outputs for the long run and next 3 quarters.

[7]

[Total 15]

REMEMBER TO SAVE

END OF EXAMINATION