Queen Mary
University of London

Main Examination Period 2021

ECOM049 - Commercial & Investment Banking **Duration: 3 hours**

Answer ALL questions

THIS IS AN OPEN BOOK EXAMINATION TO BE CONDUCTED ONLINE. YOU MAY REFER TO ANY OF THE COURSE MATERIALS, OR ANY OTHER SOURCE OF INFORMATION. YOU MAY ALSO USE A SPREADSHEET OR CALCULATOR.

YOU CANNOT SUBMIT HANDWRITTEN ANSWERS

ANSWERS ARE TO BE TYPED AND SUBMITTED TO BOTH QMPLUS & EMAILED TO: ECOM049-exam@qmul.ac.uk

PLEASE ENSURE THAT YOUR WORKING IS CLEARLY SHOWN WITH ALL STEPS OF YOUR CALCULATION INCLUDED IN YOUR ANSWER DOCUMENT, INCLUDING ANY FORMULA USED.

When writing formulas, please note the following:

- It is acceptable to use the standard alphabet rather than greek letters. The following are recommended: m for μ, s for σ, w for ω, r for ρ, d for Δ, b for β.
- For mathematical operators: add +, subtract -, multiply *, and divide /.
- Where appropriate, use an underscore to indicate a subscript, Eg r_f for $r_{f.}$
- Use the ^ character for power, eg x^2 for x^2, x^0.5 for $\sqrt{x}$.
- As an alternative to x^.5 you may type sqrt(x).
- Use brackets as necessary. To make your answer clearer use different brackets where appropriate, eg [] {} ().

Examiner: Y. Makedonis

Answer, please, ALL questions

Student ID: _____

For the 10 Multiple Choice Questions Tick √ the correct answer in the table below.
If you believe the options available are not correct, please, provide your own within the table.

[20 marks]

	a)	**b)**	**c)**	**d)**	**e)**
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Multiple Choice Questions 1.
Based on the Standardized Approach leverage ratio zones of Basel III, how would regulators characterize a bank with the balance sheet below?

Securities (at par)	$250	Deposits	$975
Loans (at par)	$760	Capital	$35

A. Well capitalized
B. Undercapitalized
C. Severely undercapitalized
D. Overcapitalized
E. Insolvent

Multiple Choice Questions 2.
Given the market value of the loan portfolio of a bank is reduced by 25 percent, what is the market value of its capital assuming the balance below?

Securities (at par)	$250	Deposits	$975
Loans (at par)	$760	Capital	$35

A. $35 million.
B. -$155 million.
C. $7 million.
D. -$7 million.
E. $0.

Multiple Choice Questions 3.
If the loan portfolio of a bank consists of a five-year, 10 percent annual coupon loan selling at par, what is the market, or economic, value of capital if interest rates increase by 1 percent?

Securities (at par)	$250	Deposits	$975
Loans (at par)	$760	Capital	$35

A. $35 million.
B. -$155 million.
C. $7 million.
D. -$7 million.
E. $0.

Multiple Choice Questions 4.
What is the amount of risk-adjusted assets for a bank with the assets stated in the table below?

Cash and Treasury securities	$100 million
Fed Funds Sold	$100 million
Residential Mortgages 1-4 family	$200 million
Commercial Loans	$600 million

A. $1,000 million.
B. $720 million.
C. $900 million.
D. $600 million.
E. $700 million.

Multiple Choice Questions 5.
One hundred identical mortgages are pooled together into a pass-through security. Each mortgage has a $150,000 principal, a fixed annual interest rate of 8 percent (paid monthly), and is fully amortized over a term of 30 years.What is the monthly payment on the mortgage pass-through?

A. $100,000.
B. $110,065.
C. $12,000.
D. $12,000,000.
E. $80,000.

Multiple Choice Questions 6.
One hundred identical mortgages are pooled together into a pass-through security. Each mortgage has a $150,000 principal, a fixed annual interest rate of 8 percent (paid monthly), and is fully amortized over a term of 30 years. If the entire mortgage pool is repaid after the second month, what is the second month's (liquidating) principal and interest payments?

A. $99,933 interest and $14,989,935 principal.
B. $100,000 interest and $10,065 principal.
C. $100,000 interest and $15,000,000 principal.
D. $99,933 principal and $14,989,935 interest.
E. $12,000 interest and $138,000 principal.

Multiple Choice Questions 7.
One hundred identical mortgages are pooled together into a pass-through security. Each mortgage has a $150,000 principal, a fixed annual interest rate of 8 percent (paid monthly), and is fully amortized over a term of 30 years. What is the present value of the mortgage pass-through if the entire pool is repaid after two months and there is no change in interest rates?

A. $14,989,935.
B. $15,089,868.
C. $15,000,000.
D. $15,110,065.
E. $14,889,935.

Multiple Choice Questions 8.
One hundred identical mortgages are pooled together into a pass-through security. Each mortgage has a $150,000 principal, a fixed annual interest rate of 8 percent (paid monthly), and is fully amortized over a term of 30 years. What is the present value of the mortgage pass-through if, immediately after origination, interest rates increase to 8.25 percent per annum?

A. $15,000,000.
B. $14,650,591.
C. $14,000,000.
D. $15,115,493.
E. $15,267,549.

Multiple Choice Questions 9.
The following information is for a collateralized mortgage obligation (CMO). Tranche A has a face value of $110 million and pays 5 percent annually. Tranche B has a face value of $90 million and pays 7 percent annually. If at the end of the first year, the CMO trustee receives total cash flows of $15 million, how are they distributed?

A. $7.5 million to Tranche A and $7.5 million to Tranche B.
B. $15 million to Tranche A and nothing to Tranche B.
C. $5.5 million to Tranche A and $9.5 million to Tranche B.
D. $8.7 million to Tranche A and $6.3 million to Tranche B.
E. $7.1 million to Tranche A and $7.9 million to Tranche B.

Multiple Choice Questions 10.
The underlying USA's Government National Mortgage Association 15-year mortgage pool has a principal amount of $50 million and an annual yield of 6 percent (paid monthly). Assume that there are no prepayments. What is the first monthly payment on the Principal Only (PO) strip?

A. $3 million.
B. $421,928.
C. $250,000.
D. $299,775.
E. $171,928.

Question 11.

An investment bank based in USA and specializing in fixed-income assets has the following balance sheet (in millions). Amounts are in market values and all interest rates are annual unless indicated otherwise.

Assets		Liabilities and Equity	
Cash	$0.5	5% 1-year Eurodollar deposits	$5.0
8% 10-year Treasury-notes semiannual (par = $16.0)	15.0	6% 2-year subordinated debt (par = $9.5)	9.5
		Equity	1.0
Total assets	$15.5	Total liabilities and equity	$15.5

a. Briefly explain whether the investment bank have sufficient liquid assets per the net capital rule? Is the investment bank in compliance with the Securities and Exchange Commission (SEC) Rule 15C 3-1?

[4 marks]

b. Assume that the rates on all assets rise 15 basis points and, on all liabilities, rise 25 basis points (per year). Briefly explain whether the FI will be in compliance with the SEC Rule 15C 3-1?

[10 marks]

Question 12.

Third Fifth Bank has the following balance sheet (in millions), with the risk weights in parentheses.

Assets		Liabilities and Equity	
Cash (0%)	$21	Deposits	$133
Mortgage loans (50%)	50	Subordinated debt (> 5 years)	1
Consumer loans (100%)	70	Equity	6
Reserve for loan losses	(1)		
Total assets	$140	Total Liabilities and equity	$140

In addition, the bank has $20 million in commercial direct-credit substitute standby letters of credit to a public corporation and $40 million in 10-year FX forward contracts that are in the money by $1 million.

a. What are the risk-weighted on-balance-sheet assets of the bank as defined under the Basel III?

[2 marks]

b. What is the CET1, Tier I, and total capital required for both off- and on-balance-sheet assets?

[8 marks]

c. Disregarding the capital conservation buffer, briefly discuss whether the bank have sufficient capital to meet the Basel requirements, and calculate by how much less or more.

[8 marks]

d. Does the bank have enough capital to meet the Basel requirements, including the capital conservation buffer requirement? If not, what minimum CET1, additional Tier 1, or total capital does it need to meet the requirement?

[8 marks]

Question 13.
Discuss the major differences of the fed funds and repurchase agreements as liability management tools.

[20 marks]

Question 14.
Discuss the potential threats and opportunities central bank digital currency (CBDC) may bring to the banking industry.

[20 marks]

End of Paper