

## MOCK EXAM 1 - QUESTIONS

### Question 1

An investor believes there are three important factors that determine the expected return for a common stock. The investor uses the following factor betas and factor exposures.

Factors	Factor Betas	Factor Exposures
1	0.7	1.5%
2	1.2	4.0%
3	-0.1	5.0%

If the risk-free rate is 3%, what is the expected return for this stock using the arbitrage pricing theory (APT) model?

- A) 5.35%.
- B) 8.35%.
- C) 9.50%.
- D) 10.37%.

### Question 2

A \$1,000 par corporate bond carries a coupon rate of 6%, pays coupons semiannually, and has 10 coupon payments remaining to maturity. Market rates are currently 5%. There are 90 days between settlement and the next coupon payment. The dirty and clean prices of the bond, respectively, are closest to:

- A) \$1,043.76, \$1,013.76.
- B) \$1,043.76, \$1,028.76.
- C) \$1,056.73, \$1,041.73.
- D) \$1,069.70, \$1,054.70.

### Question 3

Which of the following statements regarding option "Greeks" is incorrect?

- A) Vega is highest when options are at-the-money.
- B) Forward instruments cannot be used to create gamma-neutral positions.
- C) Rho is higher for at-the-money versus in-the-money options.
- D) Gamma represents the expected change in delta for a change in the value of the underlying instrument.

### Question 4

Firm X is looking to mitigate counterparty risk by centrally clearing trades through a central counterparty (CCP). The firm is aware of some of the potential benefits of central clearing, but is concerned that the drawbacks have not been properly considered by its risk management department. Which of the following definitions is associated with the moral hazard problem of using a central counterparty?

- A) CCPs are expected to be designated as systemically important entities.
- B) Counterparties are likely to over-trade products for which the CCP underestimates risk.
- C) Losses arising from a counterparty's default are spread across all central clearing members.
- D) When margin calls are made, members have to liquidate sufficient assets to meet the margin calls.

### Question 5

An asset manager sells a March 2025 call on XYZ stock with an exercise price of \$45 for a \$3 premium. He also buys a March 2025 call on the same stock with an exercise price of \$40 for a \$5 premium. Identify this option strategy and the maximum profit and loss for the manager.

- A) Bear call spread, maximum profit is \$3, maximum loss is \$2.
- B) Bull call spread, maximum profit is \$3, maximum loss is unlimited.
- C) Bear call spread, maximum profit is unlimited, maximum loss is \$2.
- D) Bull call spread, maximum profit is \$3, maximum loss is \$2.

### Question 6

Based on a sample size of 100 and a sample mean of \$30, a risk analyst estimates a 95% confidence interval for the mean weekly soft drink expenditures of students at a local college. His estimate of the confidence interval is \$26.77 to \$33.23. Since the analyst knew the standard deviation beforehand, the confidence interval was based on a standard deviation closest to:

- A) 1.65.
- B) 6.59.
- C) 11.53.
- D) 16.48.

### Question 7

Consider a 1-year European call option with a strike price of \$27.50 that is currently valued at \$4.10 on a \$25 stock. The 1-year risk-free rate is 6% compounded annually. Which of the following is closest to the value of the corresponding put option?

- A) \$0.00.
- B) \$4.95.
- C) \$5.00.
- D) \$5.04.

### Question 8

Which of the following statements comparing VaR with expected shortfall is true?

- A) Expected shortfall is sub-additive while VaR is not.
- B) Both VaR and expected shortfall measure the amount of capital an investor can expect to lose over a given time period and are, therefore, interchangeable as risk measures.
- C) Both VaR and expected shortfall depend on the assumption of a normal distribution of returns.
- D) VaR can vary according to the confidence level selected, but expected shortfall will not.

### Question 9

Cooper Industries (Cooper) is the pay-fixed counterparty in an interest rate swap. The swap is based on a notional value of \$2,000,000, and Cooper receives a floating rate based on the 6-month SOFR. Cooper pays a fixed rate of 7% semiannually. A swap payment has just been made. The swap has a remaining life of 18 months, with pay dates at 6, 12, and 18 months. Spot SOFR rates are shown in the table below.

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6-month SOFR	6.5%
12-month SOFR	6.8%
18-month SOFR	7.5%
24-month SOFR	7.7%

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The value of the swap to Cooper is closest to:

- A) \$0.
- B) \$10,000.
- C) \$13,000.
- D) \$16,000.

### Question 10

Metallgesellschaft Refining and Marketing (MGRM) offered customers contracts to buy fixed amounts of heating oil and gasoline at a fixed price over a 5- or 10-year period. The customer contracts effectively gave MGRM a short position. MGRM hedged exposure using a rolling hedge strategy. This strategy is best described as:

- A) buying futures contracts of different expirations and allowing them to expire in sequence.
- B) buying futures contracts of different expirations and closing out the position shortly before expiration.
- C) using short-term futures to hedge a long-term risk exposure by replacing them with newer contracts shortly before they expire.
- D) using short-term futures contracts with a larger notional value than the long-term risk they are meant to hedge.

### Question 11

Assume an investor holds a portfolio of bonds as follows:

- \$2,000,000 par value of 10-year bonds with a duration of 6.95 priced at 95.5000.
- \$3,000,000 par value of 15-year bonds with a duration of 9.77 priced at 88.6275.
- \$5,000,000 par value of 30-year bonds with a duration of 14.81 priced at 114.8750.

The duration of this portfolio is closest to:

- A)** 10.64.
- B)** 12.06.
- C)** 13.28.
- D)** 13.57.

### Question 12

Vega is the sensitivity of an option's price to changes in volatility. Increases in an underlying instrument's volatility will usually increase the value of options since increases in volatility produce a greater probability that an option will find its way into the money. Of the four options listed below, which investment has the potential to produce a negative vega measure?

- A)** Exchange options.
- B)** Call options.
- C)** Put options.
- D)** Barrier options.

### Question 13

A portfolio manager for the Matrix Tactical Growth Fund, a mutual fund with total assets of \$225 million. The mandate of the mutual fund is to make active tactical shifts in long and short exposure based on current views of stock market action. Recently, the manager has been cautious on stocks and has positioned the fund with a beta of  $-0.30$ ; however, the most recent jobless claims were more positive than he expected, and he expects the stock market to rally strongly when the monthly non-farm payroll data is released. The manager would like to take advantage of this market rally using S&P 500 index futures and increase the fund's beta to  $1.25$ . Currently, S&P 500 futures are trading at  $5,400$  and the multiplier is  $250$ . How can the portfolio manager achieve his objective for his fund?

- A) Sell 135 contracts.
- B) Buy 155 contracts.
- C) Buy 188 contracts.
- D) Buy 258 contracts.

### Question 14

A hedge fund is considering using one of the following non-parametric methods for estimating value at risk (VaR): traditional historical simulation or multivariate density estimation. Which of the following statements is an advantage of these methods compared to parametric methods for estimating VaR?

- A) Deviations from normality may be a concern for non-parametric methods.
- B) Data is used more efficiently with non-parametric methods than with parametric methods.
- C) The multivariate density estimation is very flexible in introducing dependence on economic state variables.
- D) Parametric methods require a large amount of data that is directly related to the number of conditioning variables used in the model.

### Question 15

A supervisor at Country Bank is examining the Basel Committee's principles for effective risk data aggregation and reporting. Which of the following statements would be incorrect regarding the principle of risk reporting accuracy? The bank should:

- A) define the processes used to create risk reports.
- B) create error reports that identify, report, and explain weaknesses or errors in the data.
- C) include descriptions of mathematical and logical relationships in the data that should be verified.
- D) remove any minimum standards for risk reporting to improve the timeliness of risk approximations.

### Question 16

An analyst is concerned with the symmetry and tails of a distribution of returns over a period of time for a company she is examining. She does some calculations and finds that the median return is 4.2%, the mean return is 4.8%, and the modal return is 3.7%. She also finds that the measure of excess kurtosis is 2. Based on this information, the correct characterization of the distribution of returns over time is:

- |    | <u>Skewness</u> | <u>Kurtosis</u> |
|----|-----------------|-----------------|
| A) | Positive        | Leptokurtic     |
| B) | Positive        | Platykurtic     |
| C) | Negative        | Platykurtic     |
| D) | Negative        | Leptokurtic     |

### Question 17

Fixed-income portfolio managers must always be concerned with the impact of interest rate and reinvestment risk on client portfolios. Which of the following statements regarding interest rate and reinvestment risk is incorrect?

- I. The lower the coupon rate, the lower the interest rate risk.
- II. The longer the term of the bond, the greater the reinvestment risk.

- A) I only.
- B) II only.
- C) Both I and II.
- D) Neither I nor II.

### Question 18

A portfolio manager of an endowment wants to calculate a daily VaR for the portfolio. The €5,000,000 portfolio is restricted from using derivative securities. The manager uses a 5% level of significance to estimate the VaR. The manager ranked the 100 daily returns from last year, and reports the lowest eight returns to be:  $-0.0099$ ,  $-0.0106$ ,  $-0.0132$ ,  $-0.0159$ ,  $-0.0211$ ,  $-0.0254$ ,  $-0.0368$ , and  $-0.0584$ . Which of the following amounts is closest to the daily VaR using the historical simulation method?

- A)  $-\text{€}66,000$ .
- B)  $-\text{€}79,500$ .
- C)  $-\text{€}105,500$ .
- D)  $-\text{€}127,000$ .

### Question 19

The spot rate for a commodity is \$19. The annual lease rate for the commodity is 5%. The appropriate annually compounded annual risk-free rate is 6.5%. Which of the following amounts is closest to the 3-month commodity forward price?

- A) \$18.46.
- B) \$18.93.
- C) \$19.07.
- D) \$19.55.

### Question 20

A buffalo farmer is concerned that the price he can get for his buffalo herd will be less than he had forecasted. To protect himself from price declines, the farmer has decided to hedge with live cattle futures. Specifically, he has entered into the appropriate number of cattle futures positions for September delivery that he believes will help offset any buffalo price declines during the winter slaughter season. The appropriate position and the likely sources of basis risk in the hedge are, respectively:

- A) short; choice of futures delivery date.
- B) short; choice of futures asset.
- C) short; choice of futures delivery date and asset.
- D) long; choice of futures delivery date and asset.

### Question 21

An investment manager at Java Investments collects five years of historical returns in order to calculate Spearman's rank correlation coefficient for the stock returns of stocks A and B. The stock returns for A and B from 2021 to 2025 are as follows:

Year	A	B
2021	-3%	6%
2022	12%	-3%
2023	-8%	4%
2024	-11%	8%
2025	3%	3%

What is Spearman's rank correlation coefficient for the stock returns of A and B?

- A) -0.9.
- B) -0.7.
- C) -0.3.
- D) +0.2.

### Question 22

A risk consultant believes that the price of SCU's stock will have little volatility over the next three months and wants to construct a butterfly spread option strategy to take advantage of the opportunity he believes to exist. Looking at his computer screen, the consultant sees the following 3-month options are available on SCU's stock:

- Put option with a strike price of \$35 and a price of \$1.25.
- Put option with a strike price of \$40 and a price of \$3.50.
- Put option with a strike price of \$45 and a price of \$5.50.
- Call option with a strike price of \$40 and a price of \$5.90.

The risk consultant can use any number of contracts from the above options to construct his strategy. Assuming the price of the underlying stock at expiration is \$41, what is the total profit (loss) on a properly constructed butterfly spread?

- A)** -\$1.15.
- B)** +\$1.15.
- C)** +\$4.25.
- D)** +\$6.90.

### Question 23

A hedge fund with a 2-plus-20% fee structure has equal probabilities of a 10% loss or a 30% gain in its first year. The expected return to an investor in the fund for the first year is closest to:

- A)** -2.0%.
- B)** 5.2%.
- C)** 8.8%.
- D)** 17.6%.