



Sample Questions Bank (Derivatives Markets) for SOA Exam FM/ CAS Exam 2

Electronic Product/ No Returns

Preface

Ever since the material of Derivatives Market is included, exam FM/2 is no longer testing the candidates purely on the classical theory of interest, and, from the response of most candidates, the exam has become tougher than before. To many candidates, numerous graphs, jargons, apparently-similar yet different terms and concepts are rather confusing and hard to comprehend.

Facing these challenges, the candidates still need to find out the potential questions asked in the exams. Most candidates find it relatively easy to understand the material on theory of interest, and the questions on the material can be easily obtained from the past year exam questions, unlike the material on derivatives market, which is scarce and not available in the market. This makes it harder for the candidates to know what to expect in the exam.

Attributable to this, this questions bank is specially written to assist candidates who face difficulty in the material. It consists of 180 questions covering the required readings in the textbook by Robert McDonalds. The questions test the candidates both the calculation skills and the comprehension of the concepts. With all my best, I have attempted to exhaust from pages to pages of the textbook all the potential questions that can be raised in the exam. I believe that this can help the candidates to understand the material tremendously.

Should you have any questions, feel free to raise them to me at anistudymanual@gmail.com. I will reply you in 1-3 business days. You can also add me in your contact list of messenger for further clarification of your problems. However, do send me an email before contacting me directly through messenger.

All the best for the exam, and enjoy the reading.

Alvin Soh

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Part 1: Introduction on Derivatives and Risks

1. Which of the followings cannot mitigate credit risk?
 - (A) Collateralization
 - (B) Bank letters
 - (C) Haircut
 - (D) Hedging
 - (E) No answer is given in (A), (B), (C), and (D)

Sample Questions

Answer keys

1	D
2	E
3	C
4	D
5	E

Solutions

1. Collateralization is to pledge a liability using assets. It definitely reduces the exposure of credit risk. Bank letters is the acknowledgement letter from bank, which gives guarantee to the creditors on the payment of the debtors. Haircut is similar to collateralization, which is used in short sales.

Hedging mitigates the market risk but not credit risk. For example, a gold seller hedges the gold price by purchasing a put option. That does not protect the gold seller from the probability that the buyer is unable to pay for the gold. The answer is **(D)**.

Sample Questions

Part 2: Forward Contracts and Options

1. You are given that the ABC Stock price is traded at \$45 now and the 3-month forward price is \$46.80. Which of the following is true about outright purchase of this stock and the forward contract?
 - (A) If the spot price is \$45 after 3 months, the profit for outright purchase and long forward contract is the same
 - (B) If the spot price is \$46.80 after 3 months, the profit for outright purchase and long forward contract is the same.
 - (C) If the ABC Stock pays a dividend of \$0.50 after 1 month and is traded at \$46.80 after 3 months, purchasing the stock outright makes a profit of \$2.30.
 - (D) If the ABC stock pays a dividend of \$0.50 after 1 month and is traded at \$46.80 after 3 months, the profit of long forward is \$0.
 - (E) The answer is not given in (A), (B), (C), and (D).
2. The current price of the Lucky Company Stock is \$50, and the 6-month forward price is \$52. What is the amount of money that needs to be lent today to mimic the profit of outright purchase after 6 months? Assume that the annual continuously compounded risk free rate is 5%.
 - (A) \$50.00
 - (B) \$50.20
 - (C) \$50.70
 - (D) \$51.20
 - (E) \$52.00
3. A dealer has just entered into a short forward position. The underlying asset is currently traded at \$100 and the 1-year forward price is \$105. Assuming an annual effective rate of 3%, find the number of 100 zero-coupon bonds that the dealer has to buy to hedge his position.
 - (A) 0.00000
 - (B) 0.19417
 - (C) 0.98058
 - (D) 1.019417
 - (E) 2.00000
4. Which of the following is false?
 - (A) Entering into a long forward contract with a purchased zero-coupon bond maturing at the expiration date of forward mimics the payoff of an outright purchase of stock
 - (B) Purchasing a stock and borrowing the present value of forward price replicate a long forward contract
 - (C) Entering into a long forward contract, selling a stock and buying a bond are always making a negative profit, since there is transaction cost.
 - (D) Selling a stock and lending money at certain risk free rate earns the same payoff as a short forward contract
 - (E) Forward contracts are the only derivative that has no credit risk involved

Answer Keys

1	E	11	A	21	B
2	C	12	E	22	C
3	C	13	C	23	C
4	D	14	D	24	C
5	C	15	E	25	A
6	D	16	B	26	A
7	E	17	E		
8	C	18	D		
9	C	19	C		
10	B	20	E		

Solutions

- (A) is incorrect, because the profit for outright purchase is \$0, whereas the profit of the forward contract is -\$1.80. (B) is incorrect, since the profit for outright purchase is \$1.80, whereas the profit for long forward contract is \$0. (C) is incorrect, because the cash dividend is payable after 1 month. Due to time value of money, the profit for stock outright purchase is $\$1.80 + \$0.50e^{0.1667r} > \$2.30$, when $r > 0$. (D) is correct, since the forward contract is not directly affected by dividend paid before the date of maturity. So, the answer is **(D)**.
- The answer is **(C)**. Remember that the payoff of a forward contract is equivalent to purchasing a stock at expiration plus paying cash of the forward price. In order to achieve this, the present value of the forward price needs to be lent (buy bond) so that at expiration date, the money lent will grow to the forward price. Therefore, the money that needs to be lent today is $\$52e^{-0.05(0.5)} = \50.7161 .
- To hedge the position of a short forward, we need to replicate a long forward contract. This requires selling bonds (borrowing money) today so that there will be cash outflow at the expiration date. Hence, the dealer needs to borrow the present value of the forward price: $\$105/1.03 = \101.9417 , which is 1.019417 unit of a 100 zero-coupon bond. The answer is **(D)**.
- The answer is **(E)**. All derivatives involve credit risk. It is just the matter of exposure of the risk. For example, for forward contract, the short forward faces the credit risk that the buyer is unable to pay for the underlying asset.

Part 3: Insurance and Other Option Strategies

1. A dealer has just entered into a derivative contract with a customer. The customer is obligated to sell the underlying asset to the dealer at the expiration date at price K . The dealer wishes to fully hedge his position by trading the following derivatives. Which of the followings achieves his goal?
 - (A) Purchase a put option with strike price K
 - (B) Sell a call option with strike price K
 - (C) Purchase a K -strike call and sell a K -strike put
 - (D) Sell a K -strike call and purchase a K -strike put
 - (E) Enter into a long forward contract with forward price at K

2. A dealer has just entered into a derivative position with a customer. The customer is obligated to sell the underlying asset to the dealer if the spot price at expiration is more than K , whereas the dealer has the right to sell the underlying asset to the customer if the spot price at expiration is less than K . Which of the followings describes the derivative trading?
 - (A) The dealer purchases a K -strike call and a K -strike put
 - (B) The dealer sells a K -strike call and purchases a K -strike put
 - (C) The dealer purchases a K -strike call and sells a K -strike put
 - (D) The dealer sells a K -strike call and a K -strike put
 - (E) The dealer enters into a long forward contract

3. Alan has just entered into a derivative position with a dealer. The dealer makes a positive payoff when the price of underlying asset is less than $\$35$ and higher than $\$45$ at expiration. Which of the followings describes the option strategy that the dealer has entered into?
 - I. 35-45 purchased strangle
 - II. 35-45 written strangle
 - III. 35-40-45 butterfly-spread
 - IV. 35-45 Bull call spread
 - (A) I, III
 - (B) II, III
 - (C) II, IV
 - (D) III, IV
 - (E) No answer is given in (A), (B), (C), and (D)

Answer Keys

1	C	11	E	21	D	31	E	41	B
2	E	12	D	22	E	32	E	42	E
3	E	13	C	23	B	33	A	43	E
4	B	14	E	24	E	34	C	44	C
5	D	15	B	25	D	35	B	45	B
6	D	16	C	26	C	36	A	46	C
7	E	17	E	27	C	37	B	47	D
8	E	18	C	28	E	38	B	48	A
9	D	19	C	29	E	39	C	49	A
10	A	20	D	30	E	40	E		

Solutions

1. “Obligation to sell the underlying asset to the dealer” implies that the customer is in the short position on the forward contract. The dealer is then in the long forward position. To hedge this position, the dealer needs a short forward contract. Since selling a call option and buying a put option with the same strike price of K replicates a short forward position, **(D)** is the answer.
2. “The customer is obligated to sell the underlying asset to the dealer if...” implies that the customer is writing an option. “... if the spot price at expiration is more than K ” implies that the option is a call option. “The dealer has the right to sell the underlying asset to the customer if...” implies that dealer is purchasing an option. “... if the spot price at expiration is less than K ” implies that the trader purchases a put option. This means, the dealer purchases a K -strike call option and a K -strike put option. The answer is **(A)**.
3. A strangle bets on the volatility of the underlying asset price. A 35-45 purchased strangle makes payoff when the spot price of underlying asset at expiration is not between \$35 and \$45. A 35-45 written strangle is just the opposite. 35-40-45 butterfly spread has almost the same payoff as written straddle, just that the payoff from 0-35 and 45 to infinity is zero. 35-45 Bull call spread makes \$0 profit if it is less than \$35, and \$5 when it is more than \$45. Hence, the answer that fulfils the requirement is I only. The answer is **(E)**.

Author's Biography

Alvin Soh was born in Penang, Malaysia. He is now a final year campus student studying in Petaling Jaya, Malaysia. He is keen in sharing and helping his peers in actuarial exams. His strong passion in mathematics and actuarial career is reflected in his fast progress in actuarial exams. He has passed all the preliminary exams in the mere 1.5 years and he is more than willing to share his study methods and experience to every actuarial student striving to progress in exams. He has passed an advanced level exam (Exam AFE) recently, and is pursuing his CERA and FSA in Finance and Enterprise Risk Management.

The following is the progress of his exams:

Exam Passed	Sitting
P/1- Probability	Spring 2007
FM/2- Financial Mathematics	Fall 2007
MLC- Models for Life Contingencies	Spring 2008
MFE/3F- Models for Financial Economics	Fall 2008
C/4- Construction and Evaluation of Actuarial Models	Fall 2008
AFE- Advanced Finance and Enterprise Risk Management	Spring 2009

He is now preparing for the last fellowship exam by the Society of Actuaries in finance and enterprise risk management track- exam FETE (Financial Economics Theory and Engineering).