

K.J. Somaiya Institute of Management Studies & Research

Course : PGDM / PGDM (FS) – IV – Batch: 2016-18 Trim End Term Exam

Sub : Derivatives and Risk Management-I

Date of Exam : 18 /09/2017

Time : 3 hours

Marks : 50

Note : **Q. No. 1 is compulsory.** Answer **ANY THREE** complete questions from the rest.

Question 1 **(20**

Marks)

- (a) Delta Air wishes to hedge its exposure to changes in the price of aviation turbine fuel (ATF). Since futures contracts on ATF are not available it uses crude oil futures to hedge its exposure. The following table shows the monthly changes in the spot price and the futures price of crude oil. Use the data to calculate a minimum variance hedge ratio. (10 marks)

<i>Spot Price Change</i>	+0.50	+0.61	-0.22	-0.35	+0.79
<i>Futures Price Change</i>	+0.56	+0.63	-0.12	-0.44	+0.60
<i>Spot Price Change</i>	+0.04	+0.15	+0.70	-0.51	-0.41
<i>Futures Price Change</i>	-0.06	+0.01	+0.80	-0.56	-0.46

- (b) Today is September 18. A company is planning to launch an issue of commercial paper to the tune of Rs.100 crore on December 18. The commercial paper will have a maturity of three months. Three-month commercial paper yield is currently around 7.80% p.a. What is the risk faced by the company in this transaction? Enumerate the different ways by which the company can manage this risk and explain the merits and demerits of each alternative. (10 marks)

Question 2 **(10**

Marks)

- (a) Vizag Ports Ltd shares are traded at Rs.150. Compute the value of a one-year call option on Vizag Ports Ltd shares at a strike price of Rs.140 using the binomial option pricing method and time steps of 6 months each. Assume that the share price can move up by 25% or down by 20% in each period and the risk-free interest rate is 8% p.a. continuously compounded. (5 marks)
- (b) An Indian exporter to Canada is scheduled to receive a payment of CAD 100,000 on December 20, 2017. He decides to hedge the exchange rate risk using the USDINR futures contract which will expire on December 28. The exporter receives his payment on December 20, converts the CAD to INR at the spot rate on that date and squares up his futures position. Explain whether the exporter has achieved a perfect hedge. (5 marks)

Question 3 **(10**

Marks)

- (a) A European call option on RIL with 23 days to maturity is currently selling for Rs.55. The stock price is Rs.1649.50, the strike price is Rs.1600, and the risk-free interest rate is 8% per annum. What opportunities are there for an arbitrageur? (5 marks)

- (b) Today is September 18. Paul is holding an American call option on shares of Apple Inc. (AAPL). The stock price on September 18 is USD 162 and the call strike price is USD 145. The option will expire on November 17, 2017. Apple Inc. is not scheduled to pay any dividend between today and November 17. Paul wants to know whether he should exercise his call option today and pocket his gains. Advise him. (5 marks)

Question 4 **(10 Marks)**

- (a) On September 6, Nifty spot is trading at 9985.60. Call options on Nifty expiring on September 28 and with a strike price of 9900, 10000 and 10100 are traded at Rs.134.70, Rs.81.25 and Rs.42.55 respectively. An options trader is of the view that Nifty will be largely range-bound till expiry. What kind of butterfly strategy is advised under these circumstances? Construct the strategy and show the pay-off assuming that on expiry Nifty closes at (a) 9900 or (b) 10020 or (c) 10200. (5 marks)
- (b) State the five main determinants of the price of an option and explain how each of these affects the option price. (5 marks)

Question 5 **(10 Marks)**

- (a) Using the Black-Scholes-Merton model calculate the price of a one-month European call option on shares of Reliance Capital Ltd with a strike price of 800 when the current stock price is Rs.762.20, the risk-free interest rate is 10% per annum, and the volatility is 35% per annum. Use the z-tables. The formula is

Where $d_1 = \frac{\ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}}$ and $d_2 = d_1 - \sigma\sqrt{t}$ (5 marks)

- (b) What is meant by (a) an investment asset and (b) a consumption asset. Why is the distinction between investment and consumption assets important in the determination of forward and futures prices? (5 marks)

Question 6 **(10 Marks)**

- (a) Suppose that the Treasury bond futures price is Rs.101.38. Which of the following four bonds is cheapest to deliver? (5 marks)

Bond	Price	Conversion Factor
1	125.16	1.2131
2	142.47	1.3792
3	115.97	1.1149
4	144.06	1.4026

- (b) Explain whether TRUE or FALSE: Reverse cash-carry arbitrage is more difficult to execute than cash-carry arbitrage. (5 marks)