

PGDM/PGDM-IB, 2021-23

Financial Derivatives

DM-412/IB-412

Trimester – IV, End-Term Examination: September 2022

Roll No: _____

Time allowed: 2 Hrs

Max Marks: 40

Instruction: Students are required to write Roll No on the cover page of the Answer Sheet. All other instructions on the question paper / Admit card should be followed meticulously.

Use of scientific calculator is allowed.

Sections	No. of Questions to attempt	Marks	Total Marks
A	Minimum 4 questions with internal choices and all COs (Course Intended Learning Outcomes) covered in the Question Paper	4* 5	20
B	Compulsory Case Study	(4+8+8)	20
			40

SECTION A – (5 marks * 4 questions) = 20 Marks

A1 a. In July, a mining company discovered a small deposit of gold. It will take 6 months to construct the mine. The gold will then be extracted on a more or less continuous basis for 2 years. Futures contracts on gold are available with delivery months every 2 months throughout the year. Each contract is for the delivery of 100 ounces. Discuss how the mining company might use futures markets for hedging. (CO 1)

OR

A1 b. "When a futures contract is traded on the floor of the exchange, it may be the case that the open interest increases by one, stays the same, or decreases by one." Explain this statement.

A2 a. A company has a ₹2 million portfolio with a beta of 1.2. It would like to use futures contracts on the Nifty 50 to hedge its risk. The index is currently standing at 8,400 and each contract is for delivery of ₹200 times the index. What is the hedge that minimizes risk? What should the company do if it wants to reduce the beta of the portfolio to 0.6? (CO2)

OR

A2 b. A corn farmer argues "I do not use futures contracts for hedging. My real risk is not the price of corn. It is that my whole crop gets wiped out by the weather." Discuss this viewpoint.

Should the farmer estimate his or her expected production of corn and hedge to try to lock in a price for expected production?

A3 a. When a known future cash outflow in a foreign currency is hedged by a company using a forward contract, there is no foreign exchange risk. When it is hedged using futures contracts, the daily settlement process does leave the company exposed to some risk. Explain the nature of this risk. In particular, consider whether the company is better off using a futures contract or a forward contract when:

- The value of the foreign currency falls rapidly during the life of the contract.
- The value of the foreign currency rises rapidly during the life of the contract.
- The value of the foreign currency first rises and then falls back to its initial value.
- The value of the foreign currency first falls and then rises back to its initial value.

Assume that the forward price equals the futures price. (CO 3)

OR

A3 b. A stock is expected to pay a dividend of \$1 per share in 2 months and in 5 months. The stock price is \$50, and the risk-free rate of interest is 8% per annum with continuous compounding for all maturities. An investor has just taken a short position in a 6-month forward contract on the stock.

(a) What are the forward price and the initial value of the forward contract?

(b) Three months later, the price of the stock is \$48 and the risk-free rate of interest is still 8% per annum. What are the forward price and the value of the short position in the forward contract?

A4 a. A stock price is currently \$50. It is known that at the end of six months it will be either \$45 or \$55. The risk-free interest rate is 10% per annum with continuous compounding. What is the value of a six-month European put option with a strike price of \$50? (CO 4)

OR

A4 b. Three put options on a stock have the same expiration date and strike prices of \$55, \$60, and \$65. The market prices are \$3, \$5, and \$8, respectively. Explain how a butterfly spread can be created. Construct a table showing the profit from the strategy. For what range of stock prices would the butterfly spread lead to a loss?

SECTION B – CASE STUDY (20 Marks)

An investor has collected the following information on NCC June, September and December options. (CO4)

Strike Price (₹)	Call options (₹)			Put Options (₹)		
	Jun	Sep	Dec	Jun	Sep	Dec
63.00	1.70	-	-	-	-	-
63.50	1.50	1.70	-	-	-	-
64.00	1.30	1.50	1.65	-	-	-
64.50	1.20	1.40	1.50	0.30	-	-

65.00	1.10	1.20	1.30	0.40	0.50	-
65.50	0.90	1.10	1.15	0.70	0.85	1.00
66.00	0.80	0.90	1.00	0.90	1.00	1.05
66.50	0.60	0.70	0.80	1.00	1.10	-
67.00	0.30	-	-	1.10	-	-
67.50	0.20	-	-	1.30	-	-

The current spot price is ₹65.80

1. Find the intrinsic value of ₹63.50 June call and ₹66.00 Dec put. (4 marks)
2. If the spot rate is expected to be ₹65.50 in September, which call and put option should be bought? (8 marks)
3. If the investor wants to buy NCC stocks in December and expected spot rate is ₹67.00, which call option should be bought? (8 marks)