VPM's
DR VN BRIMS, Thane
Programme: MMS (2022-24)
Third Semester Regular Examination January - February 2024

Course Name:	Derivatives and Risk Management	**Course Code**	F-308
Roll No.		**Marks**	60
Total No. of Questions	6	**Duration**	3 Hours
Total No. of printed pages	4	**Date**	06.02.2024

Course Outcome Statements:

CO1: To understand the concepts related to derivatives markets and gain in-depth knowledge of the functioning of derivatives markets.

CO2: To learn the derivatives pricing and application of strategies for financial risk management.

CO3: To acquaint learners with the trading, clearing, and settlement mechanisms in derivatives markets.

<table>
<tr><td colspan="3">Instructions: -</td><td rowspan="3">Marks</td><td rowspan="3">BL</td><td rowspan="3">CO</td></tr>
<tr><td colspan="3">Q. No 1 (All Questions are Compulsory)</td></tr>
<tr><td>Q. No.</td><td></td><td>Questions</td></tr>
<tr><td>Q. 1</td><td></td><td>Case/Case-let Study</td><td></td><td></td><td></td></tr>
<tr><td></td><td>a.</td><td>
On August 1, 2023, an investor has a portfolio consisting of 5 securities as shown below:

Security	Market Price (Rs.)	No. of shares	Beta
A	60	450	0.87
B	320	850	1.31
C	640	200	0.94
D	130	500	0.66
E	480	600	1.50

The cost of capital for the investor is 20% p.a. compounded. The current NIFTY value is 19,500. Nifty futures are available with expiry for 3 months (Oct.23) and 4 months (Nov. 23) and are currently quoted at 19,700 and 19,900 respectively. Each NIFTY futures can be traded in units of 50 only.

Analyse the above data and calculate:

(i) The beta of his portfolio
(ii) Theoretical value of Futures contract for contracts expiring in Oct. & Nov. (Given $e^{0.05} = 1.05127$, $e^{0.06} = 1.06184$, $e^{0.07} = 1.07251$, $e^{0.067} = 1.06931$)
(iii) The number of contracts of NIFTY the investor needs to sell to get a full hedge until November for his portfolio.
(iv) The number of future contracts the investor should trade, if he desires to reduce the beta of his portfolio to 0.25
</td><td>6</td><td>Level 4</td><td>CO2</td></tr>
<tr><td></td><td>b.</td><td>Mr. Rohan established the following spread on Neel Corporation’s stock:</td><td>6</td><td>Level 5</td><td>CO2</td></tr>
</table>

(i) Purchased one 3-month call option with a premium of Rs. 30 and an exercise price of Rs. 550.

(ii) Purchased one 3-month put option with a premium of Rs. 5 and an exercise price of Rs. 450.

Neel Corporation's stock is currently selling at Rs. 500. **Evaluate** the strategy adopted by Rohan to ascertain profit or loss, if the price of Neel Corporation's stock:

(i) remains at Rs. 500 after 3 months
(ii) falls at Rs. 350 after 3 months
(iii) rises to Rs. 600

Assume the size of the option is 100 shares of Neel Corporation.

Q. 2 Answer **Any one** from the following.

a. IF, an Indian Firm has its subsidiary in Singapore and SF, a Singapore firm has its subsidiary in India and face the following interest rates:

Company	IF	SF
INR Floating Rate	BPLR + 0.5%	BPLR + 1.5%
SGD (fixed rate)	3%	3.50%

SF wishes to borrow Rupee loan at a floating rate and IF wishes to borrow SGD at a fixed rate. The amount of loan required by both the companies is same at the current exchange rate. A bank arranges a swap and requires 50 basis points as its commission, which is to be shared equally. IF requires a minimum gain of 20 basis points and SF requires a minimum gain of 10 basis points for structuring the deal. The bank is very keen to structure the deal, even if, it has to forego a part of its commission.

You are required to evaluate:

(i) Whether there are any advantages available to IF and SF?
(ii) Whether a swap can be arranged which may be beneficial to both the firms?
(iii) What rate of interest will they end up paying? Show detailed working.

6 **Level 5** **CO2**

b. Mr. V is a commodity trader and specialised himself in trading of rice. He has 24,000 kg. of rice. The following details are available as on date:

Spot price: Rs. 70/ kg.
3 month's future is trading at Rs. 68/ kg.
Expected Lower price after 3 months Rs.64/ kg.
Contract size: 500 kg./ contract

Evaluate:

(i) How to mitigate the risk of fall in price?
(ii) How to use the futures market?

6 **Level 5** **CO2**

<table>
<tr><td></td><td></td><td>(iii) What will be the effective realized price for his sale if, after 3 months, spot price is Rs. 69 / kg. and the 3 months future contract price is :
(a) Rs. 72/ kg.
(b) Rs. 67/ Kg.</td><td></td><td></td><td></td></tr>
<tr><td>Q. 3</td><td></td><td>Answer Any one from the following.</td><td></td><td></td><td></td></tr>
<tr><td></td><td>a.</td><td>Suppose a dealer bank quotes for a generic swap “AIC 8%/8.20% vs. 6M LIBOR Flat”. Notional principal amount of swap is Rs. 1 Million, and the same is for a period of three years, reset after every six months.

In this context, analyse the following:

(i) What is the interpretation of the dealer bank quote?
(ii) If a firm is buying a swap, what is the nature of cash flows?
(iii) If a firm is selling a swap, what is the nature of cash flows?
(iv) Calculate semi-annual fixed payment for the buyer of swap at the end of every six months.
(v) If the six month period from the effective date of swap to the settlement date comprises of 181 days and that the corresponding LIBOR was 5% on the effective date of swap, then what will be the first floating rate payment for the buyer?
(vi) If the settlement is on “Net Basis”, how much the buyer of swap has to pay or receive at the end of first six months? (Assume 30/360 days basis)</td><td>6</td><td>Level 4</td><td>CO3</td></tr>
<tr><td></td><td>b.</td><td>Following is the information available pertaining to shares of Omni Ltd.:

<table>
<tr><td>Current Market Price</td><td>Rs. 420</td></tr>
<tr><td>Strike Price</td><td>Rs. 450</td></tr>
<tr><td>Maximum price expected in next 3 months’ time</td><td>Rs. 525</td></tr>
<tr><td>minimum price expected in next 3 months’ time</td><td>Rs. 378</td></tr>
<tr><td>CCROI (p.a.) (%)</td><td>8%</td></tr>
<tr><td>e^{rt}</td><td>1.0202</td></tr>
</table>
Analyse the above information and

(i) calculate the value of 3 months call option using Binomial Method and Risk Neutral Method

(ii) Are the calculated values under both the models same?

(iii) State clearly the basis of valuation of Options under these models.</td><td>6</td><td>Level 4</td><td>CO2</td></tr>
<tr><td>Q. 4</td><td></td><td>Answer Any two from the following.</td><td></td><td></td><td></td></tr>
<tr><td></td><td>a.</td><td>“The commodity characteristic approach defines feasible commodities for derivatives trading based on an extensive list of required commodity attributes”. What are the required attributes which a commodity must possess for qualifying for the derivatives trade?</td><td>6</td><td>Level 3</td><td>CO1</td></tr>
</table>

	b.	Swaptions can be applied for speculation purposes or to hedge a portion of their swap books. What are the other areas of its application?	**6**	**Level 3**	**CO2**
	c.	The following data relate to X Ltd.'s share price: Current Price per share = Rs. 2,000 3 months future's price/ share = Rs. 2250 Assuming it is possible to borrow money in the market for transactions in securities at 6% per annum, you are required to assess: (i) Whether there exists any arbitrage opportunity. (ii) Calculate the theoretical minimum price of a 3-months forward purchase. (iii) Calculate the net arbitrage gain.	**6**	**Level 3**	**CO2**
Q. 5		Answer **Any two** from the following.			
	a.	Explain the differences between Cash and the Derivative market.	**6**	**Level 2**	**CO1**
	b.	State any 6 assumptions of Black- Scholes Model of Option Pricing.	**6**	**Level 2**	**CO2**
	c.	Explain the meaning of the following terms w.r.t. Derivative Contracts: (i) Contago market v/s Inverted market (ii) In the Money v/s Out of the Money (iii) Initial Margin v/s Maintenance margin	**6**	**Level 2**	**CO1**
Q. 6		Answer **Any two** from the following.			
	a.	(i) What is meant by "delta" of an option? How would you utilize it in constructing a riskless portfolio? (ii) What do you mean by "Hedge Ratio" in the context of Future Contract? (iii) What is the meaning of "marking to market" with respect to future contracts?	**6**	**Level 1**	**CO1**
	b.	Distinguish between Forward Contract and Future Contract.	**6**	**Level 1**	**CO1**
	c.	What are the reasons for stock index futures becoming more popular financial derivatives over stock futures segment in India?	**6**	**Level 1**	**CO1**