

**VPM's  
DR VN BRIMS, Thane  
Programme: MMS (2023-25)  
Third Semester Regular Examination December 2024**

<b>Course Name:</b>	Derivatives and Risk Management	<b>Course Code</b>	F308
<b>Roll No.</b>		<b>Marks</b>	60
<b>Total No. of Questions</b>	3	<b>Duration</b>	3 Hours
<b>Total No. of printed pages</b>	4	<b>Date</b>	09.12.2024

**Course Outcome Statements:**

**CO1:** DEFINE the basic terminologies related to Derivatives, Forward, Future, Options Valuations, Option volatility, swaps, Trading, Clearing and Settlement in Derivatives Markets

**CO2:** EXPLAIN the concepts related to forward, future, options, swaps, option trading strategies, option valuation, risk management and option volatility

**CO3:** MAKE USE OF data to calculate the option volatility, valuation of derivative and apply future, option strategies for risk management

**CO4:** EXAMINE the option volatility value, future and option strategies based on different market conditions

**CO5:** CHOOSE the future and option trading strategies for hedging the risk exposures.

**Instructions: -**

<b>Q. No 1</b> (All Questions are Compulsory)		<b>Marks</b>	<b>BL</b>	<b>CO</b>
<b>Q. No.</b>	<b>Questions</b>			
<b>Q. 1</b>	Case/Case-let Study			

	a.	<p>Slot Securities, a prominent investment firm, is analysing an opportunity to invest in a European call option on Anfield Inc. shares. Anfield's stock is currently trading at \$150 per share. The firm is optimistic about Anfield's growth potential due to a recent breakthrough in artificial intelligence technology. However, given market volatility, the firm must carefully evaluate the fair value of the option before committing to a purchase.</p> <p>The option under consideration has a strike price of \$130 and a maturity of one year, divided into two six-month periods. Over each period, Anfield's stock can either rise by 20% or fall by 15%. This reflects both the high potential for upside due to technological advancements and the downside risk from regulatory concerns and market competition.</p> <p>The risk-free interest rate is 6% p.a. The investment team at Slot Securities plans to use a binomial model to value the European call option, considering the possible price movements at each stage and the resulting option payoffs. Slot Securities feel that if the option is priced below \$40, they would go ahead and buy it. <b>Examine</b> whether the option fits Slot's criteria or not?</p> <p>Factors based on continuous compounding at 6% p.a.:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Period</th> <th>FVIF</th> <th>PVIF</th> </tr> </thead> <tbody> <tr> <td>3 months</td> <td>1.0151</td> <td>0.9851</td> </tr> <tr> <td>6 months</td> <td>1.0305</td> <td>0.9704</td> </tr> <tr> <td>1 year</td> <td>1.0618</td> <td>0.9418</td> </tr> </tbody> </table>	Period	FVIF	PVIF	3 months	1.0151	0.9851	6 months	1.0305	0.9704	1 year	1.0618	0.9418	<b>6</b>	<b>Level 4</b>	<b>CO4</b>
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	b.	<p>Further Slot Securities is exploring a bullish put spread strategy on Kop Inc., a tech company known for its rapid innovation in clean energy solutions. The company's stock is currently trading at \$80 per share. Slot's analysts predict a moderate increase in Kop's stock price driven by an upcoming product launch and favourable market sentiment. However, the firm wants to limit its downside risk in case the market moves unfavourably. So effectively, there is a belief that the market will go up moderately but there is also a small possibility that it may also come down marginally.</p> <p>To execute the strategy, Slot is considering a put option with a strike price of \$80 (premium \$10) and another put option with a strike price of \$70 (premium \$5), both with the same expiration.</p> <p>Slot's objective is to <b>determine</b> the profitability of the bull put spread strategy and draw the pay-off diagram.</p>	6	Level 5	CO5												
<b>Q. 2</b>		Answer <b>Any one</b> from the following.															
	a.	<p>Tihor Fund on 30<sup>th</sup> Nov 2024 took a long position in RIL_26Dec2024_FUT. The details of the contract were as follows:</p> <p>Spot Price of RIL: Rs.1,292 FUT Price: Rs.1,301 Lot Size: 95</p> <p>On 15th Dec 2024, the following position prevailed Spot Price of RIL: Rs.1,350 FUT Price: Rs.1,355</p> <p>On Expiry the Spot Price of RIL turned out to be Rs.1,250.</p> <p><b>Evaluate</b> if it was better to hold the Future till expiry or square-off earlier.</p>	6	Level 5	CO5												
	b.	<p>Consider 2 firms Guardian and Pharoh who wish to borrow funds from the market.</p> <table border="1"> <thead> <tr> <th>Firm</th> <th>Fixed Rate</th> <th>Floating Rate</th> <th>Preference</th> </tr> </thead> <tbody> <tr> <td>G</td> <td>8%</td> <td>L + 1.5</td> <td>Floating</td> </tr> <tr> <td>P</td> <td>11%</td> <td>L + 2.5</td> <td>Fixed</td> </tr> </tbody> </table> <p><b>Recommend</b> the interest rate swap design to enable each firm achieve its preferred form of funding at a cheaper cost. Assume that Guardian would like 75% of the total share of gains and Pharoh will settle for 25% share.</p>	Firm	Fixed Rate	Floating Rate	Preference	G	8%	L + 1.5	Floating	P	11%	L + 2.5	Fixed	6	Level 5	CO5
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<b>Q. 3</b>		Answer <b>Any one</b> from the following.															
	a.	<p>A Put and a Call option each have an expiration date 6 months and have an exercise price of Rs.2,500. The Risk-free rate of interest is 6%.</p> <p>i) If the put is priced at Rs.100 and equity share is worth Rs.2,550 per share, analyse what should be the theoretical price of the call option using put-call parity?</p> <p>ii) If the call option is priced at Rs.58 and put option is priced at Rs.130, <b>examine</b> what should be the theoretical price of equity share?</p>	6	Level 4	CO4												

		Given: PVIF @ 6% with continuous compounding for 6 months = 0.9704																											
	b.	Fax Ltd. is an Indian bank and has been approached by a client to discuss opportunity for entering an FRA contract. Mr. Sinha from the derivatives department is asked to give an FRA quote to the client. He observed that the current spot interest rate for 3 months is 5% p.a. and the spot interest rate for 7 months is 7% p.a. <b>Analyse</b> what must be the FRA(3x7) quote on a per annum basis.	6	Level 4	CO4																								
<b>Q. 4</b>		Answer <b>Any two</b> from the following.																											
	a.	The following information is available for the stock of SBI Ltd. CMP Rs.838 Strike Price Rs.800 Time to expiration 3 month Risk Free Interest Rate: 6% p.a. You are required to <b>Compute</b> the Price of Call Option and Put Option using Black and Scholes Model. Given: N(d1): 0.8539 N(d2): 0.8398 PVIF @ 6% at continues compounding for 3 months = 0.9851	6	Level 3	CO3																								
	b.	i) An investor has a portfolio with a beta of 1.50 and worth Rs.30,00,000. The six-month index futures are worth Rs.2,000 per contract. The index futures contract lot size is 40. The investor wishes to reduce the portfolio beta to 0.70. <b>Solve</b> how many numbers of contracts the investor needs to take position in.  ii) <b>Calculate</b> the price of the following derivative instruments: A 4-month future based on the equity share of Tata Chemicals Ltd.: Spot price of equity share: Rs.500 Dividend Expected at the end of 2nd month: Rs.35 Risk-Free Return: 6% p.a.  <u>Factors based on continuous compounding at 6% p.a.:</u>	6	Level 3	CO3																								
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	c.	<b>Calculate</b> the Intrinsic Value and Time Value from the following option prices for both the types of options given that the Spot Price of NIFTY 23650:	6	Level 3	CO3																								
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<b>Q. 5</b>		Answer <b>Any two</b> from the following.			
	a.	<b>Explain</b> five option Greeks and discuss their salient features individually.	<b>6</b>	<b>Level 2</b>	<b>CO2</b>
	b.	<b>Describe</b> Initial Margin and Mark-to-Market margin along with its importance in the derivatives market. Substantiate your answer with an example.	<b>6</b>	<b>Level 2</b>	<b>CO2</b>
	c.	<b>Explain</b> the difference between Options and Futures	<b>6</b>	<b>Level 2</b>	<b>CO2</b>
<b>Q. 6</b>		Answer <b>Any two</b> from the following.			
	a.	<b>Write</b> a note on various participants in the Derivatives Market?	<b>6</b>	<b>Level 1</b>	<b>CO1</b>
	b.	<b>What</b> is Volatility Smile and Volatility Skew?	<b>6</b>	<b>Level 1</b>	<b>CO1</b>
	c.	<b>Recall</b> the terms Securitization and ABS.	<b>6</b>	<b>Level 1</b>	<b>CO1</b>