VPM's
DR VN BRIMS, Thane
Programme: MMS (2021-23)
Third Semester Regular Examination February 2023

Course Name: Derivatives and Risk Management		**Course Code**	MMS - F308
Roll No.		**Marks**	**60**
Total No. of Questions	6	**Duration**	**3 Hours**
Total No. of printed pages	4	**Date**	14/02/2023

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: - Kindly use the time value factors given in QP don't self-calculate them.			**Marks**	**BL**	**CO**
Q. No 1 (All Questions are Compulsory)					
Q. No.		**Questions**			
Q. 1		Case/Case-let Study (500-800 words)			
	a.	Mr. Michael Scofield hails from San Francisco, California and started a hedge fund named 'Scofield Investments' in his hometown three years back. Michael completed his graduation in finance and wanted to try his luck in the derivative markets. He started with a small set-up in a rental space nearby and currently has 10 analysts working with him for the fund. Recently, he has decided to start a new business division with the name 'OpCon' which focuses on consultancy assignments in the option domain. He recently hired 2 new analysts Ms. Veronica and Mr. Lincoln to take consultancy work on pricing of options and option strategies respectively. Ms. Veronica was given her first assignment on option pricing for Fox River PB. Pvt. Ltd. (Fox River). The Put Option which was to be priced was based on the equity shares of Fox River and had the expiry after 3 months with a strike price of \$55. The underlying shares were currently trading at \$50. Ms. Veronica thought that using a binomial model for pricing the option would be appropriate and had collected some basic data. Based on the historic performance of the equity share, she decided that within the next 3 months the underlying share can go up by 25% or it can move down by 15%. She also found that the risk-free return in the market is 4% p.a. Examine the data above and analyse what fair price would Ms. Veronica arrive at? Also show the binomial tree diagram. Given: FVIF (4%, 0.25) = 1.0101	**6**	**Level 4**	**CO4**

		PVIF (4%, 0.25) = 0.9900			
	b.	On the same day, Mr. Lincoln met with the trading team of Sucre Enterprises. The team was analysing NASDAQ index (Spot 12,000) and was expecting that in the next week the volatility was going to be very low. They wanted to cash in on this opportunity using NASDAQ index options. Mr. Sucre immediately suggested a 'Short Strangle' strategy. He identified the following two options: **Option** **Strike** **Premium** Call 12,200 $50 Put 11,800 $40 Assess the net pay-off diagram of the strategy suggested by Mr. Sucre using the range of 11,600 to 12,400 for the spot at expiry	**6**	**Level 5**	**CO5**
Q. 2		Answer **Any one** from the following.			
	a.	Felix Fund on 31st January took a short position in ADANIENT_23FEB2023_FUT. The details of the contract were as follows: Spot Price of Adani Enterprise: Rs.1,250 FUT Price: Rs.1,275 Lot Size: 250 On 15th Feb 2023, the following position prevailed Spot Price of Adani Enterprise: Rs.1,050 FUT Price: Rs.1,060 On Expiry the Spot Price of Adani Enterprise turned out to be Rs.1,400. Evaluate if it was better to hold the Future till expiry or square-off earlier.	**6**	**Level 5**	**CO5**
	b.	Mr. Saul Goodman runs a hedge fund and specializes in spread strategies. He's currently having a bearish view on the Sensex and wants to create a 'Bearish-Put' Spread. He has collected the following data on Put options: **Strike** **Premium** 60,600 300 60,300 50 Compare the net pay-off of Mr. Saul assuming Spot at expiry turns out to be Case I) 60,100 Case II) 60,800 No need to develop the net pay-off diagram.	**6**	**Level 5**	**CO5**
Q. 3		Answer **Any one** from the following.			
	a.	A Put and a Call option each have an expiration date 6 months and have an exercise price of Rs.1,500. The Risk-free rate of interest is 6%. i) If the put is priced at Rs.100 and equity share is worth Rs.1,450 per share, analyse what should be the theoretical price of the call option using put-call parity?	**6**	**Level 4**	**CO4**

		ii) If the call option is priced at Rs.158 and put option is priced at Rs.13, analyse what should be the theoretical price of equity share? Given: PVIF (6%,0.5) = 0.970			
	b.	Maverick Ltd. is a multi-national bank and has been approached by a client to discuss opportunity for entering into an FRA contract. The client is asking for a quote on FRA(2x6). Ms. Benjamin from the derivatives team is undertaking the task of pricing the FRA contract. She observed that the current spot interest rate for 2 months is 6% p.a. and hence she quotes the FRA(2x6) rate as 8% p.a. Analyse her FRA price quote and find what must be the spot interest rate for 6 months on a per annum basis?	**6**	**Level 4**	**CO4**
Q. 4		Answer **Any two** from the following.			
	a.	Calculate the Intrinsic Value and Time Value from the following option prices for both the types of options given that the Spot Price of NIFTY 17650:	**6**	**Level 3**	**CO3**
	b.	Calculate the price of the following derivative instruments: a) <u>A 3-month forward based on wheat:</u> Spot price of wheat: Rs.25 per Kg Risk-Free Return: 6% p.a. Storage Cost: Rs.8 per kg in total for 3 months (entirely payable at the end of 1 month) PV of convenience yield: Rs.2 b) <u>A 6-month future based on the equity share of Asian Paints Ltd.:</u> Spot price of equity share: Rs.2,750 Dividend Expected at the end of 3rd month: Rs.50 Risk-Free Return: 6% p.a. <u>Factors based on continuous compounding at 6% p.a.:</u>	**6**	**Level 3**	**CO3**
	c.	The following information is available for the stock of ITC Ltd. CMP Rs.350 Strike Price Rs.370 Time to expiration 1 month Risk Free Interest Rate: 6% p.a.	**6**	**Level 3**	**CO3**

Strike Prices	**Call Option Prices**	**Put Option Prices**
17500	295	67
17550	250	80
17600	225	97
17650	194	116
17700	165	140
17750	140	168
17800	118	195

Period	**FVIF**	**PVIF**
1 month	1.0050	0.9950
3 months	1.0151	0.9851
6 months	1.0305	0.9704

		You are required to compute the Price of Call Option and Put Option using Black and Scholes Model. Given: N(d1) = 0.1238 N(d2) = 0.1153 PVIF (6%,0.0833) = 0.9950			
Q. 5		Answer **Any two** from the following.			
	a.	Explain five option Greeks and discuss their salient features individually.	**6**	**Level 2**	**CO2**
	b.	Describe Initial Margin and Mark-to-Market margin along with its importance in the derivatives market. Substantiate your answer with an example.	**6**	**Level 2**	**CO2**
	c.	Explain the difference between Forwards and Futures	**6**	**Level 2**	**CO2**
Q. 6		Answer **Any two** from the following.			
	a.	Write a note on various participants in the Derivatives Market?	**6**	**Level 1**	**CO1**
	b.	What is VaR? and what are the various methods of calculating VaR?	**6**	**Level 1**	**CO1**
	c.	Define CDO and recall the structure of CDO.	**6**	**Level 1**	**CO1**