- In Binomial

  1 call is equivalent to 0.4 share long.

  1 put is equivalent to 0.6 share short

  Hedge Ratio

  Delta call 0.4 = Write call & buy 0.4 shares.

(II) GAMMA

Delta does not move at same rate hence rate of changes in delta with respect to rate of change in stock price is called Gamma.

(III) THETA

Rate of change in option price with respect to rate & change in time is called theta.

Option price will go down due to passage of time.

(IV) VEGA

Rate of change in option price with respect to volatility is called vega.

Price of option will go up due to increase in volatility.

(V) RHO

Rate of change in option price with respect to increase rate is called "Rho"

MULTIPLE CHOICE QUESTIONS

Case Scenario 1

X and Y are two friends. since Y has earned a profit from trading in financial derivative market, X is also considering speculating on Gamma corporation's share which is currently trading at ₹ 700 per share through taking positions in options on Gama corporation's stock:

(1) Purchasing one contract of 2-month call option with a premium of ₹ 35 and an exercise price of ₹ 750

(2) Purchasing one contract of 2-month put option with a premium of ₹25 and an exercise price of ₹ 600

After some time, trading in Option market and understanding the nitty-gritties of same, X being CEO in an organization advised his team to implement the concept of financial option in the capital budgeting decision called 'Real option'.

Based on the above information answer the following questions:

1. Assuming that the contract size of each option contract is 100 and the price of Gama corporation's share after two month falls to ₹550, the net pay-off of X will be_____

   Answer-1 : ₹ 1,000 loss

   Answer-2 : ₹ 1,000 profit

   Answer-3 : ₹ 3,000 profit

   Answer-4 : ₹ 3,000 loss

2. The per share price of Gama corporation's stock after 2 month at which X shall be at Break even is_____

   Answer-1 : ₹ 540

   Answer-2 : ₹ 600

   Answer-3 : ₹ 625

   Answer-4: ₹ 785

3. Which of the following position provides protection from a decrease in prices of a share?

   Answer 1 : Buying of future contracts in the share.

   Answer 2 : Buying call option in the share.

   Answer 3 : Selling of future contracts in the share .

   Answer 4 : Selling put option in the share.

4. In a future contract the term Basis is _____

Answer 1 : The difference between the prevailing spot price and the future price.

Answer 2 : The difference between the current market price and the strike price.

Answer 3 : The difference between the long position and the short position.

Answer 4 : The difference between the initial margin and the maintenance margin.

5. A put option on a company's stock has an exercise price of ₹ 200. on the delivery date, the stock is trading at ₹ 240 per share. what should the investors who has paid ₹ 20 for the option do ?

Answer 1 : Not exercise the option and lose ₹ 20.

Answer 2 : Not exercise the option and lose ₹ 60.

Answer 3 : Exercise the option and gain ₹ 20.

Answer 4 : Exercise the the option and gain ₹ 40.

6. The spot price of an investment asset that provides no income is ₹ 3000 and the risk-free rate for all maturities (with yearly compounding) is 10%. The three-year forward price of same investment shall be _____

Answer 1 : ₹ 3,993

Answer 2 : ₹ 4,050

Answer 3 : ₹ 4,020

Answer 4 : ₹ 4,034

7. Mr. A a speculator short 1000 shares of X Ltd. when the share price was ₹ 50 and closes out the position after 3 month when the share price was ₹ 43. The company pays a dividend of ₹ 3 per share during the 3 months. The gain of Mr. a will be____

Answer 1 : ₹ 1,000

Answer 2 : ₹ 4,000

Answer 3 : ₹ 7,000

Answer 4 : ₹ 3,000

8. Which amongst the following is not a Greek for options pricing

Answer 1 : Delta

Answer 2 : Gamma

Answer 3 : Alpha

Answer 4 : RHO

9. The spot price of an investment is ₹ 3,000 and the risk-free rate for all maturities (with continuous compounding) is 10% p.a. suppose the asset provides an income of ₹ 200 at the end of the first year and at the second year, then three year forward prices shall be _____

($e^{0.10}$ = 1.1052, $e^{0.20}$ = 1.2214 and $e^{0.30}$ = 1.3499)

Answer 1 : ₹ 1,967

Answer 2 : ₹ 3,584

Answer 3 : ₹ 4,515

Answer 4 : ₹ 4,050

Case Scenario 2

You as an investor had purchased a 4-month European Call Option on the equity shares of X Ltd. for ₹ 10, of which the current market price is ₹ 132 per share and the exercise price ` 150. You expect the price to range between ₹ 120 to ₹ 190. The expected share price of X Ltd. and related probability is given below:

Expected Price (₹)	120	140	160	180	190
Probability	0.05	0.20	0.50	0.10	0.15

Based on above case scenario answer the following questions:

I. Expected price of share of X Ltd. at the end of 4 months shall be.....

(a) ₹ 160.00

(b) ₹ 160.50

(c) ₹ 158.00

(d) ₹ 140.00

II. Suppose if the exercise price prevails at the end of 4 months the Value of Call Option shall be.....

(a) ₹ 0

(b) ₹ 18

(c) ₹ 10

(d) ₹ 14

III. In case the option is held to its maturity, the expected value of the call option shall be.....

(a) ₹ 0

(b) ₹ 18

(c) ₹ 10

(d) ₹ 14

IV. In the given different scenarios of expected prices of share of X Ltd. at the time of maturity the option shall be in-the-money in ..... scenarios.

(a) two

(b) three

(c) five

(d) In none of the scenario

V. In the given different scenarios of expected prices of share of X Ltd. at the time of maturity the option shall be at-the-money in ..... scenarios.

(a) two

(b) three

(c) five

(d) In none of the scenario

Case Scenario 3

Suppose you are a risk manager at a financial institution, and your company has loaned a significant amount of ₹ 500 crore to a company X Ltd. for a period of 3 years at 6-month at MCLR plus 200 bps. You are concerned about X Ltd.'s ability to repay the debt due to recent market volatility. To protect your institution from potential default, you decide to purchase a Credit Default Swap (CDS) from ABC Bank Ltd. for same notional amount at a premium quoted at 1% per year through cash settlement

On the respective reset dates for the same period actual MCLR interest rate comes out as follows:

Reset	MCLR
1	9.75%
2	10.00%
3	10.25%
4	10.35%
5	10.50%
6	10.60%

Based on above case scenario answer the following questions:

1. The primary purpose of a Credit Default Swap (CDS) is..... (a) to increase the value of bonds. (b) to protect against default risk of a debt obligation. (c) to provide guaranteed profit to the buyer. (d) to create a new form of loan.

2. Which of the following statements is true about CDS contracts?

   (a) CDS contracts cannot be used for speculation.

   (b) CDS contracts are governed by government regulations.

   (c) CDS contracts are private agreements between two parties.

(d) CDS contracts eliminate all risks for the buyer.

3. Which organization publishes the guidelines and rules for conducting Credit Default Swap transactions?

(a) Federal Reserve

(b) International Swap and Derivative Association (ISDA)

(c) Securities and Exchange Commission (SEC)

(d) World Trade Organization (WTO)

4. Assuming no default occurs the total premium your company will pay during the designated loan period shall be.....

(a) ₹ 5 crore

(b) ₹ 10 crore

(c) ₹ 15 crore

(d) ₹ 30 crore

5. Suppose if the lender defaults somewhere in the beginning of third year of loan (after payment of interest upto 2 years) and the market value of a reference loans falls to 75% of its par value, then ABC Bank will pay your company .....in a cash settlement.

(a) ₹ 15 crore

(b) ₹ 30 crore

(c) ₹ 125 crore

(d) ₹ 500 crore

Case Scenario 4

Based on the following information, choose the correct answer from the following questions:

Situation	Action	Exercise Price	Premium	Spot Price
I	Exercised	140	20	160

II	Exercised	200	15	175
III	Lapsed	300	25	400

From the information given above, choose the correct answer to the Question no. 10 to 12:

I. In situation 1, the investor's position and amount of profit or lose is:

(a) Put option and ₹ 20

(b) Call option and ₹ 0

(c) Put option and ₹ 0

(d) Call option and ₹ 20

II. In Situation III, the investor's position and the amount of profit/loss is:

(a) Put option, ₹ (25)

(b) Call option, ₹ 75

(c) Short position, ₹ 100

(d) Long position, ₹ (100)

III. In situation II, the investor's position and the amount of profit/loss is :

(a) Put option and ₹ 10

(b) Call option and ₹ 10

(c) Put option and ₹ 25

(d) Call option and ₹ 25

CHAPTER – 04

INTEREST RATE RISK MANAGEMENT

PART 1: FORWARD RATE AGREEMENT (FRA)

Question – 01

M/s. Parker & Co. is contemplating to borrow an amount of ₹ 60 crores for a Period of 3 months in the coming 6 month's time from now. The current rate of interest is 9% p.a., but it may go up in 6 month's time. The company wants to hedge itself against the likely increase in interest rate.

The Company's Bankers quoted an FRA (Forward Rate Agreement) at 9.30% p.a.

What will be the Final settlement amount, if the actual rate of interest after 6 months happens to be

(i) 9.60% p.a. and

(ii) 8.80% p.a.?

(Exam May – 2013, SM TYK – 01)

Solution:

M/s Packer & Co. Buy FRA 6 × 9 at 9.30% because it afraids of Interest Rate rising

(i) Rate of Interest = 9.60%

FRA bank will pay to Parker & Co.

$$\text{Net settlement amount} = \frac{N\,(RR - FR)\,Dtm/DY}{1 + (RR \times Dtm/DY)}$$

$$= \frac{₹\,60,00,00,000 \times (9.60\% - 9.30\%) \times 3/12}{1 + (9.60\% \times 3/12)}$$

$$= \frac{₹\,60,00,00,000 \times 0.075\%}{1.024}$$

= ₹ 4,39,453

(ii) If Rate of Interest = 8.80%

In this situation Parker & Co. will pay to FRA bank

$$\text{Final settlement amount} = \frac{₹\,60,00,00,000 \times (9.3\% - 8.80\%) \times 3/12}{1 + (8.80\% \times 3/12)}$$

$$= \frac{₹\,60,00,00,000 \times 0.125\%}{1.022}$$

= ₹ 7,33,855

Question – 02

P Ltd. is contemplating to borrow an amount of ₹ 50 crores for a period of 3 months in the coming 6 months time for now. The current rate of interest is 8% per annum but it my go up in 6 months time. The company wants to hedge itself against the likely increase in interest rate.

The Company's Bankers quoted an FRA (Forward Rate Agreement) at 8.30% per annum.

Compute the effect of FRA and actual rate of interest cost to the company, if the actual rate of interest during consideration period happens to be

(i) 8.60% p.a., or

(ii) 7.80% p.a.

(Show your working on the basis of months)

(Exam November – 2019)

Solution:

(1) Actual Rate of Interest 8.60%

In this situation FRA bank will pay to P Ltd.

Effect of FRA

$$\text{Net settlement amount} = \frac{(N)(RR-FR) \times (Dtm/Dy)}{1 + (RR \times Dtm/Dy)}$$