

CA-Final AFM Test 3

Topics Covered: Derivatives

Max Marks: 35

Time: 1 Hour

Question 1(10 Marks): Details about portfolio of shares of an investor is as below:

Shares	No. of shares (lakh)	Price per share	Beta
A Ltd.	10.00	Rs 400	1.50
B Ltd.	6.00	Rs 500	1.20
C Ltd.	5.00	Rs 600	1.80

The investor thinks that the risk of portfolio is very high and wants to reduce the portfolio beta to 1.125. He is considering two below mentioned alternative strategies:

- (i) Dispose off a part of his existing portfolio to acquire risk free securities, or
- (ii) Take appropriate position on Nifty Futures which are currently traded at 5000 and each Nifty points is worth Rs 500.

You are required to determine:

- (1) portfolio beta,
- (2) the value of risk free securities to be acquired,
- (3) the number of shares of each company to be disposed off,
- (4) the number of Nifty contracts to be bought/sold; and
- (5) the value of portfolio beta for 4% rise in Nifty.

Question 2(5 Marks): Hari is holding 100 equity shares of VCC Ltd. which is being quoted at Rs210 per share. He is interested in hedging downside risk of his holding as he is going to sell them after 2 month. A 2-month Call option is available at a premium of Rs 6 per share and a 2- month put option is available at a premium of Rs 5 per share. The strike price in both cases is Rs 220. You are required to:

- (i) Suggest the position Hari should take in the option market to hedge his holding in the VCC Ltd.
- (ii) Calculate his final position after 2 months if after 2 months i.e. on the day of exercise the actual market price of per share of VCC Ltd. happens to be Rs 200, Rs 210, Rs 220, Rs 230 and Rs 240.

Question 3(5 Marks):

BSE Index	10000
Value of portfolio	Rs 12,00,000
Risk free interest rate	10% p.a.
Dividend yield on Index	5% p.a.
Beta of portfolio	1.70

We assume that a future contract on the BSE index with six months maturity is used to hedge the value of portfolio over next five months. One future contract is for delivery of 50 times the index.

Based on the above information CALCULATE:

- (1) Price of future contract.
- (2) The gain on short futures position if index turns out to be 8,500 in five months.

Question 4(5 Marks): You as an investor had purchased a 4 month call option on the equity shares of X Ltd. of Rs 10, of which the current market price is Rs 132 and the exercise price Rs 150. You expect the price to range between Rs 120 to Rs 190. The expected share price of X Ltd. and related probability is given below:

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

COMPUTE:

- (i) Expected Share price at the end of 4 months.
- (ii) Value of Call Option at the end of 4 months, if the exercise price prevails.
- (iii) In case the option is held to its maturity, what will be the expected value of the call option?

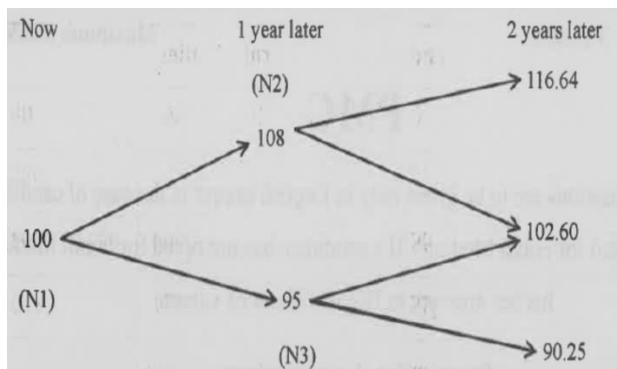
Question 5(5 Marks): The price of ACC stock on 31 December 2022 was Rs 220 and the Futures price on the same stock on the same date, i.e., 31 December 2022 for March 2023 was Rs 222. Other features of the Futures contract and related information are as follows:

Time to expiration	-	3 months (0.25 year)
Borrowing rate	-	15% p.a.
Annual Dividend on the stock-		25% payable before 31.03. 2023
Face Value of the Stock	-	Rs 10

Advise the investor the course of action to be followed by him so as to earn Risk free income if he can sell the stock short at spot price. Show Risk free income

Question 6(5 Marks):

A two year tree for a share of stock in ABC Ltd., is as follows:



Consider a two years American call option on the stock of ABC Ltd., with a strike price of Rs 98. The current price of the stock is Rs 100. Risk free return is 5 per cent per annum with a continuous compounding and $e^{0.05} = 1.05127$.

Assume two time periods of one year each. Using the Binomial Model, calculate:

- (i) The probability of price moving up and down;
- (ii) Expected pay offs at each nodes i.e. N1, N2 and N3 (round off upto 2 decimal points).