Enrolment No. _____

AHMEDABAD UNIVERSITY

AMRUT MODY SCHOOL OF MANAGEMENT

UNDERGRADUATE / GRADUATE PROGRAMMES

2023-2024 WINTER SEMESTER

END SEMESTER EXAMINATION

FAC635 FINANCIAL MODELLING

Date: 21-04-2024
Time: 11.00 am – 12.30 pm

Total Marks: 30
No. of printed pages: 3

Instructions:

1. Use only one MS Excel Workbook to answer all the questions. Answer each question in a separate worksheet of the same Workbook.
2. Name each worksheet with appropriate question number.
3. Save the MS Excel Workbook with your name and enrolment number.
4. Upload the MS Excel Workbook to the designated drive on LMS by the end of examination time. No separate time will be provided to upload the Workbook.
5. MS Excel Workbook submitted through any mode other than LMS will not be evaluated.
6. All Questions are compulsory and carry equal marks.

Questions:

1. Nipoxy Polymers and Adhesives Pvt Ltd is considering investment in a new plant to supply its western region stores. The stores currently require 65,00,000 kilograms of adhesives per year, and they are purchased from various local producers for an average price of Rs 5 per kilogram. The managers believe that their new plant would lower the cost per kilogram to Rs 4, while maintaining the average selling price of Rs 9 per kilogram. However, due to centralized structure of this operation, shipping expenses will increase to Rs 1.25 per kilogram from the current Rs 0.80. The firm will need to increase its inventory of adhesives by Rs 4,50,000. It will cost Rs 15,00,000 to purchase the land and Rs 30,00,000 to construct the buildings and purchase equipment. In addition, labour expense will rise by Rs 25,00,000 per year. The building and equipment will be depreciated using the straight-line method over five years to a salvage value of Rs 10,00,000. After five years, the company will sell the plant for Rs 30,00,000 (Rs 10,00,000 for the buildings and equipment, Rs 20,00,000 for the land). The firm's marginal tax rate is 25%.

   a. Develop a model to calculate NPV and IRR for the firm considering WACC of 15%.
   b. Management is uncertain about several of the variables in your analysis and have asked you to provide three different scenarios.

Scenario	Incremental Labour Expense in Rupees	Average Selling Price Per Kilogram in Rupees	WACC (%)
Best Case	20,00,000	12	13.5
Expected Case	25,00,000	9	15
Worst Case	35,00,000	6	16.5

Calculate NPV and IRR for the three scenarios presented above. Use scenario manager functionality of MS Excel.

2. Download daily closing stock prices from NSE for Biocon Ltd for the period 1-04-2023 to 31-03-2024. Using the historical prices downloaded, develop a model based on geometric Brownian motion to simulate Biocon's stock prices. Plot the historical and simulated stock prices of Biocon Ltd using line charts.

3. Develop a model to estimate price, Macaulay's duration, modified duration and convexity for the bond described below:

Face Value	Rs. 10,000
Redemption Value	At Par
Coupon	9.5% p.a.
Coupon Frequency	Semi-annual
Maturity	4 years
Yield to Maturity	9.5% p.a.

Using Data Table feature, calculate the impact of yield to maturity ranging from 7% to 12% (with an interval of 0.1%) on the price of the bond. Also, insert a chart to demonstrate the relation of yield to maturity and bond price using the same data. DO NOT USE ANY MS EXCEL FUNCTION.

4. 'Bear Spread Using Calls' is a trading strategy that involves simultaneously buying a call option with higher strike price and selling another call option with lower strike price on the same asset. Create a financial model and draw a chart for the pay-off profile (on the day of option expiry) of 'Bear Spread Using Calls' on the stock of HDFC Bank Ltd with the following information:

Asset: Equity shares of HDFC Bank Ltd currently available to buy at Rs. 1550
Option1: Call option with strike price of Rs. 1550 available to sell at a premium of Rs. 62 and buy at a premium to Rs. 63.
Option2: Call option with strike price of Rs. 1600 available to sell at a premium of Rs. 32 and buy at a premium to Rs. 33.
Maturity of the Call option: 1 month

Possible range of price of shares of HDFC Bank Ltd on the day of option expiry: Rs. 1000 to Rs. 2000 with an interval of Rs. 25.

5. An investor plans to buy four securities A, B, C, D and E for her portfolio but is not certain about the weights of the securities in the portfolio. The historical risk and return characteristics of these securities are as follows:

Securities	**Return (%)**	**Standard Deviation (%)**
A	12%	18%
B	15%	22%
C	18%	26%
D	14%	16%
E	22%	19%

Using "Random Number Generation' feature within Data Analysis, generate returns for 10 years for the four securities. Subsequently, create a Variance-Covariance matrix for the five securities and answer following questions.

a. Assuming no short sale is allowed, what should be the weights of securities that maximize returns for portfolio standard deviation of 20%.
b. Assuming no short sale is allowed, what should be the weights of securities that minimize risk for portfolio return of 17%.

Note: Please use matrix functions and solver.