Birla Institute of Technology & Science, Pilani
Pilani Campus – Rajasthan

Comprehensive Exam (Open Book)
FIN F 414 – Financial Risk Analytics & Management
Session - 2023-24

Maximum Marks: 75 **Dated: 09/Dec./2023**

Instructions: **Time Duration: 90 Minutes**

- All questions are compulsory. Start each question from a new page.
- **In the case of numerical, write all the steps necessary to arrive at the final answer with interpretation.**
- Marks would be deducted in case of No Valid Interpretation.
- Make sure that you have correctly mentioned your Name, ID, Course, and other details on your answer sheet.

Short Type Questions (Each question 7 marks)

Q1: Answers all the questions.

A. A $2 million balanced portfolio is comprised of 40 percent stocks and 60 percent intermediate bonds. For the next year, the expected return on the stock component is 9 percent and the expected return on the bond component is 6 percent. The standard deviation of the stock component is 18 percent, and the standard deviation of the bond component is 8 percent. What is the annual VAR for the portfolio at a 1 percent probability level if the correlation between the stock and the bond component is 0.25? [z-value at 1% is 2.33]

B. Tim Jones is evaluating two mutual funds for an investment of $100,000. Mutual fund A has $20,000,000 in assets, an annual expected return of 14 percent, and an annual standard deviation of 19 percent. Mutual fund B has $8,000,000 in assets, an annual expected return of 12 percent, and an annual standard deviation of 16.5 percent. What is the daily value at risk (VAR) of Jones' portfolio at a 5 percent probability if he invests his money in mutual fund A? [z-value at 5% is 1.65]

C. A portfolio manager is constructing a portfolio of stocks and corporate bonds. The portfolio manager has estimated that stocks and corporate bonds returns have daily standard deviations of 1.8% and 1.1% respectively. The correlation coefficient of returns is 0.43. If the portfolio managers plan to allocate 35% of the portfolio to corporate bonds and the rest to the stocks, what is the daily portfolio VaR (2.5%) on a percentage basis? [z-value at 2.5% is 1.96]

D. The following particulars are furnished about three Mutual Fund Schemes, P, Q, and R-

Particulars	Scheme P	Scheme Q	Scheme R
Dividend Distributed	Rs.1.75	—	Rs.1.30
Capital Appreciation	Rs.2.97	Rs.3.53	Rs.1.99
Opening NAV	Rs.32.00	Rs.27.15	Rs.23.50
Beta	1.46	1.10	1.40

Ascertain the Alpha of the three schemes and evaluate their performance if the Government of India Bonds carry an interest rate of 6.84%, and the NIFTY has increased by 12.13%.

E. Rank these Portfolios using Sharpe's method and Treynor's Method. Also, Compare the ranking using both ways and explain the reasons behind the differences.

Portfolio	Average annual return	Standard Deviation	Correlation with market
P	18.6	27.0	0.81
Q	14.8	18.0	0.65
R	15.1	8.0	0.98
S	22.0	21.2	0.75
T	-9.0	4.0	0.45
U	26.5	19.3	0.63
Market Risk	12.0	12.0	
Risk Free Rate	9.0		

Long Type Questions

Q2: [20 Marks]

You are the portfolio manager of XYZ Ltd. You are constructing a portfolio of four securities (A, B, C & D). You have Rs.10000 of wealth to be distributed among four securities as: 4000, 3000, 1000, and 2000 respectively. Using, historical price information you calculated the variance-covariances among all the four securities. You want to determine the portfolio Value-at-Risk and Expected Shortfall at 99% and 95% confidence level. Show all the steps clearly with proper reasoning. [z-value at 1% is 2.33 and z-value at 5% is 1.65]

The variance-covariance matrix is given as follows:

	A	B	C	D
A	0.0001227	0.0000768	0.0000767	-0.0000095
B	0.0000768	0.0002010	0.0001817	0.0000394
C	0.0000767	0.0001817	0.0001950	0.0000407
D	-0.0000095	0.0000394	0.0000407	0.0001909

Q3: [10 Marks}

A Mutual Fund having 200 units has shown in NAV of Rs.8.75 and Rs.9.45 at the beginning and at the end of the year, respectively. The Mutual Fund has given two options:

(a) Pay Rs.0.75 per unit as a dividend and Rs.0.60 per unit as a capital gain, or

(b) These distributions are to be reinvested at an average NAV of Rs.8.65 per unit.

What difference would it make in terms of return available, and which option is preferable?

Q4: Critically analyse the need of BASEL-III in India and explain in detail. **[10 Marks]**