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

Comprehensive Exam (Open Book)
FIN F 414 – Financial Risk Analytics & Management
Session - 2022-23

Maximum Marks: 90 **Dated: 21/Dec/2022**

Instructions: **Time Duration: 3 Hours**

- 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.
- Normal distribution table is given in page no.4

Short Type Questions (Each question 5 marks)

Q1: Abhimanyu Investments have floated a equity based fund scheme called "X-Cube", the funds of which will be invested only in stocks and bonds of infrastructure and construction companies. 60% of the Fund Value is invested in Companies engaged Commercial Construction Services and the other 40% in companies engaged in developing Residential Colonies/Townships. Average Beta of return from development of Residential Townships is measured at 1.9 and that from commercial construction is measured at 1.4.

The benchmark index yields 11.20% return and T-Bill carry an interest rate of 4.25%. Ascertain Jensen's Alpha from the following monthly particulars relating to "X-Cube" —

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Closing NAV	18.60	17.80	18.20	18.00	17.80	16.80	17.20	17.80	17.90	18.10	18.80	18.50
Dividend Pay-out	—	0.75	—	—	—	1.20	—	—	—	—	—	—

Opening NAV for January was Rs. 17.75.

Q2:

From the following data relating to investment made by a Company for the past 5 years, ascertain the expected return for the 6th year —

Years	1	2	3	4	5
Closing Market Price (Rs.)	50.00	64.00	85.00	100.00	125.00
Dividend Yield (Rs.)	4.00	8.00	10.00	15.00	15.00

Opening Market Price in Year 1 was Rs.45. Also ascertain the Compounded Annual Growth Rate. What would be the Capital Annual Growth Rate if there were no dividend pay-outs at all?

Q3: Critically examine the Basel-III norms and provide the strengths, weaknesses, opportunities, and threats of Basel-III in Indian context.

Q4: Fair-to-Midland Manufacturing, Inc., (FMM) has applied for a loan at True Credit Bank. Jon Fulkerson, the credit analyst at the bank, has gathered the following information from the company's financial statements:

Particulars	Rs.
Total Assets	95000
EBIT	7300
Net Working Capital	3800
Book value of equity	21000
Accumulated retained earning	19600
Sales	104000

The stock price of FMM is $27 per share and there are 7500 shares outstanding. What is the Z-score for this company? Interpret the results with proper arguments.

Q5: Suppose that we back-test a VaR model using 1,000 days of data. The VaR confidence level is 99% and we observe 15 exceptions. Should we reject the model at the 5% confidence level? Use Kupiec's two-tailed test.

Q6: What is the delta of a short position in 1,000 European call options on silver futures? The options mature in eight months, and the futures contract underlying the option matures in nine months. The current nine-month futures price is $8 per ounce, the exercise price of the options is $8, the risk-free interest rate is 12% per annum, and the volatility of silver futures prices is 18% per annum.

Long Type Questions (Each question 20 marks)

Q7: Dhruv Funds has a fund named "F3 Fund" (F3F), a fund which invests in 3 different funds— Fund X, Fund Y and Fund Z and the particulars of the Funds are -

Fund	Value Invested (Rs.)	Return	Standard Deviation
X	2.5 Crores	15.50%	3.20%
Y	6.0 Crores	19.20%	4.50%
Z	1.5 Crores	12.80%	1.50%

Correlation between the Funds are as follows — XY: 0.30; XZ: 0.50; YZ: 0.20

If the Risk-Free Return is 5% and the return on Nifty is 17% with a standard deviation of 3%, ascertain the Sharpe's Index for F3F and evaluate its performance. Interpret the results with proper justifications.

Q8: Mr. Arun on 1.7.2009, during the initial offer of some Mutual Fund, invested in 10,000 units having face value of Rs.10 for each unit. On 31.3.2010, the dividend operated by the M.F. was 10% and Mr. Arun found that his annualized yield was 153.33%. On 31.12.2011, 20% dividend was given. On 31.3.2012 Mr. Arun redeemed all his balance of 11,296.11 units when his annualized yield was 73.52%. What are the NAVs as on 31.3.2010, 31.12.2011 and 31.3.2012.

Q9:

(A) The Westover Fund is portfolio consisting of 42% fixed income investments and 58% equity investments. The manager of the Westover Fund recently estimated that the annual VaR (5 %), assuming a 250 days year, for the entire portfolio was $1,367,000 based on the portfolio's maket value of $12,428,000 and a correlation coefficient between stock and bond of zero. If the annual loss in the equity position is only expected to exceed $1,153,000 for 5% of time, then what will be the daily expected loss in the bond position that will be exceeded 5 % of the time?

(B) On December 31, 2006, portfolio A had a market value of $2,520,000. The historical standard deviation of the daily returns was 1.7%. Assuming that portfolio A is normally distributed, calculate the daily VaR (2.5%) on a dollar basis and interpret it. [Z-value for 2.5% is 1.96]

Table for $N(x)$ When $x \geq 0$

This table shows values of $N(x)$ for $x \geq 0$. The table should be used with interpolation. For example,

$$\begin{aligned} N(0.6278) &= N(0.62) + 0.78[N(0.63) - N(0.62)] \\ &= 0.7324 + 0.78 \times (0.7357 - 0.7324) \\ &= 0.7350 \end{aligned}$$

x	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9986	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998
3.5	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
3.6	0.9998	0.9998	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.7	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.8	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
4.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000