Finance

Midterm / Semester I 2022-23

Time - 2 and 1/2 hours/ Maximum Score - 60

<u>NOTE</u> : A standard calculator is allowed as per rule. A normal table will be supplied, if needed. SHOW ALL YOUR WORK TO GET THE FULL CREDIT. RESULTS USED MUST BE CLEARLY STATED.

1. [$10 + 10 = 20$ points]
   There are two lotteries L_1 and L_2. L_1 pays Rs.10000 with probability 0.1 and Rs.0 with probability 0.9, whereas L_2 pays Rs.2000 with probability 0.11 and Rs.0 with probability 0.89.

   (a) Can you give one criteria, which suggests and justifies that L_2 is better than L_1?

   (b) Can you give another criteria which suggests and justifies the opposite, i.e., L_1 is better than L_2?

2. [$(8 + 8 + 8) + (10 + 10) = 44$ points]
   Let there be a market with 3 risky assets with mean vector $= (0.03, 0.12, 0.07)$ and covariance matrix, $V = \begin{pmatrix} 0.35 & 0.48 & 0.42 \\ 0.48 & 1.45 & 0.82 \\ 0.42 & 0.82 & 1.10 \end{pmatrix}$.

   (a) For this market, obtain

   (i) the minimum variance portfolio vector w_{mvp};

   (ii) the minimum variance portfolio vector when the short sale is not allowed;

   (iii) the zero covariance portfolio vector $w_{zc(p)}$ where w_p is the frontier portfolio corresponding to the expected return is 8%. [Hint: $b_{zc(p)} = \frac{B}{C} - \frac{D}{C^2(b_p - \frac{B}{C})}$.]

   (b) Suppose, from the market with 3 risky assets as described above and one riskfree asset whose return is 8%, you would like to have a portfolio whose expected return is 10%. How would you like to invest so that your variance is minimum (i) allowing shortsale, (ii) without shortsale.