MSO205 PRACTICE PROBLEMS SET 10

<u>Question</u> 1. Let X, Y be RVs defined on the same probability space. Fix $a, b, c, d \in \mathbb{R}$ and set U = a + bX, V = c + dY. Express $\rho(U, V)$ in terms of $\rho(X, Y)$.

Question 2. Let X_1, X_2, X_3 be a random sample from Bernoulli(p) distribution, for some $p \in (0, 1)$. Find the p.m.f. of $X_{(2)}$.

<u>Question</u> 3. Let X_1, \dots, X_n be a random sample from Uniform(0,1) distribution. Identify the distribution of $X_{(r)}$ for $r=1,\dots,n$.

<u>Question</u> 4. Let X_1, \dots, X_n be a random sample from a distribution given by a p.d.f. f. Find the joint p.d.f. of $(X_{(r)}, X_{(s)})$ of $1 \le r < s \le n$.

<u>Question</u> 5. Compute the factorial moments for Negative Binomial and Hypergeometric distribution.

<u>Question</u> 6. Suppose a pair of fair die are rolled seven times independently. Find the probability that the sum of the dots obtained is 12 once and 8 twice.

<u>Question</u> 7. If X_1, X_2, \dots, X_n are i.i.d. Geometric(p) RVs, for some p > 0, then find the distribution of $X_1 + X_2 + \dots + X_n$.