Question 1: Let X: B(5, 1/3), Y: Poisson (3). Assume that X and Y are independent. Find

(a) $E(X^2)$ (b) Var(3Y - 2)   (c) P(Y = 4)   (d) P(X = 0)

Question 2: Let X ~ B(100, 0.02), using Poisson approximation, find

(a) P(X > 3)   (b) P(X = 2)   (c) $P(2.5 \le X \le 2.98)$

Question 3: Three balls are drawn without replacement from a box containing 2 red and 2 black balls. Let X be the number of red balls. Compute mean and Std. of X.

Question 4: Let X: N(10, 4) and Y: N(8, 16). Assume that X and Y are independent random variables. Find

(a) The 90th percentile of X   (b) $E(3 X^2 - 2XY + 7)$

(c) Corr(X, Y)   (d) $P(X \ge 11| Y \le 7)$

Question 5:
(a) Let X ~ B(100, 0.1). Find $P(7 \le X < 11)$
(b) Let X be binomial random variable with mean 10 and Std. 3.
    Find P(X > 2).

Question 6: The grades in a general exam are normally distributed with mean 75 and Std. 8
(a) What is the proportion of grades that exceed 83?
(b) If four grades are selected at random, what is the probability that at least one of them will be more than 83?
(c) If 50 grades are selected at random, what is the probability that at least 7 of them will be more than 83?

Question 7: The weights of male students are normally distributed with mean 65 Kgs and Std. 4 Kgs, while the weights of female students are normally distributed with mean 60 Kgs and Std. 3 Kgs. If one male and one female are selected at random, what is the probability that their total weight will be more than 130 Kgs?

Question 8: Let X ~ N(50, 100), Y ~ t(15) and W ~ χ^2_{10}. Find

(a) 80th percentile of X   (b) 10th percentile of Y   (c) 90th percentile of W

Question 9: Let $X_1, X_2, \ldots, X_{12}$ be a random sample from N(60, σ^2), such that $S^2 = 9$. Find c such that $P(\overline{X} \le c) = 0.90$.

Question 10: Let $X_1, X_2, \ldots, X_6$ be a random sample from N(μ, $\sigma^2 = 9$). If S^2 is the sample variance, find $P(S^2 < 16.63)$.