Assignment No. 4

CPE251 Probability Methods in Engineering

Spring 2025

Student Name: _____

Registration Number: _____

Marks Obtained: _____

Total Marks: 20

Assignment Date: Tuesday June 03, 2025

Due Date: Thursday June 12, 2025

Resource Person

Engr. Dr. Muhammad Farooq-i-Azam

Department of Electrical and Computer Engineering

COMSATS University Islamabad, Lahore Campus

Problem 1 **(10)**

The price of a randomly chosen book from a shop has expected value E[X]=500 rupees and standard deviation $\sigma_X = 100$ rupees. Use the Chebyshev inequality to determine the upper bound on the probability that the price of a randomly chosen book is more than 200 rupees from the expected value of the price.

Solution

Problem 2 **(10)**

Let X be a non negative random variable representing the number of days a server remains online before going down for maintenance. Suppose the expected uptime is E[X] = 20 days. Using Markov's inequality, answer the following:

(a) What is the upper bound on the probability that the server stays online for at least 100 days?
(b) Interpret this result in practical terms. What does it say about the likelihood of the server remaining online for an unusually long duration?

Solution