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|  | **BAHRIA UNIVERSITY,**  **(Karachi Campus)**  *Department of Software Engineering*  **ASSIGNMENT 3 – Fall 2023** |

COURSE TITLE: **Probability & Statistics**  COURSE CODE: **GSC 122**

Class: **BSE - 3** Shift: **Morning**

Course Instructor: **Dr. Muhammad Hussain** Date: **Dec 10, 2023**

Due Date: **Oct 27, 2023** Marks: **5.0 Marks**

**Analysis of Discrete Probability Distributions CLO-3**

Q.1 A communications system consists of n components, each of which will, independently, function with probability p. The total system will be able to operate effectively if at least one-half of its components function. For what values of p is a 5-component system more likely to operate effectively than a 3-component system?

Q.2 It has been established that the number of defective stereos produced daily at a certain plant is Poisson distributed with mean 4. Over a 2-day span, what is the probability that the number of defective stereos does not exceed 3?

Q.3 The probability of hitting a target is 1/5 and ten shots are fired independently.

1. What is the probability of the target being hit at least twice?
2. Find the conditional probability that the target is hit at least twice, assuming that at least one hit is scored.

Q4. A government task force suspects that some manufacturing companies are in violation of federal pollution regulations with regard to dumping a certain type of product. Twenty firms are under suspicion but not all can be inspected. Suppose that 3 of the firms are in violation.

1. What is the probability that inspection of 5 firms will find no violations?
2. What is the probability that the plan above will find two violations?

Q.5 Every hour, 10,000 cans of soda are filled by a machine, among which 300 underfilled cans are produced. Each hour, a sample of 30 cans is randomly selected and the number of ounces of soda per can is checked. Denote by X the number of cans selected that are underfilled. Find the probability that at least 1 underfilled can will be among those sampled.