COMSATS University Islamabad
Abbottabad Campus
Department of Mathematics

Mid Term Spring-2024

Class: BSE 5A/ 5B/ 5C
Subject: SPT
Instructors: M. Rafay Shah
Name: Kamran Khan

Date: 15/05/2024
Total Time Allowed: 1:30Hrs
Max Marks: 50
Registration # SP22-BSE-039

Question 1) [6]

The probability that the head of a household is home when a telemarketing representative calls is 0.4. Given that the head of the house is home, the probability that goods will be bought from the company is 0.3. Find the probability that the head of the house is home and goods being bought from the company?

Question 2) [6]

A random sample of concrete cubes was selected from a batch of concrete cubes prepared under a certain process from two factories. The sample mean of 48 concrete cubes from factory A is found to be 30 KN/m3 with standard deviation of 2 KN/m3. The sample mean of 30 concrete cubes from factory B is found to be 35 KN/m3 with a standard deviation of 3 KN/m3. Which of the factory's cubes strength is more reliable?

Question 3) [13]

An automobile manufacturer is concerned about a possible recall of its best-selling four-door sedan. If there were a recall, there is a 0.86 probability that a defect is in the brake system, 0.72 in the transmission, 0.26 in the fuel system, and 0.60 in some other area. What is the probability that the defect is the brakes or some other area if the probability of defects in both systems simultaneously is 0.75?

Question 4) [6]

Let A be the event that the component fails a particular test and B be the event that the component displays strain but does not actually fail. Event A occurs with probability 0.40 and event B occurs with probability 0.45. What, is the probability that a component works perfectly well (i.e., neither displays strain nor fails the test)?

Question 5) [13]

Aggregates used for highway construction are produced at three plants X, Y and Z with daily production volumes with proportion of 0.14, 0.30 and 0.56 tons respectively. Past experience indicates that the fractions of deleterious material produced at the three plants are respectively, 0.05, 0.08 and 0.01 respectively. If a sample of aggregate is selected at random from a day's total production and found to be deleterious, what is the probability that it is produced by plant Y?

Question 6) [6]

Of flights from Paris to Dubai, 89.5% leave on time and arrive on time, 3.5% leave on time and arrive late, 1.5% leaves late and arrives on time, and 5.5% leave late and arrive late. What is the probability that, given a flight leaves on time, it will arrive late?

GOOD LUCK

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