University of Sargodha

BS 2nd Term Examination 2017

Subject: Computer Sc./I. T **Paper: Probability & Statistics (MATH: 2110)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: **Objective part is compulsory. Attempt any three questions from subjective part.**

Objective Part (Compulsory)

Q.1: Write short answers of the following in 2-3 lines each. (2*16)

i. What is descriptive statistics?
ii. Define Sample mean and sample median with examples
iii. Construct the sample space S, of possible outcomes when 3 coins are flipped.
iv. What do you mean by complement of an event.
v. How many distinct permutations can be made from the letters of the word LITTLE.
vi. A pair of fair dice is tossed. Find the probability of getting a total of 8.
vii. What is difference between probability mass function and cumulative distribution function
viii. What is difference between continuous and discrete sample space.
ix. What do mean by marginal distribution involving two variables.
x. A coin is biased such that a head is two times as likely to occur as a tail. Find the expected number of tails when this coin is tossed twice.
xi. Is an outcome in a Bernoulli trial depends on its previous outcome?
xii. What do mean by Chi-Squared distribution?
xiii. What is longnormal distribution?
xiv. What is Symmetry and Skewness?
xv. Define correlation coefficient.
xvi. What is Absolute Measures of Dispersion?

Subjective Part (4*12)

Q.2: According to the journal *Chemical Engineering*, an important property of a fiber is its water absorbency.A random sample of 20 pieces of cotton fiber was taken and the absorbency on each piece was measured.The following are the absorbency values: 18.71 ,21.41, 20.72, 21.81, 19.29, 22.43 ,20.17,23.71, 19.44 ,20.50.

(a) Calculate the sample mean and median for the above sample values.
(b) Compute the 10% trimmed mean.
(c) Using only the values of the mean, median, and trimmed mean, do you have evidence of outliers in the data?

Q.3: A construction company employs two sales engineers.Engineer 1 does the work of estimating cost for 70% of jobs bid by the company. Engineer 2 does the work for 30% of jobs bid by the company. It is known that the error rate for engineer 1 is such that 0.02 is the probability of an error when he does the work, whereas the probability of an error in the work of engineer 2 is 0.04. Suppose a bid arrives and a serious error occurs in estimating cost. Which engineer
would you guess did the work? Explain and show all work.

Q.4: From a sack of fruit containing 3 oranges, 2 apples, and 3 bananas, a random sample of 4 pieces of fruit is selected. If X is the number of oranges and Y is the number of apples in the sample, find
(a) the joint probability distribution of X and Y .
(b) $P[(X, Y) \in A]$, where A is the region that is given by $\{(x, y) \mid x + y \leq 2\}$.

Q.5: The probability distribution of X, the number of imperfections per 10 meters of a synthetic fabric in continuous rolls of uniform width, is given by Construct the cumulative distribution function of X.

x	0	1	2	3	4
$f(x)$	0.41	0.37	0.16	0.05	0.01

(a) Plot the probability function.
(b) Find the expected number of imperfections, $E(X) = \mu$.
(c) Find $E(X^2)$.

Q.6: An employee is selected from a staff of 10 to supervise a certain project by selecting a tag at random from a box containing 10 tags numbered from 1 to 10. Find
the formula for the probability distribution of X representing the number on the tag that is drawn. What is the probability that the number drawn is less than 4?

Q.7: An inventory study determines that, on average, demands for a particular item at a warehouse are made 5 times per day. What is the probability that on a given day this item is requested
(a) more than 5 times? (b) not at all?