University of Sargodha

BS 2nd Semester/Term Examination 2020

Subject: Information Technology   **Paper: Probability & Statistics (MATH-102)**   **Maximum Marks: 80**

Time Allowed: 2:30 Hours

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

Objective Part   (Compulsory)   (2*16)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet.

i. Define the term Statistics.
ii. Distinguish between primary and secondary data.
iii. Define standard deviation and how it is calculated.
iv. Write down any four properties of variance.
v. Write only the names of different relative measure of dispersion.
vi. What are the shortcomings of the classical definition of probability?
vii. State only the law of addition for mutually exclusive events.
viii. Under what condition two events are said to be independent.
ix. Define expectation and write any two properties of expectation.
x. Define binomial experiment with properties.
xi. Differentiate between simple regression and multiple regression.
xii. In what situation binomial distribution converges to normal distribution.
xiii. Discuss the sampling distribution of means.
xiv. Differentiate between Point and interval estimates.
xv. Distinguish between simple and composite hypothesis.
xvi. Define type-I and type-II error.

Subjective Part   (3*16)

Q.2. Find Arithmetic Mean and Mode for the following data.   (8+8)

Weights(gms)	50-54	55-59	60-64	65-69	70-74	75-79
No. of students	4	15	17	8	5	1

Q.3. a) Three ball are drawn from a bag congaing 5 white and 3 black balls. If X denotes the number of black balls drawn from bag, then find the probability distribution of X.   (8+8)
b) A random variable X has $E(X^2) = 25$, Var (X) = 9, then calculate $E(X^2+5X+3)$

Q.4. The joint p.d. of two discrete random variables X and Y is given by   (16)

$$f(x,y) = \frac{xy^2}{30} \ for \ x = 1, 2, 3 \ and \ y = 1, 2$$

Are X and Y independent?

Q.5. Compute the least square regression line of Y on X for the following data and also   (8+8)

X	5	6	8	10	12	13	15
Y	16	2p	23	28	36	41	44

i) Find the values of $\hat{Y}$ and show that $\sum(Y - \hat{Y}) = 0$
ii) Compute the standard error of estimate i.e. $S_{y.x}$

Q.6. a) A random sample of size n_1=100 yielded the $\bar{X}_1 = 509$ and $S_1^2 = 950$. A random sample of size n_2=100 from another population yielded $\bar{X}_2 = 447$ and $S_2^2 = 876$. Find 95% confidence Interval for: $\mu_1 - \mu_2$.   (8+8)

b) The weight of 1500 ball bearings are normally distributed with mean 22.40 and standard deviation 0.048. If 300 random samples of size 36 are drawn from this population, then determine mean and variance of sampling distribution of means if sampling is done without replacement.