Exam.Code:0001
Sub. Code: 0041

1129

B.A./B.Sc. (General), First Semester

Statistics

Paper - 101: Probability Theory and descriptive Statistics – I

(In all mediums)

Time allowed: 3 Hours **Max. Marks: 65**

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section.*

x-x-x

Q. No.1: Answer the following questions:

(a) Let A and B be independent events such that P(A)=0.3 and P(AUB)=0.8 then what will be the value of P(B)? (2)

(b) Differentiate between quantitative and qualitative variables with example. (2)

(c) Let X is a random variable. Then find whether f(x) is a probability mass function or not,

$$f(x) = \begin{cases} 2x, & 0 < x < 1 \\ 4 - 2x, & 1 \le x < 2 \\ 0, & otherwise \end{cases}$$ (2)

(d) If P (A) = 1/4, P (A|B) = 1/4 and P (B|A) = 1/2 then find P (B)? (2)

(e) Define moment? (1)

(f) Write formula for Harmonic mean, geometric mean and mean deviation? (2)

(g) In an experiment a coin is thrown five times. Write down the sample space. How many points are there in the sample space? (2)

SECTION- A

Q. No. 2 (a) Explain the following:

(i) Addition theorem for mutually exclusive and not mutually exclusive events.

(ii) Multiplication theorem for independent events and dependent events. (3)

(b) A bag contains 30 balls numbered from 1 to 30. One ball is drawn at random. Find the probability that the number of the ball drawn will be a multiple of (i) 5 or 7, and (ii) 3 or 7. (5)

Q. No. 3 (a) State and prove Baye's Theorem. (6)

(b) A machine part is produced by three factories A, B, and C. Their proportional production is 25, 35 and 40 per cent, respectively. Also, the percentage defectives manufactured by three factories are 5, 4 and 3, respectively. A part is taken at random and is found to be defective. Find the probability that the selected part belongs to factory B. (7)

Q. No. 4 (a) What is meant by a random variable? Define distribution function of a random variable. What are the properties of a distribution function? (7)

(b) Let X is a random variable. Then for what value of k,

$$f(x) = \begin{cases} ke^{-2x}, & x \ge 0 \\ 0, & otherwise \end{cases}$$ be a density functions. (3)

P.T.O.

(c) If X is a random variable with mean μ and variance σ^2, then find $E\left(\frac{X-\mu}{\sigma}\right)$ and $V\left(\frac{X-\mu}{\sigma}\right)$. (3)

Q. No. 5 (a) Define mathematical expectation of a random variable. Find the expectation and variance of Y, if Y = aX+b. (6)

(b) A random variable X has the following probability distribution

X	:	0	1	2	3
P(X=x)	:	1/3	1/2	0	1/6

Find $E[\{X - E(X)\}^2]$ and hence obtain var(Y) where Y=2X-1. (7)

SECTION- B

Q. No. 6 (a) Differentiate between primary data and secondary data. What are sources of collecting primary data? (7)

(b) Differentiate between the following:

(i) Variables and Attributes

(ii) Discrete Variable and Continuous Variable (6)

Q. No. 7 (a) Write short notes on:

(i) Histogram,

(ii) Frequency polygon and frequency curve

(iii) Ogive

(iv) Percentage Bar Diagram (8)

(b) Draw a frequency polygon and frequency curve for the following data.

Weight (in kg)	Number of Students
30-35	4
35-40	7
40-45	10
45-50	18
50-55	14
55-60	8
60-65	3

(5)

Q. No. 8 (a) What is skewness? How does it differ from dispersion? Draw rough sketches to indicate different types of skewness. What are the different measures of skewness? (8)

(b) What is kurtosis? What are the different measures of kurtosis? (5)

Q. No. 9 (a) The first of the two samples has 100 items with mean 15 and standard deviation 3. If the whole group has 250 items with mean 15.6 and standard deviation 3.67, find the mean and the standard deviation of the second group. (7)

(b) Explain central moments. How do you convert non-central moments into central moments? (6)

x-x-x