

**University of the Punjab**  
**Part I Annual 2022 Examination ADC/BCOM**  
**Subject: Business Statistics & Mathematics**  
**Paper: BC: 301**

**Time Allowed: 3 Hours                      Maximum Marks: 100**

**Composed by Iftikhar Ali Lecturer Statistics, Finance & Accounting**

*NOTE: Attempt any FIVE questions using proper method. All questions carry equal marks. Attempt at least TWO questions from each section.*

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**Section I**

**Q.1: (a)** Define the following: (10)

- (i) Geometric Mean
- (ii) Harmonic Mean
- (iii) Quartiles
- (iv) Dispersion
- (v) Measures of Skewness

**(b)** The mid values of a frequency distribution are given as: (10)

<b>Mid Values</b>	115	125	135	145	155	165	175	185	195
<b>Frequency</b>	6	25	48	72	116	60	38	22	2

**Calculate: (i) Geometric Mean (ii) Median (iii) Coefficient of Skewness**

**Q.2: (a)** The manufacturer has 20 sales points of them 12 are in the urban areas. The manufacturer selects a sale point at random to know the stock position. What is the probability that the selected point is of rural area? (10)

**(b)** A pair of unbiased die is tossed. Calculate variance of the random variable X from the probability distribution, where X represents the sum of dots on the upper face of dice. (10)

**Q.3: (a)** Define the following: (10)

- (i) Statistical hypothesis

- (ii) Type I Type II errors
- (iii) Test Statistics
- (iv) Rejection Region
- (v) Null Hypothesis

(b) A random sample of 40 hens from a normal population showed the average laying is 272 eggs per year with standard deviation of 25 eggs. The company claims that the average laying is at least 285 eggs per year. Test this claim of the company using  $\alpha=0.05$  (Table value is -1.645) (10)

**Q.4:** A population consists of five numbers 2, 4, 6, 8, 10. Consider all possible samples of size 2 which can be drawn with replacement from this population. From the sampling distribution of sample means and sample variance and verify that:

- (i)  $E(\bar{X}) = \mu$
- (ii)  $E(S^2) = \frac{n-1}{n} \sigma^2$

## Section II

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**Q.5:** (a) The first term of an A.P is 5, the last term 45 and the sum 400. Find number of terms and common difference in the series. (10)

(b) The common ratio, last term and the sum of a G.P are 3, 486 and 728 respectively. Find the first term and the number of terms. (10)

**Q.6:** (a) Sum of money doubles itself in 12.5 years at a certain rate p.a of simple interest. Show that it will take about 9 years to double itself at the same rate of compound interest. (10)

(b) In what time Rs. 3000 invested at 10% simple interest will amount to Rs. 12000. (10)

**Q.7:** (a) The sum of two consecutive even numbers is 66. Find the integers. (10)

(b) Solve the following equation by any appropriate method: (10)

$$\sqrt{5x - 4} - \sqrt{3x + 1} = 1$$

**Q.8:** Solve the following system of linear equations by matrices: (20)

$$x + y - z = 1$$

$$2x - y + z = 5$$

$$3x - y - 2z = 10$$