

**Paper 4- Fundamentals of Business Mathematics  
and Statistics**

Paper 4 - Fundamentals of Business Mathematics and Statistics

Full Marks:100

Time allowed: 3 hours

Section - A

I. Choose the Correct Answer

[1 × 8= 8]

- If  $16x^2 - 8x + 1 = 0$  when  $x = \frac{1}{4}y$  Find the value of y \_\_\_\_\_  
(i)  $\frac{1}{4}$       (ii) 1      (iii) 2      (iv)  $-\frac{1}{4}$
- Evaluate:  $1+2+3+\dots\dots\dots + (n-1)$   
(i)  $\frac{n}{2}$       (ii)  $n(n-1)$       (iii)  $\frac{n(n-1)}{2}$       (iv)  $\frac{(n-1)}{2}$
- If one root of the equation  $x^2 - 3x + m = 0$  exceeds the other by 5 then value of M is equal to \_\_\_\_\_  
(i) -6      (ii) -4      (iii) 12      (iv) 18
- If  $3^x = 5^y = (225)^z$  then  $z =$  \_\_\_\_\_  
(i)  $\frac{xy}{x+y}$       (ii)  $2\frac{xy}{x+y}$       (iii)  $2(x+y)$       (iv) none of these
- Everybody in a room shakes hands with everybody else. The total number of hands shakes is 66. The total number of person in the room is —  
(i) 11      (ii) 12      (iii) 10      (iv) 14
- The product of three terms in G. P is 1,000, what is its middle term?  
(i) 12      (ii) 14      (iii) 16      (iv) 18
- The inverse ratio of  $1\frac{3}{5} : 2\frac{1}{4}$  is  
(i) 32:45      (ii) 45:32      (iii) 18:5      (iv) 5:18
- If 2, x 50 are in G. P. find x  
(i)  $\pm 10$       (ii)  $\pm 8$       (iii)  $\pm 9$       (iv) none

II. State whether the following statements are True (or) False.

[5 × 1 = 5]

- The C. I on a certain sum of money for 1 year at 8% p.a. compounded annually is `824 then the sum is `10,000.
- The number of different words that can be formed form the letter of the work "TRIANGLE" so that no vowels one together is 36,000.
- The logarithm of a number which is not equal to one is itself as base is zero.
- If  $A : B = B : C = C : D = 5 : 6$  then  $A : B : C : D = 125 : 150 : 180 : 216$ .
- If the ratio of two positive numbers is 4: 5 and their L. C. M is 140 then the number are 35, 45.

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### III. Fill in the blanks:

[5 × 1 = 5]

1. The C. I. on a certain sum of money for 2 years at 8% p. a. compounded annually is ₹1,040. The sum is \_\_\_\_\_
2. If  $nP_3 = 60$  then  $n =$  \_\_\_\_\_
3. ₹2,530 is distributed between Ram and Hari such that Ram gets  $\frac{11}{12}$  part that Hari gets. Then Hari gets \_\_\_\_\_
4. If 3, x, 27 are in continued proportion then  $x =$  \_\_\_\_\_
5. At \_\_\_\_\_ rate percent will be Simple interest be equal to principle amount in 10 yrs.

### IV. Answer any three Short Question:

[2×3=6]

1. In how many ways 5 different beads be strung on a necklace?
2. If  ${}^{18}C_r = {}^{18}C_{r+2}$ , find the value of r.
3. Express as positive indices -  $x^{-\frac{1}{3}}$
4. Show that  $\log_3 \sqrt{3\sqrt{3\sqrt{3}\dots}} = 1$ .

### V. Choose the following Any Four Question:

[4 × 4 = 16]

1. If a, 4, b are in AP and a, 2, b are in G. P. then prove  $\frac{1}{a} + \frac{1}{b} = 2$ .
2. Find the value of  $a + b + c$ , if  $x^{\frac{1}{a}} = y^{\frac{1}{b}} = z^{\frac{1}{c}}$  satisfying  $xyz = 1$ .
3. If  $\log_2 x + \log_4 x + 10 \log_{16} x = 21/4$ , Find the value of x.
4. The value of  $\log_3 x = -2$ , Find the value of x
5. If  $x + y \propto x - y$ , prove that  $ax + by \propto px + qy$ .
6. How much interest will be earned on ₹2,000 at 6% simple interest for 2 years?

### Section-B

### VI. Choose the Correct Answer

[1 × 10 = 10]

1. If each item is reduced by 10, the range is  
(i) Increased by 10                      (ii) Decreased by 10                      (iii) Unchanged  
(iv) none
2. If the range of x is 2, what would be the range of  $3x + 50$ ?  
(i) 2                      (ii) 6                      (iii) -6                      (iv) 44
3. Two regression lines coincide when  
(i)  $r=0$                       (ii)  $r=2$                       (iii)  $r=+1$  or -1  
(iv) none
4. If the relationship between two variables x and y is given by  $2x + 3y + 4 = 0$ , then the value of the correlation coefficient between x and y is  
(i) 0                      (ii) 1                      (iii) -1                      (iv) Negative

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5. If  $b_{yx}$  and  $b_{xy}$  are negative,  $r$  is  
(i) Positive (ii) Negative (iii) Zero (iv) None
6. (Class frequency)/ (Width of the class) is defined as  
(i) Frequency density (ii) Frequency distribution (iii) Both  
(iv) None
7. An area diagram is  
(i) Histogram (ii) Frequency polygon (iii) Ogive  
(iv) None
8. Median of distribution can be obtained from  
(i) Less than type Ogives than Ogives (ii) Point of intersection of Less than and greater than Ogives (iii) Both a and b (iv) none of these
9. Length of a class is  
(i) The difference between the UCB and LCB of that class  
(ii) The Difference between the UCL and LCL of that class  
(iii) i or ii  
(iv) Both i and ii
10. For any two numbers range is always  
(i) Twice the SD (ii) Half the SD (iii) Square the SD  
(iv) None of these

### VII. State whether the following statements are True (or) False.

[8 × 1 = 8]

1. Bowley's measure of skewness is based on quartiles.
2. In a normal distribution the extreme deciles are equidistant from median.
3. Average alone is enough to throw light on the main characteristics of a statistical series.
4. An area diagram is Histogram.
5. Combined median can be calculated as in case of arithmetic mean.
6. In a positively skewed distribution mode > mean.
7. Harmonic mean is a positional average.
8. Mean deviation can never be negative.

### VIII. Fill in the blanks:

[8 × 1 = 8]

1. When one regression coefficient is positive, the other would be .....
2. Graphic method of calculating dispersion is.....
3. If the Co-efficient of Skewness is Zero, the distribution is .....
4. .... Of a set of observation is to be their sum, divided by the number of observations.
5. The harmonic mean for the numbers 2, 3, 5 is .....
6. 10<sup>th</sup> percentile is equal to .....decile.
7. The Slope of the regression line of y on x is .....
8. Mode can be located graphically with the help of .....

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**IX. Answer the following five Questions:**

**[2×5 = 10]**

1. If the A. M & G. M. for two numbers are 6.50 and 6 respectively. What are the two numbers?
2. What is the med law for the following observations. 5, 8, 6, 9, 11, 4?
3. Find out the probability of throwing an even number with an ordinary Six faced dice.
4. The following data relate to the marks of a group of students:

Marks	No. of Students
Below 10	15
Below 20	38
Below 30	65
Below 40	84
Below 50	100

How many students got marks more than 30?

- (a) 65
  - (b) 50
  - (c) 35
  - (d) 43
5. What is the GM for the number 8,24 & 40?

**X. Answer any three Questions:**

**[3×8 = 24]**

1. Define mode. What is the relation between mean, median & mode? [8]
2. Define: [2×4=8]
  - (a) Mutually exclusive Event.
  - (b) Equally likely Event
  - (c) Exhaustive event.
  - (d) Dependent event.
3. The following table gives the soil temperature and the germination time at various places. Calculate the co-efficient of correlation and interpret the value

Temperature	57	42	40	38	42	45	42	44	40	46	44	43
Germination Time	10	26	30	41	29	27	27	19	18	19	31	29

Take 44 and 26 as assumed means .

[8]

4. Eight students have obtained the following marks in Accountancy and economics. Calculate the Rank Co- efficient of correlation. [8]

Accountancy (X)	25	30	38	22	50	70	30	90
Economic (Y)	50	40	60	40	30	20	40	70