

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

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Full Marks:100

Time allowed: 3 hours

Section-A

I. Choose the Correct Answer: **[1 × 8= 8]**

1. The compound interest on ₹500 for 2 years at 10% p. a
(i) 100 (ii) 105 (iii) 110 (iv) 120
2. If ${}^8C_r - {}^7C_3 = {}^7C_2$ then $r =$ _____
(i) 3 (ii) 4 (iii) 2 (iv) 6
3. $(\log_5 3) \times (\log_3 625)$ equal:
(i) 1 (ii) 2 (iii) 3 (iv) 4
4. If the sum of three numbers in A. P is 18, then what is the middle term?
(i) 6 (ii) 4 (iii) 8 (iv) 10
5. The 3rd and 6th terms of a G. P are 3 and 81 respectively, find the common ratio
(i) 1 (ii) 2 (iii) 3 (iv) 4
6. Find G.M of 2 and 6
(i) ± 4 (ii) $\pm\sqrt{3}$ (iii) ± 2 (iv) $\pm 2\sqrt{3}$
7. $3x^2 + 6x + 3 = 0$ then the roots of the equations are –
(i) (3, 3) (ii) (-1, -1) (iii) (2, 4) (iv) (4, 1)
8. Find the 8th term of the series 4, -8, 16, -32.....
(i) -512 (ii) 512 (iii) -521 (iv) 521

II. State whether the following statements are True (or) False: **[5 × 1 = 5]**

1. $\log_3 + \log 5$ is $\log 15$
2. There 11 distinct books, among them 6 books can be arranged in a shelf. The number of arrangements so that 3 particular books will be always side by side is 8064
3. If the roots of the equations $2x^2+8x+c = 0$ are equal then $c = 8$
4. The number of permutations if the letter in the word "BANANA" is which two letters N do not come together is 60.
5. The degree of the equation $3x^5 + xyz^2 + y^3$ is 3

III. Fill in the blanks: **[5 × 1 = 5]**

1. The value of $\log_2 (\log_5 625)$ is: -----
2. If $\log_{32} x = 0.8$ then x is equal to: -----
3. The number of ways in which the letters of the word "VOWEL" can be arranged so that the letters O, E occupy even places is
4. If the equations $x^2+7x+12 = 0$ and $x^2+mx+5 = 0$ have common roots, the value of m is equal to
5. If $a^{1/3} + b^{1/3} + c^{1/3} = 0$ then $(a + b + c)^3 =$

IV. Choose the following Any Three Short Question: **[2 × 3 = 6]**

1. If a, ar, ar^2, ar^3, \dots be in G. P. find the common ratio.
2. If ${}^{18}C_r = {}^{18}C_{r+2}$ find the value of rC_5
3. The product of 3 consecutive terms in GP is $27/8$. Find the middle term.

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4. Find out — $4P_2 \div 4C_2$

V. Answer any four Questions:

[4×4 = 16]

1. Show that $\left(\frac{x^b}{x^c}\right)^a \times \left(\frac{x^c}{x^a}\right)^b \times \left(\frac{x^a}{x^b}\right)^c = 1$
2. Prove that $10\log_a^m + \log_a^n = \log_a^{mn}$
3. If $\frac{P}{b-c} = \frac{Q}{c-a} = \frac{R}{a-b}$ prove that $P + Q + R = 0$
4. A sum of ₹1,200 was lent out for 2 years at simple interest. The lender got ₹1,536 in all. Find the rate of interest p. a.
5. If the 7th and 11th terms of a A. P. are (-39) and 5 respectively then find out the 24th term.
6. If $\frac{a}{4} = \frac{b}{5} = \frac{c}{9}$, prove that $\frac{a+b+c}{c} = 2$.

Section-B

VI. Choose the Correct Answer:

[1×10=10]

- (i) The value of correlation coefficient lies between
(i) -1 and +1 (ii) -1 and 0 (iii) 0 and 1 (iv) None
- (ii) A Qualitative characteristic is known as
(i) An attribute (ii) A discrete variable (iii) A continuous variable
(iv) None of above
- (iii) If each item is reduced by 15, AM is
(i) Reduced by 15 (ii) Increased by 15 (iii) Reduced by 10 (iv) None
- (iv) "Stub" of table is the
(i) Left part of the table describing the Columns
(ii) Right part of the table describing the columns
(iii) Right part of the table describing the rows
(iv) Left part of the table describing the rows
- (v) Median of distribution can be obtained from
(i) Less than type O gives
(ii) Point of intersection of less than and greater than Ogives
(iii) Both a and b
(iv) None of these
- (vi) The quickest method to collect primary data is
(i) Personal interview (ii) Indirect interview (iii) Telephone interview
(iv) By observation
- (vii) If Median = 5, quartile Deviation = 2.5 then the coefficient of Quartile deviation is -
i. 20 (ii) 50 (iii) 125 (iv) 5
- (viii) If $y = 5x - 20$ & $\bar{x} = 30$ then the value of \bar{y} is
i. 130 (ii) 140 (iii) 30 (iv) None

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- (ix) The most commonly used measure of dispersion is
(i) Range (ii) Standard (iii) Coefficient of variation
(iv) Quartile deviation
- (x) Statistics is applied in
(i) Economics (ii) Business Management (iii) Commerce and industry
(iv) All these

VII. State whether the following statements are True (or) False: [8 × 1 = 8]

1. In a normal distribution $S. D. > M. D. > Q. D.$
2. Harmonic mean is always less than geometric mean.
3. Mean deviation can never be negative
4. The arithmetic mean is always the best measure of central tendency
5. Median can never be equal to mean in a skewed distribution
6. Range is the value of difference between mode and median.
7. Mean deviation can never be negative
8. Mode is the value that has maximum frequency

VIII. Fill in the blanks: [8 × 1 = 8]

1. The average based on reciprocals to the numbers is
2.always lies in between the arithmetic mean and mode
3. For calculating mean deviation, generally deviations are taken from
4. Quartiles can be determined graphically using
5. Graphical method of calculating dispersion is
6. A quantitative Characteristic is known as
7. If the Co-efficient of skewness is zero, the distribution is
8. A distribution with two modes is called

IX. Define: [2 × 5 = 10]

1. Percentile
2. Mode
3. Decile
4. Quartile
5. Median

X. Answer any three Questions: [3×8 = 24]

1. From the following data find quartile deviation and its coefficient. [8]

x	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
f	8	10	12	15	10	7	8	5

2. Calculate Mode for the following data [8]

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X:	0-10	10-20	20-30	30-40	40-50	50-60	60-70
F:	4	13	21	44	33	22	7

3. From the following data compute the co-efficient of correlation between x and y: [8]

	X Series	Y Series
No. of items	15	15
Arithmetic Mean	25	18
Square of deviations from mean	136	138

Summation of product of deviations of X and Y series from their respective Arithmetic mean is 122.

4. (a) If two unbiased coins are tossed, find the probability of obtaining one head and one tail . [4]
(b) If an unbiased coin is tossed twice, find the probability of obtaining at least one head. [4]