Paper- 4: FUNDAMENTALS OF BUSINESS MATHEMATICS AND STATISTICS

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

Section – A
(Fundamentals of Business Mathematics)
PART A

1. Answer All objective questions.
    (a) Answer Multiple Choice Question   [9×2= 18]

    (i) A certain amount was divided between X and Y in the ratio 4 : 3. If B's share was ₹4,800, the total amount was:

    (a) ₹11,200

    (b) ₹6,400

    (c) ₹19,200

    (d) ₹39,200

    (ii) At what rate converted semi-annually will the present value of a perpetuity of ₹450 payable at the end of each 6 months be ₹20,000.

    (a) 5.4%

    (b) 5%

    (c) 4.59

    (d) 4%

    (iii) In how many ways can 15 things be divided into three groups containing 8, 4 and 3 things respectively.

    (a) $\dfrac{15!}{8!.\ 4!.\ 3!}$

    (b) 15!

    (c) 7!

    (d) None of these

    (iv) How many combinations can be formed of 8 counters marked 1, 2, 3, 4, 5, 6 7, 8 taking them 4 at a time, there being at least one odd and one even counter in each combination

    (a) 80

    (b) 86

    (c) 68

    (d) None of these

    (v) $\log_{100}(0.1) = ?$

    (a) -2

(b) $\frac{1}{2}$

(c) $-\frac{1}{2}$

(d) 2

(vi) What will be the difference between simple and compound interest on ₹8,000 at the rate of 5 percent per annum at the end of 3 years?

(a) ₹61.00

(b) ₹122.00

(c) ₹91.50

(d) ₹152.50

(vii) In how many ways can 8 books can be arranged, so that the best and worst books never come together

(a) 8!

(b) 7!. 2!

(c) 7!

(d) None of these

(viii) If the sum of an infinitely decreasing G.P. is 3 and the sum of the squares of its terms is (9/2), then the sum of the cubes of these terms is –

(a) $\frac{105}{13}$

(b) $\frac{108}{13}$

(c) $\frac{729}{8}$

(d) None

(ix) [n (n + 1)/2 : n is a positive integer] is

(a) a finite set

(b) An infinity set

(c) is an empty set

(d) None of these

(b) Answer the following Question True or False   [6×1=6]

(i) The g.c.d of the equations $2x^2-x-1 = 0$ and $4x^2+8x+3 = 0$ is 3x+1   ( )

(ii) The total number of 9 digits numbers which have all different digits id 9×9 ( )

(iii) The numbers of different number of 6 digits (without repetition) can be formed form the digits 3,1,7,0,9,5 is 120 ( )

(iv) The logarithms with base e are called comm. Logarithm ( )

(v) If $9 \times 81^x = \dfrac{1}{27^x - 3}$ then the value of x is ( )

(vi) The difference between S.I and C.I on ₹1,000 for 1 years at 4% payable quarterly is 0.40 ( )

PART B

4 Questions to be answered out of 6 questions [4×4=16]

2. A locomotive engine without a train can go 24 Km./hr. and its speed is diminished by a quantity which varies as the square root of the number of wagons attached. With 4 wagons its speed is 20 Km./hr. Find the greatest number of wagons with which the engine can move. [4]

3. In what time will the C.I. on ₹ 1,200 be ₹ 124.60 p. at 8% p.a. payable quarterly? [4]

4. Which term of the G.P. 36, 24, 16, ….. is 512/81? [4]

5. A If $x = 2 + 2^{2/3} + 2^{1/3}$, prove that $x^3 - 6x + 6x - 2 = 0$. [4]

6. If $^nC_8 = {}^nC_6$, find $^nC_2$. [4]

7. Solve $x^2 + 7x + \sqrt{x^2 + 7x + 9} = 3$ [4]

Section – B

PART A

8. Answer All objective questions.

   (a) Answer Multiple Choice Question   [12×2= 24]

      (i) If $r = 0.7$, then the value of coefficient of determination is

         (a) 0.51

         (b) 0.7

         (c) 0.49

         (d) 0.50

      (ii) The two regression lines are $3x - y = 0$ and $3x - 4y = 0$. If variance of x is 4 then variance of y is

         (a) 4

         (b) 2

         (c) 3

         (d) 9

      (iii) The mode of 5, 5, 5, 7, 9, 10, 10, 10 is

         (a) 5

         (b) 10

         (c) 5 and 10

         (d) None of these

      (iv) In the method of concurrent deviations, only the changes of signs in the values of the variables are taken in account for the calculation of

         (a) Coefficient of standard deviation

         (b) Coefficient of determination

         (c) Coefficient of regression

         (d) Coefficient of correlation

      (v) Mean deviation from the mean for the observations 0, -1, 4 is

         (a) 2

         (b) 2/5

         (c) 3/5

         (d) None of these

(vi) For three mutually exclusive and exhaustive events A, B and C, 2P(A) = 3P (B=) = P (C). What is P(BUC)?

(a) $\dfrac{6}{11}$

(b) $\dfrac{5}{11}$

(c) $\dfrac{9}{11}$

(d) $\dfrac{8}{11}$

(vii) If r = -0.9, it indicates that

(a) There is high degree of correlation between two variables and changes are in opposite direction

(b) The assumption of liner correlation is valid

(c) The correlation between population variables is significant

(d) All of these

(viii) N = 10, $\sum x = 55$, $\sum y = 88$, $\sum x2 = 385$, $\sum y2 = 1114$, $\sum xy = 586$. The regression equation of y on x is

(a) 1.98x- y + 1.24 = 0

(b) 1.24x-y + 2 = 0

(c) 124x – 100y + 198 = 0

(d) 12.4x – 10y + 1.94 = 0

(ix) A frequency distribution

(a) Arranges observations on an increasing order

(b) Arranges observation in terms of a number of groups

(c) Relates to a measurable characteristic

(d) All these

(x) Median of 2, 4, 5, 6, 7, 8 and 9 is

(a) 9

(b) 6

(c) 3

(d) 5

(xi) Three families consist of 3 boys and 2 girls, 2 boys and 2 girls, and 2 boys and 3 girls respectively. A family is selected at random and from it two children are selected. What is the probability that both of them are girls?

(a) 0.20

(b) 0.12

(c) 0.04

(d) None

(xii) The variance of standard normal distribution is

(a) 1

(b) µ

(c) 02

(d) 0

(b) Answer the following Question True or False [12×1=12]

(i) If P(A) = 7/8 then P(A^C) is equal to 0

(ii) Initially, probability was a branch of Mathematics

(iii) If P(A) = 1, then the event A is known as Importable event

(iv) BAYE's Theorem is not associated with the name of Reverend Thomas Bayes.

(v) Two regression lines coincide when r = D

(vi) If r = 0.6 then the coefficient of non-determination is 0.64

(vii) 10th percentile is equal to 1st decile

(viii) Quartile deviation is based on the Highest 50%

(ix) An ideal measure of central tendency is Moving average

(x) Pooled mean is also called Grouped mean

(xi) The colour of a flower is an example of a variable

(xii) Weights are generally called Frequencies

PART B

4 Questions to be answered out of 6 questions [6×4=24]

9. Explain the Importance and Scope of Statistics. [6]

10. From the following table, find the median time taken by 40 male students to solve a problem. [6]

Table

Time (S)	Frequency
118-126	3
127-135	5

136-144	9
145-153	12
154-162	5
163-171	4
172-180	2
	Total = 40

11. Calculate (a) mean coefficient of dispersion from the following data: [6]

Table

Marks:	10	15	20	30	40	50
Frequency:	8	12	15	10	3	2

12. Consider the following table. Calculate the product moment correlation coefficient.

Table

1998	Mean Temperature (°C)	Beer Production (million barrels)
January	6	2.5
February	5	2.4
March	5	3.3
April	8	3.3
May	12	3.5
June	17	3.7
July	19	3.9
August	18	3.6
September	14	3.4
October	11	3.1

[6]

13. Compute the regression coefficients from the data given below and find the value of 'r' (the correlation coefficient) using the same:

Table

X	7	4	8	6	5
Y	6	5	9	8	2

[6]

14. Four cards are drawn at a time from a pack of 52 playing cards. Find the probability of getting all the four cards of the same suit. [6]