2017

(October)

BUSINESS ADMINISTRATION

(Honours)

(Quantitative Analysis)

(BBAC–102)

Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

PART—A

(*Marks* : 50)

UNIT—I

1. *(a)* Distinguish between population and sample. What is stratified random sampling? 2+2=4

(b) The following data relate to profits earned by 200 firms during a year.

Draw a 'less than' ogive and a 'more than' ogive : 6

Profits (in ₹ '000)	*No. of firms*
0–30	3
30–60	12
60–90	33
90–120	69
120–150	50
150–180	25
180–210	8

OR

2. *(a)* What is the relationship between mean, median and mode? 2

(b) The following data are the wages of workers working in two divisions of a firm :

	Division A	*Division B*
No. of workers :	100	150
Average wage :	45	55
Standard deviation :	7	12

(i) Calculate average income when both divisions are put together.

(ii) Calculate standard deviation of both divisions taken together.

(iii) State in which division the wage is more variable. 2+3+3=8

(Continued)

UNIT—II

3. The demand for TV set as obtained by sample survey on 7 towns are shown below :

Population (*X*) (in '000) :	11	14	14	17	17	21	35
Demand (*Y*) :	15	27	27	30	34	38	46

Find the linear regression equation of Y on X and estimate the demand of TV set in a town of population 30000. 10

OR

4. *(a)* Distinguish between positive and negative correlations and between linear and non-linear correlations. 2+2=4

(b) Briefly explain the four components of a time series. 1½×4=6

UNIT—III

5. *(a)* What is the difference between ϕ and $\{\phi\}$? 2

(b) If the universal set is given by

$$U = \left\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}, \frac{7}{8}, \frac{8}{9}, \frac{9}{10}, \frac{10}{11}\right\}$$

$$A = \left\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}\right\}$$

(Turn Over)

and $B = \left\{\frac{2}{3}, \frac{4}{5}, \frac{6}{7}, \frac{8}{9}, \frac{10}{11}\right\}$

verify that—

(i) $(A \cap B)^C = A^C \cup B^C$;

(ii) $(A \cup B)^C = A^C \cap B^C$. 4

(c) What is meant by an event? 2

(d) State the addition theorem of probability. 2

OR

6. (a) In how many ways can the letters of the word 'FAILURE' be arranged? 3

(b) In how many ways can 4 different books be given to 5 persons, if one person may have more than one book? 3

(c) If ${}^{n}P_3 : {}^{n+2}P_3 = 5 : 12$, find the value of n. 4

UNIT—IV

7. (a) If

$$A = \begin{bmatrix} 3 & -1 & 2 \\ -2 & 1 & 0 \\ 0 & -2 & 1 \end{bmatrix} \text{ and } B = \begin{bmatrix} 1 & 2 & -3 \\ 3 & 0 & 1 \\ -1 & 1 & 0 \end{bmatrix}$$

prove that $(AB)^T = B^T A^T$. 6

(Continued)

(b) What is a singular matrix? Is

$$A = \begin{bmatrix} 1 & 2 & 0 \\ 3 & 0 & 4 \\ 0 & 5 & 1 \end{bmatrix}$$

a singular matrix? 2+2=4

OR

8. (a) What are the properties of determinants? 4

(b) Solve the following system of equations : 6

$$x+y+z=3$$
$$x+2y+3z=4$$
$$x+4y+9z=6$$

UNIT—V

9. (a) Show that

$$\frac{x^2-6x+8}{x^2-8x+12}$$

is undefined for $x=2$. 2

(b) Distinguish between $\lim_{x \to a} f(x)$ and $f(a)$. 2

(c) Evaluate the following : 2×3=6

(i) $\lim_{x \to 1} \frac{x^2-3x+2}{x^2-4x+3}$

(Turn Over)

(ii) $\lim_{x \to 2} \frac{x^9 - 2^9}{x - 2}$

(iii) $\lim_{x \to 0} \frac{a^x - 1}{x}$

OR

10. *(a)* Find $\frac{dy}{dx}$ of the following : 2+2+3=7

(i) $y = \log\left(\frac{1+x}{1-x}\right)$

(ii) $y = (x+2)(x^2+3)$

(iii) $x = \frac{3t}{1+t}$, $y = \frac{3t^2}{1+t}$

(b) If the demand function is $q = 7 - 2p$, find price elasticity (e_d) of demand, when $P = 1$. 3

PART—B

(*Marks* : 25)

11. What are the merits and demerits of arithmetic mean? 5

OR

12. Calculate the mean deviation from the following data : 5

Marks	:	5	15	25	35	45
No. of students	:	5	8	15	16	6

(*Continued*)

13. Show that correlation coefficient (r) lies between – 1 and + 1. 5

OR

14. *(a)* What are the uses of index numbers? 3

(b) Write a short note on the uses of regression analysis. 2

15. *(a)* Prove that ${}^nC_r = {}^nC_{n-r}$. 2

(b) If ${}^9C_{2r+3} = {}^9C_{8-3r}$, find the value of r. 3

OR

16. In a basket, there are 5 mangoes, 8 apples and 7 oranges. One fruit is chosen at random. What is the probability that the fruit is *(a)* mango or orange and *(b)* apple? 3+2=5

17. Define : 2½+2½=5

(a) Identity matrix

(b) Orthogonal matrix

OR

18. If $A = \begin{bmatrix} 2 & 0 & -1 \\ 2 & 4 & -1 \\ 1 & -8 & -3 \end{bmatrix}$, find A^2. 5

(*Turn Over*)

19. *(a)* Roughly sketch the graph for the function $f(x) = x^2$, when $-2 \leq x \leq 2$. 2

(b) Find the points of discontinuity of the function

$$\frac{12x^2 + 6x - 5}{12x^2 + x - 20}$$ 3

OR

20. If total cost function is $C = 10 + 2q + 3q^2$, find at what level of output average cost (AC) will be minimum and what will be the minimum value. 5

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