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(October)

BUSINESS ADMINISTRATION

(Honours)

(BBAC–102)

(Quantitative Analysis)

Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

PART—A

(*Marks* : 50)

UNIT—I

1. *(a)* What are primary data? 2

   (b) What are the various methods of collecting primary data? 3

   (c) The following data are the wages of 50 workers. Calculate the mean wage : 5

Wages (in ₹)	*No. of workers*
50–100	5
100–150	8
150–200	15
200–250	12
250–300	10

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OR

2. *(a)* The following are the number of apples distributed to patients in a hospital for a week. Calculate the median : 4

No. of apples : 15, 12, 16, 18, 8, 21, 13

(b) The following data are the goals scored by a team of players. Calculate the standard deviation of goals scored : 6

No. of goals	No. of players
2	2
3	4
4	5
5	7
6	3
7	4
8	3
9	2

UNIT—II

3. *(a)* What is correlation? Explain the different types of correlation. 2+5=7

(b) What are the uses of index number? 3

OR

4. *(a)* Show that correlation coefficient (r) lies between −1 and +1. 5

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(b) To study the effect of rain on yield of wheat, the following results were obtained :

	Yield (in kg)	Rainfall (in cm)
Mean	450	50
Standard deviation	12	2

Correlation coefficient (r) = 0·80

Estimate the yield of wheat when raifall is 80 cm. 5

UNIT—III

5. *(a)* If

$U = \{2, 4, 6, 8, 10, 12\}$, $A = \{2, 4, 6\}$,
$B = \{2, 6, 10\}$ and $C = \{6, 10, 12\}$

prove that—

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

(ii) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ 2+2=4

(b) In how many ways can 10 examination papers be arranged so that the best and worst papers are always seperated? 6

OR

6. *(a)* Prove that $^nC_r + {}^nC_{r-1} = {}^{n+1}C_r$. 4

(b) What are mutually exclusive events? 2

(c) There are 50 balls in a box consecutively numbered from 1 to 50. One ball is selected at random. Find out the probability that its number is divisible by 5 or 6. 4

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UNIT—IV

7. *(a)* Find the value of

$$\begin{vmatrix} 2 & -3 & 1 \\ 3 & 1 & -2 \\ 4 & -1 & 1 \end{vmatrix}$$

4

(b) Solve the following system of equations :

$$2x - z = 1$$
$$2x + 4y - z = 1$$
$$x - 8y - 3z = -2$$

6

OR

8. *(a)* If

$$A = \begin{bmatrix} 1 & 3 & 2 \\ 4 & 6 & 7 \\ 2 & 4 & -1 \end{bmatrix} \text{ and } B = \begin{bmatrix} 1 & 0 & 2 \\ 3 & -1 & 1 \\ 4 & 2 & -1 \end{bmatrix}$$

show that $AB \neq BA$.

6

(b) For two matrices A and B where

$$A = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix} \text{ and } B = \begin{bmatrix} 1 & -2 \\ -1 & 1 \end{bmatrix}$$

verify that $(AB)^T = B^T A^T$.

4

UNIT—V

9. *(a)* Distinguish between $\lim\limits_{x \to a} f(x)$ and $f(a)$.

2

(b) Find the points of discontinuity of a function

$$f(x) = \frac{2x^2 + x + 1}{x^2 - 7x + 12}$$

3

3+2=5

(c) Evaluate :

(i) $\lim\limits_{x \to 2} \dfrac{4 - x^2}{3 - \sqrt{x^2 + 5}}$

(ii) $\lim\limits_{x \to 2} \dfrac{x^4 - 16}{x - 2}$

OR

2×3=6

10. *(a)* Find $\dfrac{dy}{dx}$ of the following :

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

(ii) $y = \left(\dfrac{1}{x}\right)^x$

(iii) $6x^3 + y^2 + 3axy = 0$

(b) A firm has the total cost function and demand function as

$$C = \frac{1}{3}q^3 - 7q^2 + 111q + 50$$

and $P = 100 - q$. Find profit maximising level of output. 4

PART—B

(*Marks* : 25)

UNIT—I

11. Distinguish between :

(a) Population and Sample 2½+2½=5

(b) Stratified random sampling and Purposive sampling

OR

12. Draw a histogram and frequency curve for the following data : 5

Marks	No. of students
20–30	3
30–40	7
40–50	12
50–60	20
60–70	15
70–80	10
80–90	5

(Continued)

UNIT—II

13. What is time series? Distinguish between seasonal and cyclical components of time series. 2+3=5

OR

14. Find the coefficient of correlation for the following data : 5

X :	1	2	3	4	6
Y :	3	2	5	4	6

UNIT—III

15. *(a)* What is complement of a set? 2

(b) If

$$^nP_3 : {}^{n+2}P_3 = 5 : 12$$

find the value of n. 3

OR

16. *(a)* State multiplication theorem of probability. 2

(b) A card is drawn from a pack of 52 cards. Find the probability that a card drawn is either a king or a diamond. 3

(Turn Over)

UNIT—IV

17. Find the inverse of

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

5

OR

18. Define the following : $\qquad$ 3+2=5

(a) Singular and non-singular matrices

(b) Diagonal matrix

UNIT—V

19. Given

$$f(x) = 2x + 4 \,, \quad \text{when } x \neq 2$$
$$= \quad 10 \quad , \quad \text{when } x = 2$$

examine whether the function is continuous or not at $x = 2$. $\qquad$ 5

OR

20. Find $\dfrac{dy}{dx}$ when $x = 2\log t - e^{2t+1}$ and $y = \dfrac{3}{\sqrt{t+1}} + 5\sqrt{t}.$ 5

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