

IV/COM (xii)

2015

(4th Semester)

COMMERCE

Paper : BC-412

(Quantitative Techniques)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(Marks : 50)

*The figures in the margin indicate full marks
for the questions*

Answer **one question from each Unit**

UNIT—I

1. Discuss the limitations of statistics. Write the importance of statistics in the field of business. 5+5=10

G15—550/259a

(Turn Over)

2. (a) The mean marks of 100 students were found to be 40. Later on it was discovered that a score of 53 was misread as 83. Find the correct mean corresponding to the correct score. 4
- (b) Find the standard deviation of the following distribution : 6

Age	:	20-25	25-30	30-35	35-40	40-45	45-50
No. of persons	:	170	110	80	45	40	35

UNIT—II

3. (a) A bag contains 5 white and 8 red balls. Two drawings of 3 balls are made such that—

- (i) the balls are replaced before the second trial;
- (ii) the balls are not replaced before the second trial.

Find the probability that the first drawing will give 3 white and the second 3 red balls in each case. 4

- (b) A problem in statistics is given to three students A, B and C. Their chances of solving it are

$$\frac{1}{2}, \frac{1}{3} \text{ and } \frac{1}{4}$$

What is the probability that the problem will be solved? 6

4. (a) What is correlation analysis? Describe briefly three types of correlation. 2+3=5

- (b) A research company summarized advertising expenditure and sales results as follows :

	Adv. Exp. (₹ in crore)	Sales (₹ in crore)
Mean	20	200
SD	18	170

Karl Pearson's correlation coefficient (γ) = 0.6.

Find out two regression equations and estimate advertisement expenditure when sales is ₹ 250 crores. 5

UNIT—III

5. (a) Describe in brief the uses of index number. 4

- (b) Construct index numbers of price from the following data by applying—

(i) Laspeyre's method;

(ii) Paasche's method;

(iii) Fisher's ideal method : 6

Commodity	2012		2013	
	Price	Quantity	Price	Quantity
A	2	8	4	6
B	5	10	6	5
C	4	14	5	10
D	2	19	2	13

6. (a) Describe briefly the utility of time series. 5

(b) Fit a straight-line trend for the following series. Estimate the value for 2010 : 5

Year	:	2001	2002	2003	2004	2005	2006	2007
Production of steel (in tons)	:	60	72	75	65	80	85	95

UNIT—IV

7. (a) Find the inverse of the matrix

$$\begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix} \quad 5$$

(b) Mr. Maurer has invested a part of his investment in 10% bond A and a part in 15% bond B. His income from interest during the first year is ₹ 4,000. If he invests 20% more in 10% bond A and 10% more in 15% bond B, his income during the second year increased by ₹ 500. Find his initial investments in bond A and B using matrix method. 5

8. (a) Solve the following equations by Cramer's rule : 5

$$\begin{aligned} x + y + z &= 3 \\ 2x + 3y + 4z &= 9 \\ x + 2y - 4z &= -1 \end{aligned}$$

(5)

- (b) A manufacturer produces three products A, B and C which are sold in Aizawl and Lungle. The annual sales of these products are given below :

	A	B	C
Aizawl	5000	7500	15000
Lungle	9000	12000	8700

If the sales prices of products A, B and C per unit be ₹ 2, ₹ 3 and ₹ 4 respectively, calculate the total revenue in each centre by using matrices.

5

UNIT—V

9. (a) Show that the function $f(x)$
 $= 3x - 2$, when $x \leq 0$
 $= x + 1$, when $x > 0$

is discontinuous at $x = 0$.

5

- (b) Miss Annie can sell x items per week at price $P = 20 - 0.001x$ rupees each when it costs $y = 5x + 2000$ rupees to produce x items. Determine the number of items she should produce per week for maximum profit.

5

10. (a) Evaluate $\int x^2 \log x \, dx$. 5

(b) The total cost $C(x)$ associated with producing and marketing x units of an item is given by

$$C(x) = 0.005x^3 - 0.02x^2 + 30x + 3000$$

Find—

- (i) total cost when output is 4 units;
- (ii) marginal cost when output is 3 units.

5

IV/COM (xii)

2015

(4th Semester)

COMMERCE

Paper : BC-412

(Quantitative Techniques)

(PART : A—OBJECTIVE)

(Marks : 25)

The figures in the margin indicate full marks for the questions

Answer **all** questions

SECTION—A

(Marks : 10)

1. State whether the following statements are *True (T)* or *False (F)* by a Tick (✓) mark : 1×5=5

(a) In plural sense, the word 'statistics' implies a set of numerical figures, usually obtained by measurement or counting.

(T / F)

(b) A distribution in which the values of mean, median and mode coincide is known as asymmetrical distribution.

(T / F)

(2)

- (c) Time reversal test is satisfied by Laspeyre's and Paasche's method.

(T / F)

- (d) A diagonal matrix whose all the diagonal elements are equal is called a unit matrix.

(T / F)

- (e) A function $y = f(x)$ is said to have maximum value $f(a)$ at $x = a$ if a ceases to increase at $x = a$ and begins to decrease as x increases beyond a .

(T / F)

2. Choose the correct answer and place its code in the brackets provided : 1×5=5

- (a) Circular test is satisfied when

(i) $P_{01} \times P_{12} \times P_{20} = 1$

(ii) $P_{01} \times Q_{01} = \frac{\Sigma p_1 q_1}{\Sigma p_0 q_0}$

(iii) $P_{01} = \frac{\Sigma p_1 q_0}{\Sigma p_0 q_0}$

- (iv) None of the above

[]

(3)

(b) The difference between the value of the smallest item and the value of the largest item included in the distribution is called

(i) average deviation

(ii) quartile deviation

(iii) mean

(iv) range

[]

(c) Karl Pearson expressed the relationship between mean, median and mode as

(i) $\text{mode} = 3 \text{ median} - 2 \text{ mean}$

(ii) $\text{mode} = \text{mean} - 3 (\text{mean} - \text{median})$

(iii) $\text{mode} = \text{mean} + \frac{2}{3} (\text{mean} - \text{mode})$

(iv) All of the above

[]

(4)

(d) The differentiation of $\frac{d}{dx}(e^x)$ is

(i) e^x

(ii) $e^x \log_e a$

(iii) xe^{x-1}

(iv) None of the above

[]

(e) The integration of $\int a^x dx$ is

(i) $\frac{a}{x} + c$

(ii) $a^x + c$

(iii) $\frac{1}{a^x} + c$

(iv) None of the above

[]

(5)

SECTION—B

(Marks : 15)

3. Write notes on the following in not more than
6 sentences each : 3×5=15

(a) Descriptive statistics

(6)

(b) Regression equation

(7)

(c) Independent and dependent events

(8)

(d) Difference between matrix and determinants

(9)

(e) Maximum value and minimum value
