2016

(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. *(a)* What is inferential statistics? Compare it with basic statistics.   2+3=5

   (b) Discuss in brief the relationship of statistics with other sciences.   5

G16/**256a**   (*Turn Over*)

(**2**)

2. *(a)* In a class of 50 students, 10 have failed and their average of marks is 2·5. The total marks secured by the entire class were 281. Find the average marks of those who have passed.   2

(b) A fighter jet flight flies around a square, the sides of which measure 100 km each. The flight covers the first side at a speed 100 kph, the second side at 200 kph, the third side at 300 kph and the fourth side at 400 kph. Find the average speed of its entire journey.   2

(c) Find the coefficient of variation from the following :   6

Weight (in gm)	110–119	120–129	130–139	140–149
Frequency	5	7	12	20

Weight (in gm)	150–159	160–169	170–179	180–189
Frequency	16	10	7	3

UNIT—II

3. *(a)* Give the classical definition of probability and state its limitation.   3+3=6

(b) If from a pack of cards a single card is drawn, what is the probability that it is either a spade or a king?   4

(**3**)

4. *(a)* Define regression analysis and write down the uses of it. 2+3=5

(b) Find out rank coefficient of correlation from the following observations : 5

A : 115 109 112 87 98 97 120 100 98 118

B : 75 73 85 70 76 65 82 73 68 80

UNIT—III

5. *(a)* What is the meaning of an index number? Discuss briefly about the cost of living index numbers. 2+3=5

(b) From the following observations, show that Fisher's ideal index satisfies time-reversal test : 5

Commodity	Base year		Current year	
	P	Q	P	Q
A	6	50	10	56
B	2	100	2	120
C	4	60	6	60
D	10	30	12	24

6. *(a)* What do you understand by analysis of time series? Describe in brief different components of time series. 2+4=6

(**4**)

(b) Calculate 5 yearly moving averages for the data given below :   4

Year	:	2007	2008	2009	2010	2011
Values	:	116	120	125	132	125

Year	:	2012	2013	2014	2015
Values	:	129	134	140	112

UNIT—IV

7. **(a)** Solve the following system of equations by Cramer's rule :   5

$$x - 4y - z = 11$$
$$2x - 5y + 2z = 39$$
$$-3x + 2y + z = 1$$

(b) The prices of three commodities A, B and C in a shop are ₹ 5, ₹ 6 and ₹ 10 respectively. Customer X buys 8 units of A, 7 units of B and 8 units of C. Customer Y buys 6 units of A, 7 units of B and 8 units of C. Show the prices of the commodities, quantities bought in matrix and money spent by X and Y.   5

8. **(a)** Discuss in detail about the properties of determinants.   6

(b) An amount of ₹ 65,000 is invested in three investments at rates of 6%, 8% and 9% per annum respectively. The total annual income is ₹ 4,800. The income from the third investment is ₹ 600 more than the income from the second investment. Using matrix algebra, determine the amount of each investment.　　4

UNIT—V

9. *(a)* Evaluate the following limit :　　2

$$\lim_{x \to 0} \frac{\sqrt{2+3x} - \sqrt{2-5x}}{4x}$$

(b) If $x^3 + y^3 = 3axy$, find $\dfrac{dy}{dx}$.　　3

(c) The manufacturing cost of an item consists of ₹ 1,000 as fixed overhead cost, material cost ₹ 2 per unit and the labour cost $\dfrac{x^2}{90}$ for x items produced. Find how many items be produced to have the average cost as minimum.　　5

(6)

10. *(a)* Evaluate the following integrals : 3+3=6

(i) $\int \dfrac{x^3 + 2x^2 + 3x}{\sqrt{x}}\,dx$

(ii) $\int_0^6 \sqrt{2x+4}\,dx$

(b) Evaluate the following integral by substitution : 4

$$\int \dfrac{x}{\sqrt{a^2 - x^2}}\,dx$$

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2 0 1 6

(4th Semester)

COMMERCE

Paper : BC–412

(Quantitative Techniques)

(PART : A—OBJECTIVE)

(*Marks* : 25)

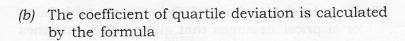*The figures in the margin indicate full marks for the questions*

SECTION—A

(*Marks* : 10)

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

    (a) The word 'statistics' refers to quantitative information or to a method of dealing with qualitative information.

    (*T* / *F*)

    (b) When data collected from published observation are called primary data.

    (*T* / *F*)

(c) A map is called a pictograph.

(*T* / *F*)

(d) A square matrix is called a diagonal matrix if all the elements, except those in the leading diagonal are zero.

(*T* / *F*)

(e) A function $f(x)$ is said to be continuous, if it is giving same result at each point of its domain.

(*T* / *F*)

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

(a) In a moderately asymmetrical distribution

(i) AM < GM < HM

(ii) HM < GM < AM

(iii) AM > GM > HM

(iv) AM > HM > GM   [   ]

(b) The coefficient of quartile deviation is calculated by the formula

(i) $\dfrac{Q_3 - Q_1}{2}$

(ii) $\dfrac{Q_3 + Q_1}{Q_3 - Q_1}$

(iii) $\dfrac{Q_2 + Q_1}{Q_3 - Q_1}$

(iv) $\dfrac{Q_3 - Q_1}{Q_2 + Q_1}$ [   ]

(c) The factor-reversal test is satisfied when

(i) $P_{0n} \times Q_{0n} = \dfrac{\Sigma p_0 q_0}{\Sigma p_n q_n}$

(ii) $P_{0n} \times P_{n0} = \dfrac{\Sigma p_n q_n}{\Sigma p_0 q_0}$

(iii) $P_{0n} \times Q_{0n} = 1$

(iv) $P_{0n} \times Q_{0n} = \dfrac{\Sigma p_n q_n}{\Sigma p_0 q_0}$ [   ]

(4)

(d) The classical school of thought on probability or 'a priori' assumes that all possible outcomes of an experiment are

  (i) equally likely

  (ii) mutually exclusive, exhaustive and equally likely

  (iii) mutually exclusive

  (iv) exhaustive   [   ]

(e) The derivative of e^x is

  (i) $x e^x$

  (ii) $\log_e a$

  (iii) e^x

  (iv) $e^x \log_e a$ [   ]

(**5**)

SECTION—B

(*Marks* : 15)

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

(a) Primary data

(b) Scatter diagram

(c)   Secular trend

(d) Cofactors of a matrix

(e) Theorems of maxima-minima points

★ ★ ★