N.B. :

1) Attempt any two Questions from section -I.

2) Attempt any two Questions from section- II.

3) Use of Calculator is allowed.

4) Bracketed figures to the right indicate marks.

Section- I

Q.1 a) Find $\dfrac{dy}{dx}$ for the following

(Solve any three)

i) $y = 4x^3 + \dfrac{1}{x} + e^x - \log x$

ii) $y = (3x^2 - x + 5)(e^x - 1)$

iii) $y = e^x (x^2 + 5x - 4)$

iv) $y = \dfrac{x + \sqrt{x}}{\sqrt{x} + 1}$

v) $y = \dfrac{3x^2 + 5}{e^x + 1}$ (6)

b) White BASIC Expressions for the following arithmatic expressions.

i) $\dfrac{A + B + C}{ABC}$;

iii) $\sqrt{S(S-A)(S-B)(S-C)}$

ii) $4(A^4 + B^4)^{1/4}$

iv) $a + \dfrac{b-c}{d} + \dfrac{e^2 + f^2}{e^2 - f^2}$ (4)

Q.2 a) Find out the errors if any, in the following BASIC statements and rewrite them if necessary.

i)   20 INPUT x ; y ; z.

ii)   100 STOP : END

iii)   30 PRINT 5 + 3 + 8

iv)   40 J = 2,500 + 3,500   (4)

b) Find equation of tangent and normal to the curve $y = x^2 + 10 - x$ at P(1,5)   (6)

PTO /2

Q.3 a) The cost function is given by

$C = 900 + 50x - x2$

find   i)   Average cost (AC)

ii)   Marginal cost (MC)

iii)   Marginal cost when 4 units are produced (i.e. MC at x = 4)

iv)   Marginal Average cost (MAC)   ④

b) What are the logical operators in BASIC ?   ②

c) State true of false giving reason for the following :

i)   A string variable can be given a numeric value.

ii)   END statement can be use anywhere in the programme.

iii)   "20 + 30" is a numeric constant.

iv)   Each READ statement must have it's own data.   ④

Q.4 a) A manufacturing company produces x items at total cost of Rs. (50 +2x).

The demand function is P= 100 − x where P is price and x is demand

find x for which i)   total revenue is increasing.

ii)   total profit is increasing.   ⑤

b) Find values of the BASIC expressions

$8 * 1/2 + 4 * (8/4) + (12/4) * 4$

ii)   SQR (2 * 5 + 6) + ABS (3 * 4 − 7)

iii)   INT (SQR ($25/4$)) − 2 * ($12/4$)

iv)   SQR (4 * 16) + INT ((8 − 16) / 16)

v)   5 ↑ 2 − 3 ↑ 2 + 5 * 4 + 4 * 3   ⑤

Section- II

Q.5 a) Compute Karl Pearson's coefficient of correlation for the following data.
Also find regression coefficient of y on x i.e., by x

x: 7   4   8   6   5
y: 6   5   9   8   2   ⑤

b) Explain difference between correlation and regression.
State two regression lines.   ④

c) Two regression equations are given below :
$$2x + 3y - 61 = 0$$
$$x + y - 25 = 0$$
find
i)   Mean values of x & y.
ii) Correlation coefficient between x & y
iii) SD of y when SD of x = 4   ⑥

Q.6 a) For the following distribution of x

Year	1990	1991	1992	1993	1994	1995	1996
Sales (In lakhs)	10	12	14	11	13	15	16

i)   Fit a straight line trend by the method of least square.
ii) Estimate the sales for the year 1997.   ⑥

b) What is trend ? Explain any one of the method of determining the trend ?   ④

c) For the following data obtain
i) $P[x > 2]$,   ii) $P[x \le 1]$,   iii) $E[x]$,   iv) $v[x]$

x	-2	-1	0	1	2	3
P(x)	0.1	0.2	0.2	0.3	0.15	0.05

⑤

Q.7 a) A card is drawn at random from a well shuffled pack of 52 cards.
Find the probability that the card is
i)   A king
ii) A Spade
iii) A king of Spade
iv) Either king or Spade   ⑤

b) The man and variance of binomial distribution are 3 and 2 respectively find the

probability of following

   i)   getting no success.

   ii)   getting exactly 2 success.   **(5)**

c) Explain Census method and sampling method of data collection

Distinguish between them.   **(5)**

Q.8 **a)** Calculate Spearman's Rank correlation coefficient for the following data

giving marks in two tests in statistics for a group of 10 students.

   x : 15   12   16   15   17   13   11   10   9   8

   y: 17   14   20   25   20   24   22   19   18   16   **(5)**

b) The income of a group of 10,000 persons were found to be normally

distributed with mean Rs. 8000/- and standard deviation Rs. 500/- find.

   i)   No. of person having income between Rs. 7,500 and Rs. 8,500

   ii) No. of persons having income less than Rs. 7,500.

      (Given : Area between z = 0 and z = 1 is 0.3413)   **(5)**

c) Explain the following terms with an example

   i)   Random Experiment

   ii)   Sample space and event

   iii) Mutually Exclusive event

   iv) State addition theorem for any two event A, B

   v)   Expected value of a random variable x.   **(5)**