Instruction : 1) Q.1 & Q.2 are compulsory.

2) Figures to the right indicate full marks.

3) Simple calculators are allowed.

Q.1 a) Calculate arthmetic mean, median & mode for the following distribution   06

Income in Rs.	500-1000	1000-1500	1500-2000	2000-2500	2500-3000
No.of person	30	50	100	40	30

b) Explain the functions of statistics.   06

c) Find Fisher's, Marshall - Edgeworth, Dorbish-Bowleys index numbes from the following data for the year 2000 with base 1998.   03

Commodity	1998		2000	
	Price	Quantity	Price	Quantity
A	2	74	3	82
B	5	125	4	140
C	7	40	6	33

Q.2 a) Find the values of x, for which the following function are (A) increasing (B) decreasing. 04

If $f(x) = 2x^3 - 3x^2 - 72x - 100$

b) i) If $f(x) = 1 + 2x$, $g(x) = \dfrac{x}{2}$ show that   03

$f(g(x)) - g(f(x)) = \dfrac{1}{2}$

ii) Evaluate :-   (A) $\lim\limits_{x \to 4} \dfrac{x^2 - 9}{x - 3}$ 03

(B) $\lim\limits_{x \to 3} \dfrac{x^3 - 27}{\sqrt{x^2 + 7} - 4}$

c) For a group of 25 observations arthmetic mean was found to be 75 with stadard deviation 8. It was later found that one observation was wrongly taken as 53 instead of 35 & one observation with value 60 did not infact belong to this group. Find the correct mean & standard deviation correcting the wrong value & removing the observation which did not belong to the group.   05

Q.3 a) Draw a pie dieagram for each of the following data & answer the questions given below.   06

	Private Section	Investment (%)
	7th plan	8th plan
Agriculture & Allied	20.2	22.2
Industry & Minerals	37.0	34.9
Others	42.8	42.9
Total	100.0	100.0

i) Which plan shows higher investment in industry & minerals?

ii) Which part of investment is almot the same in the two years?

b) If $C = \dfrac{1}{3} x^3 - 10x^3 - 300x$ is the cost function of a firm, where x is the output, find
(i) the output at which the marginal cost is minimum (ii) the output at which the average cost is minimum.   0

c) Explain the steps involved in construction of index numbers   0

Q.3 a) Prepare a bivarlate frequency distribution table for the following data & also marginal frequency distribution table for marks in statistics & marks in business law. 06

Marks in Statistics	15	10	18	28	20	30	35	45	14	16	40	4	48	28	12
	25	15	35	18	6	26	21	32	45	9	11	16	35	41	34
Marks in business low.	5	20	8	15	6	22	28	39	26	18	38	12	29	38	13
	26	17	9	25	17	30	41	40	18	15	40	5	35	7	12

b) Find the elasticiyt of y w.r.t x if $y = 1 + 2x - x^2$ for (i) $x = 1$, (ii) $x = 10$. 04

c) The sum of deviations of all 60 values from 6 is -10 for a distributiion. The sum of square of these deviations if 240. Find the arithmetic mean, standard deviation & coefficient of vatiation for the distributioin. 05

Q.4 a) Given that the median sales of shops were Rs.2400. Find the missing frequency. 06

Sales in Hundred of Rs.	0-10	10-20	20-30	30-40	40-50
No. of shos.	5	25	—	18	7

Also calculate Q1 & Q3.

b) Define the four measures of dispersion 04

(i) Range   (ii) Quartile Deviation   (iii) Mean deviation   (iv) Standard deviation

c) (i) Find the weight for the group 'Clothing' 02

Group	Food	Fuel & Lighting	Clothing	House Rent	Miscellaneous
Index Number	140	110	170	100	120
Weight	30	20	-	15	25

(ii) Find from first principle 03

$f^1 (1)$ where $f(x) = \dfrac{1}{x - 2}$

OR

Q.4 a) (i) Find $\dfrac{dy}{dx}$ where, (A) $y = (x^2 + 2x) (1 + \log x)$ 02

(B) $y = x^3 . 7^x$

(ii) The total cost function is given by $C = 20x + 100$ & the demand function is $P = 300 - 2x$, where C = cost, P = Price & x = demand. Find the value of x for which the total profit is increasing. 03

b) Find standard deviation & coefficient of variation for the following data :- 05

(i) $N = 10$, ; $\sum x = 390$, $\sum x^2 = 15970$

(ii) $N = 15$, ; $\sum x = 600$; $\sum (x - \bar{x})^2 = 240$.

c) Find the missing values in the following table. 05

	Group - I	Group - II	Group - III
Observations	60	?	140
mean	?	22.5	30
S.D.	4.5	7	?