Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/BSM/SEM-1/BSM-102/2010-11

2010-11
STATISTICS –I

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

$10 \times 1 = 10$

i) The probability of obtaining an odd number in throw of a fair die is

a) $\frac{1}{2}$ b) $\frac{1}{3}$

c) $\frac{1}{4}$ d) none of these.

ii) Correlation coefficient between two variables x and y is

a) $\frac{\text{Cov}(x, y)}{\sigma_x \sigma_y}$ b) $\frac{\text{Cov}(x, y)}{\sigma_x + \sigma_y}$

c) $\frac{\text{Cov}(x, y)}{\sigma_x - \sigma_y}$ d) 0.

iii) If Var $(X) = 2$, then Var $(2X + 3)$ will be

a) 8 b) 3

c) 4 d) 2.

iv) The correlation co-efficient r satisfies the relation

a) $r < -1$ b) $-1 \le r \le 1$

c) $r > 2$ d) none of these.

v) If A and B are independent events and $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{4}$, then the value of $P(AB)$ is

a) $\frac{1}{12}$ b) $\frac{1}{6}$

c) $\frac{2}{3}$ d) $\frac{3}{4}$.

vi) If $f(x)$ be a probability density function, then the value of the integration $\int_{-\infty}^{\infty} f(x)\,dx$ is

a) 0 b) 1

c) $F(x)$ d) none of these.

vii) If X be a Poisson 4 variate, then the mean of the distribution is

a) 0 b) 2

c) 4 d) none of these.

viii) If Cov (x, y) = 12, $\sigma_x = 5$ and $r_{xy} = 0{\cdot}6$, then the value of σ_y is

a) 16 b) 8

c) 2 d) 4.

ix) If the mean of a Poisson distribution is λ, then its standard deviation is

a) $\frac{1}{\sqrt{\lambda}}$ b) $\sqrt{\lambda}$

c) λ d) $\frac{1}{\lambda}$.

x) If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, $P(AB) = \frac{1}{4}$, then the value of P ($A \cup B$) is

a) $\frac{6}{7}$ b) $\frac{3}{7}$

c) 1 d) $\frac{7}{12}$.

xi) Mode of 15, 12, 5, 13, 12, 15, 8, 8, 9, 9 and 15 is

a) 15 b) 12

c) 8 d) none of these.

xii) If A denotes that a student reads in a collage and B denotes that he plays football, then P ($A \cup B$) = 0 is

a) True b) False

c) Uncertain d) None of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Represent the following distribution of marks of 100 students in the examination by a histogram :

Marks obtained	No. of students
< 10	4
< 20	6
< 30	24
< 40	46
< 50	67
< 60	86
< 70	96
< 80	99
< 90	100

3. The mean salary paid to 1000 employees of an establishment was found to be Rs. 180·40. Later on, after disbursement of salary, it was observed that the salary of two employees was wrongly entered as Rs. 297 and Rs. 165. Their correct salaries were Rs. 197 and Rs. 185. Find the correct arithmetic mean.

4. What are the criteria of a good satisfactory measure of the central tendency ? Discuss in brief the standard measure of central tendency and state which of these satisfy your criteria.

5. What is scatter diagram ? Explain with example.

6. Find the S.D. of the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Prove that if all the observations of a series are added, subtracted, multiplied or divided by a constant β the mean also added, subtracted, multiplied or divided by the same constant.

   b) Prove that for any discrete distribution, standard deviation is not less mean deviation from mean. 8 + 7

8. a) Calculate the coefficient of correlation from the following data :

X	65	63	67	64	67	62	70	66
Y	68	66	68	65	6	64	66	68

   b) Find the regression of x on y form the following data :

$$\sum x = 24,\ \sum y = 44,\ \sum xy = 306$$

$$\sum x^2 = 164,\ \sum y^2 = 574,\ n = 4.$$ 7 + 8

9. a) Calculate the coefficient of skewness from the following data using quartiles.

Marks	No. of student	Marks	No. of students
> 0	180	> 60	65
> 15	160	> 75	20
> 30	130	> 90	5
> 45	100		

b) A bag contains three black, four white and five red balls. A ball is drawn at random. What is the probability that it is a –

i) black ball ?

ii) white ball ?

iii) red ball ?

iv) non-black ball ? 8 + 7

10. a) The regression equations are $8x - 10y + 66 = 0$ and $40x - 18y = 214$. Also given the variance of $x = 9$.

Find the following :

i) Average value of x and y.

ii) Correlation coefficient between two variables.

iii) S.D. of y.

b) Obtain the rank correlation co-efficient between the variables x and y from the following :

Pairs of observed values :

x :	50	55	65	50	55	60	50	65	70	75
y :	110	110	115	125	140	115	130	120	115	160

7 + 8

11. a) The mode of he following frequency distribution of heights of students of a class is 153 cm. Find the missing frequency of the distribution :

Heights in cm	140 – 145	145 – 150	155 – 155	155 –160	160 – 165
No. of students	10	20	35	?	10

b) Draw a multiple bar diagram from the following data :

Year	Sales ('000 Rs.)	Gross Profit ('000 Rs.)	Net Profit ('000 Rs.)
2002	120	40	20
2003	135	45	30
2004	140	55	35
2005	150	60	40

7 + 8