Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/HM/SEM-2/BHM-202/2013

2013

BIOSTATISTICS – 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) Bio-statistics is concerned with

   a) living organism b) non-living organism

   c) both (a) & (b) d) none of these.

   ii) Bio-statistics is also known as

   a) Biology b) Biometry

   c) Biotic d) None of these.

   iii) The chart in which different categories of data are represented as percentage of 360 degree is called

   a) Pie diagram b) Line diagram

   c) Ogive d) None of these.

iv) Standard deviation is independent of change of

a) origin b) scale

c) both (a) & (b) d) none of these.

v) If the mean of 7, $x - 3$, 10, $x + 3$ and $x - 5$ is 15 then the value of x is

a) 20 b) 21

c) 22 d) None of these.

vi) The algebraic sum of deviation of observation from their A.M. is

a) minimum b) maximum

c) zero d) none of these.

vii) Area under standard normal curve between $Z = +1$ and $Z = -1$ is

a) 95·45% b) 68·27%

c) 99·75% d) None of these.

viii) The shape of the normal distribution curve is

a) Bell shaped b) U-shaped

c) Downward sloping d) None of these.

ix) The range of the following marks of 10 students given by 91, 54, 44, 56, 71, 25, 09, 27, 72, 62 is

a) 82 b) 72

c) 92 d) none of these.

x) The median of the following marks obtained by 7 students 4, 12, 7, 9, 14, 17, 16 is

a) 12 b) 13

c) 14 d) none of these.

xi) The S.D of the following numbers 4, 5, 6, 6, 7, 8 is

a) 1·29 b) 2·29

c) 3·29 d) 4·29.

xii) If A.M. of a data set is 20 and its G.M. is 10, then its H.M. is

a) 5 b) 40

c) 10 d) none of these.

GROUP – B

(Short Answer Type Questions)

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

2. Construct a pie diagram for the data on blood group of 250 newly employed personnel in a company.

Blood Group	**No. of persons**
A	50
B	90
O	70
AB	40
Total	250

3. An incomplete frequency distribution is given below :

Height (inches)	0 — 10	10 — 20	20 — 30	30 — 40	40 — 50	50 — 60
No. of plants :	4	6	20	?	7	3

It is known that the median height of the plant is 28·8 inches. Calculate the missing frequency.

4. A certain stimulus administered to each of 12 patients resulted in the following changes in blood pressure :

   5, 2, 8, – 1, 3, 0, – 2, 1, 5, 0, 4, 6

   Can it be concluded that the stimulus will in general be accompanied by an increase in blood pressure ?

   (t = 2·2 for 11 d.f. at 5% level)

5. The mode of the following distribution is Rs. 66. Find the missing frequency.

Daily wages (Rs.)	30 — 40	40 — 50	50 — 60	60 — 70	70 — 80	80 — 90
No. of workers	8	16	22	28	?	12

6. Mrs. Basu wants to invest Rs. 10,000 in one of the two companies *A* or *B*. Average return in a year from company *A* is Rs. 16,000 with a standard deviation of Rs. 125, while in company *B* the average return in a year is Rs. 20,000 with a standard deviation of Rs. 200. Which company will you recommend to Mrs. Basu for investment ? Justify your answer.

GROUP – C

(Long Answer Type Questions)

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

7. Ages of death of 50 persons of a town are given below :

34	46	48	47	29	47	45	42	44	43
37	32	40	39	41	47	45	39	43	47
38	39	37	40	32	52	56	31	54	36
53	48	43	57	61	33	44	55	34	46
54	37	61	60	42	54	59	37	39	61

a) Arrange the data in frequency distribution in 10 class-intervals.

b) Obtain the percentage frequency in each class-interval; and

c) Also find the class boundaries and cumulative frequencies from below and from above. 5 + 5 + 5

8. a) Calculate the quartile deviation from the following data :

Class-interval	10- 15	15-20	20-25	25-30	30-40	40-50	50-60	60- 70	Total
Frequency	4	12	16	22	10	8	6	4	82

b) The number of runs scored by cricketers *A* and *B* during the test for each of 10 innings is shown below :

Cricketer *A*	34	36	45	75	12	61	40	58	82	11
Cricketer *B*	47	38	52	42	36	54	48	34	50	54

Make a comparative study of their batting performance. 7 + 8

9. a) What do you mean by Scatter diagram ? Illustrate the Scatter diagram with the help of a graph.

b) Consider the following data of the two variates :

X	1	2	3	4	5	6
Y	6	4	3	5	4	2

Draw a scatter diagram of the above data and comment.

7 + 8

10. a) In a sample of 120 workers in a factory, the mean and S.D. of wages were Rs. 11·35 and Rs. 3·30 respectively. Find the percentage of workers getting wages between Rs. 9 and Rs. 17 in the whole factory, assuming that the wages are normally distributed. (Given, area under standard normal curve from $z = 0$ to $z = 0{\cdot}78$ is 0·2823 and to $z = 1{\cdot}86$ is 0·4686).

b) It is claimed that the students entering in Hospital Management Dept. have an average I.Q. higher than 100. A random sample of 16 is taken and the sample mean is found to be 106. The sample S.D. is 10. Is the claim supportable ? (It is given $t_{0{\cdot}01} = 2{\cdot}82$ for 9 d.f.)

7 + 8

11. a) Define vital statistics.

Calculate

i) crude death rate

ii) specific death rate

iii) standardized death rate from the following data :

Age group	Population	No. of deaths in a year	Standard population (thousand)
0 — 4	5000	150	110
5 — 14	7000	21	210
15 — 34	14000	63	360
35 — 59	16000	176	240
60 and over	8000	320	80

b) The following table gives the frequency distribution on rainfall in a certain locality in 106 consecutive days :

Rainfall (inches)	0-5	5-10	10-15	15-20	20-30	30-50	50-70	Total
No. of days	5	10	25	20	18	20	8	106

Find the number of days having rainfall more than 35 inches. 3 + 9 + 3