



Name :
Roll No. :
Invigilator's Signature :

CS/HM/SEM-2/BHM-202/2012

2012

BIO-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 × 1 = 10

- i) Bio-statistics is also known as
 - a) Biology
 - b) Biometry
 - c) Biotic
 - d) none of these.
- ii) A median divides a set of observation into
 - a) two equal parts
 - b) three equal parts
 - c) four equal parts
 - d) none of these.
- iii) If for a distribution, mean = 24·6 and median = 25·1, the mode is
 - a) 26·1
 - b) 28
 - c) 30·8
 - d) 26.



- iv) Mean = 10, coefficient of variation = 5, value of standard deviation will be
 - a) 10
 - b) 5
 - c) 50
 - 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 A.M. of two observations is 25 and their G.M. is 5. Then their H.M. is
 - a) 9
 - b) 25
 - c) 1
 - d) none of these.

- vii) If for a distribution, $Q_1 = 10$, $Q_2 = 22$, $Q_3 = 33$, then Q.D. is
 - a) 11.5
 - b) 13
 - c) 12.5
 - d) none of these.

- viii) The symmetry of the normal distribution about its mean indicates that
 - a) the distribution is bell shaped
 - b) the area under the curve on both sides of the mean is equal
 - c) the two tails extend indefinitely on either sides of the mean
 - d) all of these.



- ix) For a standard normal probability distribution, the mean μ and standard deviation σ are
- a) $\mu = 0, \sigma = 1$ b) $\mu = 16, \sigma = 4$
 c) $\mu = 25, \sigma = 5$ d) $\mu = 100, \sigma = 10$.
- x) The skewness of normal density curve is
- a) 1 b) 0
 c) 2 d) none of these.
- xi) Vital statistics is related with
- a) statistics of national income
 b) statistics of consumption expenditure
 c) statistics of human beings
 d) none of these.
- xii) Which of the following is a measure of relative dispersion ?
- a) Standard deviation b) Mean deviation
 c) Coefficient of variation d) Range.
- xiii) The area under the normal curve covered within $\mu \pm 3\sigma$ limits is
- a) 0.6827 b) 0.9545
 c) 0.9973 d) none of these.
- xiv) Relation between mean, median and mode is
- a) mode = 3 median – 2 mean
 b) mean – mode = 3 (mean – median)
 c) 3 median = 2 (mean + mode)
 d) none of these.



GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Present the following data by a Component bar diagram :

Year	Numbers of Bushel of Wheat (in tons)	Numbers of Bushel of Corn (in tons)
1990	200	75
1991	155	90
1992	220	120
1993	240	150
1994	250	90

3. A student obtained mean and standard deviation of 100 observations as 40.1 and 5 respectively. It was later found that he copied 50 wrongly instead of correct value 40. Find the correct mean and standard deviation.
4. Find the missing frequencies in the following frequency distribution, when it is known that A.M. = 11.09 :

Class Limits	9.3 - 9.7	9.8-10.2	10.3-10.7	10.8-11.2
Frequency	2	5	f_3	f_4

11.3-11.7	11.8-12.2	12.3-12.7	12.8-13.2	Total
14	6	3	1	60

5. 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)



6. Construct a pie chart for the following data :
Principal Exporting Countries of cotton with their respective frequencies are as follows :

USA	India	Egypt	Brazil	Argentina
6,367	2,999	1,688	650	202

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. Marks of 50 students in a test are given below :

34	46	48	43	47	30	48	50	45	32
15	10	5	6	25	39	41	47	5	7
11	13	17	21	27	30	31	33	37	38
49	43	41	12	9	21	37	36	48	25
21	20	15	16	8	32	40	41	50	47

- Arrange the data in frequency distribution in 10 class intervals.
- Find the class boundaries and the class marks.
- Find the cumulative frequency both more than and less than types.
- Obtain the percentage frequency in each class intervals.

$$3 + 3 + 6 + 3$$



8. 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 $z = 0.78$ is 0.2833 and to $z = 1.86$ 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 $t_{0.01} = 2.28$ for 9 d.f.)
9. a) Define vital statistics. 3
- b) Calculate (i) Crude death rate, (ii) Specific death rate and (iii) standardized death rate from the following data : 8

Age group	Population	No. of deaths in a year	Standard population (thousand)
0-5	6000	140	110
6-15	8000	25	210
16-35	15000	65	360
36-60	16000	175	240
61 and above	10000	325	80

- c) Write a short note on Normal distribution. 4



10. a) The number of students for different marks group is given below. Calculate standard deviation.

Class intervals	12.5-17.5	17.5-22.5	22.5-27.5	27.5-32.5
No. of Students	2	22	10	14

32.5-37.5	37.5-42.5	42.5-47.5	47.5-52.5	52.5-57.5
3	4	6	1	1

- b) After shift of origin and change of scale of a frequency distribution of a continuous variable (x) with equal class width takes the following form with changed variable (u) :

U	-4	-3	-2	-1	0	1	2	3
Frequency	2	5	7	13	21	16	8	3

If the mean and variance of the distribution are 21.9 and 63.9725 respectively, find the original frequency distribution.

11. a) The distribution of heights of a group of 10000 men is normal with mean height 64.5" and standard deviation 4.5". Find the number of men whose height is
- less than 69" but more than 55.5"
 - less than 55.5"
 - more than 73.5" 7
- b) Draw histogram, frequency polygon and ogives (both 'more than' and 'less than' types) for the following frequency distribution : 8

Wages (Rs.)	50-59	60-69	70-79	80-89	90-99	100-109	110-119
No. of employees	8	10	16	14	10	5	2

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