2011

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.

(Graph sheets(s) will be provided by the institute on demand)

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) and (b) d) none of these.

ii) The chart in which different categories of data are

represented as percentage of 360° is called

a) Pie diagram b) Histogram

c) Ogive d) None of these.

iii) Median of 2, 5, 8, 4, 9, 6, 7 is

a) 9 b) 8

c) 7 d) 6.

iv) Which of the following is not a measure of central

tendency ?

a) Mean b) Median

c) Mode d) Average deviation.

v) Standard deviation is independent of change of

a) origin b) scale

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

vi) Two variables X and Y are given by $Y = (X - 10)/5$. If

S.D. of Y is 4 then S.D. of X will be

a) 10 b) – 10

c) 4 d) 20.

vii) Highest point of the frequency curve is

a) mean b) median

c) mode d) none of these.

viii) The normal distribution is a

a) continuous probability distribution

b) discrete probability distribution

c) both (a) and (b)

d) none of these.

ix) Standard normal deviation is equal to

a) $(x - \mu) / \sigma$ b) $(x - y) / z$

c) $(x - \sigma) / \mu$ d) none of these.

x) If the first and third quartiles are $22 \cdot 16$ and $56 \cdot 36$

respectively, the quartile deviation is

a) $17 \cdot 1$

b) $34 \cdot 2$

c) $51 \cdot 3$

d) none of these.

xi) The skewness of normal curve is

a) 1 b) 0

c) 2 d) none of these.

xii) The most common form of diagrammatic representation

of a grouped frequency distribution is

a) Histogram b) Frequency polygon

c) Pictogram d) Pie chart.

xiii) A scatter diagram is

a) statistical test b) linear

c) curvilinear d) graph.

xiv) Vital statistics is related with

a) statistics of national income

b) statistics of human beings

c) statistics of consumption expenditure

d) none of these.

GROUP – B

(Short Answer Type Questions)

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

2. Construct a Pie diagram for the data on blood group of

250 newly employed Personnel in a company :

Blood Group : A B O AB

No. of Persons : 50 90 70 40

3. The mean height of patients of Sakuntala hospital is 67·45.

Find the missing frequency.

Height : 60 – 62 63 – 65 66 – 68 69 – 71 72 – 74

Frequency : 15 54 f 81 24

4. Calculate standard deviation from the following :

Age (Years) No. of Workers

20 - 25 170

25 - 30 110

30 - 35 80

35 - 40 45

40 - 45 40

45 - 50 35

5. The frequency distribution of rainfall in a certain locality in

200 days is as follows :

Rainfall

*(Inches) :*0 – 5 5 – 10 10 – 15 15 – 20 20 – 25 25 – 30

No. of days : 20 30 35 40 50 25

Find out the number of days having rainfall more than

12 inches and 20 inches.

6. Draw a histogram with the following data :

Age : 0 – 10 10 – 30 30 – 60 60 – 70 70 – 90

Frequency : 5 20 45 12 16

GROUP – C

(Long Answer Type Questions)

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

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 classintervals.

b) Obtain the percentage frequency in each class-interval.

c) Also find the class boundaries and cumulative

frequencies from below and from above. $5 + 5 + 5$

8. A distribution is given below :

12 19 46 36 27 37 40 15 06 30

05 09 10 30 26 20 28 20 11 45

20 42 42 27 19 12 35 12 18 34

32 30 45 37 41 39 46 40 22 25

a) Arrange the data in frequency tables with 9 classes.

b) Draw the more than and less than ogive. Also find the

median from them.

c) Draw the histogram and frequency polygon corresponding to the above frequency distribution.

$$3 + 6 + 6$$

9. a) Define vital statisties.

b) Calculate (i) crude death rate (ii) Specific death rate (iii) Standardized death rate from the following data :

Age groupPopulation No. of deaths Standard population

in a year (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

c) Define Primary and Secondary data. $3 + 9 + 3$

10. a) The table gives the diastolic blood pressure of 250 men. The readings were made to the nearest millimetre and the central value of each group is given below :

Blood Pressure (mm) : 60 65 70 75 80 85 90 95

No. of men : 4 5 31 39 114 30 25 2

Calculate the mean and the median from the data.

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

$u : -3 -2 -1 0 1 2 3$

Frequency : 3 5 12 49 22 8 1

If the mean and standard deviation of the original frequency distribution are 56 and 11 respectively, find the original frequency distribution. $8 + 7$

11. a) The following are the runs made by two criketers in 10 innings :

Innings : 1 2 3 4 5 6 7 8 9 10

Cricketer A : 31 48 13 51 38 43 50 36 47 82

Cricketer B : 51 5 12 83 37 112 42 18 79 20

i) Which of the two cricketers is a better scorer on average ?

ii) Which of them is more consistent ?

b) A man travels from village *A* to village *B* at a speed of 10 kms/hour. On his way back, he travels at a speed of 5 kms/hour. Find his average speed.

c) As a result of test on electric light bulbs, it was found that the lifetime of a particular make was distributed normally with an average life of 1000 burning hours and standard deviation of 200 hours. Out of 10,000 bulbs produced by the company, how many bulbs are expected to fail —

(i) in the first 800 burning hours ?

(ii) between 800 and 1200 burning hours ?

(Given φ (I) = 0·84134). 6 + 3 + 6