Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/B.OPTM/SEM-6/BO-603/2011

2011
BIO-STATISTICS

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)   What is the median of the given observations ?

5, 8, 6, 9, 11, 4.

   a)   24   b)   7

   c)   9   d)   4.
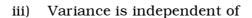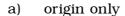
   ii)   The G.M. of 3, 6, 24, 48, is

   a)   4   b)   12

   c)   8   d)   6.

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iii) Variance is independent of

    a)   origin only   b)   scale only

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

iv) Which of the following is a unitless measure of dispersion ?

    a)   S.D.   b)   M.D.

    c)   C.V.   d)   Range.

v) The correlation between the speed of an automobile and the distance travelled by it after applying the brake is

    a)   negative   b)   zero

    c)   positive   d)   none of these.

vi) If X and Y are jointly distributed random variables and a, b, c, d are arbitrary constants, then

    a) $cov(aX + b, cY + d) = bc\ cov(X, Y)$

    b) $cov(aX + b, cY + d) = cd\ cov(X, Y)$

    c) $cov(aX + b, cY + d) = ac\ cov(X, Y)$

    d) $cov(aX + b, cY + d) = abc\ cov(X, Y)$.

vii) If two unbiased dice are rolled together, what is the probability of getting no difference points

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

    c) $\frac{1}{5}$ d) $\frac{1}{6}$.

viii) $\sum (x - \bar{x}) =$

    a)   0   b)   1

    c)   – 1   d)   Mean.

ix)   If AB are mutually exclusive then $P (AB) =$

    a)   1   b)   0

    c) $\frac{1}{3}$ d) $\frac{1}{4}$.

x)   If A and B are mutually exclusive events, then

    a) $P (A) + P (B) < 1$

    b) $P (A) + P (B) > 1$

    c) $P (A) + P (B) = 1$

    d)   none of these.

xi)   If $P (A \cup B) = \frac{1}{2}$, $P (A) = \frac{1}{4}$, $P (B) = \frac{2}{5}$, then $P (AB)$ will be

    a) $\frac{3}{20}$ b) $\frac{5}{20}$

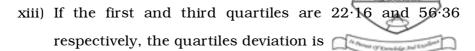   c)   0·7   d)   0·9

xii)   The normal distribution is a

    a)   continuous probability distribution

    b)   discrete probability distribution

    c)   both (a) and (b)

    d)   none of these.

xiii) If the first and third quartiles are 22·16 and 56·36 respectively, the quartiles deviation is

a)   17·1   b)   34·2

c)   51·3   d)   none of these.

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

a)   pie diagram   b)   line diagram

c)   ogive   d)   none of these.

GROUP – B
(Short Answer Type Questions)
Answer any *three* of the following.   3 × 5 = 15

2.   Draw a histogram and frequency polygon from the following distribution :

Weekly wages (Rs.) :	0 — 20	20 — 40	40 — 60	60 — 80	80 — 100
No. of workers :	8	10	12	14	16

3.   Construct a pie diagram for the data on blood group of 250 newly employed personnel in a hospital :

Blood group :	A	B	O	AB
No. of Workers :	50	90	70	40

4.   Calculate standard deviation from the following distribution :

Age (Years) :	20 — 25	25 — 30	30 — 35	35 — 40	40 — 45	45 — 50
No. of Workers :	170	110	80	45	40	35

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5. A problem in probability was given to three WBUT students, *A, B, C* whose chances of solving it are $\frac{1}{3}$, $\frac{1}{5}$, $\frac{1}{2}$ respectively. What is the probability that the problem would be solved ?

6. The regression equations are $8x - 10y + 66 = 0$ and $40x - 18y = 214$. Find correlation co-efficient of variates.

GROUP – C
(Long Answer Type Questions)
Answer any *three* of the following.   3 × 15 = 45

7. a) The median and mode of the following frequency distribution are known to be 27 and 26 respectively. Find the values of '*a*' and '*b*' :

Value :	0 — 10	10 — 20	20 — 30	30 — 40	40 — 50
Frequency :	3	*a*	20	12	*b*

b) Draw the histogram and frequency polygon with the following data :

Age :	0 — 10	10 — 30	30 — 60	60 — 70	70 — 90
Frequency :	5	20	45	12	16

7 + 8

8. a) 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

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

   ii) Draw the more than and less than ogive. Also find the median from them.

b) Three coins are tossd. Find the probabilities of

   i) more than one head

   ii) at least one head.   3 + 6 + 6

9. a) According to the theory in Genetics, the proportion of beans of *A, B, C* and *D* types in a generation should be 9 : 3 : 3 : 1. In an experiment with 1600 beans, the frequency of bean of *A, B, C* and *D* types was observed to be 882, 313, 287 and 118 respectively. Does the result support the theory ?

b) The probability that an employee getting occupational disease is 20%. In a firm having 5 employees, what is the probability that :

   i) none of the employees get the disease

   ii) exactly 2 will get the disease

   iii) more than 4 will contract the disease.   8 + 7

10. a) You are given three urns as follows :

Urn *X* contains 3 red and 5 white marbles ; Urn *Y* contains 2 red and 1 white marbles ; Urn *Z* contains 2 red and 3 white marbles. An urn is selected at random and a marble is draw from the urn. If the selected marble is red, what is the probability that it came from the urn *X* ?

b) 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.   7 + 8

11. a) The following are the runs made by two cricketers 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) For a group of 8 students, the sum of squares of difference in rank for mathematics and statistics marks was found to be 50. What is the value of rank correlation coefficient ?

   c) From the following data, find out the two regression equations :

Age (years) :	1	3	4	5	7
Weight (kg) :	3	5	8	12	17

   What will be the most probable weight of a baby at the age of 8 years ?   6 + 4 + 5

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