CS/B.OPTM/SEM-6/BO-603/2010

2010

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) The mode of the following data :

2, 2, 3, 3, 3, 3, 4, 4, 4, 4, 4, 5, 5, 5, 25, 26, 27

is

a) 2 b) 4

c) 5 d) 27.

ii) Find the geometric mean of 3, 12 and 48.

a) 8 b) 12

c) 13 d) 16.

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iii) Mean depends on the both origin and scale.

a) True

b) False.

iv) Correlation coefficient lies between

a) – 10 to 10

b) – 1 to 1

c) 0 to 1

d) none of these.

v) Which is true ?

a) A.M. ≤ G.M. ≤ H.M.

b) A.M. ≤ H.M. ≤ G.M.

c) A.M. ≥ G.M. ≥ H.M.

d) None of these.

vi) Which is true for Mesokurtic distribution ?

a) $\beta_2 < 3$

b) $\beta_2 = 3$

c) $\beta_2 > 3$

d) None of these.

vii) Which is true ?

a) $P(A) \geq 0$, for all events

b) $P(A) \leq 1$, for all events

c) $P(S) = 1$

d) All are true.

viii) The two variables x and y have the regression lines

$3x + 2y - 26 = 0$ and $6x + y - 31 = 0$.

The values of $\overline{x}$ and $\overline{y}$ are

a) 4, 5

b) 5, 4

c) $\dfrac{5}{3}$, 21

d) None of these.

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ix) The number of telephone calls received in some unit of time follows the

   a) Binomial distribution

   b) Poisson distribution

   c) both (a) and (b)

   d) none of these.

x) Mean, Median and Mode coincide in

   a) Binomial distribution

   b) Poisson distribution

   c) Normal distribution

   d) All are three.

xi) A.M. of 1, 2, 3, ... n is

   a) $\dfrac{n}{2}$ b) $\dfrac{n+1}{2}$

   c) $\dfrac{n-1}{2}$ d) $\dfrac{(n+1)n}{2}$.

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

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

   c) $\dfrac{5}{12}$ d) none of these.

GROUP – B

(Short Answer Type Questions)

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

2. The mean of optometry students is 28·8. Find the missing frequency.

Class :	0-10	10-20	20-30	30-40	40-50	50-60
Frequency :	4	6	20	?	7	3

3. Define Median and find Median from the following :

Income	260-269	270-279	280-289	290-299	300-309	310-319	320-329
Workers :	6	14	29	23	16	10	2

4. A sample of size 60 has mean 52 and standard deviation 9. Another sample of size 90 has mean 48 and standard deviation 12. If two samples are pooled together, find the mean and the standard deviation of combined samples.

5. The coefficient of rank correlation of the marks obtained by 10 students in Bio-statistics and Vision science was found to be 0·5. It was later found that the difference in ranks in the two subjects obtained by one of the students was wrongly taken as 3 instead of 7. Find the correct Rank correlation.

6. Two persons M and N appear in an inteview for two vacancies in the same post. The probabilities of their selections are $\frac{1}{5}$ and $\frac{1}{3}$ respectively. What is the probability that none of them will be selected ?

7. Find the mode of the following :

Year under :	10	20	30	40	50	60
Number of persons :	15	32	51	78	97	109

GROUP – C

(Long Answer Type Questions)

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

8. a) Four persons are chosen at random from a group containing 3 men, 2 women and 4 children. Show that the chance that exactly two of them will be children is $\frac{10}{21}$.

   b) Let the lines of regression concerning to variables x and y be given by $y = 32 - x$ and $x = 13 - 0·25y$. Obtain the values of the means and the correlation coefficient.

   7 + 8

9. a) Compute the Arithmetic mean, Standard deviation :

Scores :	4-5	6-7	8-9	10-11	12-13	14-15	Total
f :	4	10	20	15	8	3	60

   b) Compute the median :

Class-interval :	10 – 15	15 – 20	20 – 25	25 – 30	30 – 40
Frequency	4	12	16	22	10

40 – 50	50 – 60	60 – 70	Total
8	6	4	82

   8 + 7

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

x :	65	63	67	64	68	62	70	66
y :	68	66	68	65	69	66	68	65

b) If *A* and *B* be any two events, then prove that

$$P(A \cup B) = P(A) + P(B) - P(A \cap B).\qquad 10 + 5$$

11. a) Draw one of the ogives for the following data and find the median wage :

Wages :	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Workers :	40	51	64	38	7

b) Draw the Histogram of the above data. 8 + 7

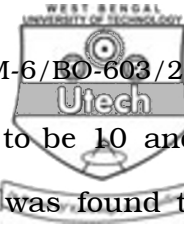12. Form a frequency distribution table of eight class intervals from the following data :

17, 11, 65, 14, 22, 35, 44, 81, 39, 58, 47, 75, 58, 37, 49, 27, 56, 77, 81, 20, 19, 45, 28, 60, 16, 26, 50, 25, 33, 53, 57, 48, 47, 81, 58, 76, 37, 23, 83, 42, 71, 78, 89, 43, 31, 40, 82, 24, 78, 30.

a) Find A.M. and Mode

b) Draw a Histogram. 5 + 5 + 5

13. a) The mean & S.D. of 20 items is found to be 10 and 2 respectively. At the time of checking it was found that one item 8 was incorrect. Calculate the mean and S.D. if it is replaced by 12.

b) The following data are given for marks in Mathematics and Statistics at a certain examination :

	Mathematics	*Statistics*
Mean Marks	12	15
S.D. Marks	2	3

Coefficient of correlation between them is 0·5. Find two regression equations. 10 + 5

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