

(a) What do you understand by t-test? Describe their practical importance. 5

(b) The following table gives the number of units of an article produced daily (for same days) by two labourers A and B.

A	48	30	38	41	38	35		
B	39	38	41	33	32	39	40	34

can these results be treated as sufficient evidence that labourer B is more stable? 5

[5% value of F at $v_1=5, v_2=7$ is 3.97]

Explain the Completely Randomised Design and Randomised Block Design. Give their advantages and disadvantages. 10

10. (a) Two lines of regression are given by $x+2y-5=0$ and $2x+3y-8=0$ and variance of $x=12$. Calculate the values of $\bar{x}, \bar{y}, \sigma_y^2$ and r . 5

(b) Define z-test and its practical importance. 5

N (Printed Pages 4)
(20517) Roll No.....
B.Sc.(Bio-Tech.)-I Yr.

NS-3461
B.Sc.(Bio-Tech.) Examination, May 2017
Bio-Mathematics and Bio-Statistics

(B-107)
(New)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt any five questions. Each question carries 10 marks.

1. (a) Define the following terms— 5
(i) Finite set
(ii) Proper subset
(iii) Super set
(iv) Universal set
(v) Singleton set.

(b) If $A = \{x \in N : x < 6\}$ 5
 $B = \{x : x^2 \leq 10, x \in Z\}$
 $C = \{2, 4, 6, 8, 10\}$

Find (i) $A \cap (B - C)$
(ii) $(A - B) \cup (C - B)$

P.T.O.

2. (a) Define linear function with example. 5
 (b) Evaluate

$$\lim_{x \rightarrow 2} \frac{x^2 - 3x + 2}{x^2 - 4} \quad 5$$

3. (a) Find the value 5

(i) $\frac{d}{dx} \left(\sqrt{x} + \frac{1}{\sqrt{x}} \right)^2$

(ii) $\frac{d}{dx} x^3 \log x$

- (b) Evaluate : 5

(i) $\int \frac{\cos x}{\sin^2 x} dx$

(ii) $\int (x+1)(x+2)^2 dx$

4. (a) Find the term independent of x in the expansion of $\left(\frac{3}{2}x^2 + \frac{1}{3x} \right)^9$ by using Binomial theorem. 5

- (b) (i) Show that

$$\log 25 + 2 \log 3 - 3 \log 2 = \log \frac{225}{8}$$

- (ii) Find the value 5

$\log_{10} 5$ given that

$\log_{10} 2 = 0.3010$

NS-34612

5. (a) Write a note on the merits and demerits of the arithmetic mean. 5

- (b) Write a note on graphical representation of data. 5

6. (a) Three light bulbs are chosen at random from 15 bulbs of which 5 are defective. Find the probability that :

- (i) none of defective 5

- (ii) exactly one is defective

- (iii) at least one is defective

- (b) Three machines A, B and C produce respectively 50%, 30% and 20% of the total produce of a factory. The percentages of defective output of these machines are 3%, 4% and 5%. If an item is selected at random, find the probability that it is defective. 5

7. What is the relation between Normal and Binomial distribution. 10

Let x be binomially distributed random variable with mean = 1 and variance = 0.9 compute $P[3 \leq x \leq 5]$.

NS-34613

P.T.O.

- (iii) Kurtosis
- (iv) Frequency polygon.

9. (a) An urn contains 10 black and 10 white balls. Find the probability of drawing two balls of the same colour.

(b) A Poisson distribution has a double mode at $x = 4$ and 5. Find the probability that x will have either of these values.

10. (a) What is Chi-square test ? What conditions are necessary in using this test ?

(b) Define 't' and 'z' and 'f' test with examples of each.

01	01-10
11	10-20
21	20-30
31	30-40
41	40-50
51	50-60
61	60-70

NS-3461

B. Sc. (Biotech.) Examination, May 2018

Biomathematics & Biostatistics

(B-107)

(New)

Time : Three Hours]

[Maximum Marks : 50

Note : Attempt any five questions. Each question carries 10 marks.

1. (a) If $A = \{1,2,3,4\}$, $B = \{2,3,4,5\}$, $C = \{4,5,6\}$, then show that :

$$(A \cup B) \cup C = A \cup (B \cup C) = (C \cup A) \cup B.$$

(b) Write down all possible subset of $A = [2, 3]$.

2. (a) Define difference of a set. If $A = \{2,4,6,8,10,12\}$ and $B = \{3,4,5,6,7,8,10\}$, find $(A - B) \cup (B - A)$.

(b) Define complement of a set. Find the complement if $U = \{1,2,3,4,5,6,7,8,9\}$, $A = \{1,2,3,4\}$, $B = \{2,4,6,8\}$ and $C = \{1,4,5,6\}$, find A' , B' and C' .

(2)

3. (a) Find the differential coefficient of the following functions w. r. to x :

$$y = \log \frac{x^2 + x + 1}{x^2 - x + 1}$$

- (b) If $y = \sin x \cdot \cos 2x$, prove that :

$$\frac{dy}{dx} = y[\cot x - 2 \tan 2x]$$

4. (a) Evaluate :

$$\int x^2 \tan^4 x^3 \sec^2 x^3 \cdot dx.$$

- (b) Evaluate :

$$\int \frac{\tan^{-1} x}{(1+x^2)^{3/2}} dx.$$

5. (a) If $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x^2 - 1} = \lim_{x \rightarrow k} \frac{x^3 - k^3}{x^2 - k^2}$, find the value of k .

- (b) Find $\lim_{x \rightarrow 1} f(x)$, where :

$$f(x) = \begin{cases} 3x - 2, & \text{when } x < 1 \\ 4x^3 - 3x, & \text{when } x > 1 \end{cases}$$

NS-3461

(3)

6. (a) Define correlation coefficient and find the correlation coefficient between aptitude score and productivity :

Aptitude Score(x)	1	3	5	7	9	2	4	6	8
Productivity(y)	9	10	11	14	15	8	12	13	16

- (b) Obtain the lines of regression for the following data :

x	1	2	3	4	5	6	7	8	9
y	9	8	10	12	11	13	14	16	15

7. Compute mean standard deviation and coefficient of variance from the following series :

Marks	No. of Students
0-10	10
10-20	15
20-30	25
30-40	25
40-50	10
50-60	10
60-70	5

8. Write short notes on any two of the following :

- (i) Dispersion
(ii) Skewness

NS-3461