

(20518)

Roll No.

B. Sc. (Biotech.)- I Year

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 :

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

(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 :

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

(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

(4)

- (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.