(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 caries 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'.

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 $y = \sin x . \cos 2x$, 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 $\lim_{x \to 1} \frac{x^4 - 1}{x - 1} = \lim_{x \to k} \frac{x^3 - k^3}{x^2 - k^2}$, find the value of k.

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

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

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

   (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.