B.Sc. Part-I (Semester-I) Examination
BIOINFORMATICS
(Elementary Mathematics & Statistics)

Time : Three Hours]   [Maximum Marks : 80

Note :— (1)   Attempt **ALL** questions.

(2)   Question No. **1** is compulsory.

1.   (A)   Fill in the blanks :   2

   (i)   Definite integral of any function is _____.

   (ii)   f″(x) is called as _____.

   (iii) Median divides the series in _____ equal parts.

   (iv)   Upper limit of probability is _____.

   (B)   Choose the correct alternatives and rewrite the sentences :   2

   (i)   f′(x) is called as :

   (a)   Function of X   (b)   Derivative of X

   (c)   Second order derivative   (d)   Integral of X

   (ii)   Order of differential equation $\dfrac{d^2y}{dx^2} + \dfrac{dy}{dx} = 0$ is :

   (a)   Zero   (b)   One

   (c)   Two   (d)   None of the above

   (iii) Deciles divide the series in _____ equal parts.

   (a)   Two   (b)   Four

   (c)   Ten   (d)   Hundred

   (iv)   A die is rolled, then probability of getting number 5 is :

   (a) $\dfrac{1}{2}$ (b)   1

   (c) $\dfrac{1}{6}$ (d)   Zero

   (C)   Answer the following in **ONE** sentence :   4

   (i)   Define definite integral.

   (ii)   Order of the differential equation.

   (iii) Meaning of mode.

   (iv)   What do you mean by dispersion ?

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2.   (a)   Explain the difference and product of two functions.   4

     (b)   Discuss procedure of obtaining integration of function.   4

     (c)   Solve the differential equation :

$$3\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + \sin x = 0 .$$

     4

OR

     (p)   How would you obtain limit of function ? Give example.   4

     (q)   Explain derivative of trigonometric function.   4

     (r)   Discuss about implicit function.   4

3.   (a)   Explain the integration by substitution.   4

     (b)   How would you obtain a function from derivative ?   4

     (c)   Explain procedure of obtaining volume of bounded region.   4

OR

     (p)   Define difference equation with example.   4

     (q)   Discuss procedure for integration by partial function.   4

     (r)   Explain how would you obtain difference and product of two functions.   4

4.   (a)   Discuss the concept of order and degree of differential equation.   4

     (b)   Explain the variable separable method.   4

     (c)   Solve the differential equation : $y = 2e^x p + e^x Q + R$ eliminating P, Q and R.   4

OR

     (p)   Explain the procedure of obtaining solution of first degree differential equation.   4

     (q)   What are the types of the differential equations ? Give example.   4

     (r)   Obtain the solution of $3\sin x \dfrac{dy}{dx} + 2\sin x = \cos 2x$.   4

5.   (a)   Define central tendency. What are its measures and define arithmetic mean for grouped data ?   6

     (b)   Obtain the first and third quartile for following data :

Marks	10 — 20	20 — 30	30 — 40	40 — 50	50 — 60	60 — 70
No. of Students	5	12	15	11	8	3

   6

OR

     (p)   Explain concept of correlation, scatter diagram and correlation coefficient.   6

     (q)   Obtain correlation coefficient for following data :

X	2	8	9	11	13	16	17
Y	6	10	12	14	18	22	26

   6

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6.   (a)   Define sample space and events.   4

      (b)   What are the axioms of probability ?   4

      (c)   Obtain probability of getting sum 10, when two dice are rolled simultaneously.   4

<p align="center">OR</p>

      (p)   Explain mutually exclusive and independent events.   4

      (q)   State the Baye's rule of probability.   4

      (r)   Discuss concept of probability tree.   4

7.   (a)   What do you mean by random variable ? Explain, with example, discrete and continuous random variable.   6

      (b)   Obtain the expected value of x for following :

x	2	3	4	5	6	7
p(x)	0.1	0.2	0.2	0.3	0.15	0.05

     6

<p align="center">OR</p>

      (p)   Explain the cumulative distribution function. Give its properties.   6

      (q)   Describe probability mass function and probability density function.   6