**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 $\frac{d^2y}{dx^2}+\frac{dy}{dx}=0$ 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) $\frac{1}{2}$ (b) 1

(c) $\frac{1}{6}$ (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 ?

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 : 4

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

**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 $3\sin x\frac{dy}{dx} + 2\sin x = \cos 2x$. 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 : 6

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

**OR**

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

(q) Obtain correlation coefficient for following data : 6

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

(Contd.)

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

**OR**

(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 : 6

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

**OR**

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

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