B.Sc. (Hons.) Bio-Informatics (FYUP)
First Semester
BINF-1003: Maths and Computer Fundamentals for Biologist

Time allowed: 3 Hours

Max. Marks: 60

NOTE: Attempt _five_ questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.

x-x-x

1. Answer the following:-

    i) If A={1, 3, 5, 9} , B={3, 7, 8}, C={2, 3, 4, 8} verify that A∩(B∪C)=(A∩B)∪(A∩C).

    ii) Differentiate between permutations and combinations with example.

    iii) Mention various types of Matrices with example.

    iv) What is the primary distinction between Mainframe and Mini computers?

    v) Differentiate between PROM and EPROM.

    vi) Define the term software and explain its importance in a computer system.

    (6×2)

UNIT-I

2. a) In a group of 65 people, 40 like cricket, 10 like both cricket and tennis. Find,
    i) How many like tennis?
    ii) How many like tennis only and not cricket?

    b) Let A={1, 2, 3, 4}, and B={x, y, z}. Let R be a relation from A into B defined by R= {(1, x), (1, z), (3, x), (4,y)}. Find,

    i) The domain and range of R.

    ii) Draw the arrow diagram of relation R.

    iii) Represent R in a tabular form.

    c) Draw the graph of the trigonometric function y=cos x between 0° and 360°.

    (4, 4, 4)

    P.T.O.

3. a) How many different words can be formed out of the letters of the word MALENKOV so that

    i)   first letter is a vowel.

    ii)   no two vowel are together.

    iii)   relative position of vowels and consonants remains unchanged.

b) If $^nC_9 = {}^nC_8$, find $^nC_{17}$.

c) Find the middle term(s) in the binomial expansion of $\left(3 - \dfrac{x^3}{6}\right)^7$.

(4, 4, 4)

4. a) Find X if $Y = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$ and $2X + Y = \begin{bmatrix} 1 & 0 \\ -3 & 2 \end{bmatrix}$.

b) Verify that A(B+C)=AB+AC Where

$A = \begin{bmatrix} 1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 4 & 5 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 & 1 \\ 2 & 3 & 0 \end{bmatrix}$

c) Find the inverse of the matrix $\begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$.

(4, 4, 4)

UNIT-II

5. a) What is a computer? Describe its characteristics and explain the role of the Central Processing Unit (CPU) in the functioning of a computer system.

b) What characteristics make Personal Computers (PCs) more accessible and user-friendly compared to other types of computers?

(6, 6)

6. a) What are input and output devices? Explain the functions of commonly used input devices.

b) Mention the difference between the primary storage and secondary storage devices.

(6, 6)

7. Discuss the three types of programming languages: Machine Language, Assembly Language, and High-Level Language. How do they differ in terms of their use, complexity, and machine interaction?

(12)

x-x-x