Total No. of Questions : **11**]　　　　　　[Total No. of Printed Pages : **3**

BPP–1095

M.Sc. (Previous) Examination, 2022
COMPUTER SCIENCE

Paper – MCS–106

(Mathematics for Computer Science)

Time : 3 Hours]　　　　　　　　　　　　　[*Maximum Marks : 50*

Section–A　　　　　**(Marks : 2 × 10 = 20)**

Note :–　Answer all *ten* questions (Answer limit **50** words). Each question carries **2** marks.

Section–B　　　　　**(Marks : 3 × 5 = 15)**

Note :–　Answer all *five* questions. Each question has internal choice (Answer limit **200** words). Each question carries **3** marks.

Section–C　　　　　**(Marks : 5 × 3 = 15)**

Note :–　Answer any *three* questions out of five (Answer limit **500** words). Each question carries **5** marks.

Section–A

1.　(i)　Define basic counting principle of addition.

　　(ii)　Find out the value of $(5 - 5)!$.

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(iii) Define Contradiction.

(iv) What do you mean by position vector ?

(v) Define greatest element of a poset.

(vi) Define Transitive Closure.

(vii) What do you mean by discrete random variable ?

(viii) Define conditional probability.

(ix) What do you understand by planer graphs ?

(x) Define Eulerian Path.

Section–B

2. In a group of 5 boys and 4 girls, a team of 5 students is to be formed in which at least 3 girls must be there. How many ways are possible to form a team ?

Or

Explain the concept of pigeonhole principle with suitable example.

3. If $\vec{x} = \hat{j} - \hat{k}$ and $\vec{y} = -\hat{i} - \hat{k}$, find the vector product of there two vectors.

Or

Using mathematical induction, prove the following :

$$\sum_{i=1}^{n} i = \frac{n(n+1)}{1} \text{ for } n \geq 1$$

4. Explain the concept of Chomsky hierarchy.

Or

What properties a poset should have ? Explain with suitable example.

5. Find out the equation of circle with centre (2, 1) and radius 4.

Or

Explain the concept of asymptotic notations.

6. Explain travelling salesman problem.

Or

Describe Hamiltonian path with suitable example.

Section–C

7. Prove the following using the properties of Binomial theorem/coefficients :

$$\sum_{r=0}^{n} \binom{n}{r} = 2^n$$

8. Explain the types of quantifiers with suitable example.

9. Explain the concept of Hasse diagram with suitable example.

10. Write the equation of line passing through points (2, 3) and (5, 6).

11. Explain the concept of graph coloring with 3 applications.