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QP CODE: 24020114



| Reg No | : |  |
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# B.Sc DEGREE (CBCS) REGULAR / IMPROVEMENT / REAPPEARANCE EXAMINATIONS, MAY 2024

### **Second Semester**

B.Sc Bioinformatics Model III

### **Complementary Course - BI2CMT04 - BIOMATHEMATICS**

2017 ADMISSION ONWARDS

AFEA1C4D

Time: 3 Hours

Max. Marks : 80

#### Part A

Answer any **ten** questions.

Each question carries **2** marks.

- 1. Define Finite Set.
- 2. What is meant by power set?
- 3. Define Rectangular matrix.

4. Find the product of A and B where  $A = \begin{pmatrix} 6 & -12 \\ 5 & 11 \end{pmatrix}$  and  $B = \begin{pmatrix} 2 & 8 \\ 3 & 1 \end{pmatrix}$ .

- 5. Find the value of  $\begin{vmatrix} 3 & 2 \\ -4 & 8 \end{vmatrix}$ .
- 6. Define the term logical operators.
- 7. What are the three logical operators?
- 8. Define the term Contingency in Propositional calculus.
- 9. What does it mean for two propositions to be logically equivalent?
- 10. Define complete bipartite graph.
- 11. What is a walk in graph theory?
- 12. What is Hamiltonian cycle with example?

(10×2=20)

#### Part B

Answer any **six** questions.

Each question carries 5 marks.



- 13. Explain Difference of two sets and compliment of a set.
- 14. What is an equivalence relation explain with an example?

15.  
Find all cofactors of the matrix 
$$P = \begin{bmatrix} 1 & 5 & 4 \\ 5 & 2 & 5 \\ 4 & 5 & 3 \end{bmatrix}$$
  
16.  
Find the rank of the matrix  $\begin{pmatrix} 2 & 1 & -4 \\ 3 & 5 & -7 \\ 4 & -5 & -6 \end{pmatrix}$ .

17. Generate the truth table of  $(p \rightarrow q) \land (q \rightarrow p)$ .

- 18. Prove  $p \lor \neg(p \land q)$  is a tautology.
- 19. Write the adjacency matrix of the given graph.



- 20. What is Kruskal's algorithm with example?
- 21. How do you find the minimum spanning tree?

(6×5=30)

#### Part C

## Answer any **two** questions.

#### Each question carries **15** marks.

22. 1. If A = { a, b, c, d}, B = {b, c, d, e, f} C = {e, f, g, i}, Find
i) A x (B U C)
ii) (B x C ) U (A x B )
iii) B x (A ∩ C)
iv) {(A U B ) ∩ C}xC

23. Find the inverse of 
$$\begin{pmatrix} -2 & 3 & 9\\ 8 & -11 & -34\\ -5 & 7 & 21 \end{pmatrix}$$
.

| <b>1</b> |  |
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| <u> </u> |  |

Using elementary transformations, find the inverse of the following matrix .

| [ 1                  | 2  | 3 ] |
|----------------------|----|-----|
| 2                    | 5  | 7   |
| $\lfloor -2 \rfloor$ | -4 | -5  |





25. Make a truth table for the given statement.

- 2. (pvq)  $\rightarrow \sim r$
- 3.  $\sim [(\sim p \land \sim q) \rightarrow q]$
- 4. (~p∧~q) → r
- 5.  $\sim [(\sim p \land q) \rightarrow p]$

(2×15=30)