

(FOR THE CANDIDATES ADMITTED

SUBJECT CODE **25 UBC 2A1**

DURING THE ACADEMIC YEAR 2025-26 ONLY)

REG.NO. **N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI****END-OF-SEMESTER EXAMINATIONS : MAY– 2026****B.C.A.****MAXIMUM MARKS: 75****II SEMESTER****TIME : 3 HOURS****PART – III****MATHEMATICS - II : MATHEMATICAL FOUNDATIONS OF
COMPUTER APPLICATIONS****SECTION – A****(10 X 1 = 10 MARKS)****ANSWER THE FOLLOWING QUESTIONS.****(K1)**

1. If a set has 5 elements, how many subsets does it have?
a) 5 b) 32 c) 25 d) 10
2. If $f(x) = x$, then f is called ____
a) Constant function b) Identity function c) Inverse function d) Composite function
3. A graph with no edges is called ____
a) Simple graph b) Regular graph c) Null graph d) Complete graph
4. A matrix which has an inverse is called ____
a) Non-Singular matrix b) Zero matrix c) Singular matrix d) Scalar matrix
5. If two events A and B are independent, then.....
a) $P(A \cup B) = P(A) + P(B)$ b) $P(A \cap B) = 0$
c) $P(A) = P(B)$ d) $P(A \cap B) = P(A)P(B)$

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

6. What is the complement of Universal set?
7. Define Equivalence relation.
8. What is degree of an isolated vertex?
9. Eigen values are associated with which matrix?
10. Define a Sample Space.

SECTION – B**(5 x 5 = 25 MARKS)****ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.**

11. a) Define a set and its types
(OR)
b) Explain principle of inclusion and exclusion.
12. a) Describe the types of functions
(OR)
b) Define reflexive, symmetric and transitive relations.

(CONTD 2)

13. a) Write short notes undirected and directed graphs.
(OR)
b) How will you find degree of graph and its order?

14. a) Find the Rank of Matrix A:

$$A = \begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$$

(OR)

- b) Solve the system of linear equations: $x + y = 5$
 $2x + y = 7$
15. a) A bag contains 5 red balls and 3 blue balls. One ball is drawn at random. What is the probability that it is a red ball?
(OR)
b) A bag contains 4 red and 6 blue balls. Two balls are drawn one after another without replacement. What is the probability that both balls are red?

SECTION - C

(5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

16. a) Discuss operations on sets with laws.

(OR)

- b) Explain Cartesian product and partition of a set.

17. a) Explain properties of relations with examples.

(OR)

- b) Consider the following functions:
 $f(x) = 2x + 3$ and $g(x) = x^2$. Find $f \circ g(x)$ and $g \circ f(x)$

18. a) Outline the various types of graphs?

(OR)

- b) Discuss Euler and Hamiltonian graphs.

19. a) Find the Eigen values and Eigen Vectors of $A = \begin{vmatrix} 2 & 0 \\ 0 & 3 \end{vmatrix}$

(OR)

- b) Find the inverse of $A = \begin{vmatrix} 2 & 3 \\ 1 & 4 \end{vmatrix}$

20. a) A factory has 3 machines A, B, and C producing 40%, 35%, and 25% of items, respectively. 1% of items from A are defective, 2% of items from B are defective, 3% of items from C are defective.
Find the probability that a randomly selected item is defective.

(OR)

- b) A factory has two machines M1 and M2. M1 produces 60% of items, M2 produces 40% of items. 3% of items from M1 are defective, 5% of items from M2 are defective. If a randomly selected item is defective, find the probability that it was produced by M1.