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St. Claret College

Autonomous, Bengaluru

ROLL NO:

DATE:

MCA END SEMESTER EXAMINATION-APRIL 2026
MCA: FIRST SEMESTER
MCA 1125: Mathematical Foundation for Computer Science

TIME: 3 hours. **MAX. MARKS: 70**

This paper contains TWO printed pages and FOUR parts

Instructions:
1. **Verify and ensure that the question paper is completely printed.**
2. **Any discrepancies or questions about the exam paper must be reported to the COE within 1 hour after the examination.**
3. **Students must check the course title and course code before answering the questions.**

PART-A

Answer any EIGHT questions out of TEN. Each answer carries TWO marks. **[2X8 = 16]**

1. If A={1,2,3,4} and B={3,4,5}, find A∩B.
2. State De Morgan's Laws for sets.
3. Write the negation of the statement: "All students in the class passed the examination."
4. Define a reflexive relation with an example.
5. What is an equivalence relation? Write the three properties it must satisfy.
6. Define probability of an event. Write the formula for classical probability.
7. A fair coin is tossed once. Find the probability of getting Head.
8. Define a simple graph with an example.
9. What is the degree of a vertex in a graph?
10. Define a complete graph with an example.

PART-B

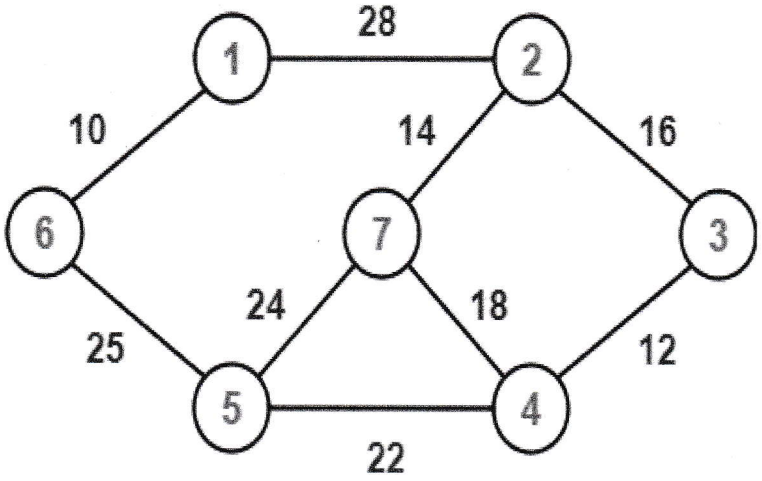
Answer any FOUR questions out of SIX. Each answer carries FIVE marks. **[5X4=20]**

11. Show that $(p \wedge q) \wedge \neg(p \vee q)$ is a contradiction.
12. Find how many arrangements can be made with the letter of the word **"MATHEMATICS".** In how many of them the vowels occur together.
13. Find the coefficient of x^6y^3 in the expansion of $(x+2y)^9$.
14. The number of accidents in a year to the taxi driver in a city with mean 3. Out of 1000 taxi driver find the approximate number of drivers 1) No accident in a year 2) More than three accidents in a year(e^{-3}=0.0498)
15. The probability that a student passes a physics test is 2/3 and the probability that he passes both physics and English is 14/45. The probability that he passes atleast one test is 4/5.What is the probability he will pass English test.
16. A non-directed graph G has 8 edges. Find the number of vertices, if the degree of each vertex is 2

PART-C

Answer any TWO questions out of FOUR. Each answer TEN marks. **[10X2=20]**

17. A relation on the set of integers defined by R={(x,y):x-y is a multiple of a integer 5}. Show that R is an equivalence relation on Z.
18. Find r if 15pn-1: 16pr-2 =3:4
19. Find the area under the normal curve in the following cases.
    1. Z=0 and z=1.4 2. Z=-0.78 and z=0 3. Z=-046 to z=2.21
20. Find the minimum spanning tree using Kruskal's algorithm



PART-D

Answer the following question. Answer carries FOURTEEN marks. **[14X1=14]**

21. a) Show that $1+3+5+\text{--------}+(2n-1) = n^2$
    b) Prove that $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$ is a tautology.

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