MMSEC-2

Sl.No. :

Total No. of Pages : 3

Fourth Semester M.Sc. Degree Examination, October - 2025
(SLM Scheme) (CBCS)
MATHEMATICS
SEC : Algorithms and Computations

Time : 1½ Hours **Max. Marks : 40**

SECTION - A

I. Answer any five questions. **[5 × 2 = 10]**

Q1) Write a note on Central Processing Unit (CPU)

Q2) Write flowchart to find the area of a triangle.

Q3) Write the formulas of Simpson's $\frac{1}{3}^{rd}$ rule and Simpson's $\frac{3}{8}^{th}$ rule.

Q4) Define i) graph ii) Trivial graph iii) Connected graph

Q5) Define Spanning tree, write the properties of spanning tree.

Q6) Write a note on time complexity of an algorithm.

Q7) Explain all the steps involved in solving knapsack problem.

SECTION - B

II. Answer any four questions. **[4 × 5 = 20]**

Q8) Explain the functionalities of the unit of computer as listed below.

i) Input unit

ii) Control unit

iii) Memory unit

iv) Output unit

Q9) Solve the following system of equations by using the Gauss-Jordan elimination method.

$x + y + z = 5$

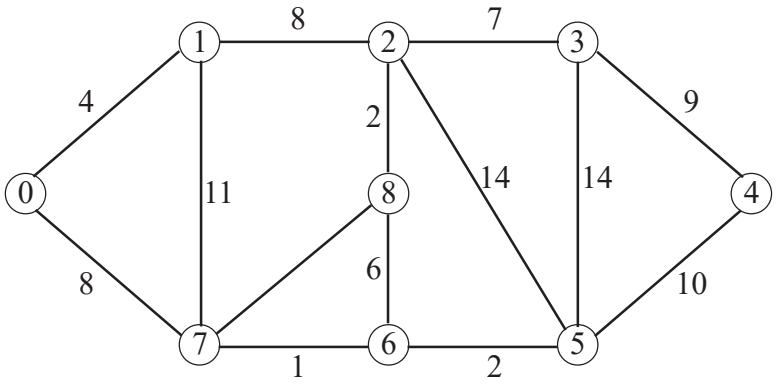
$2x + 3y + 5z = 8$

$4x + 5z = 2$

Q10) Calculate the value of $f(7.5)$ from the given table using Newton backward interpolation formula.

x	1	2	3	4	5	6	7	8
$f(x)$	1	8	27	64	125	216	343	512

Q11) Find the shortest path between two vertices for the following weighted graph using Dijkstra's Algorithm.



Q12) Explain all the Asymptotic notations (0, Ω, θ).

Q13) Write all the steps involved in Binary search algorithm.

SECTION - C

III. Answer any one questions : [1 × 10 = 10]

Q14) Explain the steps involved in Gauss Elimination method to solve a simultaneous system of linear equations using direct method. Also solve the following simulltaneous system of linear equations using Gauss Elimination method.

$x + 2y + z = 3$

$2x + 3y + 3z = 10$

$3x - y + 2z = 13$

Q15) Solve the following :

i) Use Gauss's forward formula to find y for $x = 30$ given that.

x	21	25	29	33	37
y	18.470	17.814	17.107	16.343	15.515

ii) Compute the value of $\frac{2}{\sqrt{\pi}}\int_0^x e^{-x^2}\,dx$, when, $x = 0.6538$ by using Gauss's backward formula.