

M.Sc. II SEMESTER [MAIN/ATKT] EXAMINATION JUNE - JULY 2024

COMPUTER SCIENCE

Paper - III

[Computer Oriented and Numerical and Statistical Method]

[Max. Marks : 75]

[Time : 3:00 Hrs.]

[Min. Marks : 26]

Note : Candidate should write his/her Roll Number at the prescribed space on the question paper.
Student should not write anything on question paper.
Attempt five questions. Each question carries an internal choice.
Each question carries **15 marks**.

- Q. 1 a)** Define Round-off error and truncation error with suitable example. (05 Marks)
- b)** Find the roots of equation $\cos x + x \cdot e^x = 0$, by secant method, correct to three decimal places. (10 Marks)

OR

- a)** Explain the concept of significant digit and normalized floating point number (05 Marks)
- b)** Find the root of equation $x^3 - 4x - 9 = 0$, by successive approximation method correct to four decimal place. (10 Marks)

- Q. 2 a)** Explain the Gauss elimination procedure in brief. (05 Marks)
- b)** Solve the following system by Gauss seidel method - (10 Marks)

$$\begin{aligned} 10x_1 - 2x_2 - x_3 - x_4 &= 3 \\ -2x_1 + 10x_2 - x_3 - x_4 &= 15 \\ -x_1 - x_2 + 10x_3 - 2x_4 &= 27 \\ -x_1 - x_2 - 2x_3 + 10x_4 &= -9 \end{aligned}$$

OR

- a)** Prove the system - $x - y = 1, x - 1.00001 y = 0$ is well conditioned or not. (05 Marks)
- b)** Solve the following system by Gauss - Jordan method. (10 Marks)
- $$\begin{aligned} x + 2y + z - w &= -2 \\ 2x + 3y - z + 2w &= 7 \\ x + y + 3z - 2w &= -6 \\ x + y + z + w &= -2 \end{aligned}$$

Q. 3 a) Briefly explain double interpolation with suitable example. (05 Marks)

b) Find the value of $y(2.5)$ (10 Marks)

x	-3	-1	0	3	5
$y(x)$	-30	-22	-12	330	3458

OR

a) Evaluate $\Delta^3 f(x)$ (05 Marks)

b) Find the value of x for which y is 18,600 (10 Marks)

x	52	53	54	55	56
y	19231	18868	18519	189182	17855

Q. 4 a) Explain predictor - corrector method in brief. (05 Marks)

b) Find the value of $\log 2$ from (10 Marks)

$\int_0^1 \frac{x^2}{1+x^3} dx$ using Simpson's 1/3 rule by dividing the range into four equal parts and also find the error.

OR

a) Define Weddle rule in brief. (05 Marks)

b) Using Euler's modified method, find a solution of y at $x = 0.1$ for the equation (10 Marks)

$$\frac{dy}{dx} = x^2 + y \quad \text{with initial condition } y(0) = 0.94 \text{ and taking } h = 0.1$$

Q. 5 a) Find the arithmetic mean for following data - (05 Marks)

x	150-155	155-160	160-165	165-170	170-175
f	12	18	30	15	05

b) What is Frequency Distribution ? Define in brief ? Also explain frequency distribution graphical method with examples. (10 Marks)

OR

a) Calculate the coefficient of standard deviation - (05 Marks)

x	0-10	10-20	20-30	30-40	40-50
f	3	7	5	3	6

b) Define correlation in brief and also explain graphic methods (scatter diagram) of measuring correlation. (10 Marks)

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