21P339 (Pages: 2) Name: .....

Reg.No: .....

THIRD SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2022

(CBCSS - PG)

(Regular/Supplementary/Improvement)

CC19P CSS3 E01f - NUMERICAL AND STATISTICAL METHODS

(Computer Science)

(2019 Admission onwards)

Time : 3 Hours Maximum : 30 Weightage

Part-A

Answer any ***four*** questions. Each question carries 2 weightage.

1. Explain errors and their types.
2. Apply Gauss Siedel method to solve the equations : 20x+y-2z=17,
   3x+20y-z= -18,
   2x-3y+20z=25
3. Calculate $\int_1^{1.4} e^{-x^2}\ dx$ using trapezoidal rule , considering four equal parts.
4. Calculate $\int_0^6 \frac{1}{1+x^2}$ dx using Simpson's $1/3$ rule.
5. If P(A)= ¼,P(B)= 1/3 and P(A∪B)=1/2. Find the values (a) P(A∩B) (b) P(A∩B') (c) P(A'∩B')
6. State and Prove the multiplication theorem for two independent events.
7. There are two bags, one containing 5 white and 4 black balls and the other containing 6 white and 5 back balls. One bag is chosen and one ball is drawn. If it is white, what is the probability that the bag selected is the first.

(4 × 2 = 8 Weightage)

Part-B

Answer any ***four*** questions. Each question carries 3 weightage.

8. Find the real root of the equation f(x)= 2x-log x-6, by the method of regula- falsi position correct to 3 decimal places.
9. Find the root of the equation 2x-log x=7 , using secant method to 5 decimal places.
10. Find the cubic polynomial which takes the following values using Newton's forward difference method:

x	0	1	2	3
y	1	2	1	10

11. Calculate using Runge-kutta fourth order $y(0.1)$, given $\frac{dy}{dx} = x + y,\ y(0)1.$
12. An article manufactured by a company consists of two parts A and B. In the process of manufacturing part A, 9 out of 100 are likely to be defective. Similarly, 5 out of 100 are likely to be defective in the manufacture of part B. Calculate the probability that the assembled part will not be defective.

13. A continuous random variable x has the following density function

$f(x) = ax, 0 \leq x \leq 1$

$= a, 1 < x \leq 2$

$= -ax + 3a, 2 < x \leq 3$

14. Solve the following Transportation problem using Vogel's Approximation method to minimize the total cost of transportation.

	Destination 1	Destination 2	Destination 3	Destination 4	Supply
Source1	14	56	48	27	70
Source2	82	35	21	81	47
Source3	99	31	71	63	93
Supply	70	35	45	60	

(4 × 3 = 12 Weightage)

Part-C

Answer any **two** questions. Each question carries 5 weightage.

15. Apply Gauss elimination method to solve the equations: $x + 4y - z = -5$,

$x + y - 6z = -12$,

$3x - y + z = -5$

16. Find the value at x=4 using Lagrange's formula

x	1.5	3	6
f(x)	-0.25	2	20

17. A factory uses 3 different resources for manufacturing 2 different products. 20 units of the resources A, 12 units of resource B and 16 units of resource C being available . One unit of first product requires 2,2 and 4 with unit respective resources and one unit of the second product requires 4,2 and 0 units of the respective resources . Given that the first product gives a profit of Rs. 2/- per unit and second Rs. 3/-. Formulate the linear programming problem. How many units of each product should be produced to maximize the profit? Solve it graphically.

18. A company has 4 machines(M1,M2,M3 and M4) to do 3 jobs(J1,J2 and J3) . Each job can be assigned to one and only one machine. The cost of each job on each machine is given in the following table . What are the job assignments which will minimize the cost?

	M1	M2	M3	M4
J1	18	24	28	32
J2	8	13	17	19
J3	10	15	19	24

(2 × 5 = 10 Weightage)

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