647510 **BSc6MatC603x** **Seat No :_____**

B.Sc. Semester - 6 (*CBCS*) Examination
March/April-2026 (NEW COURSE)
Optimization and Numerical Analysis-2 (Core (New))

Time: 2:30 Hours **Marks: 70**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que.1(A) Answer any two out of three. (10)

(1) Solve following L.P.P. using simplex method

Maximize $Z= 16X_1+17X_2+10X_3$

Subject to: $X_1+X_2+4X_3\leq 2000$

$2X_1+X_2+X3\leq 3600;$

$X_1+2X_2+2X_3\leq 2400;$

$X_1\leq 30;$ $X_1,X_2,X_3\geq 0$

(2) Solve following L.P.P. using simplex method

Maximize $Z= 3X_1+2X_2$

Subject to: $2X_1+X_2\leq 10$;

$X_1+3X_2\leq 6$; $X_1,X_2\geq 0$

(3) Solve following L.P.P. using Graphical method.

Maximize $Z= 2X_1+5X_2$

Subject to: $X_1\leq 4$;

$X_2\leq 3$;

$X_1+2X_2\leq 8;$ $X_1,X_2\geq 0$

Que.1(B) Answer any one out of two (04)

(1) Find dual of following L.P.P.

Minimize $Z= X_1+X_2+X_3$

Subject to: $7X_1-8X_2+4X_3=8;$

$X_1-2X_2\leq 2;$

$4X_2-X_3\geq 4;$ $X_1,X_2\geq 0$, X_3 is unrestricted in sign.

(2) Explain method to find dual of given L.P.P

Que.2(A) Answer any two out of three. (10)

(1) Explain Vogel's Approximation Method to find initial solution of Transportation Problem.

(2) Find solution of following Assignment Problem for minimize.

		MEN			
JOBS		1	2	3	4
	A	8	26	17	11
	B	13	28	4	26
	C	38	19	18	15
	D	19	26	24	10

(3) Find initial solution of following Transportation Problem using Vogel's Approximation Method minimize.

		TO				Supply
		D1	D2	D3	D4	
FROM	F1	19	30	50	10	7
	F2	70	30	40	60	9
	F3	40	8	70	20	18
Demand		5	8	7	14	

Que.2(B) Answer any one out of two (04)

(1) Explain Hungarian Method to find solution of Assignment Problem.

(2) Find initial solution of following Transportation Problem using North West Corner Rule.

		TO				Supply
		D1	D2	D3	D4	
FROM	F1	19	30	50	10	7
	F2	70	30	40	60	9
	F3	40	8	70	20	18
Demand		5	8	7	14	

Que.3(A) Answer any two out of three. (10)

(1) Derive Bessel's interpolation formula for central differences.

(2) Prove that divided differences are symmetrical in all their arguments.

(3) Derive Gauss's forward interpolation formula.

Que.3(B) Answer any one out of two (04)

(1) Derive Lagrange's interpolation formula for unequal intervals.

(2) Derive relation between divided differences and forward differences.

Que.4(A) Answer any two out of three. (10)

(1) Define numerical integration and derive general quadrature formula.

(2) Derive Simpson's 1/3 and 3/8 rules.

(3) Obtain derivatives using Gregory Newton's backward interpolation formula.

Que.4(B) Answer any one out of two (04)

(1) Evaluate $\int_4^{5.2} log\ x\ dx$ by Trapezoidal rule.

(2) State and prove Trapezoidal rule.

Que.5(A) Answer any two out of three. (10)

(1) Solve $\frac{dy}{dx}$ =f(x,y), $y(x_0)=y_0$, by Euler's method.

(2) Solve $\frac{dy}{dx}$ =f(x,y), $y(x_0)=y_0$, by Milne's predictor – corrector method.

(3) Solve $\frac{dy}{dx}$ = 3x + y/2 ; y(0) =1 find y(0.1) using Taylor's series method.

Que.5(B) Answer any one out of two (04)

(1) Solve $\frac{dy}{dx}$ =f(x,y), $y(x_0)=y_0$, by Taylor's method.

(2) Let $\frac{dy}{dx}$ = 3x + y^2 ; y(0) =1.2 find y(1.1) using Runge's method.

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