647510 **BSConaCC6030** **Seat No :_____**

B.Sc. Semester - 6 (*CBCS*) Examination

Oct/Nov -2020

OPTIMIZATION AND NUMERICAL ANALYSIS -2 (CORE)

Time: 2:00 Hours **Marks: 56**

Instructions:

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any four of the following questions.

Q-1 (A) Answer any Two out of Three **[10]**

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

Maximize $Z= 3X_1+5X_2+4X_3$

Subject to: $2X_1+3X_2 \leq 8$

$2X_2+5X_3 \leq 10;$

$3X_1+2X_2+4X_3 \leq 15;\quad X_1,X_2,X_3 \geq 0$

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

(3) Explain Graphical Method to find solution of L.P.P.

(B) Answer any One out of Two **[4]**

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

Minimize $Z= X_1-3X_2-2X_3$

Subject to: $3X_1-X_2+2X_3 \leq 7$

$2X_1-4X_2 \geq 12;$

$4X_1-3X_2-8X_3=10;\quad X_1,X_2,X_3 \geq 0$

(2) Define slack variable and surplus variable.

Q-2(A) Answer any Two out of Three **[10]**

(1) Explain VAM to find initial solution of Transportation Problem.

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

(3) Find initial solution of following Transportation Problem using VAM for minimize.

	TO				Supply
FROM		D1	D2	D3	
	F1	2	7	4	5
	F2	3	3	1	8
	F3	5	4	7	7
	F4	1	6	2	14
Demand		7	9	18	34

(B) Answer any one out of two **[4]**

(1) Explain North West corner rule to find initial solution of Transportation Problem.

(2) Find initial solution of following Transportation Problem using NWCR for minimize.

	TO				Supply
FROM		D1	D2	D3	
	F1	5	3	9	10
	F2	3	4	6	25
	F3	6	7	5	18
	F4	4	8	8	7
Demand		30	15	15	60

Q-3 (A) Answer any Two out of Three **[10]**

(1) State and prove Gauss's forward interpolation formula.

(2) State and prove Gauss's forward interpolation formula.

(3) Derive Newton's divided difference formula for unequal intervals.

(B) Answer any one out of two **[4]**

(1) If $f(x) = x^{-2}$ then show that $f(a,b,c,d) = -\frac{abc+abd+acd+bcd}{(abcd)^2}$

(2) Use Lagrange's interpolation formula to find the value of Y for X=10 from given table.

X	5	6	9	11
Y	12	13	14	16

Q-4 (A) Answer any Two out of Three **[10]**

(1) Obtain Derive Simpson's 3/8 rule.

(2) Obtain $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ by using Newton's backward difference formula.

(3) Obtain the value of f'(90) using Stirling's formula to the following data

x	60	75	90	105	120
f(x)	28.2	38.2	43.2	40.9	37.7

(B) Answer any one out of two **[4]**

(1) In usual notation prove that $D=\frac{1}{h}[\ \Delta - \frac{\Delta^2}{2} + \frac{\Delta^3}{3} - \frac{\Delta^4}{4} + \ldots\ldots\ ]$.

(2) Evaluate $\int_0^{\pi/2} sin\ x\ dx$ by Trapezoidal rule.

Q-5 (A) Answer any Two out of Three **[10]**

(1) Derive Milne's Predictor – Corrector formula.

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

(3) Derive Euler's improved method, for $\frac{dy}{dx} = f(x,y)$, $y(x_0)=y_0$.

(B) Answer any one out of two **[4]**

(1) Apply Range's method to find an approximate value of y at x=0.2 given $\frac{dy}{dx} = x+y$, y(0)=1.

(2) Using Picard's method find y(0.2) given that y'=x-y; y(0)=1.

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