(Time: 3 Hours)

**Total Marks: 80** 

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• (	Question 1	is <b>com</b>	pulsory	7.							
• ;	Solve ant t	<b>hree</b> qu	estions	from qu	estions 1	no. 2 to 6	5. END			35	
• ,	Assume ne	cessary	data w	herever	necessar	y.	300				
								G N D		Y (2)	
Q1	Answer the following questions										
	A) Define error, accuracy and precision of numbers with suitable examples.									10	
	B) Derive the condition for convergence in case of Newton Raphson method.  C) What do you understand by unconstrained optimization? Write the									٢	
	C) What do you understand by unconstrained optimization? Write the algorithm for Golden section search method?										
	D) What are the basic requirements of Linear programming problem?									35	
	D) What	are the	ousio it	, quiroini						6	
Q2 a)	Solve the equation $\frac{dy}{dx} = x^2 + y^2$ , using 2 <sup>nd</sup> order RK method at x=0.2 and										
	x = 0.4, y(0) = 0.									5	
	x –υ.4, y	f(0) = 0	•		366	NO O					
	Solve the	e equati	on dv/d	$\mathbf{x} = \mathbf{b} +$	xv <sup>2</sup> with	$\mathbf{v}(0) =$	= 0.2 usin	Adam	's Bashforth		
Q2 b)	method.								800000000000000000000000000000000000000		
			55						(2) 25°		
Q3 a)	Write th	e algo	rithm 1	for New	ton's f	orward	difference	e interp	olation and		
<b>(</b> )		Write the algorithm for Newton's forward difference interpolation and calculate f(3.5) for the following data									
		497,67			10000			9 (F) (F)			
	X	2	3	4	5	6	57000	8	9		
	f(x)	19	48	99	178	291	444	643	894		
	2000 A	3,67,67	\$ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	0000		2 2 2 2	(13) (4) (4)				
Q3 b)	Minimize $Z = 2x_1^2 + x_2^2$										
20 0)	$subjected to x_1 + x_2 = 1$										
	$x_1, x_2 \geq 0$										
80 80 F				multipl	ier meth	od.					
1 / 65 0		(Y / (E) / (Y ) 7	6 6 6	11/51/4°							
N. CO				2.421.45°		300		D:	41		
Q3 c)				irements	s of Line	300	amming?	Discuss	s the various		
Q3 c)	What are terms use			irements	s of Line	300	ramming?	Discuss	s the various		
Q3 c)				irements	s of Line	300	ramming?	Discuss	s the various		
Q3 c)	terms use	ed in LF	P.			300	ramming?	Discuss	s the various		
Q3 c) Q4 a)	terms use	ed in LF	P.	$0x_1 + 8$	$00x_2$	ear progi	ramming?	Discuss	s the various		
	terms use	ed in LF	P.	$0x_1 + 8$ $6x_1 +$	$ \begin{array}{c} 0.00x_2 \\ 2x_2 \ge 12 \end{array} $	ear progi	ramming?	Discuss	s the various	1	
	terms use	ed in LF	P.	$0x_1 + 8$ $6x_1 + 2x_1 + 3$	$\begin{array}{c} 300x_2\\ 2x_2 \ge 12\\ 2x_2 \ge 8 \end{array}$	ear progr	amming?	Discuss	s the various		
	terms use	ed in LF	P.	$0x_1 + 8$ $6x_1 + 2x_1 + 4x_1 + 6$	$600x_2$ $2x_2 \ge 12$ $2x_2 \ge 8$ $12x_2 \ge 8$	ear progr 2 24			s the various	1	
	terms use	ed in LF	P.	$0x_1 + 8$ $6x_1 + 2x_1 + 4x_1 + 6$	$600x_2$ $2x_2 \ge 12$ $2x_2 \ge 8$ $12x_2 \ge 8$	ear progr 2 24	cal metho		s the various	-	
	terms use	ed in LF	P.	$0x_1 + 8$ $6x_1 + 2x_1 + 4x_1 + 6$	$600x_2$ $2x_2 \ge 12$ $2x_2 \ge 8$ $12x_2 \ge 8$	ear progr 2 24			s the various	1	
)4 a)	Minimize subject to	ed in LF	Z = 40	$0x_{1} + 8$ $6x_{1} +$ $2x_{1} +$ $4x_{1} +$ $x_{1}, x_{2}$	$\begin{array}{c} 00x_2\\ 2x_2 \ge 12\\ 2x_2 \ge 8\\ 12x_2 \ge 2\\ \ge 0 \text{ usin} \end{array}$	ear progr 2 24 g graphi	cal metho	d.	on Raphson	1	
	Minimize subject to	ed in LF e cost	Z = 40	$0x_1 + 8$ $6x_1 +$ $2x_1 +$ $4x_1 +$ $x_1, x_2$ ation $f$	$\begin{array}{c} 00x_2\\ 2x_2 \ge 12\\ 2x_2 \ge 8\\ 12x_2 \ge 2\\ \ge 0 \text{ usin} \end{array}$	ear progr 2 24 g graphi	cal metho	d.		1	

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Q5 a) Use LU Decomposition method to find solution of the following system of equations.

$$2x + 2y + 3z = 4$$
$$4x - 2y + z = 9$$
$$x + 5y + 4z = 3$$

10

10

- Q5 b) Use method of Regula Falsi to obtain root of equation sins = x 2, near x = 2.5 for 5 iterations. x is in radians. Write the algorithm for this method. 10
- Q6 a) Using Simplex method solve  $Max Z = 500x_1 + 600x_2$

subjected to 
$$x_1 + 2x_2 \le 15$$
  
 $3x_1 + 2x_2 \le 18$   
 $x_1, x_2 \ge 0$ 

Q6 b) Solve the equation  $\frac{dy}{dx} = x - y^2$  using Milne's Predictor-Corrector method. Find y at x = 0.8 and x = 1 with step size of 0.2. Given that y(0) = 0, y(0.2) = 0.0199, y(0.4) = 0.079, y(0.6) = 0.1762.

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