Zagazig University- Banha Branch 2 <sup>nd</sup> Year: Civil Engineering Faculty of Engineering-Shoubra Date: 14/1/2003 Answer the following p.D.E: (a) $3u_x + 4u_y - 5u = 25y$ (b) $3u_{xx} - 4u_{xy} + u_{yy} + u_x + u_y - 12u = 0$ (c) $u_{tt} - 4u_{xx} = 0$ , $0 < x < 1$ B.C $u(0,t) = u(1,t) = 0$ I.C $u(x,0) = x - 1$ , $u_t(x,0) = x + 1$ . 2 Solve the LP problems: (a) Minimize $f = x - y - z + 5$ (b) Maximize $f = x + 2y + 3z$ s.t $2x - y + z \le 4$ s.t $x + y + z \le 18$ $x + 2y + 2z \le 10$ $2x + 3y - z \ge 16$ $-x + y - z \le 8$ $2x - y + 2z \ge 12$ $x, y, z \ge 0$ . X, $y, z \ge 0$ . 3 (a) Find the exponential curve that fits the points: (1, 2), (2, 3), (3, 2.5), (4, 3.8), (5, 6). (b) Evaluate the integral: $\int_{x^2} \frac{e^{1/x}}{x^2 + 1} dx$ by Simpson's rule, $\Delta = 0.1$ 4 (a) Solve the system of equations, number of iterations is 3: $\begin{bmatrix} 2 & -1 & 2 & -1 \\ 1 & 2 & -1 & -1 \\ 1 & -2 & 2 & 1 \\ x & x & 4 & 2 & -1 \\ 1 & 1 & -1 & 2 & x & 3 \\ x & 4 & 2 & -1 & -1 \\ 1 & 2 & -1 & -1 & x & 2 \\ x & 3 & 4 & 2 & -1 & -1 \\ 1 & 2 & -1 & -1 & 2 \\ x & 3 & -1 & -1 & 2 & -1 \\ 1 & 2 & -1 & -1 & -1 & -2 \\ x & 3 & -1 & -1 & -2 & -1 \\ x & 2 & -1 & -1 & -1 & -2 \\ x & 3 & -1 & -1 & -2 & -1 \\ x & 2 & -1 & -1 & -1 & -2 \\ x & 3 & -1 & -2 & -1 & -1 \\ x & 2 & -1 & -1 & -1 & -2 \\ x & 3 & -1 & -1 & -2 & -1 \\ x & 2 & -1 & -1 & -1 & -2 \\ x & 3 & -2 & -1 & -2 & -1 \\ x & 2 & -1 & -1 & -2 & -1 \\ x & 2 & -1 & -1 & -2 & -2 & -1 \\ x & 2 & -1 & -1 & -2 & -2 & -1 \\ x & 2 & -1 & -1 & -2 & -2 & -1 \\ x & 3 & -2 & -1 & -2 & -2 & -2 & -2 \\ x & 3 & -2 & -2 & -2 & -2 & -2 & -2 & -2 $					
Nat. and Math. Sci. DepartmentDate: $14/1/2003$ Answer the following questions:Time: 3 Hours1Solve the following P.D.E:(a) $3u_x + 4u_y - 5u = 25y$ (b) $3u_{xx} - 4u_{xy} + u_{yy} + u_x + u_y - 12u = 0$ (c) $u_{tt} - 4u_{xx} = 0$ , $0 < x < 1$ B.C $u(0,t) = u(1,t) = 0$ I.C $u(x,0) = x - 1$ , $u_t(x,0) = x + 1$ .2Solve the LP problems:(a) Minimize $f = x - y - z + 5$ (b) Maximize $f = x + 2y + 3z$ s.t $2x - y + z \le 4$ s.t $x + y + z \le 18$ $x + 2y + 2z \le 10$ $-x + y - z \le 8$ $2x - y + 2z \ge 12$ $x, y, z \ge 0$ .3(a) Find the exponential curve that fits the points:(1, 2), (2, 3), (3, 2.5), (4, 3.8), (5, 6).(b) Evaluate the integral: $\int_{1}^{\infty} \frac{e^{1/x}}{x^2 + 1} dx$ by Simpson's rule, $\Delta = 0.1$ 4(a) Solve the system of equations, number of iterations is 3: $\begin{bmatrix} 2 & -1 & 2 & -1 \\ 1 & 2 & -1 & -1 \\ 1 & -2 & 2 & 1 \\ 1 & 1 & -1 & 2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 2 \\ -2 \\ 7 \\ 8 \end{bmatrix}$ (b) Find a root to the equation $f(x) = x^4 - x - 1 = 0$ in [1,2], using the bisection method and number of iterations is 5.55(a) Find the sum of the series: $1 + \cos \theta + \cos 2\theta + \ldots$ (c) Evaluate the following integrals:(i) $\int_{C} \frac{h(2z + 15)}{z^2 - 36} dz$ (ii) $\int_{C} \frac{2e^2}{z - 36} dz$ (iii) $\int_{C} \frac{2e^2}{z - 36} dz$ (iii) $\int_{C} \frac{2e^2}{(z - 1)^2} dz$ where C is the ellipse $ z - 3  +  z + 3  = 10$ .	-				
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$\begin{bmatrix} 2 & -1 & 2 & -1 \\ 1 & 2 & -1 & -1 \\ 1 & -2 & 2 & 1 \\ 1 & 1 & -1 & 2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 2 \\ -2 \\ 7 \\ 8 \end{bmatrix}$ (b)Find a root to the equation $f(x) = x^4 - x - 1 = 0$ in [1,2], using the bisection method and number of iterations is 5. 5 (a)Find u and v of the function $f(z) = \sin z \cos z$ and show that they satisfy Riemman equations. (b)Find the sum of the series: $1 + \cos \theta + \cos 2\theta +$ (c)Evaluate the following integrals: (i) $\int \frac{h(2z+15)}{c} dz$ (ii) $\int \frac{ze^z}{c} dz$ (iii) $\int \frac{ze^z}{c} (z-1)^2 dz$ where C is the ellipse $ z-3  +  z+3  = 10$ .		(b)Evaluate the integral: $\int \frac{1}{1} \frac{1}{x^2+1} dx$ by Simpson's rule, $\Delta = 0.1$			
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$\begin{bmatrix} 1 & -2 & 2 & 1 \\ 1 & 1 & -1 & 2 \end{bmatrix} \begin{bmatrix} x_3 \\ x_4 \end{bmatrix}^{-1} \begin{bmatrix} 7 \\ 8 \end{bmatrix}$ (b)Find a root to the equation $f(x) = x^4 - x - 1 = 0$ in [1,2], using the bisection method and number of iterations is 5. 5 (a)Find u and v of the function $f(z) = \text{sinz cosz}$ and show that they satisfy Riemman equations. (b)Find the sum of the series: $1 + \cos \theta + \cos 2\theta +$ (c)Evaluate the following integrals: (i) $\int \frac{h(2z+15)}{c^2 - 36} dz$ (ii) $\int \frac{ze^z}{c^2 + \pi i} dz$ (iii) $\int \frac{ze^z}{c(z-1)^2} dz$ where C is the ellipse $ z - 3  +  z + 3  = 10$ .		$\begin{bmatrix} 2 & -1 & 2 & -1 \end{bmatrix} \begin{bmatrix} x_1 \end{bmatrix} \begin{bmatrix} 2 \end{bmatrix}$			
$\begin{bmatrix} 1 & -2 & 2 & 1 \\ 1 & 1 & -1 & 2 \end{bmatrix} \begin{bmatrix} x_3 \\ x_4 \end{bmatrix}^{-1} \begin{bmatrix} 7 \\ 8 \end{bmatrix}$ (b)Find a root to the equation $f(x) = x^4 - x - 1 = 0$ in [1,2], using the bisection method and number of iterations is 5. 5 (a)Find u and v of the function $f(z) = \text{sinz cosz}$ and show that they satisfy Riemman equations. (b)Find the sum of the series: $1 + \cos \theta + \cos 2\theta +$ (c)Evaluate the following integrals: (i) $\int \frac{h(2z+15)}{c^2 - 36} dz$ (ii) $\int \frac{ze^z}{c^2 + \pi i} dz$ (iii) $\int \frac{ze^z}{c(z-1)^2} dz$ where C is the ellipse $ z - 3  +  z + 3  = 10$ .		$\begin{vmatrix} 1 & 2 & -1 & -1 \end{vmatrix} x^2 \begin{vmatrix} -2 \end{vmatrix}$			
(b)Find a root to the equation $f(x) = x^4 - x - 1 = 0$ in [1,2], using the bisection method and number of iterations is 5. 5 (a)Find u and v of the function $f(z) = \sin z \cos z$ and show that they satisfy Riemman equations. (b)Find the sum of the series: $1 + \cos \theta + \cos 2\theta +$ (c)Evaluate the following integrals: (i) $\int_C \frac{h(2z+15)}{z^2-36} dz$ (ii) $\int_C \frac{z e^z}{z+\pi i} dz$ (iii) $\int_C \frac{z e^z}{(z-1)^2} dz$ where C is the ellipse $ z-3  +  z+3  = 10$ .		$\begin{vmatrix} 1 & 2 & 2 & 1 \\ 1 & 2 & 2 & 1 \end{vmatrix} = \begin{vmatrix} 1 & 2 \\ -1 & -2 \end{vmatrix} = \begin{vmatrix} 1 & 2 \\ -1 & -2 \end{vmatrix}$			
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where C is the ellipse $ z - 3  +  z + 3  = 10$ .		$\lim_{z \to 1} \left[ \frac{\ln(2z+15)}{dz} \right]_{dz} = \lim_{z \to 2} \left[ \frac{ze^z}{dz} \right]_{dz} = \lim_{z \to 2} \left[ \frac{ze^z}{dz} \right]_{dz}$			
where C is the ellipse $ z - 3  +  z + 3  = 10$ .		$\begin{vmatrix} c_{1} & z_{2}^{2} - 36 \\ c_{1} & z_{1}^{2} & c_{2}^{2} + \pi i \\ c_{1} & c_{2}^{2} & c_{1}^{2} & c_{1}^{2} \\ c_{1} & c_{1}^{2} & c_{1}^{2} & c_{1}^{2} \\$			
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Zagazig University- Banha Branch Faculty of Engineering- Shoubra		2 <sup>nd</sup> Year: Civil Engineering Mathematics		
Nat	. and Math. Sci. Department (تخلفات)	Date: 26/12/ 2002		
	Answer the following questions:	Time: 3 Hours		
1	Solve the following P.D.E:			
	$(a)_{u_x} + u_y - 4\sqrt{2} u = 8  (b) 6_{u_{xx}} - 5_{u_{xy}} + u_{yy} - u_x + 2u_y - 15u = 0$			
	(c) $u_{tt} - 9u_{xx} = 0$ , $0 < x < 1$			
	B.C $u(0,t) = u(1,t) = 0$			
	I.C $u(x,0) = x$ , $u_t(x,0) = x - 1$			
2	Solve the LP problems:			
	-	mize $f = 2x + y + z$		
	•	$x - y + 2z \le 3$		
	$x - y + z \le 8$	$x + 2y - z \le 4$		
	$x, y, z \ge 0$	$x - 2y + 3z \ge 4$		
		x, y, z≥ 0		
3	(a)Find the least squares line that fits the points:			
	(0, 0), (1, 2), (2, 3), (3, 5), (4, 8), (5, 9).			
	(b)Find the value of y at $x = 2$ from the data:			
4	(1, 3), (3, 6), (5, 12), (7, 15).			
4	(a)Evaluate the integral: $\int_{1}^{3} \frac{\ln(x+2)}{x+1} dx$ by Simpson's rule, $\Delta = 0.25$			
	(b)Find the Lagrange's polynomial that satisfies the data:			
	(0, 1), (1, 2), (2, 7), (3, 22).			
5	(a)Show that the function $u(x,y) = 2xy + 2y$	2y is harmonic and find		
	its conjugate $v(x,y)$ such that the function $w = u + iv$ is analytic.			
	(b)Evaluate the following integrals:			
	(i) $\int_{C} \frac{z e^{z}}{z+6} dz$ (ii) $\int_{C} \frac{\ln(2z+11)}{z-3} dz$	(iii) $\int_{C} \frac{e^{-3z}}{z^3} dz$		
	where C is the circle $ z - 1  = 4$ .	-		
Good Luck Dr. M.H. Eid				