Math 3-Control Autumn2019 Mid-Term Exam 1– 30 Marks Time: 1 hour

[1]If $F(x, y, z) = x^3 e^z + y \sin z - z \cos y$

Find: (a)The first derivatives of the function F (b) $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ (c) ∇F and $\nabla . \nabla F$

[2]Show that the envelope of the curves: $(x - 2a)^2 + (y - 2a)^2 = 1$ is $(x - y)^2 = 4$.

[3]Determine the extrema of the function : $f(x, y) = x^3 + y^2 - 3x - 4y$

[4]From the curve : $x = t^3 + t,\ y = t^2 + 3,\ t$ in $[1, 2]$.

Find the area A, the length L and the volume V_x.

[5]Find $\int_{(0,1)}^{(2,5)} (x^2 + y)dx + (xy)dy$ through the curve $y = x^2 + 1$

Good Luck *Dr. Mohamed Eid*

Math 3-Civil Autumn2019 Mid-Term Exam 1– 30 Marks A Time: 1 hour

[1]If $F(x, y, z) = y^3 e^x + x\cos z - z^2 \sin y$

Find: (a)The first derivatives of the function F (b) $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ (c) ∇F and $\nabla . \nabla F$

[2]Find the envelope of the curves: $x\cos a + y\sin a = 1.$

[3]Determine the extrema of the function : $f(x, y) = x^3 + (y + 2)^2 - 27x$

[4]From the curve : $x = e^t, \; y = t^3, \; t$ in $[0, 2]$.

Find the area A, the length L and the volume V_x.

[5]Find $\int_{(0,1)}^{(1,2)} (x + y)dx + (2x - y)dy$ through the curve $y = x^3 + 1$

Good Luck *Dr. Mohamed Eid*

Math 3-Civil Autumn2019 Mid-Term Exam 1– 30 Marks B Time: 1 hour

[1]If $F(x, y, z) = z^3 e^y + y\cos y - x^2 \sin z$

Find: (a)The first derivatives of the function F (b) $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ (c) ∇F and $\nabla . \nabla F$

[2]Show that the envelope of the curves: $(x - 2a)^2 + (y + 2a)^2 = 1$ is $(x + y)^2 = 4.$

[3]Determine the extrema of the function : $f(x, y) = (x - 3)^2 + y^3 - 12y$

[4]From the curve : $x = t^3, \; y = t^3 + 2, \; t$ in $[1, 3]$.

Find the area A, the length L and the volume V_x.

[5]Find $\int_{(0,1)}^{(1,3)} (x + y^2)dx + (x^2 y)dy$ through the curve $y = 2x^2 + 1$

Good Luck *Dr. Mohamed Eid*

Math 3-Control Autumn2019 ** Mid-Term Exam 1– 30 Marks Time: 1 hour

[1]If $F(x,y,z) = y^3 e^{2x} - x\sin y + z\cos z$

Find: (a)The first derivatives of the function F (b) $\frac{\partial z}{\partial y}$ (c)∇F and $\nabla.\nabla F$

[2]Find the envelope of the curves: $(x-a)^2 + (y+2a)^2 = 1$.

[3]Determine the extrema of the function $f(x,y) = x^2 + y^3 - 4xy + 4y$

[4]Determine the extrema of the function $f(x,y) = x^3 + y^2$ s.t $3x + 2y = 9$

[5]From the curve : $x = t^3,\ y = 3 + e^t,\ t$ in $[1,2]$.

Find the area A, the length L and the volume V_y.

[6]Find $\int_{(1,0)}^{(2,1)} (x^2 + y)dx + (y - x)dy$ through the curve $x = 1 + y^2$

Good Luck *Dr. Mohamed Eid*

Math 3– Control Autumn2019 Semester 201 Mid-Term Exam2 – 20 Marks

(1)If $f(z) = z + e^z$. Show that u(x, y) , v(x, y) satisfy the Riemman's equations.

(2)If $u = x + e^x\cos y$. Find its conjugate v(x, y) such that $f(z) = u + iv$ is harmonic.

(3)Determine and sketch the image of the region G : $0 \le y \le 2,\ -\pi/2 \le x \le \pi/2$

under the function $f(z) = \sin z$.

(4)If C is the circle $|z - 1| = 3$. Find the integrals:

$(a) \oint_C \frac{\sin z}{z^2 + 9} dz$ $(b) \oint_C \frac{\cos z}{(2z - \pi)^2} dz$ $(c) \oint_C \frac{3^z}{(z-1)(z-2)} dz$

Good Luck *Dr. Mohamed Eid*

Math 3– Control Autumn2019 Semester 201 Mid-Term Exam2 – 20 Marks

(1)If $f(z) = z + e^z$. Show that u(x, y) , v(x, y) satisfy the Riemman's equations.

(2)If $u = x + e^x \cos y$. Find its conjugate v(x, y) such that $f(z) = u + iv$ is harmonic.

(3)Determine and sketch the image of the region G : $0 \le y \le 2,\ -\pi/2 \le x \le \pi/2$

under the function $f(z) = \sin z$.

(4)If C is the circle |z – 1| = 3. Find the integrals:

$(a)\oint_C \frac{\sin z}{z^2+9}dz$ $(b)\oint_C \frac{\cos z}{(2z-\pi)^2}dz$ $(c)\oint_C \frac{3^z}{(z-1)(z-2)}dz$

Good Luck *Dr. Mohamed Eid*

Math 3– Civil **A** Autumn2019 Semester 201 Mid-Term Exam2 – 20 Marks

(1)If $f(z) = 3 + \ln z$. Show that u(x, y) , v(x, y) satisfy the Riemman's equations.

(2)If $u = 3 + e^{2x} \sin 2y$. Find its conjugate v(x, y) such that $f(z) = u + iv$ is harmonic.

(3)Determine and sketch the image of the region G : $\ln 3 \le x \le \ln 4,\quad 0 \le y \le \pi$
under the function $f(z) = e^z$.

(4)If C is the circle |z – 2i| = 2. Find the integrals:

$(a)\oint_C \frac{3^z}{z^2-9}dz$ $(b)\oint_C \frac{\cos z}{2z-\pi i}dz$ $(c)\oint_C \frac{2^{iz}}{(z-i)(z-3i)}dz$

Good Luck *Dr. Mohamed Eid*

Math 3– Civil **B** Autumn2019 Semester 201 Mid-Term Exam2 – 20 Marks

(1)If $f(z) = z + \cos z$. Show that u(x, y) , v(x, y) satisfy the Riemman's equations.

(2)If $v = \sin x \,.\sinh y$. Find its conjugate u(x, y) such that $f(z) = u + iv$ is harmonic.

(3)Determine and sketch the image of the region G : $0 \le y \le 3,\quad 0 \le x \le \frac{\pi}{2}$

under the function $f(z) = \sin z$.

(4)If C is the circle |z + 3| = 2. Find the integrals:

$(a)\oint_C \frac{3^z}{z^3-36z}dz$ $(b)\oint_C \frac{\cos z}{z+\pi}dz$ $(c)\oint_C \frac{z^2}{(z+2)(z+4)}dz$

Good Luck *Dr. Mohamed Eid*