Question 1 (10 marks)

(a)Find **y`** from the following:

(i) $y = \tan x . \tanh^{-1} x + \sinh^{-1} x$ (ii) $y^3 = y. \sinh^{-1} x + \tan^{-1} x$ **4**

(b)Find the integrals: **6**

(i)$\int (x^3 - 3^{2x}) \, dx$ (ii)$\int (\frac{1}{x^2} + \frac{1}{x^2+1} - \frac{1}{\sqrt{x^2+1}}) \, dx$ (iii)$\int \frac{x}{x^2-4x+4} \, dx$

(iv)$\int \tanh^{-1} x \, dx$ (v) $\int x. 2^x \, dx$ (vi)$\int (\sinh 4x + \sin^2 x) \, dx$

Question 2 (10 marks)

(a)Find the area of the region between the curve $y = x^2 - 2x$, x-axis, x in [1, 4].   **2**

(b)If the region between the curve $y = x^3 + x$, x-axis, x in [1, 2] is rotated about x-axis and y-axis. Find the volume of the generated solids V_x , V_y .   **4**

(c)Find the arc length of the curve : $y = 2^x$, x in [1, 2]. If this curve is rotated about x-axis and y-aixs, find the surface area S_x, S_y .   **4**

Question 3 (8 marks)

(a)State the definition of : (i)Line   (ii)Parabola   **2**

(b)Separate the lines: $x^2 - 3xy - 4y^2 = 0$ and find the angle between them.   **2**

(c)Find the points of intersection of circles :   **2**
  $x^2 + y^2 - 2y - 3 = 0$, $x^2 + y^2 - x - 3 = 0$.

(d)Write the equation of circle where (2, 0), (− 3, 2) are en sod diameter.   **2**

Question 4 (12 marks)

(a)Find the vertex , focus and sketch the parabola : $y^2 - 4x - 4y = 0$.   **3**

(b)Find center, vertices and sketch the ellipse : $9x^2 + y^2 + 18x + 2y + 1 = 0$.   **3**

(c)Find center, vertices and sketch the hyperbola : $x^2 - y^2 - 4y + 5 = 0$.   **3**

(d)Determine the type of the curve $x^2 - 2xy + y^2 + 2x + 2 = 0$ **1**

(e)Describe the surfaces: $x^2 + y^2 + z^2 - y + 2z = 0, x^2 + z^2 = -3y, x^2 + z^2 = y^2$ **2**

Good Luck   *Dr. Mohamed Eid*

Question 1 (10 marks)

(a)Find **y`** from the following:

  (i) $y = \tanh x . \tan^{-1} x + \coh^{-1} x$ (ii) $y^2 = y. \sin^{-1} x + y \tanh^{-1} x$ 4

(b)Find the integrals:

   6

  (i)$\int (x^3 - 2^{3x})\, dx$ (ii)$\int (3^2 - 2^x)^2\, dx$ (iii)$\int \frac{1}{x^2 - 2x + 2}\, dx$

  (iv)$\int \tan^{-1} x\, dx$ (v) $\int x \cosh x\, dx$ (vi)$\int \cos x \sqrt{1 + \sin x}\, dx$

Question 2 (10 marks)

(a)Find the area of the region between the curve $y = x^2 - 3x$, x-axis, x in $[1, 4]$.   2

(b)If the region between the curve $y = x^2 + 3x$, x-axis, x in $[1, 2]$ is rotated about   4
   x-axis and y-axis. Find the volume of the generated solids V_x , V_y .

(c)Find the arc length of the curve : $y = 3^x$, x in $[1, 2]$. If this curve is rotated   4
   about x-axis and y-aixs, find the surface area S_x, S_y .

Question 3 (8 marks)

(a)State the definition of : (i)Ellipse   (ii)Parabola   2

(b)Separate the lines: $x^2 - 3xy + 2y^2 = 0$ and find the angle between them.   2

(c)Find the points of intersection of circles :   2
   $x^2 + y^2 - 2y - 3 = 0,\ x^2 + y^2 - x - 3 = 0$.

(d)Write the equation of circle where $(3, 1), (- 2, 2)$ are en sod diameter.   2

Question 4 (12 marks)

(a)Find the vertex , focus and sketch the parabola : $x^2 - 4x - 4y = 0$.   3

(b)Find center, vertices and sketch the ellipse : $4x^2 + y^2 - 8x - 2y + 1 = 0$.   3

(c)Find center, vertices and sketch the hyperbola : $x^2 - y^2 - 6y = 0$.   3

(d)Determine the type of the curve : $2x^2 - 2xy + y^2 + 2x + 2 = 0$.   1

(e)Describe the surfaces: $x^2 + y^2 + z^2 - 4x + y = 0,\ y^2 + z^2 = x,\ y^2 + z^2 = x^2$ 2

Good Luck   *Dr. Mohamed Eid*

Credit Hours Programs			Final Exam
Program of Industrial Engineering			Course: Mathematics 2
Duration : 2 hours			Code: EMP 102
Date: January 1 , 2020	**C**	Faculty of Eng. – Shoubra	Group: 3348

The exam consists of one page   No. of questions: 4   Answer **All** questions   Total Mark: 40

Question 1 (10 marks)

(a)Find **y`** from the following:

(i) $y = \sinh x . \sin^{-1} x + \tan^{-1} x$ 　　　　　(ii) $y \sinh y = \cos^{-1} x + \tanh^{-1} x$ 　　|　4

(b)Find the integrals:

| 6

(i)$\int (x^5 - \frac{2^x}{3^x}) \, dx$ 　　　(ii)$\int (\frac{1}{x-2} + \frac{1}{x^2} + \frac{1}{1-x^2}) \, dx$ 　　　(iii)$\int \frac{x}{x^2-x-6} \, dx$

(iv)$\int \tan^{-1} x \, dx$ 　　　(v) $\int x \sinh x \, dx$ 　　　(vi)$\int (\sin x - \cos x)^2 \, dx$

Question 2 (10 marks)

(a)Find the area of the region between the curve $y = x^3 - 4x$, x-axis, x in [1, 3].　|　2

(b)If the region between the curve $y = x^3 + 2x$, x-axis, x in [1, 3] is rotated about x-axis and y-axis. Find the volume of the generated solids V_x , V_y .　|　4

(c)Find the arc length of the curve : $y = x^4$, x in [2, 3]. If this curve is rotated about x-axis and y-aixs, find the surface area S_x, S_y .　|　4

Question 3 (8 marks)

(a)State the definition of : (i)Line　　　　　(ii)Parabola　|　2

(b)Separate the lines: $y^2 - 3xy - 4x^2 = 0$ and find the angle between them.　|　2

(c)Find the points of intersection of circles :
$x^2 + y^2 - 2y - 3 = 0, \ x^2 + y^2 - x - 3 = 0.$　|　2

(d)Write the equation of circle of radius 3 and center the mid-point of $(0, 3), (-2, 1).$　|　2

Question 4 (12 marks)

(a)Find the vertex , focus and sketch the parabola : $y^2 + 4x - 4y = 0.$　|　3

(b)Find center, vertices and sketch the ellipse : $4x^2 + y^2 + 8x - 2y + 1 = 0.$　|　3

(c)Find center, vertices and sketch the hyperbola : $x^2 - y^2 + 4y - 5 = 0.$　|　3

(d)Determine the type of the curve : $2x^2 - 2xy + y^2 + 4x + 2y + 3 = 0.$　|　1

(e)Describe the surfaces: $x^2 + y^2 + z^2 - 3x + 2 = 0, \ y^2 + z^2 = 2x, \ z^2 + y^2 = x^2$　|　2

Good Luck 　　　　　　　　　　*Dr. Mohamed Eid*

The exam consists of one page   No. of questions: 4   Answer **All** questions   Total Mark: 40

Question 1 (10 marks)

(a)Find **y`** from the following:

  (i) $y = \tan x \cdot \tanh^{-1} x + \sinh^{-1} x$ (ii) $y \ln y = \sinh^{-1} x + \cosh^{-1} x$ 4

(b)Find the integrals:

  (i) $\int \left(\frac{1}{x} + \frac{1}{x^2} + \frac{x}{x^2+1}\right) dx$ (ii) $\int (x^2 - 3x)^2 \, dx$ (iii) $\int \frac{x+4}{x^2-4x+3} \, dx$ 6

  (iv) $\int \sinh^{-1} x \; dx$ (v) $\int x \ln x \, dx$ (vi) $\int (\cosh x - 2\cos^2 x) \, dx$

Question 2 (10 marks)

(a)Find the area of the region between the curve $y = x^2 - 3x$, x-axis, x in [2, 5].   2

(b)If the region between the curve $y = x^4 + x$, x-axis, x in [1, 3] is rotated about   4
  x-axis and y-axis. Find the volume of the generated solids V_x , V_y .

(c)Find the arc length of the curve : $y = 1 + x^3$, x in [1, 3]. If this curve is rotated   4
  about x-axis and y-aixs, find the surface area S_x, S_y .

Question 3 (8 marks)

(a)State the definition of : (i)Plane   (ii)Hyperbola   2

(b)Separate the lines: $4y^2 - x^2 = 0$ and find the angle between them.   2

(c)Find the points of intersection of circles :   2
  $x^2 + y^2 - 2y - 3 = 0, \; x^2 + y^2 - x - 3 = 0.$

(d)Determine the center and radius of the circle : $x^2 + y^2 - 2x + 4y + 1 = 0$ 2

Question 4 (12 marks)

(a)Find the vertex , focus and sketch the parabola : $x^2 - 4x + 4y = 0.$ 3

(b)Find center, vertices and sketch the ellipse : $x^2 + 9y^2 + 2x - 18y + 1 = 0.$ 3

(c)Find center, vertices and sketch the hyperbola : $x^2 - y^2 - 4x + 2y - 1 = 0.$ 3

(d)Determine the type of the curve : $x^2 + 4xy - 2y^2 + 2x + 1 = 0.$ 1

(e)Describe the surfaces: $x^2 + y^2 + z^2 + 2z = 0, \; x^2 + y^2 = -z, \; x^2 + 3y^2 = z^2$ 2

              Good Luck   *Dr. Mohamed Eid*

Credit Hours Programs		Final Exam
Program of Industrial Engineering		Course: Mathematics 2
Duration : 2 hours		Code: EMP 102
Date: January 1 , 2020 **E**	Faculty of Eng. – Shoubra	Group: 3348

The exam consists of one page   No. of questions: 4   Answer **All** questions   Total Mark: 40

Question 1 (10 marks)

(a)Find **y`** from the following:

(i) $y = \cosh x . \cosh^{-1} x + \tan^{-1} x$ (ii) $\sqrt{y} = \sinh^{-1} x + y \cos^{-1} x$ **4**

(b)Find the integrals: **6**

(i)$\int (2 - 3x^2)^2\, dx$ (ii)$\int (\frac{1}{x-2} + \frac{1}{x^3} + \frac{2x}{1-x^2})\, dx$ (iii)$\int \frac{x}{x^2-4x-5}\, dx$

(iv)$\int \sin^{-1} x\, dx$ (v) $\int x \sin x\, dx$ (vi)$\int (\sinh 2x + \cos^2 4x)\, dx$

Question 2 (10 marks)

(a)Find the area of the region between the curve $y = \sqrt{x} - x$, x-axis, x in [0, 3].   **2**

(b)If the region between the curve $y = 3^x + 2$, x-axis, x in [1, 3] is rotated about   **4**
 x-axis and y-axis. Find the volume of the generated solids V_x , V_y .   **4**

(c)Find the arc length of the curve : $y = 4^x$, x in [1, 2]. If this curve is rotated
 about x-axis and y-aixs, find the surface area S_x, S_y .

Question 3 (8 marks)

(a)State the definition of : (i)Ellipse   (ii)Sphere   **2**

(b)Separate the lines: $x^2 + 4y^2 + 4xy = 0$ and find the angle between them.   **2**

(c)Find the points of intersection of circles :   **2**
 $x^2 + y^2 - 2y - 3 = 0,\ x^2 + y^2 - x - 3 = 0.$

(d)Determine the center and radius of the circle : $2x^2 + 2y^2 - 4x + 6y = 0$ **2**

Question 4 (12 marks)

(a)Find the vertex , focus and sketch the parabola : $y^2 - 8x - 4y + 4 = 0.$ **3**

(b)Find center, vertices and sketch the ellipse : $8x^2 + y^2 - 16x - 2y + 1 = 0.$ **3**

(c)Find center, vertices and sketch the hyperbola : $x^2 - y^2 - 4x + 4y - 4 = 0.$ **3**

(d)Determine the type of the curve : $x^2 - 2xy + y^2 + 2x + 1 = 0.$ **1**

(e)Describe the surfaces: $x^2 + y^2 + z^2 - y = 0,\ 3x^2 + z^2 = y,\ x^2 + y^2 - z^2 = 0$ **2**

Good Luck   *Dr. Mohamed Eid*