National Testing Agency

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Subject Name:	A Refresher Course on Calculus
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A Refresher Course on Calculus

Group Number :	1
Group Id :	489994191
Group Maximum Duration :	0
Group Minimum Duration :	120
Revisit allowed for view? :	No
Revisit allowed for edit? :	No
Break time:	0
Group Marks:	100

A Refresher Course on Calculus

Section Id :	489994247
Section Number :	1
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	100
Number of Questions to be attempted:	100
Section Marks:	100
Display Number Panel:	Yes
Group All Questions:	No

Sub-Section Number:	1
Sub-Section Id:	489994265
Question Shuffling Allowed :	Yes

Question Number : 1 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Concepts of differentiation and integration were developed by

a) Newton

b) Leibniz

c) Euler

d) Gauss

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 2 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Non-Euclian geometry was developed by

a) Riemann

b) Laplace

c) Cauchy

d) Hilbert

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 3 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Calculus of variations was developed by

a) Gauss

b) Cauchy

c) Lagrange

d) Leibniz

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 4 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Concepts of Mathematical analysis were developed by

a) Gauss

b) Riemann

c) Euler

d) Lagrange

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 5 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Leelavathiwas written by

a) Bhaskara

b) Varahamihira

c) Brahmaguptha

d) Mahaveera

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 6 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The value of $\lim_{x\to\infty}(\frac{x+3}{x-1})^{x+3}$ is

a) e^3

b) e^2

c) e

d) e^4

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 7 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let $f(x) = \frac{|x|}{x}$. Then, which of the following is **false**?

a) $\lim_{x \to 0^+} f(x) = 1$

b) $\lim_{x \to 1^-} f(x) = 1$

c) $f(x)$ is continuous at $x = 0$

d) $f(x)$ is continuous at $x = 1$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 8 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The number of real solutions of $x^3 + 3x + 1 = 0$ is

a) 0

b) 2

c) 3

d) 1

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 9 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let $f(x) = \sqrt{x-1}$ on[1,3]. Then for which of the following c in (a, b) the conclusion of Lagrange's mean value theorem holds?

a) $\frac{-3}{2}$

b) $\frac{2}{3}$

c) $\frac{3}{2}$

d) $\frac{1}{2}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 10 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is oblique asymptote of the curve $f(x) = \frac{2x^2-3}{7x+4}$?

a) $g(x) = \frac{2}{7}x - \frac{8}{49}$

b) $g(x) = \frac{2}{7}x + \frac{8}{49}$

c) $g(x) = -\frac{4}{7}x - \frac{3}{4}$

d) $g(x) = \frac{7}{4}x + 3$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 11 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The function $f(x) = \frac{1}{|x|+1} - \frac{x^2}{2}$ is discontinuous at

a) $x = 1$

b) $x = -1$

c) $x = 0$

d) no real x

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 12 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If we approximate $f(x) = e^{2x}$ by the fourth degree Taylor's polynomial about the point $x = 0$ in the interval $[0,0.5]$, then the maximum error is

a) $\frac{e}{100}$

b) $\frac{e^2}{100}$

c) $\frac{e}{120}$

d) $\frac{e}{10}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 13 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The third term of the Taylor's series of $f(x) = \cos 2x$ about the point $x = 0$ is

a) x^3

b) $\frac{2}{3}x^3$

c) $\frac{2}{3}x^4$

d) $\frac{3}{2}x^4$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 14 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $u = e^{xyz}$, then the value of $\frac{\partial^3 u}{\partial x \partial y \partial z} =$_____

a) $e^{xyz}(x^2y^2z^2 + 3xyz - 1)$

b) $e^{xyz}(x^2y^2z^2 + 3xyz + 1)$

c) $e^{xyz}(x^2y^2z^2 - 3xyz - 1)$

d) $e^{xyz}(x^2y^2z^2)$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 15 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $u = F(x - y, y - z, z - x)$, then $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} =$_____

a) $2u$

b) u

c) 0

d) $\sin u$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 16 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $u = xyz, v = x^2 + y^2 + z^2, w = x + y + z$, then $\frac{\partial(x,y,z)}{\partial(u,v,w)} =$ _____

a) $2(x-y)(y-z)(z-x)$

b) $(x-y)(y-z)(z-x)$

c) $\frac{1}{(x-y)(y-z)(z-x)}$

d) $\frac{1}{2(x-y)(y-z)(z-x)}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 17 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $u = x\sqrt{(1-y^2)} + y\sqrt{(1-x^2)}, v = \sin^{-1} x + \sin^{-1} y$ then the relationship between u and v is _____

a) $u = \cos v$

b) $v = \cos u$

c) $u = \sin v$

d) $v = \sin u$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 18 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $u = x \log xy$, where $x^3 + y^3 + 3xy = 1$, then $\frac{\partial u}{\partial x} =$ _____

a) $1 + \log xy - x(x^2 - y)/y(y^2 + x)$

b) $1 - \log xy - x(x^2 + y)/y(y^2 + x)$

c) $1 + \log xy - x(x^2 + y)/y(y^2 - x)$

d) $1 + \log xy - x(x^2 + y)/y(y^2 + x)$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 19 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the function f(x,y) = sin x + sin y + sin (x+y),What can be said about the point $(\frac{\pi}{3}, \frac{\pi}{3})$?

a) Gives a minimum

b) Gives a maximum

c) Needs investigation

d) A saddle point

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 20 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The shortest distance from the point (1, 2, -1) to the sphere $x^2 + y^2 + z^2 = 24$ is

a) $2\sqrt{3}$

b) $\sqrt{6}$

c) $3\sqrt{6}$

d) $4\sqrt{3}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 21 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The maximum value of $x^2 + y^2 + z^2$ given that $xyz = 8$ is

a) 12

b) 10

c) 8

d) $6\sqrt{2}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 22 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider the points closest to the origin on the planes $x + y + z = a$.

a) The closest point travels farther as **a** is increased

b) The closest point travels nearer as **a** is increased

c) The closest point is independent of **a** as **a** is not there in the expression of the gradient.

d) Varies as $\mathbf{a^2}$, away from the origin.

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 23 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Half of the area of the circle $x^2 + y^2 = 2y$ is given by

a) $2 \times \int_0^1 \int_{1-\sqrt{1-x^2}}^{1} dy\, dx$

b) $\frac{1}{2} \times \int_0^1 \int_{1-\sqrt{1-x^2}}^{1+\sqrt{1-x^2}} dy\, dx$

c) $\int_0^1 \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} dy\, dx$

d) $\int_0^1 \int_0^{1+\sqrt{1-x^2}} dy\, dx$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 24 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let $f(x, y)$ be a continuous function in a region Ron the XY-plane for which $\iint_R f(x, y)\, dx\, dy = 0$. Then,

a) $f(x,y)$ Cannot be positive for any $(x, y) \in R$

b) $f(x,y) = 0$ for all $(x, y) \in R$

c) $f(x,y) \neq 0$ for any $(x, y) \in R$

d) there may exist disjoint partition R_1 and R_2 of R such that $f(x,y) \geq 0$ for all $(x, y) \in R_1$ and $f(x, y) < 0$ for all $(x, y) \in R_2$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 25 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The area of the oval-shaped playing field described by the region $R:\ -2 \le x \le 2, -1-\sqrt{4-x^2} \le y \le 1+\sqrt{4-x^2}$ is

a) $4+8\pi$

b) $8+4\pi$

c) $2+8\pi$

d) $2+4\pi$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 26 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

By changing the order of integration, the double integral $\int_{-2}^{0}\int_{x^2}^{2-x} f(x,y)\,dy\,dx$ becomes

a) $\int_{x^2}^{2-x}\int_{-2}^{0} f(x,y)\,dx\,dy$

b) $\int_{0}^{1}\int_{0}^{\sqrt{y}} f(x,y)\,dx\,dy + \int_{1}^{2}\int_{0}^{2-y} f(x,y)\,dx\,dy$

c) $\int_{0}^{2}\int_{-\sqrt{y}}^{0} f(x,y)\,dx\,dy + \int_{2}^{4}\int_{-\sqrt{y}}^{2-y} f(x,y)\,dx\,dy$

d) $\int_{-2}^{0}\int_{y^2}^{2-y} f(x,y)\,dx\,dy$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 27 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The value of $\int_0^1 \int_0^\infty \frac{dx\,dy}{\sqrt{1+x^2-y^2}}$ is

a) $\frac{\pi^2}{8}$

b) $\frac{\pi^2}{4}$

c) $\frac{\pi^2}{2}$

d) ∞

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 28 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $x = \frac{1}{3}(u+v)$ and $y = \frac{1}{3}(v-2u)$, then the Jacobian $\frac{\partial(x,y)}{\partial(u,v)}$ is

a) 1/3

b) 1/2

c) 1/4

d) -1/3

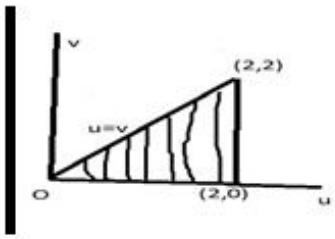
Options :

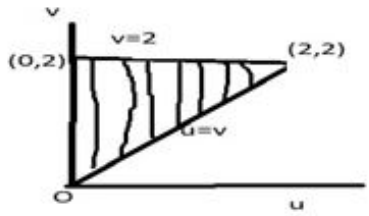
1. 1
2. 2
3. 3
4. 4

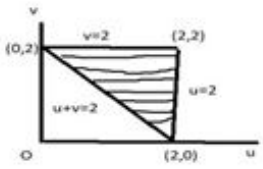
Question Number : 29 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider the image under the transformation $u = x - y$ and $v = 2x + y$ of the triangular region with vertices (0, 0), (1, 1) and (1, -2) in the xy-plane. If we sketch the transformed region in the uv-plane, then which one of the following is correct?

a) 

b) 

c) 

d) 

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 30 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The value of the double integral $\int_0^2 \int_0^{2-x} \frac{y}{x+y}\, dy\, dx$, using the transformation, $x + y = u$ and y= $u\, v$, is

a) 1/2

b) 1/4

c) 1/8

d) 1

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 31 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The typical volume element $dx\,dy\,dz$ in the Cartesian coordinates (x, y, z) is changed to spherical polar coordinates (ρ, φ, Θ) as

a) $d\rho\, d\Theta\, d\varphi$

b) $\rho\, d\rho\, d\Theta\, d\varphi$

c) $\rho^2 \sin\varphi\; d\rho\, d\Theta\, d\varphi$

d) $\rho \sin\varphi\; d\rho\, d\Theta\, d\varphi$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 32 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The area of the surface (plane) $z = x + y$ which lies above the region bounded by the lines $x = 0$, $x = 1$ $y = 0$ and $y = 2$ in the xy-plane is:

a) $\sqrt{3}$ Sq. units

b) $3\sqrt{3}$ Sq. units

c) $\sqrt{3}/2$ Sq. units

d) $2\sqrt{3}$ Sq. units

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 33 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The area of the surface (plane) $x + y + z = 1$ which lies above the region bounded by the lines $y = x$, $y = -x$ and $x = 2$ in the xy-plane is:

a) $\sqrt{3}$ Sq. units

b) $2\sqrt{3}$ Sq. units

c) $3\sqrt{3}$ Sq. units

d) $\sqrt{3}/2$ Sq. units

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 34 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The value of the triple integral $\int_0^1 \int_{y^2}^1 \int_0^{1-x} x \, dz \, dx \, dy$ is

a) $\frac{-4}{35}$

b) $\frac{4}{105}$

c) $\frac{4}{35}$

d) $\frac{-4}{105}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 35 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The volume of the solid bounded by the paraboloid $4x^2 + 4y^2 + z = 1$ and the xy-plane is

a) $\frac{\pi}{8}$

b) $\frac{\pi}{4}$

c) $\frac{\pi}{2}$

d) $\frac{-\pi}{8}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 36 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The triple integral $\int_0^1 \int_{y^3}^{\sqrt{y}} \int_0^{xy} dz\, dx\, dy$ is also equal to

a) $\int_0^1 \int_{x^3}^{\sqrt[3]{x}} \int_0^{xy} dz\, dydx$

b) $\int_0^1 \int_{x^2}^{\sqrt{x}} \int_0^{xy} dz\, dy\, dx$

c) $\int_0^1 \int_{x^3}^{\sqrt{x}} \int_0^{xy} dz\, dy\, dx$

d) $\int_0^1 \int_{x^2}^{\sqrt[3]{x}} \int_0^{xy} dz\, dy\, dx$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 37 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The volume of the region$1 \leq \rho \leq 2, 0 \leq \theta \leq \frac{\pi}{2}, \frac{\pi}{6} \leq \varphi \leq \frac{\pi}{4}$ described in spherical coordinates, is

a) $\frac{7}{6}(\sqrt{3}-\sqrt{2})\pi$

b) $\frac{7}{12}(\sqrt{3}-\sqrt{2})\pi$

c) $\frac{7}{6}(\sqrt{3}+\sqrt{2})\pi$

d) $\frac{7}{12}(\sqrt{3}+\sqrt{2})\pi$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 38 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The spherical coordinate equation for the sphere$x^2 + y^2 + (z-1)^2 = 1$ is

a) $\rho = \sin\varphi$

b) $\rho = 2\sin\varphi$

c) $\rho = \cos\varphi$

d) $\rho = 2\cos\varphi$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 39 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let R be the solid that is bounded by the parabolic cylinder $y = x^2$ and the planes $z = 0$ and $y + z = 1$. Given that it has uniform density $\rho(x, y, z) = 1$. The moment M_{xy} about the xy-plane is

a) $\frac{16}{105}$

b) $\frac{8}{35}$

c) 0

d) $\frac{16}{35}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 40 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The directional derivative of $f = x^2yz + 4xz^2$ at (1,-2,-1) in the direction PQ where P=(1,2,-1) and Q=(-1,2,3) is

a) $\frac{8}{\sqrt{5}}$

b) $-\frac{8}{\sqrt{5}}$

c) $\frac{4}{\sqrt{5}}$

d) $-\frac{4}{\sqrt{5}}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 41 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $u = x^2 + y^2 + z^2$ and $\bar{v} = x\bar{i} + y\bar{j} + z\bar{k}$, then $\nabla \bullet (u\bar{v}) =$

a) $x^2 + y^2 + z^2$

b) $3(x^2 + y^2 + z^2)$

c) $5(x^2 + y^2 + z^2)$

d) $6(x^2 + y^2 + z^2)$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 42 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $r^n \bar{R}$ is a solenoidal vector, then $n =$

a) -2

b) 2

c) -3

d) 3

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 43 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$$\nabla\left(\nabla\bullet\left(\frac{\bar{R}}{r}\right)\right)=$$

a) $\frac{2\bar{R}}{r^3}$

b) $-\frac{2\bar{R}}{r^3}$

c) $\frac{3\bar{R}}{r^3}$

Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.

Options :

1. 1
2. 2
3. 3

Question Number : 44 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$$curl\left(f(r)\bar{R}\right)=$$

a) $f'(r)\bar{R}$

b) $2f'(r)\bar{R}$

c) $4f'(r)\bar{R}$

d) 0

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 45 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $\bar{A} = \left(axy - z^2\right)\bar{i} + (a-2)x^2\bar{j} + (1-a)xz^2\bar{k}$ represents a conservative field, then a =

a) 1

b) 2

c) 3

d) 4

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 46 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Green's theorem can be related to which of the following theorems mathematically?

a) Gauss divergence theorem

b) Stokes' theorem

c) Euler's theorem

d) Leibnitz theorem

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 47 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Using Green's theorem, the value of $\oint_C [y^2 dx + xy dy]$, where C is boundary of the region lying between the graphs of $y = 0, y = \sqrt{x}$ and x= 9.

a) −81/4

b) 243/4

c) 81/4

d) 81/2

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 48 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Using Stokes' theorem, the value of

$\iint_S curlF.d\bar{s}$ where $F = z^2 i - 3xyj + x^3 y^3 k$ and S is the portion of $z = 5 - x^2 - y^2$ above the plane $z = 1$ and the upwards orientation.

a) 0

b) 2

c) -1

d) 8

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 49 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Using the divergence theorem, the value of $\iint_S F.d\bar{s}$ where $F = \sin(\pi x)i + zy^3 j + (z^2 + 4x)k$ and S is the surface of the box $-1 \le x \le 2, 0 \le y \le 1$ and $1 \le z \le 4$. Note that all six sides of the box are included in S.

a) $135\pi / 4$

b) $135 / 2$

c) $135\pi / 2$

d) $135 / 4$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 50 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Find the work done in moving a particle in the force field $F = 3x^2 i + (2xz - y)j + zk$ along the curve defined by $x^2 = 4y,\ 3x^3 = 8z$ from $x = 0$ to $x = 2$.

a) 16

b) 16/3

c) 8/3

d) 15/4

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 51 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The divergence theorem for a surface consisting of a sphere is computed in which coordinate system?

a) Cartesian

b) Cylindrical

c) Spherical

d) Depends on the function

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 52 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Evaluate the surface integral

$\iint_S [(2x+3z)i-(xz+y)j+(y^2+2z)\mathrm{k}].d\bar{S}$, where S is the surface of the sphere having centre at $(3, -1, 2)$ and radius 3.

a) 180π

b) 108π

c) 120π

d) 102π

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 53 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A conservative vector field is given by

$$F = (2xyz^2)i + (x^2z^2 + z\cos(yz))j + (2x^2yz + y\cos(yz))k.$$

Evaluate the line integral from $(0, \pi/2, 1)$ to $(1, 0, 1)$.

a) 1

b) -1

c) 0

d) 2

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 54 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let $F = (-y^2, x, z^2)$, and let the curve C be the intersection of the cylinder $x^2 + y^2 = 1$ with the plane $y + z = 2$, oriented anticlockwise when viewed from above. Compute $\int_C F.d\bar{r}$.

a) 3π

b) $-\pi$

c) π

d) 2π

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 55 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The flux of $F = (x-y)i + xj$ across the circle $x^2 + y^2 = 1$ in the xy-plane.

a) -2π

b) 2π

c) $-\pi$

d) π

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 56 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The solution of $(1+y^2)dx = (\tan^{-1}y - x)dy$ is

a). $xe^{\tan^{-1}y} = (\tan^{-1}y - 1)e^{\tan^{-1}y} + c$

b). $xe^{\tan^{-1}y} = (\tan^{-1}y + 1)e^{\tan^{-1}y} + c$

c). $ye^{\tan^{-1}x} = (\tan^{-1}x - 1)e^{\tan^{-1}x} + c$

d). $ye^{\tan^{-1}x} = (\tan^{-1}x - 1)e^{\tan^{-1}x} + c$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 57 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The solution of the differential equation $\frac{dy}{dx} - y^2 = 1$ satisfying the condition $y(0) = 1$ is

a). $y = e^{x^2}$

b). $y = \sqrt{x}$

c). $y = \cot(x + \frac{\pi}{4})$

d). $y = \tan(x + \frac{\pi}{4})$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 58 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The differential equation $(ay^2 + x + x^8)dx + (y^8 - y + bxy)dy = 0$ is exact, if

a). $b = a$

b). $a = 1, b = 3$

c). $b = 2a$

d). $2b = a$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 59 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The general solution of the d.e. $\frac{dy}{dx} = \cos(x+y)$, with c is a constant is

a). $y + \sin(x+y) = x + c$

b). $\tan\left(\frac{x+y}{2}\right) = y + c$

c). $\cos\left(\frac{x+y}{2}\right) = x + c$

d). $\tan\left(\frac{x+y}{2}\right) = x + c$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 60 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A body is originally at 60^o cools down to 40^o in 15 minutes, when kept in air at a temperature of 25^o. What will be the temperature of the body at the end of 30 minutes

a). 35.2^o

b). 31.5^o

c). 28.7^o

d). 15^o

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 61 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Biotransformation of an organic compound having concentration (x) can be modeled using an ordinary differential equation $\frac{dx}{dt} + kx^2 = 0$, where k is the reaction rate constant. If $x = a$ at $t = 0$, the solution of the equation is

a). $x = ae^{-kt}$

b). $\frac{1}{x} == \frac{1}{a} + kt$

c). $x = a(1 - e^{-kt})$

d). $x = a + kt$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 62 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Integrating factor of $\frac{dr}{d\theta} = 500\theta^n - \frac{r}{\theta}$

a). θ

b). 2θ

c). 3θ

d). 4θ

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 63 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Ascoli lemma states that

a) Every sequence of functions has a uniformly bounded subsequence.

b) Every uniformly bounded and equicontinuous

sequence of functions has a uniformly convergent subsequence.

c) Every convergent and uniformly bounded sequence of functions has equicontinuous subsequence.

d) Every equicontinuous and convergent sequence has a uniformly bounded subsequence.

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 64 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The function $f(x, y) = xy^2$ satisfies Lipschitz condition in

a) $|x| \leq 1 \;\&|y| \leq 1$

b) $|x| \leq 1 \;\&|y| < \infty$

c) $|x| \leq 2 \;\&|y| < \infty$

d) $|x| < \infty \&|y| < \infty$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 65 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The function $f(x,y) = y^{2/3}$ satisfies Lipschitz condition in

a) $|x| \leq 1 \,\&|y| \leq 1$

b) $|x-2| \leq 2 \& |y-3| \leq 2$

c) $|x-3| \leq 3 \& |y-2| \leq 3$

d) $|x| < \infty \& |y| < \infty$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 66 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

On the region $|x| \leq 1 \,\&|y| \leq 1$, which of the following don't satisfy Lipschitz condition

a) $x^2 cos^2 y + y sin^2 x$

b) xe^{-xy^2}

c) $y^{1/3}$

d) $x^2 + y^3$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 67 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider $f(x,y) = x^2|y|$ on R: $|x| \leq 1, |y| \leq 1$

a) f satisfies Lipschitz condition & $\frac{\partial f}{\partial y}$ is bounded on R.

b) f doesn't satisfy Lipschitz condition & $\frac{\partial f}{\partial y}$ is bounded on R.

c) f satisfies Lipschitz condition & $\frac{\partial f}{\partial y}$ doesn't exist at least for some points in R.

d) Neither f satisfies Lipschitz condition nor $\frac{\partial f}{\partial y}$ is bounded.

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 68 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A linear differential equation dy/dx + P(x)y = Q(x) is exact if

a) Q=0

b) P=0

c) P/Q is homogeneous of degree 0

d) P=Q

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 69 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $\frac{dx}{2x-y} = \frac{dy}{x+2y} = \frac{pdx+qdy}{\alpha(px+qy)}$, then α=

a) 1, 4

b) 1, 5

c) 2, 5

d) – 1, 5

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 70 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $\frac{dx}{x+2y-2} = \frac{dy}{2x+y-3} = \frac{pdx+qdy}{\alpha(px+qy)+r}$, then α values and rare given by

a) 3, – 1 and – 15, 5

b) 3, 1 and 8, 5

c) 1, 2 and 2, 5

d) 1, 4 0 and 2, 6

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 71 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The solution for the initial value problem is $y'' + 4y' + 29y = 0,\ y(0) = 0, y'(0) = 15$ is

a) $y = 5e^{-x}\sin 3x$

b) $y = 3e^{-2x}\sin 3x$

c) $y = 3e^{-2x}\sin 5x$

d) $y = 5e^{-x}\sin 5x$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 72 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The particular integral of the differential equation $\frac{d^2y}{dx^2} - 4y = xe^x$ is

a) $\frac{e^x}{3} + \frac{e^x}{9}$

b) $-\frac{e^x}{3} + \frac{xe^x}{9}$

c) $\frac{xe^x}{3} - \frac{e^x}{9}$

d) $-\frac{xe^x}{3} - \frac{2e^x}{9}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 73 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

4The value of $\frac{1}{D^2} x\cos x$ is

a) $-x\cos x+\sin x$

b) $x\cos x+\sin x$

c) $-x\sin x+\cos x$

d) $x\sin x+\cos x$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 74 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Using method of variation of parameters compute Wronskian of $y''-2y'+2y=e^x\tan x$ is

a) e^{4x}

b) $-e^{4x}$

c) e^{2x}

d) $-e^{2x}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 75 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The equation $x^2\frac{d^2y}{dx^2}+P_1x\frac{dy}{dx}+P_2y=R(x)$ reduces to a homogenous linear form if

a) $x=e^{-z}$

b) $x=e^{-2z}$

c) $x=e^{z}$

d) $x=e^{2z}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 76 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$\frac{1}{D-i}\cos ecx=$

a) $e^{ix}(\log\sin x-ix)$

b) $e^{x}(\log\sin x-x)$

c) $e^{ix}(\log\sin x+ix)$

d) $e^{x}(\log\sin x+x)$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 77 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If (x, y) satisfies the system of differential equations $\frac{dx}{dt} + \alpha y = 0$ and $\frac{dy}{dt} = \alpha x$, then the point (x, y) lies on a

a) ellipse

b) parabola

c) circle

d) None of these

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 78 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The maximum value of the solution $x(t)$ of the differential equation $0.25x''(t) + x(t) = 0$ with initial conditions $x(0) = 1$ and $x'(0) = 2$, for $t \geq 0$ is

a) $\sqrt{2}$

b) 2

c) $\frac{\pi}{4}$

d) None of these

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 79 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A function $f(x)$ satisfies the differential equation $\frac{d^2 f(x)}{dx^2} - \frac{f(x)}{L^2} = 0$, L is a constant. If the boundary conditions are $f(0) = k$ and $f(\infty) = 0$, then the solution is

a) $f(x) = ke^{-x/\sqrt{L}}$

b) $f(x) = ke^{-x/L}$

c) Does not exist

d) None of these

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 80 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Blasius equation $2\frac{d^3 f}{d\eta^3} = -f\frac{d^2 f}{d\eta^2}$ is a

a) Mixed order nonlinear differential equation

b) Third order linear differential equation

c) Third order nonlinear differential equation

d) None of these

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 81 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider the nonlinear differential equation $y^{(4)} = \sin x + \sin^2 x (y'')^2$, $0 < x < 1$ with $y(0) = 0$ $y(1) = \sin 1$, $y'(0) = 1$ and $y'(1) = \cos 1$. In the quasilinearization procedure, we can use one of the following as the initial nominal profile

a) $y_0(x) = x + (1 - 2\sin 1 + \cos 1)x^2 - (2 - 3\sin 1 + \cos 1)x^3$

b) $y_0(x) = x - (2 - 3\sin 1 + \cos 1)x^2 + (1 - 2\sin 1 + \cos 1)x^3$

c) $y_0(x) = x + (2 - 3\sin 1 + \cos 1)x^2 + (1 - 2\sin 1 + \cos 1)x^3$

d) None of these

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 82 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If we use the quasilinearization technique to linearize the nonlinear differential equation $y'' + 2y' + e^y = 0, y(0) = 0, y(1) = 0$, then the first approximate solution $y_1(x)$ to the sequence of linearized equations is given by

a) $y''_{n+1} + 2y'_{n+1} + e^{y_{n+1}} y_{n+1} = e^{y_n}(y_n - 1)$ with

$$y_{n+1}(0) = 0,\ y_{n+1}(1) = 0 \quad \text{for} \quad n = 0, 1, 2, \ldots$$

b) $y''_{n+1} + 2y'_{n+1} + e^{y_n} y_{n+1} = e^{y_n}(y_n - 1)$ with

$$y_n(0) = 0,\ y_n(1) = 0 \quad \text{for} \quad n = 0, 1, 2, \ldots$$

c) $y''_{n+1} + 2y'_{n+1} + e^{y_n} y_{n+1} = e^{y_n}(y_n - 1)$ with

$$y_{n+1}(0) = 0,\ y_{n+1}(1) = 0 \quad \text{for} \quad n = 0, 1, 2, \ldots$$

d) None of these

Options :

1. 1
2. 2

3. 3
4. 4

Question Number : 83 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

When a switch is closed in circuit containing a battery E, a resistor R and an inductor L, the current i build at a rate given by $L\frac{di}{dt}+Ri=E$. If this differential equation is applicable over $-10<t<10$ for $10R=-2L$, $E=0$, and $i(4)=10$ then the value of $i(-5)$

a) $10e^{1.8}$

b) $10e^{-1.8}$

c) $1.0\,e^{-1.8}$

d) None of these

Options :
1. 1
2. 2
3. 3
4. 4

Question Number : 84 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

If an uncharged condenser of capacity C is charged by applying an e.m.f. E, through leads of self-conductance L and negligible resistance R, then at any time t, the charge Q is given by

a) $c_1\cos\left(\frac{t}{\sqrt{LC}}\right)+c_2\sin\left(\frac{t}{\sqrt{LC}}\right)+ECL$

b) $c_1\cos\left(\frac{t}{\sqrt{LC}}\right)+c_2\sin\left(\frac{t}{\sqrt{LC}}\right)-ECL$

c) $c_1\cos\left(\frac{t}{LC}\right)+c_2\sin\left(\frac{t}{LC}\right)+ECL$

d) None of these

Options :
1. 1
2. 2

3. 3

4. 4

Question Number : 85 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A tank initially contains 50 *gallons* of pure water. Starting at $t = 0$, a brine containing $2lb$ of dissolved salt per *gallon* flows into the tank at the rate of 3 *gal/min*. If the mixture is kept uniform by stirring and well stirred mixture simultaneously flows out of the tank at the same rate, then the salt content is present at the end of 25 *min* is

a) $100(1-e^{1.5})\ lb$

b) $10(10-e^{-1.5})\ lb$

c) $100(1-e^{-1.5})\ lb$

d) None of these

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 86 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An 8 *pound* weight stretches a spring 2 *feet*. Assume that a damping force numerically equal to 2 times the instantaneous velocity acts on the system. If the weight is released from the equilibrium position with an upward velocity of 3 *ft/sec*, then the displacement can be written as

a) $x(t) = 6te^{-4t}$

b) $x(t) = -3te^{-4t}$

c) $x(t) = -6te^{4t}$

d) None of these

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 87 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The differential equation $(1+x^2)y'' - 2x\,y' + n(n+1)y = 0$ has a singular point at

a) $X = i$

b) $X = 1$

c) $X = 0$

d) $X = 1$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 88 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the differential $x^2y'' + y' + xy = 0$, $x = 0$ is a

a) regular point

b) regular singular point

c) irregular singular point

d) essential regular point

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 89 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a differential equation if the indicial roots are differing by integer, then second independent solution is given by $y_2(x)$=

a) $y_1(x)\ \log x$

b) $\partial y_1/\partial m$

c) $\log y_1(x) + y_1(x)$

d) $x \log y_1(x)$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 90 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The indicial equation for $x^2y'' + 2x(x-2)y' + 2(2-3x)y = 0$ is

a) $(m-4)(m-1)+2=0$

b) $(m-4)(m-1)=0$

c) $(m-4)(m+1)=0$

d) $(m+4)(m-1)=0$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 91 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The indicial equation for $x^2y'' - x(1+x)y' + y = 0$ is

a) $m^2 - 2m + 1 = 0$

b) $(m-1)\,n\,(m-2)=0$

c) $(m-1)(m+1)=0$

d) $m^2 + 2m + 1 = 0$

Options :

1. 1
2. 2
3. 3

4. 4

Question Number : 92 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

the value of $\int_{-1}^{1} P_m(x)P_n(x)dx$ for m = n

a) 0

b) $\frac{2}{2n-1}$

c) $\frac{2}{2n+1}$

d) $\frac{1}{2n+1}$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 93 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$P_n(x) =$

a) $\frac{1}{2^n n!}\frac{d^n}{dx^n}\left(x^2-1\right)^n$

b) $\frac{1}{2^n n!}\frac{d^n}{dx^n}\left(x^2+1\right)^n$

c) $\frac{1}{2^n}\frac{d^n}{dx^n}\left(x^2-1\right)^n$

d) $\frac{1}{2^n n!}\frac{d^n}{dx^n}(x-1)^n$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 94 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$J_{-\frac{1}{2}}(x) =$

a) $\sqrt{\frac{2}{\pi x}}\sin x$

b) $\sqrt{\frac{2}{\pi x}}\cos x$

c) $\sqrt{\frac{2}{\pi x}}(\cos x + \sin x)$

d) $\sqrt{\frac{2}{\pi x}}\cos x - \sin x)$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 95 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$J_{\nu-1}(x) - J_{\nu+1}(x)$

a) $J'_{\nu}(x)$

b) $2J_{\nu}(x)$

c) $J_{\nu}(x)$

d) $2J'_{\nu}(x)$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 96 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The polynomial $2x^2 + x + 3$ in terms of Legendre polynomial is

a) $(4P_2 - 3P_1 + 11P_0)/3$

b) $(4P_2 + 3P_1 - 11P_0)/3$

c) $(4P_2 + 3P_1 + 11P_0)/3$

d) $(4P_2 - 3P_1 - 11P_0)/3$

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 97 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $y' = x - y$, $y(0) = 1$, the by Modified Euler's method, the value of $y(0.1)$ is

a) 0.809

b) 0.909

c) 0.0809

d) 0.0897

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 98 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In which of the following method, we approximate the curve of solution by the tangent in each interval.

a) Picard's method

b) Euler's method

c) Newton's method

d) Runge Kutta method

Options :

1. 1
2. 2

3. 3

4. 4

Question Number : 99 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $y' = 3(1+x) - y$, $y(1) = 4$, the by Euler's method, the value of $y(1.2)$ is

a) 4.0

b) 4.84

c) 4.4

d) 0.44

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 100 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $y' = x(y + 1)$, $y(0) = 1$. the value of $y(0.1)$ by Taylors Series method of fourth order is

a) 1.100001

b) 1.010025

c) 1.000025

d) 1.040403

Options :

1. 1

2. 2

3. 3

4. 4