Section [Unit 1] 1 of 6 | Question : 1 of 5 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

The solution of an exact differential equation $\left(y\left(1+\frac{1}{x}\right)+\cos y\right)dx+(x+\log x-x\sin y)dy=0$ is

- $(x+\log x)y+x\cos y=c$
- $(x+\log x)+\cos\ y=c$
- $(x+\log x)-\sin\ y=c$
- None of these

This is the beginning of the test! | Clear Response

Once you click

Select the correct answer

Marks for this Question : 1 Negative Marks : -25% on wrong answer

The general solution of the differential equation $y = px + \sqrt{a^2p^2 + b^2}$ is:

- $y = cx + \frac{a}{c}$
- $y = cx + \sqrt{a^2c^2 + b^2}$
- $y = cx - e^c$
- $y = cx - sin^{-1}c$

Section [Unit 1] 1 of 6 | Question : 4 of 5 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

The general solution of the differential equation $\sin px \cos y = \cos px \sin y + p$ is:

- $y = cx - e^c$
- $y = cx + \frac{a}{c}$
- $y = cx - \sin^{-1} c$
- $y = cx + \sqrt{a^2c^2 + b^2}$

C

The solution of equation $xdy + ydx = 0$ is:

- $xy = c$
- $x + y = c$
- $x - y = c$
- $x/y = c$

A

Finish

Clear Response

Select the correct answer

The necessary and sufficient condition for the differential equation $Mdx + Ndy = 0$ to be exact is

- $\frac{\partial M}{\partial y} = N$
- $\frac{\partial N}{\partial x} = M$
- $\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x} = 0$
- $\frac{\partial M}{\partial y} + \frac{\partial N}{\partial x} = 0$

C

Clear Response

Question : 5 of 5 Marks for this Question : 1 Negative Marks : -25% on wrong answer

Select the correct answer

The equation $(x^4 - 2xy^2 + y^4)dx - (2x^2y - 4xy^3 + \sin y)dy = 0$ is:

- An exact differential equation
- Homogeneous differential equation
- Non-exact differential equation
- Bernoulli equation

B

Clear Response

Select the correct answer

Question : 1 | Negative Marks : -25% on wrong answer

The solution of the differential equation: $y'' - 4y' - 12y = 0$ is:

- $Ae^{-6x} + Be^{2x}$
- $Ae^{-6x} + Be^{-2x}$
- $Ae^{6x} + Be^{2x}$
- $Ae^{6x} + Be^{-2x}$

D

Marks : -25% on wrong answer

The solution of the differential equation: $3y''' - 2y'' - 3y' + 2y = 0$ is:

○ $Ae^{x} + Be^{-x} + Ce^{2x/3}$

A

○ $A + Be^{-3x} + Ce^{-x}$

○ $Ae^{x} + Be^{3x} + Ce^{-3x}$

○ $A + Be^{3x} + Ce^{3x}$

Negative Marks : -25% on wrong answer

Select the correct answer

The solution of the differential equation: $y'' + 2\pi y' + \pi^2 y = 0$ is:

- $(A + Bx)e^{-\pi/2}$
- $(A + Bx)e^{-\pi x}$
- $(A + Bx)e^{\pi x}$
- $(A + Bx)e^{2\pi x}$

B

Clear Response

The value of Wronskian for the functions: $[1, \sin x, \cos x]$ is:

- -1
- 0
- 1
- 2

A

Clear Response

Start Test

Section [illegible] | Question : [illegible] | Marks for this Question : 1 | Negative Marks : [illegible] on wrong answer

Select the correct answer

The solution of the differential equation: $4y'' + 4y' + y = 0$ is:

- $(A + Bx)e^{-x/2}$
- $(A + Bx)e^{-x}$
- $(A + Bx)e^{x}$
- $(A + Bx)e^{2x}$

A

Question : 1 Negative Marks : -25% on wrong answer

Select the correct answer

The Particular Integral (P.I.) for the equation $y'' + 5y' + 4y = 18e^{2x}$ is:

- $-e^{2x}$
- e^{2x}
- $-e^{-2x}$
- e^{-2x}

B

Finish

Clear Response

The general solution of equation $x^2y'' + xy' - 4y = 0$ is:

- $y = c_1 e^x + c_2 e^{-x}$
- $y = (c_1 \cos 5x + c_2 \sin 5x)$
- $y = c_1 e^x + c_2 e^{-5x}$
- $y = c_1 x^2 + c_2 x^{-2}$

D

Finish

Clear Response

Select the correct answer

Negative Marks : -25% on wrong answer

The Particular Integral (P.I.) for the equation $y'' + 4y = 6\cos x$ is:

○ $2\sin x$

○ $\cos x$

C

○ $2\cos x$

○ $\sin x$

Clear Response

Section (Unit 2) 2 of 6 | Question : 4 of 8 | Marks for this Question : 1 | Negative Marks : 25% on wrong answer

Select the correct answer

The differential equation corresponding to the solutions: (e^{3x}, e^{-2x}) is:

- $y'' + y' + 6y = 0$
- $y'' - y' + 6y = 0$
- $y'' - y' - 6y = 0$
- $y'' + y' - 6y = 0$

C

Clear Response

Once you click next/finish,

Marks : -25% on wrong answer

The Particular integral of equation: $y'' + 9y = sin\,3x$ is:

- $y_p = -\frac{x}{6}\cos 3x$
- $y_p = x\cos 3x$
- $y_p = \frac{1}{20}\cos 3x$
- $y_p = \cos 3x$

A

Section [Unit 2] 2 of 6 Question 2 of 6 Marks for this Question 1 Negative Marks -25% on wrong answer

Select the correct answer

The interval on which the differential equation: $(1-x^2)y'' - 2xy' + 3y = 0$ is normal is:

- $(-\infty,-1),(-1,1),(1,\infty)$
- $(-1,1),(1,\infty)$
- $(-\infty,-1),(-1,1)$
- $(-\infty,-1),(1,\infty)$

Clear Response

Section [Unit 3] 3 of 6 | Question : 2 of 5 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

By method of undetermined coefficients, the trial solution corresponding to the equation $y'' - 3y' - 10y = x^2 + 1$ is:

- $y_p = ax + b$
- $y_p = ax^2 + bx + c$
- $y_p = ax^3 + bx^2 + cx + d$
- $y_p = ae^x$

B

Clear Response

Section [Unit 2] 2 of 6 | Question : 5 of 5 | Marks for this Question : 1 | Negative Marks : 25% on wrong answer

Select the correct answer

The value of Wronskian for the functions: $[x, x^2, x^3]$ is:

- x^3
- $2x^3$
- 0
- x^2

B

Select the correct answer

The transformation that reduces Euler-Cauchy equation into a linear differential equation with constant coefficients is:

- $x = \log t$
- $x = logt + e^t$
- $x = e^t$
- None of these

C

Select the correct answer

The operator forms of the following simultaneous system of equations:

$6\frac{dy_1}{dx}+5\frac{dy_2}{dx}+3y_1+y_2=0, \frac{dy_2}{dx}-5y_1+3y_2=e^x$ is:

- $(6D+3)y_1+(5D+1)y_2=e^x, -5y_1+(D+3)y_2=0$
- $(6D+3)y_1+(5D+1)y_2=0, -5y_1+(D+3)y_2=e^x$
- $(6D+3)y_1+(5D+1)y_2=0, -5y_1+(D+3)y_2=0$
- $(6D-3)y_1+(5D-1)y_2=0, 5y_1+(D-3)y_2=e^x$

Clear Response

Marks for this Question : 1 | Negative Marks : 25% on wrong answer

Select the correct answer

The Particular Integral (P.I.) for the equation $y'' - 2y' - 3y = 3e^{2x}$ is:

- e^{2x}
- $-e^{2x}$
- e^{-2x}
- $-e^{-2x}$

B

Clear Response

Once you click next/finish, you will not be able to

The nature of partial differential equation: $\frac{\partial^2 u}{\partial x^2} + 2\frac{\partial^2 u}{\partial x \partial y} + \frac{\partial^2 u}{\partial y^2} = 0$ is:

Elliptical

Parabolic

Hyperbolic

Circular

B

Clear Response

Select the correct answer

The nature of partial differential equation: $\frac{\partial^2 u}{\partial x^2} + 3\frac{\partial^2 u}{\partial y^2} - \frac{\partial u}{\partial x} = 0$ is:

- Parabolic
- Hyperbolic
- None of these.
- Elliptical

C

Clear Response

Which of the following is the solution of wave equation?

○ $(c_1 e^{px} + c_2 e^{-px})(c_3 e^{cpt} + c_4 e^{-cpt})$

○ $(c_1 \cos px + c_2 \sin px)(c_3 \cos cpt + c_4 \sin cpt)$

○ $(c_1 x + c_2)(c_3 t + c_4)$

○ All of these

D

Finish Clear Response

Section [Unit 5] 5 of 6 | Question : 1 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

70% | General instructions

Select the correct answer

Test time left: 47:56

The level surfaces of the scalar field defined by the function $f = x + y + z$ are:

B

- Spheres
- Ellipsoids
- Paraboloids
- Parallel Planes

Select the correct answer

Negative Marks : -25% on wrong answer

The partial differential equation corresponding to the function: $Z = (x + a)(y + b)$ where a and b are arbitrary constants and $\frac{\partial z}{\partial x} = p$ and $\frac{\partial z}{\partial y} = q$ is:

- $z = pq$
- $z = p + q$
- $z = p - q$
- $z = p/q$

A

Section [Unit 4] 4 of 6 | Question : 5 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

Two-dimensional heat equation in steady state is called:

- ○ Wave Equation
- ○ One dimensional heat Equation
- ○ Laplace Equation
- ○ None of these

C

Finish | Clear Response

The partial differential equation corresponding to the function: $Z = f\left(\frac{x}{y}\right)$ where $\frac{\partial z}{\partial x} = p$ and $\frac{\partial z}{\partial y} = q$ is:

- $px = qy$
- $px + qy = 0$
- $py = qx$
- $py + qx = 0$

B

Clear Response

Section (Unit 4) 4 of 8 | Question 1 of 10 | Marks for this Question 1 | Negative Marks 25% on wrong answer

Select the correct answer

The partial differential equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ represents:

- Heat Equation
- Laplace Equation
- Wave Equation
- D' Alembert Equation

B

Select the correct answer

Which of the following solution of heat equation is used to solve the problem related to conduction of heat?

- $u(x,t) = (A\cos pt + B\sin pt)e^{-c^2p^2t}$
- $u(x,t) = (A\cos px + B\sin px)e^{c^2p^2t}$
- $u(x,t) = (A\cos px + B\sin px)e^{-c^2p^2}$
- $u(x,t) = (A\cos px + B\sin px)e^{-c^2p^2t}$

D

Clear Response

Select the correct answer

The nature of Partial differential equation: $\frac{\partial^2 u}{\partial x^2} = 5\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y}$ *is*

- Circular
- Elliptic
- Hyperbolic
- Parabolic

B

Question : 8 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

The general degree PDE:

$$A\frac{\partial^2 u}{\partial x^2} + B\frac{\partial^2 u}{\partial x\,\partial y} + C\frac{\partial^2 u}{\partial y^2} + D\frac{\partial u}{\partial x} + E\frac{\partial u}{\partial y} + Fu = 0$$ represent Hyperbolic equation if:

- $B^2 - 4AC = 0$
- $B^2 - 4AC > 0$
- $B^2 - 4AC < 0$
- None of these

B

Section [Unit 4] 4 of 6 | Question : 5 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

The nature of partial differential equation: $\frac{\partial^2 u}{\partial x \partial y} - 3\frac{\partial u}{\partial y} = 0$ is:

- Parabolic
- Elliptical
- Hyperbolic
- None of these.

B

Clear Response

Which of the following solution of heat equation is used to solve the problem related to conduction of heat?

- $u(x,t) = (A\cos pt + B\sin pt)e^{-c^2p^2t}$
- $u(x,t) = (A\cos px + B\sin px)e^{c^2p^2t}$
- $u(x,t) = (A\cos px + B\sin px)e^{-c^2p^2}$
- $u(x,t) = (A\cos px + B\sin px)e^{-c^2p^2t}$

D

Clear Response

Section [Unit 4] 4 of 4 | Question 6 of 10 | Marks for this Question 1 | Negative Marks -.25 on wrong answer

Select the correct answer

The nature of partial differential equation: $c^2 \frac{\partial^2 u}{\partial x^2} + \frac{\partial u}{\partial x} - \frac{\partial u}{\partial t} = 0$ is:

- Elliptical
- Circular
- Hyperbolic
- Parabolic

D

Select the correct answer

The normal vector to the surface $f(x, y, z) = xy^2 + 2yz - 8$ at the point $(3, -2, 1)$ is:

- $4\hat{\imath} + 10\hat{\jmath} + 4\hat{k}$
- $4\hat{\imath} + 10\hat{\jmath} - 4\hat{k}$
- $4\hat{\imath} - 10\hat{\jmath} - 4\hat{k}$
- $-4\hat{\imath} - 10\hat{\jmath} + 4\hat{k}$

C

Clear Response

Select the correct answer

The partial differential equation $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ represents:

○ Heat Equation

○ Laplace Equation

D

○ D' Alembert Equation

○ Wave Equation

The partial differential equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ represents:

- Heat Equation
- Laplace Equation
- Wave Equation
- D' Alembert Equation

B

Clear Response

The del operator, denoted as $\vec{\nabla}$, is defined as:

○ $\vec{\nabla} = \hat{\imath}\frac{\partial}{\partial x} + \hat{\jmath}\frac{\partial}{\partial y} + \hat{k}\frac{\partial}{\partial z}$

○ $\vec{\nabla} = \hat{\imath}\frac{\partial}{\partial x} - \hat{\jmath}\frac{\partial}{\partial y} + \hat{k}\frac{\partial}{\partial z}$

○ $\vec{\nabla} = \hat{\imath}\frac{\partial}{\partial x} + \hat{\jmath}\frac{\partial}{\partial y} - \hat{k}\frac{\partial}{\partial z}$

○ $\vec{\nabla} = \hat{\imath}\frac{\partial}{\partial x} - \hat{\jmath}\frac{\partial}{\partial y} - \hat{k}\frac{\partial}{\partial z}$

A

Select the correct answer

The nature of partial differential equation: $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial x \partial y} + \frac{\partial^2 u}{\partial y^2} = 0$ is:

- ○ Parabolic
- ○ Hyperbolic
- ○ Elliptical
- ○ None of these.

C

The general degree PDE:

$A\frac{\partial^2 u}{\partial x^2} + B\frac{\partial^2 u}{\partial x\, \partial y} + C\frac{\partial^2 u}{\partial y^2} + D\frac{\partial u}{\partial x} + E\frac{\partial u}{\partial y} + Fu = 0$ represent Hyperbolic equation if:

○ $B^2 - 4AC = 0$

○ $B^2 - 4AC > 0$

○ $B^2 - 4AC < 0$

○ None of these

B

Clear Response

Question : 2 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

The gradient of a scalar field f(x,y,z) produces a..............?

- Vector field
- Scalar Field
- surface
- none

A

Clear Response

The gradient of the scalar field function $f(x, y) = y^2 - 4xy$ at point (1,2) is:

- $8\hat{\imath}$
- $-8\hat{\imath}$
- $8\hat{\jmath}$
- $-8\hat{\jmath}$

B

Clear Response

Section [Unit 5] 5 of 5 | Question : 4 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

Let f be a differentiable scalar field. Then:

- $curl(grad\ f) \neq \vec{0}$
- $curl(grad\ f) = \vec{0}$
- $curl(grad\ f) = \vec{f}$
- $curl(grad\ f) = \hat{\imath} + \hat{\jmath} + \hat{k}$

B

Clear Response

Section [Unit 6] 6 of 6 | Question : 3 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

The level surfaces of the scalar field defined by the function $f = x^2 + y^2 + z^2$ are:

- Parallel Planes
- Spheres
- Paraboloids
- Ellipsoids

B

Clear Response

Let $\vec{v}$ be a differentiable vector field. Then:

- $div(curl\ \vec{v}) = \vec{v}$
- $div(curl\ \vec{v}) \neq 0$
- $div(curl\ \vec{v}) = 0$
- $div(curl\ \vec{v}) = \hat{\imath} + \hat{\jmath} + \hat{k}$

C

Select the correct answer

The directional derivative of a scalar point function f in the direction $\hat{b}$ is given by:

- $f.\hat{b}$
- $curl(f).\hat{b}$
- $diverence(f).\hat{b}$
- $gradient(f).\hat{b}$

Clear Response

Once you click next/finish, you will not be a

Section [Unit 5] 5 of 6 | Question : 6 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

If $f(x, y, z) = x + y - 2z^2$, then $grad\ (f)$ is equal to:

- $\hat{\imath} + \hat{\jmath} + \hat{k}$
- $\hat{\imath} + \hat{\jmath} - 4z\hat{k}$
- $\hat{\imath} - \hat{\jmath} + 4z\hat{k}$
- $4x\hat{\imath} + 4y\hat{\jmath} - \hat{k}$

B

Clear Response

Once you click nex

Section [Unit 5] 5 of 6 Question : 6 of 10 Marks for this Question : 1 Negative Marks : -25% on wrong answer

Select the correct answer

The parametric representation of the straight line through the point $P(1,2,3)$ and having direction $\vec{b} = \hat{\imath} + 2\hat{\jmath} + 2\hat{k}$ is:

○ $\overrightarrow{r(t)} = (1+t)\hat{\imath} - 2(1+t)\hat{\jmath} + (3-2t)\hat{k}$

○ $\overrightarrow{r(t)} = (1+t)\hat{\imath} - (1+t)\hat{\jmath} + \hat{k}$

○ $\overrightarrow{r(t)} = (1+t)\hat{\imath} + 2(1+t)\hat{\jmath} + (3+2t)\hat{k}$

C

○ $\overrightarrow{r(t)} = (1+t)\hat{\imath} + (1+t)\hat{\jmath} - \hat{k}$

Select the correct answer

If for two vectors $\vec{a}$ and $\vec{b}$, the dot product $\vec{a}.\vec{b} = 0$, then:

- vectors $\vec{a}$ and $\vec{b}$ are coincidental
- vectors $\vec{a}$ and $\vec{b}$ are parallel C
- vectors $\vec{a}$ and $\vec{b}$ are perpendicular
- None of these.

Section [Unit 5] 5 of 6 | Question : 9 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

If 'f' is a differentiable scalar field then $\nabla \times \nabla f = ?$

- 0
- f
- -f
- 2f

A

Clear Response

Section [Unit 5] 5 of 6 | Question : 8 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

The maximum rate of increase of a scalar field $f(x, y, z)$ occure in the direction of the vector...?

- ○ ∇f
- ○ $\nabla . f$
- ○ $\nabla \times f$
- ○ none

B

Clear Response

Section [Unit 5] 5 of 6 | Question : 9 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

Let $\vec{v} = x\hat{\imath} + 2y\hat{\jmath} + z\hat{k}$, then $div\ (\vec{v})$ is equal to:

- 1
- 2
- 3
- 4

D

Clear Response

Section [Unit 6] 6 of 6 | Question : 1 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

Let S be the boundary of a closed and bounded region D. If $\vec{a}$ is a constant vector, then the value of $\iint_S (\vec{a}.\hat{n})dA$ is equal to:

- $3V$
- 0
- V
- 2

A

Finish | Clear Response

Select the correct answer

Let C be a positively oriented simple closed path enclosing a simply connected region R. Using Green's theorem, area of the region R is given by:

- $\oint_C \; xdx + ydy$
- $\oint_C \; xdy - ydx$
- $\frac{1}{2}\oint_C \; xdx + ydy$
- $\frac{1}{2}\oint_C \; xdy - ydx$

A

Section [Unit 6] 6 of 6 | Question : 2 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

$\oint_C (x + xy^2)dx + (y + x^2y)dy = \cdots \ldots \ldots.?$ *where C is the boundary of the region bounded by* $x = y, x = y^2$

- 0
- 21
- 12
- 123

A

Clear Response

Once you click next/finish, you will n

Question : 2 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

Let S be a surface defined by $f(x, y, z) = C$. The unit normal vector $\hat{n}$ to the surface S is given by:

○ $\hat{n} = \frac{grad(f)}{|grad(f)|}$

○ $\hat{n} = grad(f)$

○ $\hat{n} = |grad(f)|$

○ $\hat{n} = grad(f).|grad(f)|$

A

Clear Response

Select the correct answer

Marks for this Question : 1 | Negative Marks : -25% on wrong answer

The integral $\int_C f dx + g dy$ is independent of the simply connected path C if and only if:

- $\dfrac{\partial f}{\partial x} = \dfrac{\partial g}{\partial y}$
- $\dfrac{\partial f}{\partial y} = \dfrac{\partial g}{\partial x}$
- $\dfrac{\partial f}{\partial x} + \dfrac{\partial g}{\partial y} = 0$
- $\dfrac{\partial f}{\partial y} + \dfrac{\partial g}{\partial x} = 0$

B

Section [Unit 6] 6 of 6 | Question : 3 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

If $V = zi + xj + yk \ then$ curl(curl V)=?

- 0
- -1
- 1
- 2

A

Finish | Clear Response

Section [Unit 6] 6 of 6 | Question : 3 of 10 | Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

The surface area of the surface: $x^2 + y^2 = 16, 0 \leq z \leq 2$, is:

- 2π
- 4π
- 8π
- 16π

D

Finish | Clear Response

Marks for this Question : 1 | Negative Marks : -25% on wrong answer

Select the correct answer

A vector field V is said to be rotational if

- $\nabla \times V \neq 0$
- $\nabla \times V = 0$
- $\nabla . V = 0$
- None

A

Finish | Clear Response

Marks for this Question : 1 Negative Marks : -25% on wrong answer

Select the correct answer

General Instructions

Saved successfully.

The line integral $\int_C f(x,y,z)ds$ of function $f(x,y,z)$ which is continuous over the simple smooth curve $C(x(t),y(t),z(t)), a \le t \le b$, with respect to the arc length s is given by:

○ $\int_a^b f(x(t),y(t),z(t))\sqrt{\left(\frac{dx}{dt}\right)^2+\left(\frac{dy}{dt}\right)^2+\left(\frac{dz}{dt}\right)^2}\,dt$

○ $\int_a^b f(x(t),y(t),z(t))dt$

○ $\int_a^b \sqrt{\left(\frac{dx}{dt}\right)^2+\left(\frac{dy}{dt}\right)^2+\left(\frac{dz}{dt}\right)^2}\,dt$

○ None of these.

A