The annihilator operator of the function $y = e^{-6x}$ is

$(D-6)^2$

$(D-6)^3$

$D-6$ **Correct answer**

$D+6$

After converting the given differential equation $4y' + 64y = \sec 3x$ into standard form, the function f(x) is

(Sec3x)/4 **Correct answer**

(Sec3x)/64

None of them

Secx

Wronskian of the function $y_c = c_1 + c_2 \cos x + c_3 \sin x$ is

0

1 **Correct answer**

2

3

In the infinite series of (x-a) which can be written as

$$\sum_{n=0}^{\infty} c_n (x-a)^n = c_0 + c_1(x-a) + c_2(x-a)^2 + \dots$$

the number **a** is called the

Radius of power series
Centre of power series **Correct answer**
Base of power series
None of them

$$\sum_{n=1}^{\infty} a_n (x-a)^n$$

Suppose that a power series is represented by a function "**f**" whose domain is the interval of the convergence of the power series. That function **"f"** is continuous, differentiable and integrable on

(a + R, a - R)
(R -a, R + a)
(a - R, a + R) **Correct answer**
None of them

The interval of convergence for the function **secx** is

$(-\pi, +\pi)$

$(-\frac{\pi}{2}, \frac{\pi}{2})$ **correct answer**

$(\frac{\pi}{2}, \pi)$

None of them

$$\frac{dy}{dx} - 2xy = 0$$

The solution of the linear first order differential equation is

$y = e^{x^2}$ **Correct answer**

$y=\sum_{n=0}^{\infty}\frac{x^{2n}}{n!}$

Both $y=e^{x^2}$ & $y=\sum_{n=0}^{\infty}\frac{x^{2n}}{n!}$

None of them

The quantity $X=L_{\gamma}-\frac{1}{C_{\gamma}}$ is called

Reactance of circuit **Correct answer**

Impedance of circuit

Quasi of circuit

None of them

For the equation of free damped motion $\frac{d^2x}{dt^2}+2\lambda\frac{dx}{dt}+\omega^2x=0$ the roots are $m_1=-\lambda+\sqrt{\lambda^2-\omega^2}$ & $m_1=-\lambda-\sqrt{\lambda^2-\omega^2}$ If $\lambda^2-\omega^2>0$ then system is said to be

Under damped

Over damped

Critically damped **Correct answer**

None of them

The time interval between two successive maxima of $x(t)=Ae^{-\lambda t}\sin[\sqrt{\omega^2-\lambda^2}+\phi]$ is called

Phase period **Correct answer**

Quasi-period

Both the period

None of them

The given differential equation $\frac{d^2x}{dt^2}+5\frac{dx}{dt}+4x=0$ is

Over damped

Critically damped

Under damped

None of them

The standard unit for measurement of inductance is

Volt

Ohms

Henry **Correct answer**

None of them

Which of the rule in matrices under multiplication does not hold true?

Commutative law

Associative law

Identity law

None of them

If $A=\begin{bmatrix}1 & 2 & 3\\ 5 & 6 & 7\end{bmatrix} \& B=\begin{bmatrix}x & y & z & a\\ p & q & r & b\\ l & mn & & o\end{bmatrix}$ then the order of $matirx\ A\times B$ is

2×4 **Correct answer**

2×3

3×3

None of them

$$\frac{d}{dt}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 & -7 \\ 1 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 4 \\ 8 \end{pmatrix}\sin t$$

The given system without the use of matrices is

$\frac{dx}{dt} = 3x - 7y + 4\sin 2t$; $\frac{dy}{dt} = x + y + 8\cos 2t$

$\frac{dx}{dt} = 3x - 7y + 4\sin t$; $\frac{dy}{dt} = x + y + 8\cos t$

$\frac{dx}{dt} = 3x - 7y + 4\sin t$; $\frac{dy}{dt} = x + y + 8\sin t$ **Correct answer**

None of them

Suppose that $\{X_1, X_2, X_3, \ldots, X_n\}$ is a set of n solutions vectors on an interval I, of a homogeneous system $X' = AX$. The set is said to be a fundamental set of solutions of the system on the interval I if the solution vectors are

Linearly dependent

Linearly independent **Correct answer**

Homogeneous

None of them

The coefficient matrix of the following homogeneous system of differential equation

$\frac{dx}{dt} = 3x + 2y$, $\frac{dy}{dt} = x + 2y$ *is*

$$\begin{bmatrix} 3 & 2 \\ 2 & 2 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 1 \\ 2 & 2 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 2 \\ 1 & 2 \end{bmatrix}$$

Correct answer

None of them

$$A = \begin{bmatrix} 3 & -18 \\ 2 & -9 \end{bmatrix}$$

The matrix has an eigen value of multiplicity

1

2

3

4

$$A = \begin{bmatrix} 1 & -2 & -2 \\ -2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$$

The matrix has eigen values $\lambda = -1, -1, 5$ *where* $\lambda = -1$ is a
Single root of A
triple root of A
double root of A
None of them

$$\begin{vmatrix} 4-\lambda & 1 & 0 \\ 0 & 4-\lambda & 1 \\ 0 & 0 & 4-\lambda \end{vmatrix} = 0 \text{ gives}$$

λ = 4 of multiplicity of 1
λ = 4 of multiplicity of 2
λ **= 4 of multiplicity of 3**
None of them

For the system of differential equations $\frac{dy}{dt} = 2x, \frac{dx}{dt} = 3y$ the independent variable(s) is (are)

x, t
y, t
x, y
t

For the system of differential equations $\frac{dy}{dt} = 2x, \frac{dx}{dt} = 3y$ the dependent variable(s) is (are)
x, t
y, t
x, y
t

If **L** denote the linear differential operators with constant coefficients, then $L_1L_4 - L_2L_3$ represents the

$$\begin{vmatrix} L_1 & L_2 \\ L_4 & L_3 \end{vmatrix}$$

$\begin{vmatrix} L_1 & L_3 \\ L_4 & L_2 \end{vmatrix}$

$\begin{vmatrix} L_1 & L_2 \\ L_3 & L_4 \end{vmatrix}$ **Correct answer**

None of them

Wronskian of x, x^2 is

x

x^2

x^3

0

The general solution of differential equation $\frac{dy}{dx} = \frac{x+y}{x}$ .is given by

$e^{\frac{y}{x}} = cx$

$e^{\frac{y}{x}} = cy$

$e^{\frac{x}{y}} = cx$

$e^{-\frac{x}{y}} = cx$

The form of the exact solution to

$$2\frac{dy}{dx} + 3y = e^{-x}, y(0) = 5$$

is

$Ae^{-1.5x} + Bxe^{-x}$

$Ae^{1.5x} + Be^{-x}$

$Ae^{1.5x} + Bxe^{-x}$

$Ae^{-1.5x} + Be^{-x}$

If m and n are non negative integers and $P_n(x)$ is a Legendre's polynomial then

$\int_{-1}^{1} P_m(x)P_n(x)dx = 0 \quad for \ m \neq n$ **Correct answer**

$\int_{-1}^{1} P_m(x)P_n(x)dx = 0 \quad for \ m = n$

$\int_{-1}^{1} P_m(x)P_n(x)dx = 0 \quad for \ m < 0$

$\int_{-1}^{1} P_m(x)P_n(x)dx = 0 \quad for \ n < 0$

If A is a square matrix and its determinant is zero, then
A is singular matrix. **Correct answer**
A is non singular matrix.
A is scalar matrix.
A is diagonal matrix.

An electronic component of an electronic circuit that has the ability to store charge and opposes any change of voltage in the circuit is called

Inductor

Resistor

Capacitor correct answer

None of them

Operator method is the method of the solution of a system of linear homogeneous or linear non-homogeneous differential equations which is based on the process of systematic elimination of the

Dependent variables **correct answer**

Independent variable

Choice variable

None of them

Any linear differential equation of the form

$a_n x^n \frac{d^n y}{dx^n} + a_{n-1} x^{n-1} \frac{d^{n-1} y}{dx^{n-1}} + \cdots + a_1 x \frac{dy}{dx} + a_0 y = g(x)$ $where\ a_0,\ a_1,\ a_2 ..., a_n$ are constants. is called

Homogeneous equation

Polar equation

Equi-dimensioanl equation or Cauchy eular **correct answer**

None of them

For eigen values $\lambda = 5,5$ of a matirx $A = \begin{pmatrix} 3 & 4 \\ -1 & 7 \end{pmatrix}$,there exists .... eigen vectors.

infinite

one

two

three

Ordinary points of $(x^2 - 64)(x^2 - 36)y'' + xy' - y = 0$ are

0,1
8,-8
6,-6
None of others.

A singular point $x = x_0$ of the given equation $a_2(x)y'' + a_1(x)y' + a_0(x)y = 0$ is said to be a regular singular point if

$(x - x_0)P(x)$ is analytic at x_0

$(x - x_0)Q(x)$ is analytic at x_0

$(x - x_0)P(x)$ & $(x - x_0)^2 Q(x)$ **are analytic at x_0.** **Correct answer**

None of them

Singular points **of** the equation $(x^2 - 4)^2 y'' + (x - 2)y' + y = 0$ are

x= -2, 2

None of them

x =2

x = - 2

$$A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

The matrix has ....

Real and unequal value

Repeated & real eigen value

Complex eigen value

None of them

Let λ be an eigen value of a non zero square matrix A. Then the equation $\det(A-\lambda I)=0$ is called

Trivial equation

Characteristics equation

Non-trivial equation **correct answer**

None of them

If $y_1=x^2$ is solution of the differential equation, then formula for finding Second solution of $x^2y''-2y=0$ is

$y_2 = x^2\int \frac{e^{-2x}}{x^2}dx$

$y_2 = x\int \frac{e^{2x}}{x^2}dx$

$y_2 = x^2\int \frac{e^{-\frac{2}{x}}}{x^4}dx$

$y_2 = x^2\int \frac{2}{x^4}dx$

For $y\sin^2 x - y^2\cos x = c \;\; where \;\; y(0)=3; \; the\ value\ of\ c\ is$ -------.

9

-9

10

-10

A differential equation $M(x,y)\,dx + N(x,y)\,dy = 0$ is said to be an exact if -----.

$\frac{\partial M}{\partial x} = \frac{\partial N}{\partial y}$

$\frac{\partial M}{\partial y} \neq \frac{\partial N}{\partial x}$

$\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ **Correct answer**

$\frac{\partial M}{\partial y} = \frac{\partial N}{\partial y}$

Logistics equation is an Example of

Linear

Non linear

Bernoullis

One more name was there i forgot it.

The integrating factor of the differential equation $\frac{dy}{dx} + (Cotx)\,y = \cos^2(x)$ is ------------

$\mu = \ln|Sinx|$

$\mu = \ln|Cosx|$

$\mu = Sinx$

$\mu = Cosx$

2 Marks

Give two examples of Bessel's Differential Equation?
What is wronskian?

Give principle of superposition to find out any homogeneous equation

Define general linear equation of order n?

Marks 3

Write the differential equation $\frac{d^3y}{dx^3} - 4\frac{d^2y}{dx^2} + 5\frac{dy}{dx} = 4x$ **in the form L(y) = g(x) where L is a differential operator with constant coefficients**

Marks 5

Deduce the Special Case of Logistic Equation "Epidemic spread"?

Write down the system of differential equations

$$\frac{dx}{dt} = 6x + y \,,\ \ \frac{dy}{dt} = x + 3y - 9t - 9$$

in form of $X' = AX + F(t)$