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Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)

The solution of $x^2 \frac{d^2y}{dx^2} = 0$ is

Answer (Please select your correct option)

- $y = c_1 + c_2 x$ **correct**
- $y = c_1 x + c_2 x^2$
- $y = c_1 x + c_2 x^3$
- None of them

Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

The nature of roots of auxiliary equation deduced from Cauchy Euler equation

$$4x^2\frac{d^2y}{dx^2}+8x\frac{dy}{dx}+y=0$$

Answer (Please select your correct option)

- Real and unequal
- Real and repeated

correct

- Complex
- None of them

Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

A function **f** is said to be convergent at a point **a** if it can be represented by the power series in (x-a) which has

Answer (Please select your correct option)

- Positive radius of convergence
- Radius of convergence equals zero.
- None of them

correct

- Negative radius of convergence

Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

If E(t)=0, $R \neq 0$ (E(t) is the source voltage & R is the resistance) then electric vibration of the circuit is said to be

Answer (Please select your correct option)

- Free damped oscillation

correct

- Free un-damped oscillation
- Both damped and un-damped oscillation
- None of them

Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

The quantity $Z = \sqrt{X^2 + R^2}$ is called

Answer (Please select your correct option)

- Reactance of circuit
- Impedance of circuit

correct

- Quasi of circuit
- None of them

Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- None of them
- Both the period
- Quasi-period

correct

- Phase period

Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

The Quasi-frequency of the solution **x(t)** of free damped motion is given by the number

Answer (Please select your correct option)

- $\frac{\sqrt{\omega^2 - \lambda^2}}{2\pi}$
- $\frac{2\pi}{\sqrt{\omega^2 - \lambda^2}}$ correct
- $\sqrt{\omega^2 - \lambda^2}$
- None of them

Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

For the equation of free damped motion $\frac{d^2x}{dt^2} + 2\lambda\frac{dx}{dt} + \omega^2 x = 0$ 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

Answer (Please select your correct option)

- Over damped
- Critically damped
- Under damped

correct

- None of them

The general solution of the equation $x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} + (x^2 - \frac{1}{25}) = 0$ is

Answer (Please select your correct option)

- $y = c_1 J_{\frac{1}{3}}(x) + c_2 J_{-\frac{1}{3}}(x)$
- $y = c_1 J_{\frac{1}{4}}(x) + c_2 J_{-\frac{1}{4}}(x)$
- $y = c_1 J_{\frac{1}{5}}(x) + c_2 J_{-\frac{1}{5}}(x)$ correct
- $y = c_1 J_{\frac{1}{25}}(x) + c_2 J_{-\frac{1}{25}}(x)$

Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

$J_{-\frac{2}{3}}(x) - J_{\frac{4}{3}}(x) =$

Answer (Please select your correct option)

- $2J'_{\frac{1}{3}}(x)$ correct
- $2J'_{\frac{2}{3}}(x)$
- $2J'_{\frac{4}{3}}(x)$
- None of them

Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- 2×4 **correct**
- 2×3
- 3×3
- None of them

Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

The order of a matrix which contains 1 rows and m columns is

Answer (Please select your correct option)

- $1 \times m$ correct
- $2 \times m$
- $m \times 1$
- None of them

Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

Eigen value of the matirx $A = \begin{pmatrix} 3 & 4 \\ -1 & 7 \end{pmatrix}$ is

Answer (Please select your correct option)

- $\lambda = 5, 3$
- $\lambda = 5, 5$ correct
- $\lambda = 3, 4$
- None of them

Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

The given system without the use of matrices $\frac{d}{dt}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 & -7 \\ 1 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 4 \\ 8 \end{pmatrix} \sin t$ is

Answer (Please select your correct option)

- $\frac{dx}{dt} = 3x - 7y + 4\sin 2t$; $\frac{dy}{dt} = x + y + 8\cos 2t$
- $\frac{dx}{dt} = 3x - 7y + 4\sin t$; $\frac{dy}{dt} = x + y + 8\cos t$
- $\frac{dx}{dt} = 3x - 7y + 4\sin t$; $\frac{dy}{dt} = x + y + 8\sin t$ correct
- None of them

Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

The given system without the use of matrices $\frac{d}{dt}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 & -7 \\ 1 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 4 \\ 8 \end{pmatrix} e^{-t}$ is

Answer (Please select your correct option)

- $\frac{dx}{dt} = 3x - 7y + 4\sin 2t$; $\frac{dy}{dt} = x + y + 8\cos 2t$
- $\frac{dx}{dt} = 3x - 7y + 4e^{-t}$; $\frac{dy}{dt} = x + y + 8e^{-t}$ **correct**
- $\frac{dx}{dt} = 3x - 7y + 4e^{t}$; $\frac{dy}{dt} = x + y + 8e^{-t}$
- None of them

Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

The coefficient matrix of the following homogeneous system of differential equation $\frac{dx}{dt} = 3x + 2y$, $\frac{dy}{dt} = x + 2y$ *is*

Answer (Please select your correct option)

- $\begin{bmatrix} 3 & 2 \\ 2 & 2 \end{bmatrix}$
- $\begin{bmatrix} 3 & 1 \\ 2 & 2 \end{bmatrix}$
- $\begin{bmatrix} 3 & 2 \\ 1 & 2 \end{bmatrix}$ correct
- None of them

Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

The matrix $A = \begin{bmatrix} 1 & -2 & -2 \\ -2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ has eigen values $\lambda = -1, -1, 5$ *where* $\lambda = -1$ is a

Answer (Please select your correct option)

- Single root of A
- triple root of A

correct

- double root of A
- None of them

Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

By applying the Operator method or systematic elimination on a system of linear homogeneous or linear non-homogeneous differential equations we always get a

Answer (Please select your correct option)

- Single linear differential equation — correct
- Double linear differential equation
- Partial linear differential equation
- None of them

Question No : 19 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- $\begin{vmatrix} L_1 & L_2 \\ L_4 & L_3 \end{vmatrix}$
- $\begin{vmatrix} L_1 & L_3 \\ L_4 & L_2 \end{vmatrix}$
- $\begin{vmatrix} L_1 & L_2 \\ L_3 & L_4 \end{vmatrix}$ correct
- None of them

Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

The matrix $\begin{bmatrix} 2 & 6 \\ 1 & 3 \end{bmatrix}$ is

Answer (Please select your correct option)

- Singular matrix

correct

- Non singular matrix
- Diagonal matrix
- Scalar Matrix

Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

The Differential Equation $(x^2-4)y''-10xy'+y=0$ has singularity at

Answer (Please select your correct option)

- $x = \pm 1$
- $x = \pm 2$ correct
- $x = \pm 3$
- $x = \pm 4$

Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- Dependent variables

correct

- Independent variable
- Choice variable
- None of them

Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)

The non-zero solution of the system exists only when

Answer (Please select your correct option)

- $\det(A - \lambda I) = 1$
- $\det(A - \lambda I) = 0$ correct
- $\det(A - \lambda I) = -1$
- $\det(A - \lambda I) \neq 0$

Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

The solution of the linear first order differential equation $\frac{dy}{dx} - 2y = 0$ is

Answer (Please select your correct option)

- $y = e^{2x+c}$ correct
- $y = \sum_{n=0}^{\infty} \frac{x^n}{4n!}$
- Both 1) and 2)
- None of them

Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

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

correct

Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

Ir-regular singular point **of** the equation $(x^2-4)^2 y'' + (x-2)y' + y = 0$ is

Answer (Please select your correct option)

- x = 2
- x = -2 **correct**
- x= -2, 2
- None of them

Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

The matrix $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ has .....

Answer (Please select your correct option)

- Real and unequal value
- Repeated & real eigen value

correct

- Complex eigen value
- None of them

Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

If $A = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$, then eigen values are

Answer (Please select your correct option)

- 1,2 correct
- 0,1
- 0,2
- None of them

Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- Trivial equation
- Characteristics equation
- Non-trivial equation

correct

- None of them

Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

Eigen values of the following homogeneous system of Differential equation $\frac{dx}{dt} = x$, $\frac{dy}{dt} = 2x + 2y$ with coefficient matrix $\begin{bmatrix} 1 & 0 \\ 2 & 2 \end{bmatrix}$

Answer (Please select your correct option)

- $\lambda = 1, 2$ **correct**
- $\lambda = 2, 2$
- $\lambda = 1, 1$
- None of them

Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following may not be considered as integration technique

Answer (Please select your correct option)

- By Parts
- By substitutions
- By Partial Fractions

correct

- None of these

Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following equations satisfy the differential equation $\frac{dy}{dx} = x$

Answer (Please select your correct option)

- $2y = x^2 + c$ correct
- $y = x^2 + c$
- $y = x^2$
- $y = x + c$

Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

The differential equation $(3x^2y + 2)\,dx + (x^3 + y)\,dy = 0$ is -------.

Answer (Please select your correct option)

- Exact

correct

- Non-exact
- Separable
- Homogenous

Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

In order to change the Bernoulli Equation

$$\frac{dy}{dx} + p(x)y = q(x)y^n$$

into linear differential equation, we choose ----.

Answer (Please select your correct option)

- $v = y^{n-1}$
- $v = y^{1-n}$ correct
- $v = y^n$
- $v = y'$

Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

A differential equation of the form $\frac{dy}{dx} = f(x,y)$ is said to be homogeneous if $f(tx,ty) =$ ----.

Answer (Please select your correct option)

- $f(x,y)$ — correct
- $f(x)$
- $f(y)$
- C

Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

The differential equation ---------- is separable.

Answer (Please select your correct option)

- $x(x+y)\frac{dy}{dx}=4$
- $\frac{dy}{dx}=\frac{x^2}{x+xy}$ **correct**
- $\frac{dy}{dx}=\frac{y}{1+xy^3}$
- $\frac{dy}{dx}=\frac{xy+3}{1+2xy}$

Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

The differential equation ---------- is not separable.

Answer (Please select your correct option)

- $\frac{dy}{dx} = \frac{2xy+3}{3+4xy^2}$ correct
- $\frac{dy}{dx} = \frac{x+1}{x+xy^2}$
- $\frac{dy}{dx} = \frac{1}{x^2y+4y}$
- $\frac{dy}{dx} = 1+y+x+xy$

Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

If the equation $M(x,y)dx + N(x,y)dy = 0$ is not exact and $\mu = \frac{N_x - M_y}{M}$ is a function of y only, then the integrating factor is given by----------.

Answer (Please select your correct option)

- $I.F = e^{\int \mu dy}$ correct
- $I.F = e^{\int 2\mu dy}$
- $I.F = e^{\int \frac{1}{2}\mu dy}$
- $I.F = e^{-\int \mu dy}$

Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

For the solution of the equation $\frac{-1}{y-1} = x + c$ *with* $y(0) = 3$, *the value of* c *is* - - - .

Answer (Please select your correct option)

- 0
- 1
- -1/2

correct

- -1

Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

If $e^{2x}\left(c_1 \cos 3x + c_2 \sin 3x\right)$ is the solution of $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 13y = 0$, then which of the following is the most accurate option for $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 13y = e^{2x}\sin 3x$?

Answer (Please select your correct option)

- Its general form of the particular solution will be $Ae^{2x} + B\sin x + C\cos x$.
- Its general form of the particular solution will be $e^{2x}\left(A\sin x + B\cos x\right)$.

correct

- Its general form of the particular solution will be $e^{2x}\left(Ax\sin x + Bx\cos x\right)$.
- Its general form of the particular solution will be $e^{2x}\left(Ax\sin 3x + Bx\cos 3x\right)$.

Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)

The nature of the roots of the following D.E $x^2\frac{d^2y}{dx^2}-5x\frac{dy}{dx}+8y=0$ is

Answer (Please select your correct option)

- None of them
- real and distinct
- repeated roots
- complex or imaginary

Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

An infinite series of (x-a) in the form of $c_0 + c_1(x-a) + c_2(x-a)^2 + \ldots$ *where the coefficients* $c_0, c_1, c_2, \ldots$ *and* a *are constants and* x *is a variable* is called

Answer (Please select your correct option)

- Real series
- Analytic series
- Power series

correct

- None of them

Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

In the infinite series of (x-a) which can be written as $\sum_{n=0}^{\infty} c_n (x-a)^n = c_0 + c_1(x-a) + c_2(x-a)^2 + \ldots$ the number **a** is called the

Answer (Please select your correct option)

- Radius of power series
- Centre of power series

correct

- Base of power series
- None of them

Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

The given series $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}(-1)^n$ is an

Answer (Please select your correct option)

- Alternating series

correct

- Divergent series
- Exponential series
- None of them

Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

Solution of the D.Equation $4y'' + y = 0$ is

Answer (Please select your correct option)

- $y(x) = c_1 \cos\frac{x}{2} + c_2 Sin\frac{x}{2}$ **correct**
- $y(x) = c_1 \cos\frac{x}{2}$
- $y(x) = c_1 Sin\frac{x}{2}$
- None of them

Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

A function **f** is said to be convergent at a point **a** if it can be represented by the power series in (x-a) which has

Answer (Please select your correct option)

- Negative radius of convergence
- Positive radius of convergence
- Radius of convergence equals zero.
- None of them

correct

Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

For the equation of free damped motion $\frac{d^2x}{dt^2} + 2\lambda\frac{dx}{dt} + \omega^2 x = 0$ 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

Answer (Please select your correct option)

- Over damped
- Critically damped
- Under damped

correct

- None of them

Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- Quasi-period

correct

- Phase period
- Both the period
- None of them

Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

The Quasi-frequency of the solution **x(t)** of free damped motion is given by the number

Answer (Please select your correct option)

- $\frac{\sqrt{\omega^2 - \lambda^2}}{2\pi}$
- $\frac{2\pi}{\sqrt{\omega^2 - \lambda^2}}$ correct
- $\sqrt{\omega^2 - \lambda^2}$
- None of them

Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- Over damped

correct

- Critically damped
- Under damped
- None of them

Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- Commutative law

correct

- Associative law
- Identity law
- None of them

Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- 2×4 **correct**
- 2×3
- 3×3
- None of them

Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

The order of a matrix which contains 1 rows and m columns is

Answer (Please select your correct option)

- $1 \times m$ correct
- $2 \times m$
- $m \times 1$
- None of them

Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

Eigen value of the matirx $A = \begin{pmatrix} 3 & 4 \\ -1 & 7 \end{pmatrix}$ is

Answer (Please select your correct option)

- $\lambda = 5, 3$
- $\lambda = 5, 5$
- $\lambda = 3, 4$
- None of them

correct

Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

The given system without the use of matrices $\frac{d}{dt}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 & -7 \\ 1 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 4 \\ 8 \end{pmatrix} e^{-t}$ is

Answer (Please select your correct option)

- $\frac{dx}{dt} = 3x - 7y + 4\sin 2t$; $\frac{dy}{dt} = x + y + 8\cos 2t$
- $\frac{dx}{dt} = 3x - 7y + 4e^{-t}$; $\frac{dy}{dt} = x + y + 8e^{-t}$ correct
- $\frac{dx}{dt} = 3x - 7y + 4e^{t}$; $\frac{dy}{dt} = x + y + 8e^{-t}$
- None of them

Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

The matrix $A = \begin{bmatrix} 3 & -18 \\ 2 & -9 \end{bmatrix}$ has an eigen value of multiplicity

Answer (Please select your correct option)

- 1
- 2
- 3
- 4

correct

Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

The matrix $A = \begin{bmatrix} 1 & -2 & -2 \\ -2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ has eigen values $\lambda = -1, -1, 5$ *where* $\lambda = -1$ is a

Answer (Please select your correct option)

- Single root of A
- triple root of A

correct

- double root of A
- None of them

Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

The differential equation $2\frac{dy}{dx} + x^2 y = 2x + 3, y(0) = 5$ is

Answer (Please select your correct option)

- Linear
- Nonlinear

correct

- Linear with fixed constants
- Undeterminable to be linear or nonlinear

Question No : 19 of 52 Marks: 1 (Budgeted Time 1 Min)

If A is a square matrix and its determinant is zero, then

Answer (Please select your correct option)

- A is singular matrix.
- A is non singular matrix.
- A is scalar matrix.
- A is diagonal matrix.

correct

Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

The Differential Equation $(x^2+1)y''+2xy'+6y=0$ has singularity at

Answer (Please select your correct option)

- $x=\pm 1$
- $x=\pm i$ **correct**
- $x=\pm 2$
- $x=\pm 2i$

Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

The Differential Equation $(x^2-4)y''-10xy'+y=0$ has singularity at

Answer (Please select your correct option)

- $x = \pm 1$
- $x = \pm 2$ correct
- $x = \pm 3$
- $x = \pm 4$

Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)

Any linear differential equation of the form $a_n x^n \frac{d^n y}{dx^n} + a_{n-1} x^{n-1} \frac{d^{n-1} y}{dx^{n-1}} + \mathrm{L} + a_1 x \frac{dy}{dx} + a_0 y = g(x)$ *where* $a_0, a_1, a_2 \ldots, a_n$ are constants. is called

Answer (Please select your correct option)

- Homogeneous equation
- Polar equation
- Equi-dimensioanl equation
- None of them

Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)

To reduce any Cauchy –Euler differential equation into a differential equation with constants coefficients we often use substitution

Answer (Please select your correct option)

- $y = x^3$
- None of them
- $x = e^t$ correct
- $y = e^t$

Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

A rectangular arrangement of numbers or functions enclosed in the square brackets is called

Answer (Please select your correct option)

- Equation
- derterminant
- Matrix

correct

- None of them

Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- infinite
- one
- two

correct

- three

Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

If wroskian of the solution vectors $X_1 \& X_2$ is zero, then vectors are .....

Answer (Please select your correct option)

- Linearly Independent

correct

- Linearly dependent
- None of them
- Parallel

Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

If $A = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$, then eigen values are

Answer (Please select your correct option)

- 1,2 **correct**
- 0,1
- 0,2
- None of them

Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- Trivial equation
- Characteristics equation
- Non-trivial equation

correct

- None of them

Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

Given vectors $X_1 = \begin{bmatrix} 1 \\ -1 \end{bmatrix} e^{-2t}$, $X_2 = \begin{bmatrix} 3 \\ 5 \end{bmatrix} e^{6t}$ form a

Answer (Please select your correct option)

- Linear set of solution of the system on $(-\infty, +\infty)$ **correct**
- Fundamental set of solution of the system on $(-\infty, +\infty)$
- Partial set of solution of the system on $(-\infty, +\infty)$
- None of them

Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

.....& ..... are dependent variables in differential equations $\frac{dy}{dt} = 2x$, $\frac{dx}{dt} = 3y$

Answer (Please select your correct option)

- x, t
- y, t
- x, y
- t

correct

Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

Eigen values of the following homogeneous system of Differential equation $\frac{dx}{dt} = x$, $\frac{dy}{dt} = 2x + 2y$ with coefficient matrix $\begin{bmatrix} 1 & 0 \\ 2 & 2 \end{bmatrix}$

Answer (Please select your correct option)

- $\lambda = 2, 2$
- $\lambda = 1, 1$
- None of them
- $\lambda = 1, 2$

correct

Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

The general solution of the second order differential equation contains ----------

Answer (Please select your correct option)

- no constant
- one constant
- two constants
- three constants

correct

Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

A solution obtained by giving particular values to the arbitrary constants in the General Solution of a differential equation is called a ----------

Answer (Please select your correct option)

- Singular solution
- Particular solution

correct

- Explicit Solution
- None of these

Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

If $\frac{dy}{dx} = e^x$, then $y =$ .....

Answer (Please select your correct option)

- e^{-x}
- $e^x + C$ correct
- $\ln x$
- x

Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

In a Bernoulli equation $x^2 \frac{dy}{dx} - 2xy = 3y^4$; *identify* $p(x), q(x)$ & n respectively.

Answer (Please select your correct option)

- $x^2, -2x, 4$
- $\frac{-2}{x}, \frac{3}{x^2}, 4$ correct
- $\frac{x}{-2}, \frac{3}{2x}, 4$
- $\frac{-2}{x}, \frac{3}{2x}, 4$

Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

A differential equation of the form $\frac{dy}{dx} = f(x,y)$ is said to be homogeneous if $f(tx,ty) =$ ----.

Answer (Please select your correct option)

- $f(x,y)$ correct
- $f(x)$
- $f(y)$
- C

Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

Constant solution of the differential equation $\frac{dy}{dx} = \frac{y-1}{x}$ is------.

Answer (Please select your correct option)

- $y = 1$ correct
- $y = 0$
- $x = 1$
- $x = 0$

Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

If the tangent lines of two curves are perpendicular at their point of intersection then both the curves are------

Answer (Please select your correct option)

- Non-intersecting curves
- Parallel curves
- Orthogonal curves

correct

- Intersecting curves

Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

An isotope has half life of 20 days. The value of constant k will be.....

Answer (Please select your correct option)

- $K = \frac{20}{\ln 2}$
- $K = -\frac{20}{\ln 2}$
- $K = -\frac{\ln 2}{20}$ **correct**
- $K = \frac{\ln 2}{20}$

Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

If $m^2 + 6m + 8 = (m+4)(m+2)$, then $D^2 + 6D + 8$ (D is a linear differential operator) is equivalent to_____

Answer (Please select your correct option)

- $(m+4)(m+2)$
- $(D+4)(D+2)$ correct
- D^2
- $((D+4)(D+2))y$

Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)

The solution of $x^2 \frac{d^2y}{dx^2} = 0$ is

Answer (Please select your correct option)

not sure

- $y = c_1 + c_2 x$
- $y = c_1 x + c_2 x^2$
- $y = c_1 x + c_2 x^3$
- None of them

Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

The nature of roots of auxiliary equation deduced from Cauchy Euler equation

$$4x^2\frac{d^2y}{dx^2}+8x\frac{dy}{dx}+y=0$$

Answer (Please select your correct option)

- Real and unequal
- Real and repeated
- Complex
- None of them

Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

A function **f** is said to be convergent at a point **a** if it can be represented by the power series in (x-a) which has

Answer (Please select your correct option)

- Positive radius of convergence

not sure

lecr 30, line 1..

- Radius of convergence equals zero.
- None of them
- Negative radius of convergence

Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

If E(t)=0, $R \neq 0$ (E(t) is the source voltage & R is the resistance) then electric vibration of the circuit is said to be

Answer (Please select your correct option)

- Free damped oscillation
- Free un-damped oscillation
- Both damped and un-damped oscillation
- None of them

Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

The quantity $Z = \sqrt{X^2 + R^2}$ is called

Answer (Please select your correct option)

- Reactance of circuit
- Impedance of circuit
- Quasi of circuit
- None of them

lecr 25

Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- None of them
- Both the period
- Quasi-period
- Phase period

Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

The Quasi-frequency of the solution **x(t)** of free damped motion is given by the number

Answer (Please select your correct option)

- $\frac{\sqrt{\omega^2 - \lambda^2}}{2\pi}$
- $\frac{2\pi}{\sqrt{\omega^2 - \lambda^2}}$
- $\sqrt{\omega^2 - \lambda^2}$
- None of them

Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

For the equation of free damped motion $\frac{d^2x}{dt^2} + 2\lambda\frac{dx}{dt} + \omega^2 x = 0$ 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

Answer (Please select your correct option)

- Over damped
- Critically damped
- Under damped
- None of them

Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

The general solution of the equation $x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} + (x^2 - \frac{1}{25}) = 0$ is

Answer (Please select your correct option)

- $y = c_1 J_{\frac{1}{3}}(x) + c_2 J_{-\frac{1}{3}}(x)$
- $y = c_1 J_{\frac{1}{4}}(x) + c_2 J_{-\frac{1}{4}}(x)$
- $y = c_1 J_{\frac{1}{5}}(x) + c_2 J_{-\frac{1}{5}}(x)$
- $y = c_1 J_{\frac{1}{25}}(x) + c_2 J_{-\frac{1}{25}}(x)$

Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

$J_{-\frac{2}{3}}(x) - J_{\frac{4}{3}}(x) =$

Answer (Please select your correct option)

- $2J'_{\frac{1}{3}}(x)$
- $2J'_{\frac{2}{3}}(x)$
- $2J'_{\frac{4}{3}}(x)$
- None of them

Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- 2×4
- 2×3
- 3×3
- None of them

Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

The order of a matrix which contains 1 rows and m columns is

Answer (Please select your correct option)

- $1 \times m$
- $2 \times m$
- $m \times 1$
- None of them

Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

Eigen value of the matirx $A = \begin{pmatrix} 3 & 4 \\ -1 & 7 \end{pmatrix}$ is

3-a(7-a)+4=0
21-3a-7a+a^2+4=0
a^2-10a+25=0
(a-5)^2=0

Answer (Please select your correct option)

- $\lambda = 5, 3$
- $\lambda = 5, 5$
- $\lambda = 3, 4$
- None of them

Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

The given system without the use of matrices $\frac{d}{dt}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 & -7 \\ 1 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 4 \\ 8 \end{pmatrix} \sin t$ is

Answer (Please select your correct option)

- $\frac{dx}{dt} = 3x - 7y + 4\sin 2t$; $\frac{dy}{dt} = x + y + 8\cos 2t$
- $\frac{dx}{dt} = 3x - 7y + 4\sin t$; $\frac{dy}{dt} = x + y + 8\cos t$
- $\frac{dx}{dt} = 3x - 7y + 4\sin t$; $\frac{dy}{dt} = x + y + 8\sin t$
- None of them

The given system without the use of matrices $\frac{d}{dt}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 & -7 \\ 1 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 4 \\ 8 \end{pmatrix} e^{-t}$ is

Answer (Please select your correct option)

- $\frac{dx}{dt} = 3x - 7y + 4\sin 2t\,;\ \frac{dy}{dt} = x + y + 8\cos 2t$
- $\frac{dx}{dt} = 3x - 7y + 4e^{-t};\ \frac{dy}{dt} = x + y + 8e^{-t}$
- $\frac{dx}{dt} = 3x - 7y + 4e^{t};\ \frac{dy}{dt} = x + y + 8e^{-t}$
- None of them

Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

The coefficient matrix of the following homogeneous system of differential equation $\frac{dx}{dt} = 3x + 2y$, $\frac{dy}{dt} = x + 2y$ *is*

Answer (Please select your correct option)

- $\begin{bmatrix} 3 & 2 \\ 2 & 2 \end{bmatrix}$
- $\begin{bmatrix} 3 & 1 \\ 2 & 2 \end{bmatrix}$
- $\begin{bmatrix} 3 & 2 \\ 1 & 2 \end{bmatrix}$
- None of them

Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

The matrix $A = \begin{bmatrix} 1 & -2 & -2 \\ -2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ has eigen values $\lambda = -1, -1, 5$ *where* $\lambda = -1$ is a

Answer (Please select your correct option)

- Single root of A
- triple root of A
- double root of A

i think.. becz mul of -1

- None of them

Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

By applying the Operator method or systematic elimination on a system of linear homogeneous or linear non-homogeneous differential equations we always get a

Answer (Please select your correct option)

- Single linear differential equation
- Double linear differential equation
- Partial linear differential equation
- None of them

Question No : 19 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- $\begin{vmatrix} L_1 & L_2 \\ L_4 & L_3 \end{vmatrix}$
- $\begin{vmatrix} L_1 & L_3 \\ L_4 & L_2 \end{vmatrix}$
- $\begin{vmatrix} L_1 & L_2 \\ L_3 & L_4 \end{vmatrix}$
- None of them

Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

The matrix $\begin{bmatrix} 2 & 6 \\ 1 & 3 \end{bmatrix}$ is

Answer (Please select your correct option)

- Singular matrix
- Non singular matrix
- Diagonal matrix
- Scalar Matrix

Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

The Differential Equation $(x^2-4)y''-10xy'+y=0$ has singularity at

Answer (Please select your correct option)

- $x = \pm 1$
- $x = \pm 2$
- $x = \pm 3$
- $x = \pm 4$

Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- Dependent variables
- Independent variable
- Choice variable
- None of them

Systematic Elimination: Operator Method

- This method of solution of a system of linear homogeneous or linear non-homogeneous differential equations is based on the process of systematic elimination of the dependent variables.
- This elimination provides us a single differential equation in one of the dependent variables that has not been eliminated.
- This equation would be a linear homogeneous or a linear non-homogeneous differential equation and can be solved by employing one of the methods discussed earlier to obtain one of the dependent variables.

Notice that the analogue of multiplying an algebraic equation by a constant is operating on a differential equation with some combination of derivatives.

The non-zero solution of the system exists only when

non-zero vs non trivial

Answer (Please select your correct option)

- $\det(A-\lambda I)=1$
- $\det(A-\lambda I)=0$
- $\det(A-\lambda I)=-1$
- $\det(A-\lambda I)\neq 0$

The Non-trivial solution

The non-trivial solution of the system exists only when

$$\det(A-\lambda I)=0$$

This equation is called the characteristic equation of the matrix A. Thus the Eigenvalues of the matrix A are given by the roots of the characteristic equation. To find an eigenvector corresponding to an eigenvalue λ we simply solve the system of linear algebraic equations

$$\det(A-\lambda I)K=0$$

Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

The solution of the linear first order differential equation $\frac{dy}{dx} - 2y = 0$ is

Answer (Please select your correct option)

- $y = e^{2x+c}$
- $y = \sum_{n=0}^{\infty} \frac{x^n}{4n!}$
- Both 1) and 2)
- None of them

Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

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

Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

Ir-regular singular point **of** the equation $(x^2-4)^2 y'' + (x-2)y' + y = 0$ is

Answer (Please select your correct option)

- x = 2
- x = -2
- x= -2, 2
- None of them

Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

The matrix $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ has .....

Answer (Please select your correct option)

- Real and unequal value
- Repeated & real eigen value
- Complex eigen value
- None of them

Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

If $A = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$, then eigen values are

Answer (Please select your correct option)

- 1,2
- 0,1
- 0,2
- None of them

Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- Trivial equation
- Characteristics equation
- Non-trivial equation
- None of them

Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

Eigen values of the following homogeneous system of Differential equation $\frac{dx}{dt} = x$, $\frac{dy}{dt} = 2x + 2y$ with coefficient matrix $\begin{bmatrix} 1 & 0 \\ 2 & 2 \end{bmatrix}$

Answer (Please select your correct option)

- $\lambda = 1, 2$
- $\lambda = 2, 2$
- $\lambda = 1, 1$
- None of them

Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following may not be considered as integration technique

Answer (Please select your correct option)

- By Parts
- By substitutions
- By Partial Fractions
- None of these

Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following equations satisfy the differential equation $\frac{dy}{dx} = x$

Answer (Please select your correct option)

- $2y = x^2 + c$
- $y = x^2 + c$
- $y = x^2$
- $y = x + c$

Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

The differential equation $(3x^2y + 2)\,dx + (x^3 + y)\,dy = 0$ is -------.

Answer (Please select your correct option)

- Exact
- Non-exact
- Separable
- Homogenous

Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

In order to change the Bernoulli Equation

$$\frac{dy}{dx} + p(x)y = q(x)y^n$$

into linear differential equation, we choose ----.

Answer (Please select your correct option)

- $v = y^{n-1}$
- $v = y^{1-n}$
- $v = y^n$
- $v = y'$

Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

A differential equation of the form $\frac{dy}{dx} = f(x,y)$ is said to be homogeneous if $f(tx,ty) =$ ----.

Answer (Please select your correct option)

- $f(x,y)$
- $f(x)$
- $f(y)$
- C

Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

The differential equation ---------- is separable.

Answer (Please select your correct option)

- $x(x+y)\frac{dy}{dx}=4$
- $\frac{dy}{dx}=\frac{x^2}{x+xy}$
- $\frac{dy}{dx}=\frac{y}{1+xy^3}$
- $\frac{dy}{dx}=\frac{xy+3}{1+2xy}$

Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

The differential equation ---------- is not separable.

Answer (Please select your correct option)

- $\frac{dy}{dx} = \frac{2xy+3}{3+4xy^2}$
- $\frac{dy}{dx} = \frac{x+1}{x+xy^2}$
- $\frac{dy}{dx} = \frac{1}{x^2y+4y}$
- $\frac{dy}{dx} = 1+y+x+xy$

Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

If the equation $M(x,y)dx + N(x,y)dy = 0$ is not exact and $\mu = \frac{N_x - M_y}{M}$ is a function of y only, then the integrating factor is given by----------.

Answer (Please select your correct option)

- $I.F = e^{\int \mu dy}$
- $I.F = e^{\int 2\mu dy}$
- $I.F = e^{\int \frac{1}{2}\mu dy}$
- $I.F = e^{-\int \mu dy}$

$\frac{N_x - M_y}{M}$,

Therefore, the IF is $u(y) = \exp\int \frac{dy}{y} = y$

Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

For the solution of the equation $\frac{-1}{y-1} = x + c$ *with* $y(0) = 3$, *the value of* c *is* $---$.

Answer (Please select your correct option)

- 0
- 1
- -1/2
- -1

Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

If $e^{2x}\left(c_1 \cos 3x + c_2 \sin 3x\right)$ is the solution of $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 13y = 0$, then which of the following is the most accurate option for $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 13y = e^{2x}\sin 3x$?

Answer (Please select your correct option)

- Its general form of the particular solution will be $Ae^{2x} + B\sin x + C\cos x$.
- Its general form of the particular solution will be $e^{2x}\left(A\sin x + B\cos x\right)$.
- Its general form of the particular solution will be $e^{2x}\left(Ax\sin x + Bx\cos x\right)$.
- Its general form of the particular solution will be $e^{2x}\left(Ax\sin 3x + Bx\cos 3x\right)$.

Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)

The conversion of Cauchy Euler equation $4x^2\frac{d^2y}{dx^2}+8x\frac{dy}{dx}+y=0$ after putting $x=e^t$ becomes

Answer (Please select your correct option)

- $(4\Delta^2-4\Delta-1)y=0$
- $(4\Delta^2+4\Delta+1)y=0$
- $(4\Delta^2+8\Delta+1)y=0$
- None of them

Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider a power series $\sum_{n=1}^{\infty} a_n = \sum_{n=1}^{\infty} (x-1)^n$ then power series clearly converges for the value of x lies in

rrect option)

- 0<x<1
- 0<x<2
- 0<x<3
- None of them

Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider a power series $\sum_{n=1}^{\infty} a_n = \sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} x^n$ then power series gives an inconclusive result if

Answer (Please select your correct option)

- $|x| \leq 1$
- $|x| = 1$
- $|x| > 1$
- None of them

Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- (a + R, a - R)
- (R -a, R + a)
- (a - R, a + R)
- None of them

Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

Solution of the D.Equation $4y'' + y = 0$ is

Answer (Please select your correct option)

- $y(x) = c_1 \cos\frac{x}{2} + c_2 Sin\frac{x}{2}$
- $y(x) = c_1 \cos\frac{x}{2}$
- $y(x) = c_1 Sin\frac{x}{2}$
- None of them

Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

A function **f** is said to be convergent at a point **a** if it can be represented by the power series in (x-a) which has

Answer (Please select your correct option)

- Divergent series
- Convergent series
- Both of the Ist and 2nd option
- None of them

Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

If E(t)=0, $R \neq 0$ (E(t) is the source voltage & R is the resistance) then electric vibration of the circuit is said to be

Answer (Please select your correct option)

- Free damped oscillation
- Free un-damped oscillation
- Both damped and un-damped oscillation
- None of them

Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

If E(t)=0, $R = 0$ (E(t) is the source voltage & R is the resistance) then electric vibration of the circuit is said to be

Answer (Please select your correct option)

- Free damped oscillation
- Free un-damped oscillation
- Both damped and un-damped oscillation
- None of them

Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

The Quasi-frequency of the solution **x(t)** of free damped motion is given by the number

Answer (Please select your correct option)

sure

- $\frac{\sqrt{\omega^2 - \lambda^2}}{2\pi}$
- $\frac{2\pi}{\sqrt{\omega^2 - \lambda^2}}$
- $\sqrt{\omega^2 - \lambda^2}$
- None of them

Since $x(t) = \frac{2\sqrt{10}}{3} e^{-t} \sin[3t + 4.391]$ is the solution of $\frac{d^2x}{dt^2} + 2\frac{dx}{dt} + 10x = 0$ *with* $x(0) = -2$, $x'(0) = 0$ .So the phase angle is

Answer (Please select your correct option)

- 4.193
- 4.391
- 4.931
- None of them

Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

The standard unit for measurement of inductance is

Answer (Please select your correct option)

- Volt
- Ohms
- Henry
- None of them

Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

The second order linear differential equation $x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} + (x^2 - 49) = 0$ is a Bessel equation of degree

Answer (Please select your correct option)

- 5
- 6
- 7
- None of them

Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

$J_{-\frac{2}{3}}(x) - J_{\frac{4}{3}}(x) =$

$$\Rightarrow 2J_n'(x) = J_{n-1}(x) - J_{n+1}(x)$$

put n=1/3

Answer (Please select your correct option)

- $2J'_{\frac{1}{3}}(x)$
- $2J'_{\frac{2}{3}}(x)$
- $2J'_{\frac{4}{3}}(x)$
- None of them

Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- Commutative law
- Associative law
- Identity law
- None of them

Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

If a matrix has 3 rows and 2 columns then the given matrix is called

Answer (Please select you

Column matrix

Square Matrix

Inverse matrix

Rectangular matrix

Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- 2×4
- 2×3
- 3×3
- None of them

Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

The given system without the use of matrices $\frac{d}{dt}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 & -7 \\ 1 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 4 \\ 8 \end{pmatrix}\sin t$ is

Answer (Please select your correct option)

- $\frac{dx}{dt} = 3x - 7y + 4\sin 2t\ ;\ \frac{dy}{dt} = x + y + 8\cos 2t$
- $\frac{dx}{dt} = 3x - 7y + 4\sin t;\ \frac{dy}{dt} = x + y + 8\cos t$
- $\frac{dx}{dt} = 3x - 7y + 4\sin t;\ \frac{dy}{dt} = x + y + 8\sin t$
- None of them

Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

The given system without the use of matrices $\frac{d}{dt}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 & -7 \\ 1 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 4 \\ 8 \end{pmatrix} e^{-t}$ is

Answer (Please select your correct option)

- $\frac{dx}{dt} = 3x - 7y + 4\sin 2t\ ;\ \frac{dy}{dt} = x + y + 8\cos 2t$
- $\frac{dx}{dt} = 3x - 7y + 4e^{-t};\ \frac{dy}{dt} = x + y + 8e^{-t}$
- $\frac{dx}{dt} = 3x - 7y + 4e^{t};\ \frac{dy}{dt} = x + y + 8e^{-t}$
- None of them

Question No : 19 of 52 Marks: 1 (Budgeted Time 1 Min)

The coefficient matrix of the following homogeneous system of differential equation $\frac{dx}{dt} = 3x + 2y$, $\frac{dy}{dt} = x + 2y$ *is*

Answer (Please select your correct option)

- $\begin{bmatrix} 3 & 2 \\ 2 & 2 \end{bmatrix}$
- $\begin{bmatrix} 3 & 1 \\ 2 & 2 \end{bmatrix}$
- $\begin{bmatrix} 3 & 2 \\ 1 & 2 \end{bmatrix}$
- None of them

Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- $\lambda = 4$ of multiplicity of 1
- $\lambda = 4$ of multiplicity of 2
- $\lambda = 4$ of multiplicity of 3
- None of them

Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

By applying the Operator method or systematic elimination on a system of linear homogeneous or linear non-homogeneous differential equations we always get a

Answer (Please select your correct option)

- Single linear differential equation
- Double linear differential equation
- Partial linear differential equation
- None of them

Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- x, t
- y, t
- x, y
- t

Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)

The differential equation $2\frac{dy}{dx} + x^2y = 2x + 3, y(0) = 5$ is

Answer (Please select your correct option)

- Linear
- Nonlinear
- Linear with fixed constants
- Undeterminable to be linear or nonlinear

Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

If A is a square matrix and its determinant is zero, then

Answer (Please select your correct option)

- A is singular matrix.
- A is non singular matrix.
- A is scalar matrix.
- A is diagonal matrix.

Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

The Period of oscillator in the solution X=50Sin (20t+8.5) is

Answer (Please select your correct option)

- 0.17643
- 0.32045
- 0.31400
- 0.58000

Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- Inductor
- Resistor
- Capacitor
- None of them

Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

If determinant $\begin{vmatrix} D-3 & 1 \\ -1 & D-1 \end{vmatrix} = 0$, then .....

Answer (Please select your correct option)

- $D^2 - 4D + 1 = 0$
- $D^2 - 4D + 3 = 0$
- $D^2 - 4D + 4 = 0$
- None of them

Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

A rectangular arrangement of numbers or functions enclosed in the square brackets is called

Answer (Please select your correct option)

- Equation
- derterminant
- Matrix
- None of them

Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

If wroskian of the solution vectors $X_1 \& X_2$ is zero, then vectors are .....

Answer (Please select your correct option)

- Linearly Independent
- Linearly dependent
- None of them
- Parallel

Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

If $A = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$, then eigen values are

$1-a(2-a)=2-a-2a+a^2$

$a^2-3a+2=0$

$a^2-2a-a+2=0$

$a(a-2)-1(a-2)=0$

$a=1,2$

Answer (Please select your correct option)

- 1,2
- 0,1
- 0,2
- None of them

Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- Trivial equation
- Characteristics equation
- Non-trivial equation
- None of them

Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

Eigen values of the following homogeneous system of Differential equation $\frac{dx}{dt} = x$, $\frac{dy}{dt} = 2x + 2y$ with coefficient matrix $\begin{bmatrix} 1 & 0 \\ 2 & 2 \end{bmatrix}$

Answer (Please select your correct option)

- $\lambda = 2, 2$
- $\lambda = 1, 1$
- None of them
- $\lambda = 1, 2$

Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

The equation $\frac{dy}{dx} = \frac{x(x+1)}{y(y-1)}$ is a/an ----------

Answer (Please select your correct option)

- partial differential equation.
- ordinary differential equation.
- polynomial equation.
- transcendental equation.

Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

The differential equation $dx + (\frac{x}{y} - \sin y)\, dy = 0$ is ----------

Answer (Please select your correct option)

- Exact.
- Non-exact.
- Homogenous.
- Linear.

Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

If $f(x)$ and $g(x)$ are linearly dependent on I, then-----.

Answer (Please select your correct option)

- $W(f,g)(x) \neq 0$ (Wronskian) for all x in the interval I.
- $W(f,g)(x) = 0$ (Wronskian) for all x in the interval I.
- $W(f,g)(x)$ *may or may not be* zero for all x in the interval I.
- $W(f,g)(x)$ is not defined for all x in the interval I.

Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

If the auxiliary equation has roots $-2, -2$, then the general solution of the differential equation is_____

Answer (Please select your correct option)

- $y = c_1 e^{-2x} + c_2 e^{-2x}$
- $y = c_1 e^{-2+2x}$
- $y = c_1 e^{2x} + c_2 e^{-2x}$
- $y = (c_1 + c_2 x) e^{-2x}$

Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

If the annihilator operator of $2x$ is D^2 and of xe^{3x} is $(D-3)^2$, then which of the following is the correct option?

- The annihilator operator of $2x + xe^{3x}$ is $(D-3)^2$.
- The annihilator operator of $2x + xe^{3x}$ is D^2.
- The annihilator operator of $2x + xe^{3x}$ is $D^2 + (D-3)^2$.
- The annihilator operator of $2x + xe^{3x}$ is $D^2\ (D-3)^2$.

Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

If $y_1 = x$ and $y_2 = xe^x$ are the first and second solution of $x^2\frac{d^2y}{dx^2} - x(x+2)\frac{dy}{dx} + (x+2)y = 0$ on $(0,\infty)$, then which of the following is the most accurate option?

Answer (Please select your correct option)

- $y_1 = x$ and $y_2 = xe^x$ may or may not be linearly dependent.
- $y_1 = x$ and $y_2 = xe^x$ must be linearly independent.
- $y_1 = x$ and $y_2 = xe^x$ may or may not be linearly independent.
- $y_1 = x$ and $y_2 = xe^x$ must be linearly dependent.

Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

If $y_1 = xe^{-x}$ is the first solution of the differential equation $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + y = 0$, then which of the following is true for it?

Answer (Please select your correct option)

- Its second solution is $xe^{-x}\int \frac{2}{e^{-2x}}dx$
- Its second solution is $xe^{-x}\int \frac{2}{x^2e^{-2x}}dx$
- Its second solution is $xe^{-x}\int \frac{1}{x^2e^{-2x}}dx$
- Its second solution is $xe^{-x}\int \frac{1}{x^2}dx$

$$y_2 = y_1(x)\int \frac{e^{-\int P dx}}{y_1^2}dx$$

Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

If $x^2\frac{d^2y}{dx^2} - 2\frac{dy}{dx} = 0$ is the particular form of $\frac{d^2y}{dx^2} + P(x)\frac{dy}{dx} + Q(x)y = 0$, then which of the following is the most accurate option?

Answer (Please select your correct option)

- $P(x) = \frac{2}{x^2}$ and $Q(x) = 0$
- $I.F = e^x\ P(x) = -2$ and $Q(x) = x^2$
- $P(x) = \frac{-2}{x^2}$ and $Q(x) = 0$
- $P(x) = 0$ and $Q(x) = \frac{-2}{x^2}$