

Online Examinations (Even Sem/Part-I/Part-II Examinations 2020 - 2021)

Course Name - --Linear Algebra and Differential Equations

Course Code - BSC(ECE)201

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Option 1

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Option 1

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Option 1

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Option 1

6. *Mark only one oval.*

Option 1

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Mark only one oval.

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Answer all the questions. Each question carry one mark.

14. 1. *

The value of $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega^2 & 1 & \omega \\ \omega^2 & \omega & 1 \end{vmatrix}$ is .

Mark only one oval.

- 0
- 1
- 2
- 3

15. 2. *

If the matrix $\begin{pmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & \lambda \end{pmatrix}$ is singular then the value of λ is

Mark only one oval.

3

5

2

4

16. 3. If A is a non-null square matrix, then $A+A^T$ is a *

Mark only one oval.

symmetric matrix

skew-symmetric matrix

null matrix

none of these.

17. 4. *

$$(AB)^T =$$

Mark only one oval.

$$A^T + B^T$$

Option 1

$$A^T B^T$$

Option 2

$$B^T A^T$$

Option 3

none of these.

Option 4

18. 5. *

The co-factor of x in the determinant $\begin{vmatrix} x & 1 & 1 \\ 2 & -1 & 0 \\ 1 & 3 & 2 \end{vmatrix}$ is

Mark only one oval.

-2

4

2

0

19. 6. *

The adjoint of the determinant $\begin{vmatrix} 2 & 1 \\ 3 & 6 \end{vmatrix}$ is

Mark only one oval.

$$\begin{vmatrix} 1 & 2 \\ 6 & 3 \end{vmatrix}$$

Option 1

$$\begin{vmatrix} 6 & 3 \\ 1 & 2 \end{vmatrix}$$

Option 2

$$\begin{vmatrix} -6 & 3 \\ 1 & -2 \end{vmatrix}$$

Option 3

$$\begin{vmatrix} 6 & -3 \\ -1 & 2 \end{vmatrix}$$

Option 4

20. 7. *

The value of the determinant $\begin{vmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 4 & 5 \end{vmatrix}$ is

Mark only one oval.

1

-1

2

0

21. 8. *

If $A = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$ then $A \cdot A^T =$

Mark only one oval.

 I_2

Option 1

 A

Option 2

 $2A$

Option 3

none of these.

Option 4

22. 9. *

The rank of the matrix $A = \begin{pmatrix} 2 & 1 \\ 3 & 4 \end{pmatrix}$ is

Mark only one oval.

- 2
- 3
- 4
- none of these

23. 10. For what value of μ does the system of equations $x+y+z=1$; $x+2y-z=2$; $5x+7y+\mu z=4$ have a unique solution? *

Mark only one oval.

- $\mu \neq 2$
- $\mu \neq 1$
- $\mu \neq 3$
- $\mu \neq 4$

24. 11. *

The value of 'a' for which rank of the matrix $\begin{pmatrix} 2 & 0 & 1 \\ 5 & a & 3 \\ 0 & 3 & 1 \end{pmatrix}$ is less than 3?

Mark only one oval.

- 3/4
- 3/5
- 3/2
- 1

25. 12. *

The rank of the matrix $\begin{pmatrix} 2 & 2 & 1 \\ 6 & 6 & 3 \end{pmatrix}$ is

Mark only one oval.

2

3

1

None of these

26. 13. *

The value of 'k' for which rank of the matrix $\begin{pmatrix} 1 & 1 & 1 \\ 1 & k & 1 \\ 10 & 1 & 0 \end{pmatrix}$ is 2 is

Mark only one oval.

1

0

-1

2

27. 14. *

In $\begin{vmatrix} 3 & -2 & 5 \\ -1 & 2 & -3 \\ -5 & 6 & 9 \end{vmatrix}$, the minor and co-factor of -2 are respectively

Mark only one oval.

- 24, 24
- 24, -24
- 24, -24
- none of these.

28. 15. *

$S = \{(x, y, 0) \mid x, y \in R\}$ is a subspace of R^3 , then $\dim(S)$ is

Mark only one oval.

- 2
- 3
- 5
- none of these

29. 16. The expression of the vector (7,11) as a linear combination of the vectors (2,3) and (3,5) is *

Mark only one oval.

- $1(2,3)+2(3,5)$
- $2(2,3)+1(3,5)$
- cannot be expressed
- None of these

30. 17. *

If $\{\alpha, \beta, \gamma\}$ is a basis of a vector space V , then $\{\alpha, \beta + \gamma, \gamma\}$

Mark only one oval.

- is a basis of V
- linearly dependent
- linearly independent but not a basis
- None of these

31. 18. *

The vectors $(2, 1, 0), (1, 1, 0), (4, 2, 0)$ of R^3 are

Mark only one oval.

- linearly dependent
- basis
- linearly independent but not a basis
- None of these

32. 19. *

Let $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$ be defined by $T(x_1, x_2, x_3) = (x_1 + 1, x_2 + 1, x_3 + 1), (x_1, x_2, x_3) \in \mathbb{R}^3$,
then T is a

Mark only one oval.

linear mapping

not a linear mapping

Option 1

Option 2

$T(\alpha + \beta) = T(\alpha) + T(\beta)$

none of these.

Option 3

None of these

33. 20. *

Let V and W be two vector spaces and $T : V \rightarrow W$ is a linear mapping, then T is injective if and only if

Mark only one oval.

$$\text{Ker } T = \{\theta\}$$

Option 1

$$\text{Ker } T = \{0\}$$

Option 2

$$\text{Ker } T = V$$

Option 3

None

Option 4

34. 21. *

Let V and W be two vector spaces and $T : V \rightarrow W$ is a linear mapping and θ, θ^1 be the null vectors of V and W respectively, then

Mark only one oval.

$$\text{Ker } T = \{ \alpha \in V \mid T(\alpha) = \theta \}$$

Option 1

$$\text{Ker } T = \{ \alpha \in V \mid T(\alpha) = \theta^1 \}$$

Option 2

$$\text{Ker } T = \{ \alpha \in V \mid T(\alpha) = \alpha \}$$

Option 3

none of these.

Option 4

35. 22. *

If $T : V \rightarrow W$ be a linear mapping, then

Mark only one oval.

- $\dim(\text{Ker } T) + \dim(\text{Im } T) = \dim(V)$
- $\dim(\text{Ker } T) + \dim(\text{Im } T) = \dim(W)$
- $\dim(\text{Ker } T) + \dim(\text{Im } T) = 3$
- None of these

36. 23. *

Let $T : \mathbb{R}^3 \rightarrow \mathbb{R}^2$ be a linear transformation defined by $T(x, y, z) = (x - y, x - z)$, then the dimension of the nullspace of T is

Mark only one oval.

- 0
- 1
- 2
- 3

37. 24. *

Let V be a vector space over the set of all real numbers \mathbb{R} . Let θ be the zero vector of V . Then $2\theta = ?$

Mark only one oval.

 0

Option 1

 θ

Option 2

 2

Option 3

 none of these.

Option 4

38. 25. A vector space V is finite dimensional if it has *

Mark only one oval.

- finite basis
- finite elements
- no basis
- None of these

39. 26. *

Which of the following set span the vector space $\left\{ \begin{bmatrix} x & 0 \\ 0 & y \end{bmatrix} : x, y \in \mathbb{R} \right\}$?

Mark only one oval.

$$\left\{ \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \right\}$$

Option 1

$$\left\{ \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix} \right\}$$

Option 2

$$\left\{ \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 0 \\ 0 & -1 \end{bmatrix} \right\}$$

Option 3

$$\left\{ \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}, \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \right\}$$

Option 4

40. 27. Which of the following is not linear transformation? *

Mark only one oval.

$$T: \mathbb{R}^2 \rightarrow \mathbb{R}^2 : T(x, y) = (3x - y, 2x)$$

Option 1

$$T: \mathbb{R}^3 \rightarrow \mathbb{R}^2 : T(x, y, z) = (3x + 1, y - z)$$

Option 2

$$T: \mathbb{R} \rightarrow \mathbb{R}^2 : T(x) = (5x, 2x)$$

Option 3

$$T: \mathbb{R}^3 \rightarrow \mathbb{R}^2 : T(x, y, z) = (x, 0, z)$$

Option 4

41. 28. *

Let $T: \mathbb{R}^2 \rightarrow \mathbb{R}^3$ be a linear transformation given by $T(x, y) = (x + y, x - y, y)$, then rank of T is

Mark only one oval.

2

0

1

4

42. 29. *

Let $T : V \rightarrow W$ be a linear transformation and $\text{rank}(T)=m$, then

Mark only one oval.

- $\dim(V) = m$
- $\dim(\text{Ker } T) = m$
- $\dim(\text{Im } T) = m$
- $\dim(W) = m$

43. 30. *

Let $T : R^n \rightarrow R^n$ be a linear transformation. Which one of the following statement implies that T is bijective?

Mark only one oval.

- $\text{nullity}(T) = n$
- $\text{rank}(T) = \text{nullity}(T) = n$
- $\text{rank}(T) + \text{nullity}(T) = n$
- $\text{rank}(T) - \text{nullity}(T) = n$

44. 31. *

If $A^2 = A$, then its Eigen values are either

Mark only one oval.

- 0 or 2
- 1 or 2
- 0 or 1
- Only 0

45. 32. *

If $\lambda \neq 0$ is an Eigen value of a matrix A then $\det(A - \lambda I) =$

Mark only one oval.

 λ

Option 1

 $-\lambda$

Option 2

 2λ

Option 3

 0

Option 4

46. 33. *

The sum of the Eigen values of the matrix $A = \begin{pmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{pmatrix}$ is

Mark only one oval.

5

-5

-7

7

47. 34. *

If A is a non-null square matrix then $A+A^T$ is a

Mark only one oval.

symmetric matrix

skew-symmetric matrix

null matrix

Identity Matrix

48. 35. *

If A is a non-null square matrix then $A-A^T$ is a

Mark only one oval.

- symmetric matrix
- skew-symmetric matrix
- Identity Matrix
- Orthogonal matrix

49. 36. *

If A is an orthogonal Matrix then what can we say about the matrix A

Mark only one oval.

- Singular Matrix
- Non-Singular Matrix
- Symmetric Matrix
- Skew-Symmetric matrix

50. 37. *

If $\det(A) \neq 0$ then what can we say about the matrix A

Mark only one oval.

0 is an Eigen value of A^{-1}

Option 1

0 can't be an Eigen value of A^{-1}

Option 2

$\text{tr}(A) \neq 0$

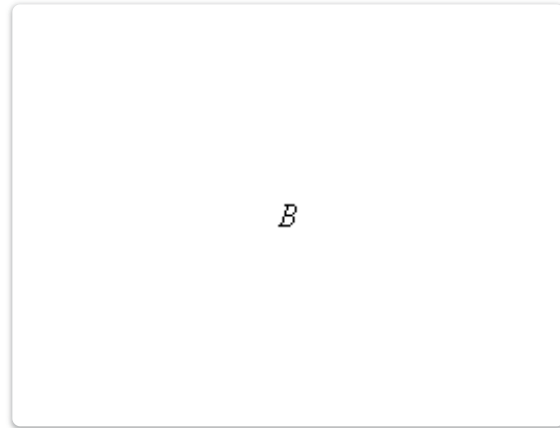
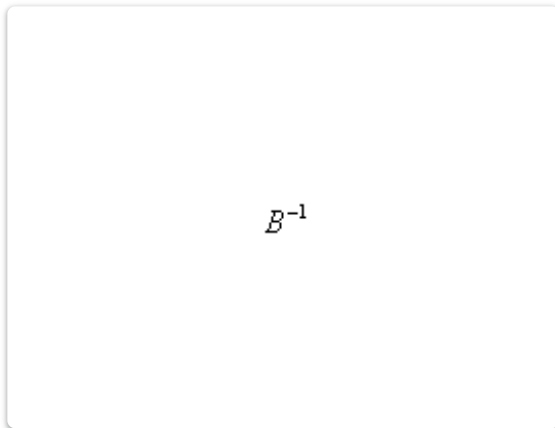
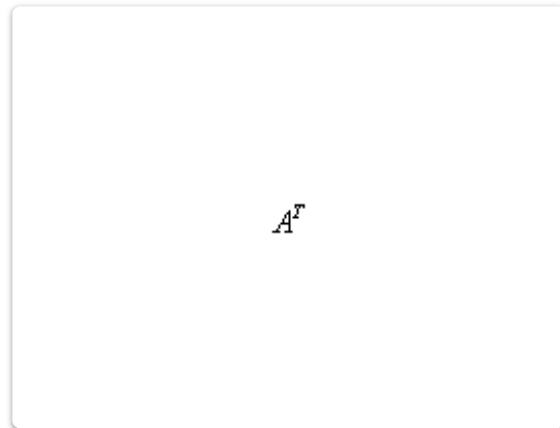
Option 3

A is a skew-symmetric matrix

Option 4

51. 38. *

If A is similar to the matrix B then A^{-1} is similar to the matrix
Mark only one oval.

 Option 1 Option 2 Option 3 Option 4

52. 39. *

If A has an Eigen vector v and $A = P^{-1}BP$ then B has an Eigen vector
Mark only one oval.

 Pv Option 1
 $P^{-1}v$ Option 2
 v Option 3
 v^{-1} Option 4

53. 40. *

If $V = \mathbb{R}^3$ be equipped with inner product $(x, y) = x_1y_1 + 2x_2y_2 + 3x_3y_3$, In this inner product space $(V, (\cdot, \cdot))$ which of the following pairs of vectors is orthonormal?

Mark only one oval.

$$u = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, v = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$

Option 1

$$u = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, v = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$

Option 2

$$u = \begin{bmatrix} \frac{1}{\sqrt{3}} \\ 0 \\ 0 \end{bmatrix}, v = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$

Option 3

$$u = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}, v = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$$

Option 4

54. 41. *

If $V = \mathbb{R}^3$ be equipped with inner product $(x, y) = x_1y_1 + 2x_2y_2 + 3x_3y_3$, In this inner

product space $(V, (\cdot, \cdot))$ then the value of the inner product of $u = \begin{bmatrix} 1 \\ 1 \\ \frac{1}{\sqrt{3}} \end{bmatrix}, v = \begin{bmatrix} 0 \\ \frac{1}{2} \\ \frac{1}{\sqrt{3}} \end{bmatrix}$

Mark only one oval.

$$\frac{2}{\sqrt{2}}$$

Option 1

$$2\sqrt{2}$$

Option 2

$$2$$

Option 3

$$\frac{\sqrt{3}}{2}$$

Option 4

55. 42. *

If $V = \mathbb{R}^3$ be equipped with inner product $(x, y) = x_1y_1 + x_2y_2 + x_3y_3$. In this inner product space $(V, (\cdot, \cdot))$ which of the following pairs of vectors is orthonormal?

Mark only one oval.

$$u = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, v = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$

Option 1

$$u = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, v = \begin{bmatrix} 0 \\ 1 \\ 2 \\ 0 \end{bmatrix}$$

Option 2

$$u = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, v = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$$

Option 3

$$u = \begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix}, v = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$$

Option 4

56. 43. The diagonalizing matrix is also known as: *

Mark only one oval.

- Eigen Matrix
- Constant Matrix
- Modal Matrix
- State Matrix

57. 44. *

If $\lambda = 1$ is an Eigen value of the matrix $\begin{bmatrix} 3 & 1 \\ 2 & 2 \end{bmatrix}$ then the corresponding Eigen vector

is

Mark only one oval.

$$\begin{bmatrix} -1 \\ 1 \end{bmatrix}$$

Option 1

$$\begin{bmatrix} 1 \\ -1 \end{bmatrix}$$

Option 2

$$\begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

Option 3

$$\begin{bmatrix} -1 \\ -1 \end{bmatrix}$$

Option 4

58. 45. *

If $V = \mathbb{R}^3$ be equipped with inner product $(x, y) = x_1y_1 + x_2y_2 + x_3y_3$. Then which of the following set of vectors are linearly independent.

Mark only one oval.

$\{(0, 1, 0), (0, 0, 1), (-1, 0, 1)\}$

Option 1

$\{(0, 1, 0), (0, -1, 0), (0, 0, 1)\}$

Option 2

$\{(0, 1, 0), (0, 0, 1), (-1, 0, 1)\}$

Option 3

$\{(1, 0, 1), (0, 1, 0), (-1, 0, 1)\}$

Option 4

59. 46. *

What is the value of k so that the vectors $(1, -2, -3)$ and $(2, k, 4)$ are orthogonal

Mark only one oval.

 -5

 5

 -10

 10

60. 47. Which of the following matrix is orthogonally diagonalizable *

Mark only one oval.

$$\begin{bmatrix} 0 & 2 & 3 \\ 2 & 0 & 4 \\ -3 & 4 & 0 \end{bmatrix}$$

 Option 1

$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 4 \\ 3 & 4 & 3 \end{bmatrix}$$

 Option 2

$$\begin{bmatrix} 1 & 2 & 3 \\ -2 & 4 & 4 \\ -3 & -4 & 3 \end{bmatrix}$$

 Option 3

$$\begin{bmatrix} 1 & 2 & 3 \\ 0 & 4 & 4 \\ 0 & 0 & 3 \end{bmatrix}$$

 Option 4

61. 48. *

If λ is an Eigen value of an orthogonal matrix A the which of the following statement is false

Mark only one oval.

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

Option 1

$$\det(A - \frac{1}{\lambda} I) = 0$$

Option 2

$$\det(A^{-1} - \lambda I) = 0$$

Option 3

One of a, b and c is false

Option 4

62. 49. *

The differential equation $(a_1x - b_1y)dx + (a_2x - b_2y)dy = 0$ is exact if

Mark only one oval.

$$a_1 = b_2$$

Option 1

$$b_1 = b_2$$

Option 2

$$a_1 = -b_2$$

Option 3

$$a_2 = -b_1$$

Option 4

63. 50. *

If $x^m y^n$ be the IF of the equation $(2ydx + 3xdy) + 2xy(3ydx + 4xdy) = 0$ then the value of m and n are respectively

Mark only one oval.

1, 3

2, 1

2, 2

1, 2

64. 51. *

The integrating factor of $y dx - x dy + 4x^3 y^2 e^{x^4} dx = 0$ is

Mark only one oval.

$$\frac{1}{y}$$

Option 1

$$y^2$$

Option 2

$$x^2$$

Option 3

$$\frac{1}{y^2}$$

Option 4

65. 52. *

The general form of a first order linear equation in x is $\frac{dy}{dx} + Px = Q$ where

Mark only one oval.

- P and Q are both functions of x
- P and Q are both functions of y
- P and Q are the functions of x and y , respectively
- P and Q are the functions of y and x , respectively

66. 53. *

The general solution of $\left(\frac{dy}{dx}\right)^2 + \frac{dy}{dx} - 6 = 0$ is

Mark only one oval.

$$(y + 3x - c)(y - 2x - c) = 0$$

Option 1

$$(y + 3x - c_1)(y - 2x - c_2) = 0$$

Option 2

$$(y + 3x)(y - 2x - c) = 0$$

Option 3

none of these.

Option 4

67. 54. *

The CF of the equation $x^2 \frac{d^2y}{dx^2} - 2x \frac{dy}{dx} = 3x$ is

Mark only one oval.

$$c_1x + c_2e^{3x}$$

Option 1

$$c_1e^x + c_2e^{3x}$$

Option 2

$$c_1 + c_2e^{3x}$$

Option 3

none of these.

Option 4

68. 55. *

The integrating factor of $\cos x \frac{dy}{dx} + y \sin x = 1$ is

Mark only one oval.

tan x

Option 1

cos x

Option 2

sec x

Option 3

sin x

Option 4

69. 56. *

$$\frac{1}{D^2 + 4} \sin 2x =$$

Mark only one oval.

$$\frac{1}{4} x \cos 2x$$

 Option 1

$$\frac{\cos 2x}{2}$$

 Option 2

$$-\frac{1}{4} x \cos 2x$$

 Option 3

none of these.

 Option 4

70. 57. *

$$\frac{1}{(D-2)(D-3)}e^{2x} =$$

Mark only one oval.

$$-e^{2x}$$

 Option 1

$$xe^{2x}$$

 Option 2

$$-xe^{3x}$$

 Option 3

$$-xe^{2x}$$

 Option 4

71. 58. *

The Wronskian for the differential equation $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = 9e^x$ is

Mark only one oval.

 e^{2x}

Option 1

 e^x

Option 2

 e^{3x}

Option 3

none of these.

Option 4

72. 59. *

The P.I. of the equation $2x \frac{d^2y}{dx^2} + 2 \frac{dy}{dx} = \frac{1}{x}$ is

Mark only one oval.

$$\frac{1}{4}x^2$$

Option 1

$$\frac{1}{2}x^2$$

Option 2

$$\frac{1}{2}(\log x)^2$$

Option 3

$$\frac{1}{4}(\log x)^2$$

Option 4

73. 60. *

For the simultaneous equation $\frac{dx}{dt} + y = \sin t$, $\frac{dy}{dt} + x = \cos t$, which of the following is true?

Mark only one oval.

$$x = c_1 \cos t + c_2 \sin t$$

Option 1

$$x = c_1 e^t + c_2 e^{-t}$$

Option 2

$$x = (c_1 + c_2 t) e^t$$

Option 3

none of these.

Option 4

74. 61. *

$$\frac{1}{D^2 - 2D + 5}(10 \sin x) =$$

Mark only one oval.

$$\sin x + \cos x$$

Option 1

$$3 \sin x - \cos x$$

Option 2

$$2 \sin x + \cos x$$

Option 3

$$4 \sin x$$

Option 4

75. 62. *

If $y = 3e^{2x} + e^{-2x} - \alpha x$ is the solution of the initial value problem $\frac{d^2y}{dx^2} + \beta y = 4\alpha x$

$y = 4$ and $\frac{dy}{dx} = 1$ at $x = 0$, where $\alpha, \beta \in \mathbb{R}$, then

Mark only one oval.

$$\alpha = 3 \text{ and } \beta = 4$$

Option 1

$$\alpha = 1 \text{ and } \beta = 2$$

Option 2

$$\alpha = 3 \text{ and } \beta = -4$$

Option 3

$$\alpha = 1 \text{ and } \beta = -2$$

Option 4

76. 63. *

For $a, b, c \in \mathbb{R}$, if the differential equation

$$(ax^2 + bxy + y^2)dx + (2x^2 + cxy + y^2)dy = 0 \text{ is exact, then}$$

Mark only one oval.

a=2, c=2a

b=4, c=2

b=2, c=4

b=2, a=2c

77. 64. *

The C.F of the differential equation $(D^2 - 2D + 5)^2 y = \sin 2x$ is

Mark only one oval.

$$e^x \{(c_1 + c_2 x) \cos 2x + (c_3 + c_4 x) \sin 2x\}$$

Option 1

$$e^x \{(c_1 + c_2 x) \cos x + (c_3 + c_4 x) \sin x\}$$

Option 2

$$\begin{aligned} &(c_1 e^x + c_2 e^{2x}) \cos x \\ &(c_3 e^x + c_4 e^{2x}) \sin x \end{aligned}$$

Option 3

$$\begin{aligned} &(c_1 \cos x + c_2 \cos 2x \\ &+ c_3 \sin x + c_4 \sin 2x) e^x \end{aligned}$$

Option 4

78. 65. *

The general solution of $xp + yq = z$ for an arbitrary function ϕ is
Mark only one oval.

$$\phi\left(\frac{x}{y}, xy\right) = 0$$

 Option 1

$$\phi(x + y, xz) = 0$$

 Option 2

$$\phi\left(\frac{x}{y}, \frac{x}{z}\right) = 0$$

 Option 3

$$\phi(xy, z) = 0$$

 Option 4

79. 66. *

The general integral of $zxp - yzq = y^2 - x^2$ for an arbitrary function ϕ is
Mark only one oval.

$$x^2 + y^2 + z^2 = \phi(xy)$$

 Option 1

$$x^2 - y^2 - z^2 = \phi(xy)$$

 Option 2

$$x^2 + y^2 + z^2 = \phi(xyz)$$

 Option 3

$$x^2 - y^2 - z^2 = \phi(yz)$$

 Option 4

80. 67. *

The complete integral of the PDE $pq = z$, where $p = \frac{\partial z}{\partial x}$, $q = \frac{\partial z}{\partial y}$ is

Mark only one oval.

$$z = (x+a)(y+b)$$

Option 1

$$z = x+y+a+b$$

Option 2

$$z = \frac{x+a}{y+b}$$

Option 3

$$z = xy+ax+by$$

Option 4

81. 68. *

The general solution of $\frac{\partial^2 z}{\partial x^2} - a^2 \frac{\partial^2 z}{\partial y^2} = 0$ is

Mark only one oval.

$$z = \phi_1(y+ax) + \phi_2(y-ax)$$

Option 1

$$z = \phi_1(x+ay) + \phi_2(x-ay)$$

Option 2

$$z = \phi_1(y+ax) + x\phi_2(y-ax)$$

Option 3

$$z = \phi_1(x+ay) + x\phi_2(x-ay)$$

Option 4

82. 69. *

The general solution of $(D^2 + 2DD' + D'^2)z = e^{2x+3y}$ is

Mark only one oval.

$$z = \phi_1(y-x) + x\phi_2(y-x) + \frac{1}{5}e^{2x+3y}$$

Option 1

$$z = \phi_1(y-x) + x\phi_2(y-x) + \frac{1}{15}e^{2x+3y}$$

Option 2

$$z = \phi_1(y-x) + (1+x)\phi_2(y-x) + \frac{1}{25}e^{2x+3y}$$

Option 3

$$z = \phi_1(y-x) + x\phi_2(y-x) + \frac{1}{25}e^{2x+3y}$$

Option 4

83. 70. Which of the following PDE represents a hyperbola? *

Mark only one oval.

$$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = 0$$

Option 1

$$\frac{\partial^2 z}{\partial x^2} = k \frac{\partial z}{\partial t}$$

Option 2

$$\frac{\partial^2 z}{\partial x^2} = \frac{1}{a^2} \frac{\partial^2 z}{\partial t^2}$$

Option 3

none of these.

Option 4

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