Online Assessment (Even Sem/Part-I/Part-II Examinations 2019 - 2020

Course Name - Linear Algebra and Differential Equations
Course Code - BSC(CSE)201/BSC(ECE)201

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Answer all the questions. Each question carry one mark.

9. 1.

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

10. 2.

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

11. 3.

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

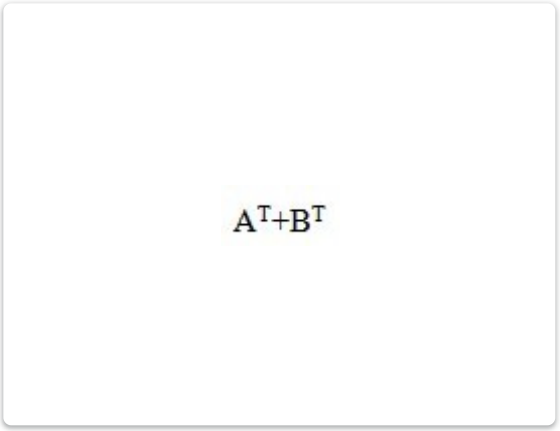
Mark only one oval.

- symmetric matrix
- skew-symmetric matrix
- null matrix
- None of these

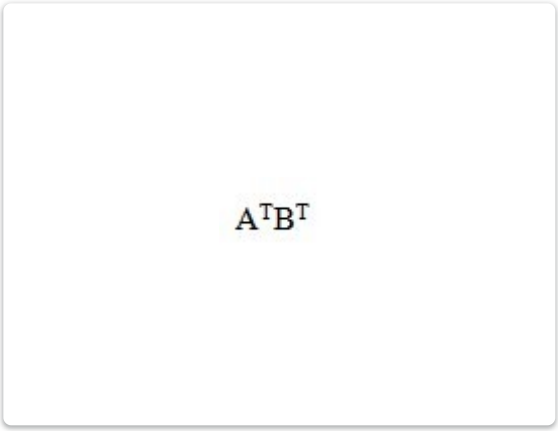
12. 4.

$(AB)^T =$

Mark only one oval.



Option 1



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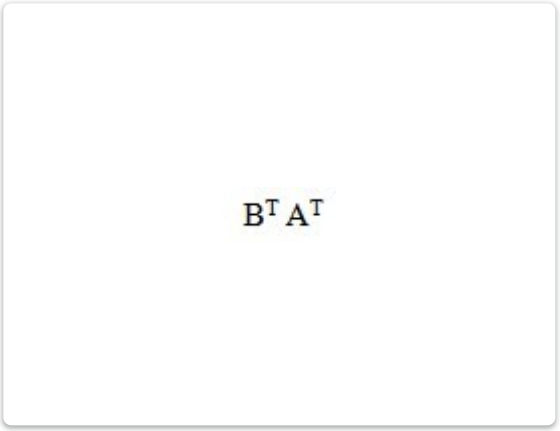


Option 3

none of these

13. 5.

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

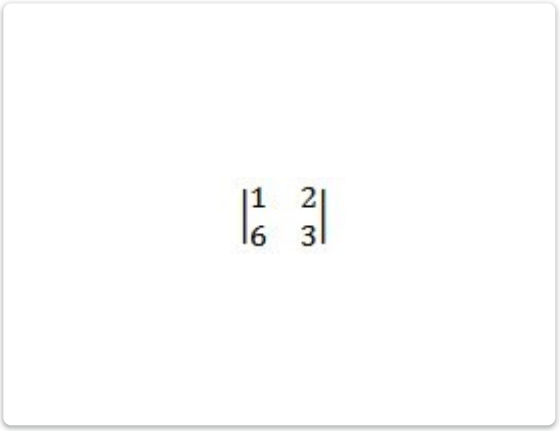
Mark only one oval.

- ⬭ - 2
- ⬭ 4
- ⬭ 2
- ⬭ 0

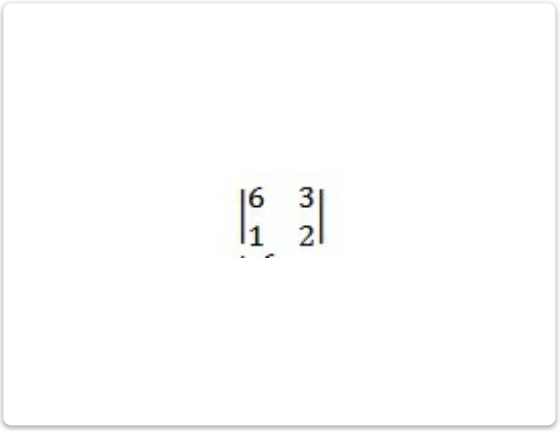
14. 6.

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

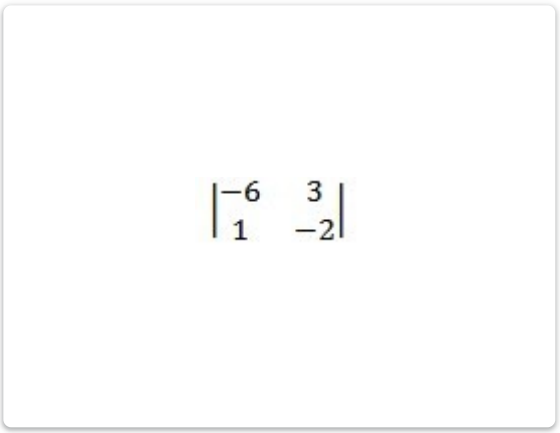
Mark only one oval.



Option 1



Option 2



Option 3

Option 4

15. 7.

If $A=\begin{pmatrix} 2 & -1 \\ 1 & 3 \end{pmatrix}$, then $A^2+7I=$

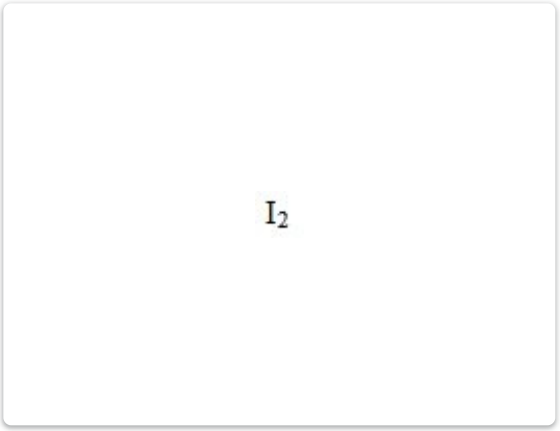
Mark only one oval.

- O
- 2A
- 3A
- 5A

16. 8.

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

Mark only one oval.



- Option 1
- A
- 2A
- None of these

17. 9.

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

18. 10. The equation x-y=0 has

Mark only one oval.

- no solution
- exactly one solution
- exactly two solutions
- infinite number of solutions

19. 11.

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

20. 12.

The set $S = \{(x, 2x, 3x) \mid x \in R\}$ is a subspace of R^3, then dim(S) is

Mark only one oval.

- 1
- 3
- 4
- None of these

21. 13. A vector space V is finite dimensional if it has

Mark only one oval.

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

22. 14.

Let $T : \mathrm{R}^2 \to R^3$ 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

23. 15.

The number of vectors presents in the basis of the vector space $\left\{\begin{bmatrix} x & 0 \\ x & y \end{bmatrix} : x, y \in R\right\}$ is-

Mark only one oval.

- 1
- 2
- 3
- 0

24. 16. If A is an skew-symmetric matrix then which of the following be an possible Eigen value of A

Mark only one oval.

- 1
- -1
- 0
- None of these

25. 17. If A is an orthogonal matrix then value of det(A)

Mark only one oval.

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

26. 18. The differential equation (a1x - b1y)dx + (a2x - b2y)dy =0 is exact if

Mark only one oval.

- a1 = b2
- b1 = b2
- a1 = -b2
- a2 = -b1

27. 19.

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
- (y+3x-c1)(y-2x-c2)=0
- (y+3x)(y-2x-c)=0
- None of these

28. 20.

$$\frac{1}{\left(D^2-2D+2\right)}\cos x =$$

Mark only one oval.

$\frac{1}{5}(-2\sin x+\cos x)$

Option 1

$\frac{1}{10}\cos x$

Option 2

$\frac{1}{5}(2\sin x+\cos x)$

Option 3

None of these

29. 21.

The differential equations of y and t obtained from $\frac{d^2x}{dt^2} - 3x - 4y = 0$, $\frac{d^2y}{dt^2} + x + y = 0$ is

Mark only one oval.

$(D^4 - 2D^2 + 1)y = 0$

Option 1

$(D^4 - D^2 + 1)y = 0$

Option 2

$(D^3 - D + 1)y = 0$

Option 3

None of these

30. 22.

The solution of the system $Dx = y,\ Dy = x\left(D \equiv \frac{d}{dt}\right)$ is

Mark only one oval.

$x = c_1 cost + c_2 sint$

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

31. 23.

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.

$\alpha=3$ and $\beta=4$

Option 1

$\alpha=1$ and $\beta=2$

Option 2

$\alpha=3$ and $\beta=-4$

Option 3

$\alpha=1$ and $\beta=-2$

Option 4

32. 24.

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

Mark only one oval.

$e^x\{(c_1+c_2x)\cos 2x+(c_3+c_4x)\sin 2x\}$

Option 1

$e^x\{(c_1+c_2x)\cos x+(c_3+c_4x)\sin x\}$

Option 2

$\left(c_1e^x+c_2e^{2x}\right)\cos x\left(c_3e^x+c_4e^{2x}\right)\sin x$

Option 3

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

Option 4

33. 25.

The particular integral of $\left(D^2-2DD'+D'^2\right)z=\tan\left(x+y\right)$ is

Mark only one oval.

$\frac{x^2}{4}\tan\left(x+y\right)$

Option 1

$\frac{x^2}{2}\cot\left(x+y\right)$

Option 2

$\frac{x^2}{2}\tan\left(x+y\right)$

Option 3

$\frac{x^2}{4}\cot\left(x+y\right)$

Option 4

34. 26.

The PDE $2y^2u_{xx} - 4x^2yu_{xy} + 2x^4u_{yy} - 2u_x + 4u_y = x^2yz^3$ can be classified as

Mark only one oval.

- Parabola
- Ellipse
- Hyperbola
- Circle

35. 27.

The solution of the partial differential equation $s = e^{x+y}$ is

Mark only one oval.

$z = \phi_1(x) + \phi_2(y) + e^x$

Option 1

$z = \phi_1(x) + \phi_2(y) + e^y$

Option 2

$z = \phi_1(x) + \phi_2(y) + e^{x+y}$

Option 3

$z = \phi_1(x) + \phi_2(y) + xy$

Option 4

36. 28. When solving a 1-dimensional wave equation using variable separation method, we get the solution if

Mark only one oval.

- k is positive
- k is negative
- k is 0
- k can be anything

37. 29.

The differential equation $x^3yz^3\frac{\partial z}{\partial x}+xy^3z^2\frac{\partial z}{\partial y}=\sin(xy+z)$ is

Mark only one oval.

- a linear PDE of order one
- a quasi-linear PDE of order one
- a semi-linear PDE of order one
- a semi-linear PDE of order two

38. 30.

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