MATHS

BOOKS - ACCURATE PUBLICATION

MATRICES

Example Questions Carrying 2 Marks

1. If matrix $A = [a_ij]_3 \times 2$ and $a_ij = (3i - 2j)^2$

, then find matrix A.

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2. Construct 2×2 matrix $A = [a_i j]$ whose elements are given by $a_i j = \frac{i}{j}$.

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3. If $x \begin{bmatrix} 2 \\ 3 \end{bmatrix} + y \begin{bmatrix} -1 \\ 1 \end{bmatrix} = \begin{bmatrix} 10 \\ 5 \end{bmatrix}$, find the values of x and y.

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4. If $x\begin{bmatrix}3\\4\end{bmatrix}+y\begin{bmatrix}-1\\1\end{bmatrix}=\begin{bmatrix}10\\11\end{bmatrix}$, then find the value of x and y.

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5. If $x\begin{bmatrix}4\\5\end{bmatrix}+y\begin{bmatrix}-1\\1\end{bmatrix}=\begin{bmatrix}6\\12\end{bmatrix}$, then find the value of x and y.

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6. If A $= \begin{bmatrix} 5 & 2 \\ -1 & 2 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ show that (A - 3I) (A - 4I) = 0

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7. If $A = \begin{bmatrix} 6 & 2 \\ -1 & 3 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ show that $(A - 4I)(A - 5I) = 0$

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8. If $A = \begin{bmatrix} 7 & 2 \\ -1 & 4 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ show that $(A - 5I)(A - 6I) = 0$

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9. If $A = \begin{bmatrix} 1 & -2 \\ -3 & 4 \end{bmatrix}$, find $-A^2 + 5A$

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10. If $A = \begin{bmatrix} 1 & -2 \\ -3 & 4 \end{bmatrix}$, find $-A^2 + 5A$

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11. If A $= \begin{bmatrix} -2 & -3 \\ -2 & 4 \end{bmatrix}$,find $-A^2 + 6A$

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12. If $f(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$, show that $f(x).\, f(y) = f(x + y)$

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13. If $F(\alpha) = \begin{bmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$, then show that $F(\alpha)F(\beta) = F(\alpha + \beta)$.

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14. If $F(\theta) = \begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$, then show that $F(\theta)F(\phi) = F(\theta + \phi)$.

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15. Find a 2×2 order matrix B such that

$$\begin{bmatrix} 2 & 5 \\ -3 & 7 \end{bmatrix} B = \begin{bmatrix} 17 & -1 \\ 47 & -13 \end{bmatrix}$$

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16. Find a 2×2 order matrix B such that

$$\begin{bmatrix} 2 & 3 \\ 0 & 1 \end{bmatrix} B = \begin{bmatrix} 12 & 11 \\ 2 & 1 \end{bmatrix}$$

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17. Find a 2×2 order matrix B such that $\begin{bmatrix} 6 & 5 \\ 5 & 6 \end{bmatrix} B = \begin{bmatrix} 11 & 0 \\ 0 & 11 \end{bmatrix}$

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18. If $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then find k so that $A^2 = 8A + kI$

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19. If A $= \begin{bmatrix} 0 & 3 \\ -7 & 5 \end{bmatrix}, I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then find k so that $kA^2 = 5A + 21I$

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20. If $(A = \begin{bmatrix} 3 & -2 \\ 4 & -2 \end{bmatrix})$, find K such that ($A^2 = KA - 2I_2$).

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21. Solve the matrix equation :

$$\begin{pmatrix} 1 & x & 1 \end{pmatrix} \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 3 & 2 & 5 \end{pmatrix} \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} = (0)$$

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22. Solve the matrix equation :

$$\begin{pmatrix} 1 & x & 1 \end{pmatrix} \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 3 & 2 & 5 \end{pmatrix} \begin{pmatrix} 1 \\ -2 \\ 3 \end{pmatrix} = (0)$$

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23. Solve the matrix equation :

$$\begin{pmatrix} 1 & 1 & x \end{pmatrix} \begin{pmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 1 & 0 \end{pmatrix} \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} = (0)$$

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24. If $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$ then find $A^2 - 3A + 2I$

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25. If $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & -1 & 3 \\ 1 & 1 & 0 \end{bmatrix}$ then find $A^2 - 3A + 2I$.

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26. If $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & 1 & 0 \end{bmatrix}$ then find $A^2 - 2A + 5I$.

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27. If A= $[3, 2, 0], [1, 4, 0][0, 0, 5]$, then show that A^2 −7A+10I3 =0

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28. If $A = ' \begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$, then find $A^2 - 23A - 40I$ where I is Identify Matrix.

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29. If $f(x) = x^2 - 5x + 7$, find f(A) where $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$

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30. If $A = \begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix}$ and $f(x) = x^2 - 4x + 2$, then find f(A).

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31. If $A = \begin{bmatrix} 1 & 2 \\ 3 & -1 \end{bmatrix}$ and $f(x) = x^2 - 7x + 10$, then find f(A).

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32. If $A = \begin{bmatrix} 2 & 1 \\ 3 & -5 \end{bmatrix}$ and $f(x) = x^2 - 2x + 3$, then find f(A).

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33. If $A = \begin{pmatrix} 3 & -4 \\ 1 & -1 \end{pmatrix}$, then prove by Mathematical Induction that :

$A^n = \begin{pmatrix} 1+2n & -4n \\ n & 1-2n \end{pmatrix}$, where $n \in N$

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34. Prove the following by principle of mathematical induction :

(a) If $A = \begin{bmatrix} 11 & -25 \\ 4 & -9 \end{bmatrix}$, then $A^n = \begin{bmatrix} 1+10n & -25n \\ 4n & 1-10n \end{bmatrix}$ where n is a positive integer .

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35. If $A = \begin{pmatrix} -1 & -4 \\ 1 & 3 \end{pmatrix}$, then prove by Mathematical Induction that : $A^n = \begin{pmatrix} 1-2n & -4n \\ n & 1+2n \end{pmatrix}$, where $n \in N$

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36. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}, B = \begin{bmatrix} 1 & 2 \\ 4 & 6 \end{bmatrix}$, then verify that (AB)' = B' A'

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37. If $A = \begin{bmatrix} 3 & 4 \\ 4 & 5 \end{bmatrix}, B = \begin{bmatrix} 5 & 3 \\ 2 & 1 \end{bmatrix}$ then verify that (AB)' = B' A'

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38. If A $= \begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 4 \\ 3 & 2 \end{bmatrix}$ then verify that (AB)' = B' A'

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39. If $A = \begin{bmatrix} -2 \\ 4 \\ 5 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 & -6 \end{bmatrix}$, then verify that (AB)' = B'A'

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40. If $A = \begin{bmatrix} 1 \\ 5 \\ 6 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 & -5 \end{bmatrix}$, verify that $(AB)' = B'A'$.

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41. If $A = \begin{bmatrix} 7 \\ 9 \\ -8 \end{bmatrix}, B = [2 \quad 0 \quad -2]$, verify that $(AB)' = B'A'$.

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42. If $A = \begin{bmatrix} 3 \\ -1 \\ 5 \end{bmatrix}, B = [-6, 7, 10]$, verify that : (AB)' = B'A'.

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43. If $A = \begin{bmatrix} 4 \\ 0 \\ 7 \end{bmatrix}, B = \begin{bmatrix} -1 & -6 & 5 \end{bmatrix}$, then verify that (AB)'=B'A' .

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44. If $A = \begin{bmatrix} 3 \\ -1 \\ 4 \end{bmatrix}, B = [7 - 712]$ then verify that (AB)' : B' A'.

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45. If $A = \begin{bmatrix} 3 \\ -4 \\ 5 \end{bmatrix}, B = \begin{bmatrix} 6 & 1 & -1 \end{bmatrix}$, the verify that (AB)'=B'A' .

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46. If $A = \begin{bmatrix} 2 \\ -4 \\ 1 \end{bmatrix}, B = [(6)(3)(-1)]$ then verify that (AB)'=B'A'.

Watch Video Solution

47. If $A = \begin{bmatrix} 2 \\ -4 \\ 1 \end{bmatrix}, B = [(6)(3)(-1)]$ then verify that (AB)'=B'A'.

Watch Video Solution

48. If $A = \begin{bmatrix} 3 \\ 1 \\ 2 \end{bmatrix}, B = \begin{bmatrix} 1 & -2 & 5 \end{bmatrix}$ then verify that (AB)' = B'A' .

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49. For the matrix $A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$, verify that $(A - A')$ is a skew symmetric matrix.

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50. For the matrix $A = \begin{pmatrix} 2 & 5 \\ 4 & 1 \end{pmatrix}$, verify that : A + A' is a Symmetric Matrix

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51. For a matrix $A = \begin{bmatrix} 6 & 2 \\ 4 & 5 \end{bmatrix}$, verify that

A + A' is a symmetric matrix

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52. Express $\begin{bmatrix} 2 & 1 \\ -1 & 8 \end{bmatrix}$ as sum of symmetric and

skew-symmetric matrices.

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53. Express the following matrices as the sum of a symmetric and a skew symmetric matrix :

(ii) $\begin{bmatrix} 5 & 1 \\ 7 & 0 \end{bmatrix}$

(iii) $\begin{bmatrix} 2 & 1 \\ 3 & 0 \end{bmatrix}$

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54. Express the following matrices as the sum of a symmetric and a skew symmetric matrix :

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Example Questions Carrying 6 Marks

1. Express the matrix $A = \begin{bmatrix} -2 & 3 & 1 \\ 1 & 3 & 2 \\ 5 & -4 & 5 \end{bmatrix}$ as the sum of a symmetric and skew - symmetric matrix

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2. Express the following matrices as the sum of a symmetric and a skew symmetric matrix :

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

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3. Express the following matrices as the sum of a symmetric and a skew symmetric matrix: :

$$\begin{bmatrix} 3 & 3 & -1 \\ -2 & -2 & 1 \\ -4 & -5 & 2 \end{bmatrix}$$

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4. Express the following as sum of symmetric and skew symmetric matrix

$$\begin{bmatrix} 2 & 4 & -6 \\ 7 & 3 & 5 \\ 1 & -2 & 4 \end{bmatrix}$$

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5. Express $\begin{bmatrix} 1 & 3 & 5 \\ -6 & 8 & 3 \\ -4 & 6 & 5 \end{bmatrix}$ as a sum of symmetric and skew-symmetric matrices.

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6. Express $\begin{bmatrix} 2 & -4 & 5 \\ 1 & 8 & -2 \\ 7 & 3 & 9 \end{bmatrix}$ as a sum of a symmetric and a skew- symmetric matrix .

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7. Express $\begin{bmatrix} 6 & -4 & 5 \\ 1 & 4 & -2 \\ 7 & 5 & 9 \end{bmatrix}$ as a sum of a symmetric and a skew- symmetric matrix .

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8. Express $\begin{bmatrix} 2 & 7 & 5 \\ 1 & 8 & -2 \\ 6 & 5 & 9 \end{bmatrix}$ as a sum of a symmetric and a skew- symmetric matrix .

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9. Express the matrix $A = \begin{pmatrix} -3 & 5 & 6 \\ -1 & 0 & 1 \\ 2 & 1 & 2 \end{pmatrix}$ as the sum of a symmetric and skew-symmetric matrix .

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10. Express the matrix $A = \begin{pmatrix} 2 & 1 & 3 \\ 3 & -2 & 1 \\ -1 & 3 & 1 \end{pmatrix}$ as the sum of a symmetric and skew-symmetric matrix .

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11. Express $\begin{pmatrix} 1 & -2 & 3 \\ 7 & 0 & 5 \\ -4 & 1 & 9 \end{pmatrix}$ as the sum of a symmetric and a skew-symmetric matrix .

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12. Express $\begin{pmatrix} 1 & 2 & 3 \\ 7 & 4 & 5 \\ 4 & 1 & 9 \end{pmatrix}$ as the sum of a symmetric and a skew-symmetric matrix .

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13. Express $\begin{pmatrix} 1 & 2 & -3 \\ 7 & 0 & 5 \\ -4 & 8 & 9 \end{pmatrix}$ as the sum of a symmetric and a skew-symmetric matrix .

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14. Express $\begin{bmatrix} 2 & 5 & -1 \\ 3 & 1 & 5 \\ 7 & 6 & 9 \end{bmatrix}$ as a sum of symmetric and skew-symmetric matrices.

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15. Express the matrix $\begin{bmatrix} 5 & 1 & -1 \\ 2 & -3 & 4 \\ 7 & 1 & -3 \end{bmatrix}$ as a sum of symmetric and skew symmetric matrix

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Questions Carrying 1 Mark Type I Multiple Choice Questions

1. If $\begin{bmatrix} x+y & 1 \\ 2y & 5 \end{bmatrix} = \begin{bmatrix} 7 & 1 \\ 4 & 5 \end{bmatrix}$, find 'x'

A. 6

B. 4

C. 5

D. 2

Answer: C

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2. If $\begin{bmatrix} 2x-y & 5 \\ 3 & y \end{bmatrix} = \begin{bmatrix} 6 & 5 \\ 3 & -2 \end{bmatrix}$, then x equals :

A. 3

B. 6

C. -2

D. 2

Answer: D

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3. The matrix $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ is equal to:

A. a unit matrix

B. a diagonal matrix

C. a scalar matrix

D. none of these .

Answer: D

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4. The matrix $A = \begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix}$ is equal to:

A. a unit matrix

B. a diagonal matrix

C. a scalar matrix

D. none of these .

Answer: D

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5. The number of all possible matrices of order 3×3 with each entry 0 or 1 is:

A. 27

B. 18

C. 81

D. 512

Answer: D

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6. The number of all possible matrices of order 3×3 with each element 0 or 2 is :

A. 27

B. 18

C. 81

D. 512

Answer: D

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7. If matrix A is of order 4×3, then each row of matrix A contains elements :

A. 12

B. 4

C. 3

D. none of these .

Answer: C

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8. If $A + B = C$, where A and B are matrices of order 2×3, then order of C is :

A. 3×2

B. 2×3

C. 2×2

D. 3×3

Answer: B

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9. If A + B = C, where A and B are matrices of order 3×5, then order of C is :

A. 3×5

B. 3×3

C. 5×5

D. 5×3

Answer: A

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10. If $A + B = C$ where B and A are matrices of order 5×5 then the order of matrix C is :

A. 3×5

B. 3×3

C. 5×5

D. 5×3

Answer: C

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11. If $X = \begin{bmatrix} 2 & 0 \\ 0 & 4 \end{bmatrix}$ and $Y = \begin{bmatrix} -2 & 0 \\ -2 & 0 \end{bmatrix}$ then X + Y equal to :

A. $\begin{bmatrix} 0 & 0 \\ -2 & 0 \end{bmatrix}$

B. $\begin{bmatrix} 0 & 0 \\ 0 & 4 \end{bmatrix}$

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

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

Answer: C

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12. If A is matrix of a order 2×3 and B is a matrix of order 3×2, then AB is a matrix of order:

A. 2×3

B. 3×2

C. 2×2

D. 3×3

Answer: C

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13. If A is matrix of a order 2×3 and B is a matrix of order 3×2, then AB is a matrix of order:

A. 2×3

B. 3×2

C. 2×2

D. 3×3

Answer: C

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14. If AB = C, where B and C are matrices of order 3×5, then order of A is :

A. 3×3

B. 3×5

C. 5×5

D. 5×3

Answer: A

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15. AB = C, where B and C are matrices of order 3×4, then order of A is :

A. 4×4

B. 3×4

C. 4×3

D. 3×3

Answer: D

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16. If AB = C, where B and C are matrices of order 4×5, then the order of matrix A is :

A. 4×5

B. 4×4

C. 5×5

D. 5×4

Answer: B

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17. If $AB = C$ where Band C are matrices of orders 5×3 then order of A is :

A. 5×5

B. 3×3

C. 3×5

D. 5×3

Answer: A

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18. If $A = [1 \quad 2 \quad 3], B = \begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix}$, then AB equals

A. $(2 \quad 6 \quad 3)$

B. $\begin{pmatrix} 2 \\ 6 \\ 3 \end{pmatrix}$

C. (12)

D. None of these .

Answer: D

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19. If $A = [2 \quad 1 \quad 3], B = \begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix}$ then AB equals

A. $(6 \quad 2 \quad 3)$

B. $\begin{pmatrix} 6 \\ 2 \\ 3 \end{pmatrix}$

C. (11)

D. None of these .

Answer: C

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20. If $A = \begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ is such that $A^2 = I$, then

a. $1 + \alpha^2 + \beta\gamma = 0$

b. $1 - \alpha^2 + \beta\gamma = 0$

c. $1 - \alpha^2 - \beta\gamma = 0$

d. $1 + \alpha^2 - \beta\gamma = 0$

A. $1 + \alpha^2 + \beta\gamma = 0$

B. $1 - \alpha^2 + \beta\gamma = 0$

C. $1 - \alpha^2 - \beta\gamma = 0$

D. $1 + \alpha^2 - \beta\gamma = 0$

Answer: C

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21. Assume X, Y, Z, W and P are matrices of order $2 \times n, 3 \times k, 2 \times p, n \times 3$ and $p \times k$ respectively. The restriction on n, k and p so that PY + WY will be defined are:

A. $k = 3, p = n$

B. k is arbitrary, $p = 2$

C. p is arbitrary, $k = 3$

D. $k = 2, p = 3$

Answer: A

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22. The matrix $A = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ is a (a) identity matrix (b) Diagonal matrix (c) symmetric matrix (d) skew symmetric matrix

A. a unit matrix

B. a diagonal matrix

C. a symmetric matrix

D. a skew-symmetric matrix

Answer: C

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23. The matrix $A = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ is a (a) identity matrix (b) Diagonal matrix (c) symmetric matrix (d) skew symmetric matrix

A. a unit matrix

B. a diagonal matrix

C. a symmetric matrix

D. a skew-symmetric matrix

Answer: D

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24. If A is any square matrix then A + A' is a :

A. skew-symmetric matrix

B. symmetric matrix

C. null matrix

D. identity matrix

Answer: A

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25. If A, B are symmetric matrices of same order, then AB - BA is a :

A. Skew symmetric matrix

B. symmetric matrix

C. Zero matrix

D. identity matrix

Answer: A

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26. If A is a matrix of order 5×2 and B is a matrix of order 2×5, then the order of matrix $(BA)^T$ is equal to :

A. 2×2

B. 2×5

C. 3×3

D. 5×5

Answer: A

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27. If A is a matrix of order 3×2 and B is a matrix of order 2×3, then the order of matrix $(BA)^T$ is equal to :

A. 2×2

B. 2×3

C. 4×3

D. 3×3

Answer: A

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28. If order of matrix A is 2×3 and order of matrix B is 3×5, then order of matrix B 'A' is :

A. 5×2

B. 2×5

C. 5×3

D. 3×2

Answer: A

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29. If order of matrix A is 4×3 and order of matrix B is 3×5, then order of matrix B 'A ' is :

A. 5×2

B. 4×5

C. 5×4

D. 3×2

Answer: A

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30. If the matrix A is both symmetric and skew symmetric, then :

A. A is a diagonal matrix

B. A is zero matrix

C. A is a square matrix

D. None of these .

Answer: B

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31. If $A = [[123]]$, then AA' is equal to :

A. $\begin{pmatrix} 1 & 4 & 9 \end{pmatrix}$

B. $\begin{pmatrix} 1 \\ 4 \\ 9 \end{pmatrix}$

C. (14)

D. (6)

Answer: C

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32. Choose the correct option in the question :

If $A = \begin{pmatrix} 3 & 2 & 1 \end{pmatrix}$ then A A' is equal to

A. $\begin{pmatrix} 4 & 1 & 9 \end{pmatrix}$

B. $\begin{pmatrix} 4 \\ 1 \\ 9 \end{pmatrix}$

C. (14)

D. (6)

Answer: C

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33. If A and B are two invertible matrices, then the inverse of AB is equal to :

A. AB

B. BA

C. $A^{-1}B^{-1}$

D. $B^{-1}A^{-1}$

Answer: D

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34. If A and B are square matrices of the same order, then $(A+B)(A-B)$ is equal to

A. $A^2 - B^2$

B. $A^2 - BA - AB^2 - B^2$

C. $A^2 - B^2 + BA - AB$

D. $A^2 - BA + B^2 + AB$

Answer: C

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35. If $A = \begin{bmatrix} 2 & -1 & 3 \\ -4 & 5 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 \\ 4 & -2 \\ 1 & 5 \end{bmatrix}$

, then

A. Only AB is defined

B. Only BA is defined

C. AB and BA both are defined

D. AB and BA both are not defined

Answer: C

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36. The matrix $\begin{bmatrix} 0 & 0 & 5 \\ 0 & 5 & 0 \\ 5 & 0 & 0 \end{bmatrix}$ is a scalar matrix. State true or false. If false, then what type of matrix is this?

A. scalar matrix

B. diagonal matrix

C. unit matrix

D. square matrix

Answer: D

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37. If A and B are symmetric matrices of same order then $AB - BA$ is a :

A. Skew symmetric matrix

B. Null matrix

C. Symmetric matrix

D. None of these .

Answer: A

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38. The matrix $P = \begin{bmatrix} 0 & 0 & 4 \\ 0 & 4 & 0 \\ 4 & 0 & 0 \end{bmatrix}$ is a

A. square matrix

B. diagonal matrix

C. unit matrix

D. None

Answer: A

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39. The number of all possible matrices of order 3×3 with each element 0 or 2 is :

A. 9

B. 27

C. 81

D. 512

Answer: D

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40. If $\begin{bmatrix} 2x+y & 4x \\ 5x-7 & 4x \end{bmatrix} = \begin{bmatrix} 7 & 7y-13 \\ y & x+6 \end{bmatrix}$ then the value of $x+y$ is

A. $x = 3, y = 1$

B. $x = 2, y = 3$

C. $x = 2, y = 4$

D. $x = 3, y = 3$

Answer: B

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41. If matrix $A = [a_{ij}]_{2\times 2}$, where $a_{ij} = 1$ if $i \neq j$, $= 0$ if $i = j$ then A^2 is equal to

A. I

B. O

C. 2 I

D. $\frac{1}{2}$ I

Answer: D

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42. If A and B are two matrices of the order $3 \times m$ and $3 \times n$, respectively , and m=n, then the order of matrix $(5A - 2B)$ is

A. $m \times 3$

B. 3×3

C. $m \times n$

D. $3 \times n$

Answer: D

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43. If $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ then A^2 is equal to

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

B. $\begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$

C. $\begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

Answer: D

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44. If matrix $A = \left[a_{ij}\right]_{2\times 2}$, where $a_{ij} = 1$ if $i \neq j$, $= 0$ if $i = j$ then A^2 is equal to

A. I

B. A

C. O

D. None of these .

Answer: A

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45. The matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 4 \end{bmatrix}$ is a

A. identity matrix

B. symmetric matrix

C. skew symmetric matrix

D. none of these .

Answer: B

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46. The matrix $\begin{bmatrix} 0 & -5 & 8 \\ 5 & 0 & 12 \\ -8 & -12 & 0 \end{bmatrix}$ is a

A. diagonal matrix

B. symmetric

C. skew symmetric matrix

D. scalar matrix

Answer: C

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47. If A is a matrix of order $m \times n$ and B is a matix such that AB' and B'A are both defined, then order of matrix B is

A. $m \times m$

B. $n \times n$

C. $n \times m$

D. $m \times n$

Answer: D

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48. If A and B are symmetric matrices of same order then $AB - BA$ is a :

A. Skew symmetric matrix

B. Null matrix

C. Symmetric matrix

D. unit matrix

Answer: A

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49. If A is square matrix suct that $A^2 = I$, then $(A - I)^3 + (A + I)^3 - 7$ A is equal to

A. A

B. I-A

C. I+A

D. 3 A

Answer: A

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50. For any two matrices A and B, we have

A. AB=BA

B. $AB \neq BA$

C. AB=0

D. None of the above

Answer: D

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Questions Carrying 1 Mark Type Ii Fill In The Blanks Questions

1. $A = \left[a_{ij}\right]_{m \times n}$ is a square matrix, if

a. m < n

b. m > n

c. m = n

d. none of these

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2. The number of all possible matrices of order 3×3 with each entry 0 or 3 is

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3. If A is a matrix of order 3×4, then each column of matrix A contains elements :

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4. If A+B=C where A and B are matrices of order 4×6 then order of C is .....

(ii) If A+B=C where B and A are matrices of order 3×3 then the order of matrix C is .....

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5. X, Z are matrices of order $2 \times n, 2 \times p$ respectively.

If n = p, then the order of the matrix 7X - 5Z is :

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6. If A is a matrix of order 3×4 and B is a matrix of order 4×3, find the order of the matrix (AB).

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7. If AB = C, where B and C are matrices of order 2×4, then order of A is :

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8. If $A = [2 \quad 3 \quad 1], B = \begin{bmatrix} 3 \\ 1 \\ 2 \end{bmatrix}$, then AB equals

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9. If A is square matrix such that $A^2 = A$, then $(I + A)^3 - 7A$ is equal to

a. A

b. I – A

c. I

d. 3A

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10. The matrix $A = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$ is .....

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11. If A and B are symmetric matrices of same order then $AB + BA$ is a :

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12. If A is a matrix of order 3×4 and B is a matrix of order 4×3, then the order of matrix $(BA)^T$ is equal to :

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13. If order of matrix A is 3×3 and order of matrix B is 3×5, then order of matrix B 'A ' is :

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14. If $A = \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$ then A+A'=I, if the value of α is .....

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15. Choose the correct option in the question :

If $A = \begin{pmatrix} 3 & 2 & 1 \end{pmatrix}$ then A A' is equal to

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16. Matrices A and B will be inverse of each other only if

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17. If A and B are two skew symmetric matrices of same order, then AB is symmetric matrix if .....

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18. If A and B are matrices of same order, then $(3A - 2B)$ is equal to .....

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19. Addition of matrices is defined if order of the matrices is .....

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20. ..... Matrix is both symmetric and skew symmetric matrix .

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21. Sum of two skew symmetric matrices is always ..... matrix .

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22. The negative of a matrix is obtained by multiplying it by .....

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23. The product of any matrix by the scalar ..... Is the null matrix .

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24. A matrix which is not a square matrix is called a .... Matrix .

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25. Matrix multiplication is ..... over addition .

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26. If A is a symmetric matrix , then A^3 is a ..... matrix .

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27. If A is a skew symmetric matrix, then A^2 is a .....

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28. If A and B are square matrices of the same order, then

(i) (AB)= .....

(ii) (kA) = ...

(iii) [k(A-B)] = ...

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29. If A is skew symmetric , then kA is a .....

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30. If A and B are symmetric matrices, then

(i) AB-BA is a ..... .

(ii) BA-2 BA is a ..... .

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31. If A is symmetric matrix, then B' AB is ..... .

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32. If A and B are symmetric matrices of the same order, then show that AB is symmetric if and only if A and B commute, that is AB = BA.

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Questions Carrying 1 Mark Type Iii True Or False Questions

1. If two matrices A and B are of the same order, then $2A + B = B + 2A$.

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2. Matrix subtraction is associative

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3. For the non singular matrix $A, (adjA)^{-1} = (adjA^{-1})$

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4. $AB = AC \Rightarrow B = C$ for any three matrices of same order .

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5. A matrix denotes a number

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6. Matrices of any order can be added .

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7. Two matrices are equal if they have same number of rows and same number of columns .

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8. Matrices of different order can not be subtracted .

Watch Video Solution

9. Matrix addition is associative as well as commutative .

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10. Matrix multiplication is commutative .

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11. A square matrix where every element is unity is called an identity matrix .

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12. If A and B are two square matrices of the same order, then A+B=B+A .

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13. If A and B are two matrices of the same order, then A-B=B-A .

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14. If matrix AB=O, then A=O or B=O or both A and B are null matrices .

15. Transpose of a column matrix is a column matrix .

16. If A and B are two square matrices of the same order, then AB=BA .

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17. If each of the three matrices of the same order are symmetric then their sum is a symmetric matrix .

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18. If A and B are two square matrices of the same order, then $AB=BA$.

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19. If $(AB)=B'A'$, where A and B are not square matrices, then number of rows in A is equal to number of column in B and number of columns in A is equal to number of rows in B .

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20. If A, B and C are square matrices of same order, then AB=AC always implies that B=C .

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21. A A' is always a symmetric matrix for any matrix A .

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22. If $A = \begin{bmatrix} 2 & 3 & -1 \\ 1 & 4 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \\ 2 & 1 \end{bmatrix}$,

then AB and BA are defined and equal .

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23. If A is skew symmetric matrix, then A^2 is a

symmetric matrix .

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24. $(AB)^{-1} = A^{-1}B^{-1}$, where A and B are invertible matrices satisfying commutative property . With respect to multiplication .

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25. The number of all possible matrices of order 3×3 with each entry 0 or 1 is 27 .

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26. If matrix A is of order 4×3, then each row of matrix A contains elements :

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27. If $A + B = C$, where A and B are matrices of order 2×3, then order of C is :

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28. The solution of matrix equation $\begin{bmatrix} x & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ -2 & 0 \end{bmatrix} = O$ is 5 .

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29. Choose the correct option in the question :

If $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} \begin{pmatrix} 3 & 1 \\ 2 & 5 \end{pmatrix} = \begin{pmatrix} 7 & 11 \\ k & 23 \end{pmatrix}$, then k equals

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30. AB=AC implies B=C .

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31. If A is matrix of a order 2×3 and B is a matrix of order 3×2, then AB is a matrix of order:

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32. If AB = C, where B and C are matrices of order 3×5, then order of A is :

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33. If A is square matrix such that $A^2 = A$,then $(I + A)^3 - 7A$ is equal to:

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34. The necessary and sufficient condition for a matrix A to be skew symmetric is that A=-A .

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Questions Carrying 2 Marks

1. Find the values of a, b, c and d from the following equations

$$\begin{bmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$$

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2. If $\begin{bmatrix} a+4 & 3b \\ 8 & -6 \end{bmatrix} = \begin{bmatrix} 2a+2 & b+2 \\ 8 & a-8b \end{bmatrix}$ write the value of $a - 2$ b .

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3. Find x and y, if $2\begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$ Also find $x + y$.

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4. If A is square matrix such that $A^2 = A$, then write the value of $7A - (I + A)^3$, where I is an identity matrix .

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5. Let

$$A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix}, C = \begin{bmatrix} 2 & 5 \\ 3 & 8 \end{bmatrix}$$

Find a matrix D such that CD – AB = O.

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6. If $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$ find $A^2 - 5A + 4I$ and find a matrix X such that

$A^2 - 5A + 4I + X = O$

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Questions Carrying 6 Marks

1. If $A = \begin{bmatrix} 1 & -2 & 0 \\ 2 & 1 & 3 \\ 0 & -2 & 1 \end{bmatrix}, B = \begin{bmatrix} 7 & 2 & -6 \\ -2 & 1 & -3 \\ -4 & 2 & 5 \end{bmatrix}$,

find AB Also solve

$x - 2y = 10, 2x + y + 3z = 8, -2y + z = 7$

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2. Given that $A = \begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$, and $B = \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$

Find AB . Use this to solve the following system

of linear equations :

$x - y + z = 4, x - 2y - 2z = 9, 2x + y + 3z = 1$

.

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3. Express the matrix A as the sum of a symmetric and skew-symmetric matrix, where :

$$A = \begin{bmatrix} 3 & -1 & 0 \\ 2 & 0 & 3 \\ 1 & -1 & 2 \end{bmatrix}$$

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4. if $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & -1 \\ a & 2 & b \end{bmatrix}$ is a matrix satisfying $AA' = 9I_3$, find the value of $|a| + |b|$.

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