Subject : Maths | **QUESTION PAPER - MCQ'S** | **Total Marks : 50**
Class : XII | Topic: **2. Matrices** | **Time : 1 Hr.**

1) **If** $A=\begin{bmatrix}2&1&3\\4&1&0\end{bmatrix}$ **and** $B=\begin{bmatrix}1&-1\\0&2\\5&0\end{bmatrix}$,

then AB will be

a) $\begin{bmatrix}17&0\\4&-2\end{bmatrix}$ b) $\begin{bmatrix}4&0\\0&4\end{bmatrix}$

c) $\begin{bmatrix}17&4\\0&-2\end{bmatrix}$ d) $\begin{bmatrix}0&0\\0&0\end{bmatrix}$

2) if $\begin{bmatrix}x-y-z\\-y+z\\z\end{bmatrix}=\begin{bmatrix}0\\5\\3\end{bmatrix}$, **then the values of x, y and z are respectively.**

a) 5, 5, 2 b) 1, – 2, 3

c) 0, –3, 3 d) 11, 8, 3

3) **If** $1,\omega,\omega^2$ **are the cube roots of unity and if**

$$\begin{bmatrix}1+\omega&2\omega\\-2\omega&-b\end{bmatrix}+\begin{bmatrix}a&-\omega\\3\omega&2\end{bmatrix}=\begin{bmatrix}0&\omega\\\omega&1\end{bmatrix}$$

then a^2+b^2 is equal to

a) $1+\omega^2$ b) ω^2-1

c) $1+\omega$ d) $(1+\omega)^2$

4) **If A is a square matrix, then**

a) $A+A^T$ is symmetric matrix

b) AA^T is skew-symmetric matrix

c) A^T+A is skew-symmetric matrix

d) A^TA is skew-symmetric matrix

5) **If** $A=\begin{bmatrix}x&1\\1&0\end{bmatrix}$ **and A^2 is the identity matrix, then x is equal to**

a) –1 b) 0

c) 1 d) 2

6) **If ω is a complex cube root of unity and** $A=\begin{bmatrix}\omega&0\\0&\omega\end{bmatrix}$, **then A^{50} is**

a) ω^2A b) ωA

c) A d) 0

7) **If** $A=\begin{bmatrix}1&-2\\4&5\end{bmatrix}$ **and $f(A)=A^2-3A+7$, then**

$f(A)+\begin{bmatrix}3&6\\-12&-9\end{bmatrix}$ **is equal to**

a) $\begin{bmatrix}1&0\\0&1\end{bmatrix}$ b) $\begin{bmatrix}0&0\\0&0\end{bmatrix}$

c) $\begin{bmatrix}0&1\\1&0\end{bmatrix}$ d) $\begin{bmatrix}1&1\\0&0\end{bmatrix}$

8) **If** $A=\begin{bmatrix}3&3&3\\3&3&3\\3&3&3\end{bmatrix}$, **then A^4 is equal to**

a) 27 A b) 81 A

c) 243 A d) 729 A

9) If $A=\begin{bmatrix}1&2&2\\2&1&2\\2&2&1\end{bmatrix}$, then A^2-4A is equal to

a) $2I_3$ b) $3I_3$

c) $4I_3$ d) $5I_3$

10) If $A=\begin{bmatrix}2&-1\\-1&2\end{bmatrix}$ and I is the unit matrix of order 2, then A^2 equals

a) $4A-3I$ b) $3A-4I$

c) $A-I$ d) $A+I$

11) If $A=\begin{bmatrix}1&-5&0\\0&7&0\\11&1&9\end{bmatrix}$ then trace of matrix A is

a) 17 b) 25

c) 3 d) 12

12) If A and B are square matrices of size $n\times n$ such that $A^2-B^2=(A-B)(A+B)$, then which of the following will be always true ?

a) $AB=BA$

b) Either of A or B is a zero matrix

c) Either of A or B is an identity matrix

d) $A=B$

13) The matrix $A=\begin{bmatrix}\frac{1}{\sqrt{2}}&\frac{1}{\sqrt{2}}\\-\frac{1}{\sqrt{2}}&-\frac{1}{\sqrt{2}}\end{bmatrix}$ is

a) unitary b) orthogonal

c) nilpotent d) involutory

14) Let A, B and C be $n\times n$ matrices. Which one of the following is a correct statement?

a) If $AB=AC$, then $B=C$

b) If $A^3+2A^2+3A+5I=0$, then A is invertible

c) If $A^2=0$, then $A=0$

d) None of the above

15) If A is an invertible matrix of order n, then the determinant of adj (A) is equal to

a) $|A|^n$ b) $|A|^{n+1}$

c) $|A|^{n-1}$ d) $|A|^{n2}$

16) Let $A=\begin{bmatrix}1&2\\3&4\end{bmatrix}, B=\begin{bmatrix}a&0\\0&b\end{bmatrix}, a,b\in N$. Then,

a) there exist more than one but finite number of B's such that $AB=BA$

b) there exists exactly one B such that $AB=BA$

c) there exists infinitely many B's such that $AB=BA$

d) there cannot exist any B such that $AB=BA$

17) If A is a symmetric matrix and $n\in N$, then A^n is

a) symmetric matrix

b) diagonal matrix

c) skew-symmetric matrix

d) None of the above

18) If A and B are two square matrices of the same order such that $AB=BA$, and $AB^n=B^nA$ then $(AB)^n$ is equal to

a) AB b) A^nB

c) B^nA d) A^nB^n

19) If $A=\begin{bmatrix}0&0&-1\\0&-1&0\\-1&0&0\end{bmatrix}$, then only correct statement about the matrix A is

a) A is zero matrix

b) $A=(-1)I$, where I is a unit matrix

c) A^{-1} does not exist

d) $A^2=I$

20) If $E(\theta)=\begin{bmatrix}\cos^2\theta&\cos\theta\sin\theta\\\cos\theta\sin\theta&\sin^2\theta\end{bmatrix}$ and θ and ϕ differ by an odd multiple of $\frac{\pi}{2}$,

then $E(\theta)E(\phi)$ **is a.**

a) unit matrix b) null matrix

c) diagonal matrix d) None of these

21) If O(A) = 2 × 3 ,O(B) = 3 × 2 and O(C) =3 ×3, which one of the following is not defined ? [O(A)- order of matrix A]

a) CB + A' b) BAC

c) C(A + B')' d) C(A + B')

22) The characteristic roots of the matrix

$$\begin{bmatrix} 1 & 0 & 0 \\ 2 & 3 & 0 \\ 4 & 5 & 6 \end{bmatrix}$$

a) 1, 3, 6 b) 1, 2, 4

c) 4, 5, 6 d) 2, 4, 6

23) If A and B are two square matrices of order 3 × 3, then which of the following is true ?

a) $AB = 0 \Rightarrow A = 0$ or $B = 0$

b) $\det(2AB) = 8 \det(A) \det(B)$

c) $A^2 - B^2 = (A + B)(A - B)$

d) $\det(A + B) = \det(A) + \det(B)$

24) If A and B are square matrices of the same order such that $(A + B)(A - B) = A^2 - B^2$, then $(ABA^{-1})^2$ is equal to

a) B^2 b) 1

c) A^2B^2 d) A^2

25) If $A = \begin{bmatrix} -2 & 4 \\ -1 & 2 \end{bmatrix}$ **then A^2 is equal to**

a) null matrix b) unit matrix

c) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ d) $\begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix}$

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