1. Let $A+2B=\begin{bmatrix}1 & 2 & 0\\ 6 & -3 & 3\\ -5 & 3 & 1\end{bmatrix}$ and $2A-B=\begin{bmatrix}2 & -1 & 5\\ 2 & -1 & 6\\ 0 & 1 & 2\end{bmatrix}$, then Tr (A) – Tr (B) has the value equal to

(A) 0 (B) 1 (C) 2 (D) none

2. If $\begin{bmatrix}x & 3x-y\\ zx+z & 3y-w\end{bmatrix}=\begin{bmatrix}3 & 2\\ 4 & 7\end{bmatrix}$, then

(A) $x=3, y=7, z=1, w=14$ (B) $x=3, y=-5, x=-1, w=-4$

(C) $x=3, y=6, z=2, w=7$ (D) None of these

3. The matrix $A^2+4A-5I$, where I is identity matrix and $A=\begin{bmatrix}1 & 2\\ 4 & -3\end{bmatrix}$ equals :[JEE-MAIN Online 2013]

(A) $32\begin{bmatrix}1 & 1\\ 1 & 0\end{bmatrix}$ (B) $4\begin{bmatrix}2 & 1\\ 2 & 0\end{bmatrix}$ (C) $4\begin{bmatrix}0 & -1\\ 2 & 2\end{bmatrix}$ (D) $32\begin{bmatrix}2 & 1\\ 2 & 0\end{bmatrix}$

4. If $M=\begin{bmatrix}0 & 2\\ 5 & 0\end{bmatrix}$ and $N=\begin{bmatrix}0 & 5\\ 2 & 0\end{bmatrix}$, then M^{2011} is -

(A) $10^{1005}M$ (B) $10^{1005}N$ (C) $10^{2010}M$ (D) $10^{2011}M$

5. If $A=\begin{bmatrix}1 & 2\\ 2 & 3\end{bmatrix}$ and $A^2-kA-I_2=0$, then value of k is-

(A) 4 (B) 2 (C) 1 (D) –4

6. Let three matrices are $A=\begin{bmatrix}2 & 1\\ 4 & 1\end{bmatrix}$; $B=\begin{bmatrix}3 & 4\\ 2 & 3\end{bmatrix}$ and $C=\begin{bmatrix}3 & -4\\ -2 & 3\end{bmatrix}$, then

$t_r(A)+t_r\left(\frac{ABC}{2}\right)+t_r\left(\frac{A(BC)^2}{4}\right)+t_r\left(\frac{A(BC)^3}{8}\right)+\ldots\ldots+\infty$ is equal to-

(A) 6 (B) 9 (C) 12 (D) none

7. For a matrix $A=\begin{bmatrix}1 & 2r-1\\ 0 & 1\end{bmatrix}$, the value of $\prod_{r=1}^{50}\begin{bmatrix}1 & 2r-1\\ 0 & 1\end{bmatrix}$ is equal to -

(A) $\begin{bmatrix}1 & 100\\ 0 & 1\end{bmatrix}$ (B) $\begin{bmatrix}1 & 4950\\ 0 & 1\end{bmatrix}$ (C) $\begin{bmatrix}1 & 5050\\ 0 & 1\end{bmatrix}$ (D) $\begin{bmatrix}1 & 2500\\ 0 & 1\end{bmatrix}$

8. A and B are two given matrices such that the order of A is 3×4 , if $A'B$ and BA' are both defined then

(A) order of B' is 3×4 (B) order of $B'A$ is 4×4

(C) order of $B'A$ is 3×3 (D) $B'A$ is undefined

9. If the product of n matrices $\begin{bmatrix}1&1\\0&1\end{bmatrix}\begin{bmatrix}1&2\\0&1\end{bmatrix}\begin{bmatrix}1&3\\0&1\end{bmatrix}......\begin{bmatrix}1&n\\0&1\end{bmatrix}$ is equal to the matrix $\begin{bmatrix}1&378\\0&1\end{bmatrix}$ then the value of n is equal to -

(A) 26 (B) 27 (C) 377 (D) 378

10. Consider a matrix $A(\theta)=\begin{bmatrix}\sin\theta & \cos\theta\\ -\cos\theta & \sin\theta\end{bmatrix}$ then

(A) $A(\theta)$ is symmetric (B) $A(\theta)$ is skew symmetric

(C) $A^{-1}(\theta) = A(\pi - \theta)$ (D) $A^2(\theta) = A\left(\frac{\pi}{2} - 2\theta\right)$

11. If p, q, r are 3 real number satisfying the matrix equation, $[p\ q\ r]\begin{bmatrix}3&4&1\\3&2&3\\2&0&2\end{bmatrix} = [3\ 0\ 1]$, then $2p + q - r$ equals :- [JEE-MAIN Online 2013]

(A) –1 (B) 4 (C) –3 (D) 2

12. If A, B and C are $n \times n$ matrices and $\det(A) = 2$, $\det(B) = 3$ and $\det(C) = 5$, then the value of the $\det(A^2BC^{-1})$ is equal to

(A) $\frac{6}{5}$ (B) $\frac{12}{5}$ (C) $\frac{18}{5}$ (D) $\frac{24}{5}$

13. Which of the following is an orthogonal matrix -

(A) $\begin{bmatrix}6/7 & 2/7 & -3/7\\ 2/7 & 3/7 & 6/7\\ 3/7 & -6/7 & 2/7\end{bmatrix}$ (B) $\begin{bmatrix}6/7 & 2/7 & 3/7\\ 2/7 & -3/7 & 6/7\\ 3/7 & 6/7 & -2/7\end{bmatrix}$

(C) $\begin{bmatrix}-6/7 & -2/7 & -3/7\\ 2/7 & 3/7 & 6/7\\ -3/7 & 6/7 & 2/7\end{bmatrix}$ (D) $\begin{bmatrix}6/7 & -2/7 & 3/7\\ 2/7 & 2/7 & -3/7\\ -6/7 & 2/7 & 3/7\end{bmatrix}$

14. Matrix $A = \begin{bmatrix}x&3&2\\1&y&4\\2&2&z\end{bmatrix}$, if $xyz = 60$ and $8x + 4y + 3z = 20$, then A (adj A) is equal to -

(A) $\begin{bmatrix}64&0&0\\0&64&0\\0&0&64\end{bmatrix}$ (B) $\begin{bmatrix}88&0&0\\0&88&0\\0&0&88\end{bmatrix}$ (C) $\begin{bmatrix}68&0&0\\0&68&0\\0&0&68\end{bmatrix}$ (D) $\begin{bmatrix}34&0&0\\0&34&0\\0&0&34\end{bmatrix}$

15. The matrix $\begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$ is a

(A) non-singular (B) Idempotent (C) Nipotent (D) Orthogonal

16. If $A = \begin{bmatrix} ab & b^2 \\ -a^2 & -ab \end{bmatrix}$, then A is

(A) Involutory matrix (B) Idempotent matrix (C) Nilpotent matrix (D) none of these

17. If A and B are symmetric matrices, then ABA is -

(A) symmetric matrix
(B) skew symmetric matrix
(C) diagonal matrix
(D) scalar matrix

18. Let $A = \begin{pmatrix} 0 & \sin\alpha & \sin\alpha\sin\beta \\ -\sin\alpha & 0 & \cos\alpha\cos\beta \\ -\sin\alpha\sin\beta & -\cos\alpha\cos\beta & 0 \end{pmatrix}$, then -

(A) $|A|$ is independent of α and β
(B) A^{-1} depends only on α
(C) A^{-1} depends only on β
(D) none of these

19. Number of real values of λ for which the matrix $A = \begin{bmatrix} \lambda-1 & \lambda & \lambda+1 \\ 2 & -1 & 3 \\ \lambda+3 & \lambda-2 & \lambda+7 \end{bmatrix}$ has no inverse

(A) 0 (B) 1 (C) 2 (D) infinite

20. If $A = [a_{ij}]_{2\times2}$ where $a_{ij} = \begin{cases} i+j & i \neq j \\ i^2 - 2j & i = j \end{cases}$, then A^{-1} is equal to -

(A) $\frac{1}{9}\begin{bmatrix} 0 & 3 \\ 3 & 1 \end{bmatrix}$ (B) $\frac{1}{9}\begin{bmatrix} 0 & -3 \\ 3 & -1 \end{bmatrix}$ (C) $\frac{1}{9}\begin{bmatrix} 0 & -3 \\ -3 & -1 \end{bmatrix}$ (D) $\frac{1}{3}\begin{bmatrix} 0 & 3 \\ 3 & 1 \end{bmatrix}$