1. If the system of equations, $x+2y-3z=1$, $(k+3)z=3$, $(2k+1)x+z=0$ is inconsistent, then the value of k is **[Roorkee 2000]**

(a) – 3 (b) 1/2
(c) 0 (d) 2

2. If the system of equations $x-ky-z=0$, $kx-y-z=0$ and $x+y-z=0$ has a non zero solution, then the possible value of k are **[IIT Screening 2000]**

(a) – 1, 2 (b) 1, 2
(c) 0, 1 (d) – 1, 1

3. The system of equations $\lambda x+y+z=0$, $-x+\lambda y+z=0$, $-x-y+\lambda z=0$, will have a non zero solution if real values of λ are given by **[IIT 1984]**

(a) 0 (b) 1
(c) 3 (d) $\sqrt{3}$

4. If $a_1, a_2, a_3, ...a_n, ...$ are in G.P. and $a_i > 0$ for each i, then the value of the determinant

$$\Delta = \begin{vmatrix} \log a_n & \log a_{n+2} & \log a_{n+4} \\ \log a_{n+6} & \log a_{n+8} & \log a_{n+10} \\ \log a_{n+12} & \log a_{n+14} & \log a_{n+16} \end{vmatrix}$$ is equal to

(a) 1 (b) 2
(c) 0 (d) None of these

5. The system of linear equations $x+y+z=2$, $2x+y-z=3$, $3x+2y+kz=4$ has a unique solution if **[EAMCET 1994; DCE 2000]**

(a) $k \neq 0$ (b) $-1<k<1$
(c) $-2<k<2$ (d) $k=0$

6. The system of equations

$x_1-x_2+x_3=2$, $3x_1-x_2+2x_3=-6$

and $3x_1+x_2+x_3=-18$ has **[AMU 2001]**

(a) No solution (b) Exactly one solution
(c) Infinite solutions (d) None of these

7. The number of values of k for which the system of equations $(k+1)x+8y=4k$, $kx+(k+3)y=3k-1$ has infinitely many solutions, is **[IIT Screening 2002]**

(a) 0 (b) 1
(c) 2 (d) Infinite

8. If $a>0$ and discriminant of $ax^2+2bx+c$ is negative, then $\begin{vmatrix} a & b & ax+b \\ b & c & bx+c \\ ax+b & bx+c & 0 \end{vmatrix}$ is

(a) Positive (b) $(ac-b^2)(ax^2+2bx+c)$
(c) Negative (d) 0

9. For what value of λ, the system of equations $x+y+z=6, x+2y+3z=10$, $x+2y+\lambda z=12$ is inconsistent **[AIEEE 2002]**

(a) $\lambda=1$ (b) $\lambda=2$
(c) $\lambda=-2$ (d) $\lambda=3$

10. If x is a positive integer, then

$$\Delta = \begin{vmatrix} x! & (x+1)! & (x+2)! \\ (x+1)! & (x+2)! & (x+3)! \\ (x+2)! & (x+3)! & (x+4)! \end{vmatrix}$$ is equal to

(a) $2(x!)(x+1)!$ (b) $2(x!)(x+1)!(x+2)!$
(c) $2(x!)(x+3)!$ (d) None of these

11. If the system of equations $x+ay=0$, $az+y=0$ and $ax+z=0$ has infinite solutions, then the value of a is **[IIT Screening 2003]**

(a) –1 (b) 1
(c) 0 (d) No real values

12. The values of x, y, z in order of the system of equations $3x+y+2z=3$, $2x-3y-z=-3$, $x+2y+z=4$, are **[MP PET 2003]**

(a) 2, 1, 5 (b) 1, 1, 1
(c) 1, –2, –1 (d) 1, 2, –1

13. The value of λ for which the system of equations $2x-y-z=12$, $x-2y+z=-4$, $x+y+\lambda z=4$ has no solution is **[IIT Screening 2004]**

(a) 3 (b) – 3
(c) 2 (d) – 2

14. If the system of linear equation $x+2ay+az=0$, $x+3by+bz=0$, $x+4cy+cz=0$ has a non zero solution, then a, b, c **[AIEEE 2003]**

(a) Are in A.P. (b) Are in G. P.
(c) Are in H. P. (d) Satisfy $a+2b+3c=0$

15. The system of equations

$\alpha x+y+z=\alpha-1$
$x+\alpha y+z=\alpha-1$
$x+y+\alpha z=\alpha-1$

has no solution, if α is **[AIEEE 2005]**

(a) Not – 2 (b) 1
(c) – 2 (d) Either – 2 or 1

16. If $M=\begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$ and $M^2-\lambda M-I_2=0$, then $\lambda=$ **[MP PET 1990, 2001]**

(a) – 2 (b) 2
(c) – 4 (d) 4

17. If $A=\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ a & b & -1 \end{bmatrix}$, then $A^2=$ **[MNR 1980; Pb. CET 1990; DCE 2001]**

(a) Unit matrix (b) Null matrix
(c) A (d) – A

18. If $A=\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$, then $A^n=$ **[RPET 1995]**

(a) $\begin{bmatrix} 1 & n \\ 0 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} n & n \\ 0 & n \end{bmatrix}$
(c) $\begin{bmatrix} n & 1 \\ 0 & n \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 1 \\ 0 & n \end{bmatrix}$

19. $AB=0$, if and only if **[MNR 1981; Karnataka CET 1993]**

(a) $A \neq O, B=O$ (b) $A=O, B \neq O$
(c) $A=O$ or $B=O$ (d) None of these

20. If the matrix $\begin{bmatrix} 1 & 3 & \lambda+2 \\ 2 & 4 & 8 \\ 3 & 5 & 10 \end{bmatrix}$ is singular, then $\lambda=$ **[MP PET 1990; Pb. CET 2000]**

(a) – 2 (b) 4
(c) 2 (d) – 4

21. If $A=\begin{bmatrix} ab & b^2 \\ -a^2 & -ab \end{bmatrix}$ and $A^n=O$, then the minimum value of n is

(a) 2 (b) 3
(c) 4 (d) 5

22. If $A=\begin{bmatrix} 1/3 & 2 \\ 0 & 2x-3 \end{bmatrix}, B=\begin{bmatrix} 3 & 6 \\ 0 & -1 \end{bmatrix}$ and $AB=I$, then $x=$ **[MP PET 1987]**

(a) −1 (b) 1
(c) 0 (d) 2

23. If $AB=C$, then matrices A, B, C are **[MP PET 1991]**

(a) $A_{2\times3}, B_{3\times2}, C_{2\times3}$ (b) $A_{3\times2}, B_{2\times3}, C_{3\times2}$
(c) $A_{3\times3}, B_{2\times3}, C_{3\times3}$ (d) $A_{3\times2}, B_{2\times3}, C_{3\times3}$

24. If $A=\begin{bmatrix} \lambda & 1 \\ -1 & -\lambda \end{bmatrix}$, then for what value of λ, $A^2=O$ **[MP PET 1992]**

(a) 0 (b) ±1
(c) − 1 (d) 1

25. If $A=\begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & 5 \\ 2 & -5 & 0 \end{bmatrix}$, then **[MNR 1982]**

(a) $A'=A$ (b) $A'=-A$
(c) $A'=2A$ (d) None of these

26. If $A=\begin{bmatrix} 4 & 1 \\ 3 & 2 \end{bmatrix}$ and $I=\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, $A^2-6A=$ **[MP PET 1987]**

(a) $3I$ (b) $5I$
(c) $-5I$ (d) None of these

27. If $A=[1\ 2\ 3]$ and $B=\begin{bmatrix} -5 & 4 & 0 \\ 0 & 2 & -1 \\ 1 & -3 & 2 \end{bmatrix}$, then $AB=$ **[MP PET 1988]**

(a) $\begin{bmatrix} -5 & 4 & 0 \\ 0 & 4 & -2 \\ 3 & -9 & 6 \end{bmatrix}$ (b) $\begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}$

(c) $[-2\ \ -1\ \ 4]$ (d) $\begin{bmatrix} -5 & 8 & 0 \\ 0 & 4 & -3 \\ 1 & -6 & 6 \end{bmatrix}$

28. If $A=\begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$, then $A^5=$ **[MP PET 1995,1999; Pb. CET 2000]**

(a) $5A$ (b) $10A$
(c) $16A$ (d) $32A$

29. If $A=\begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$ and $AB=O$, then $B=$ **[MP PET 1989]**

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

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

30. If A and B are square matrices of order 2, then $(A+B)^2=$ **[MP PET 1992]**

(a) $A^2+2AB+B^2$ (b) $A^2+AB+BA+B^2$
(c) $A^2+2BA+B^2$ (d) None of these

31. f I is a unit matrix, then $3I$ will be

(a) A unit matrix (b) A triangular matrix
(c) A scalar matrix (d) None of these

32. If $A=[a\ b], B=[-b\ -a]$ and $C=\begin{bmatrix} a \\ -a \end{bmatrix}$, then the correct statement is **[AMU 1987]**

(a) $A=-B$ (b) $A+B=A-B$
(c) $AC=BC$ (d) $CA=CB$

33. If $A=\begin{bmatrix} 1 & a \\ 0 & 1 \end{bmatrix}$, then A^4 is equal to **[MP PET 1993; Pb. CET 2001]**

(a) $\begin{bmatrix} 1 & a^4 \\ 0 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} 4 & 4a \\ 0 & 4 \end{bmatrix}$

(c) $\begin{bmatrix} 4 & a^4 \\ 0 & 4 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 4a \\ 0 & 1 \end{bmatrix}$

34. If $\begin{bmatrix} 3 & 1 \\ 4 & 1 \end{bmatrix}X=\begin{bmatrix} 5 & -1 \\ 2 & 3 \end{bmatrix}$, then $X=$ **[MP PET 1994]**

(a) $\begin{bmatrix} -3 & 4 \\ 14 & -13 \end{bmatrix}$ (b) $\begin{bmatrix} 3 & -4 \\ -14 & 13 \end{bmatrix}$

(c) $\begin{bmatrix} 3 & 4 \\ 14 & 13 \end{bmatrix}$ (d) $\begin{bmatrix} -3 & 4 \\ -14 & 13 \end{bmatrix}$

35. Which of the following is incorrect

(a) $A^2-B^2=(A+B)(A-B)$
(b) $(A^T)^T=A$
(c) $(AB)^n=A^nB^n$, where A, B commute
(d) $(A-I)(I+A)=O \Leftrightarrow A^2=I$

36. A, B are n-rowed square matrices such that $AB=O$ and B is non-singular. Then

(a) $A\neq O$ (b) $A=O$
(c) $A=I$ (d) None of these

37. Matrix theory was introduced by

(a) Newton (b) Cayley-Hamilton
(c) Cauchy (d) Euclid

38. If $A=\begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix}$ and $B=\begin{bmatrix} -1 & 0 \\ 2 & 3 \end{bmatrix}$, then **[MP PET 1996]**

(a) $A^2=A$ (b) $B^2=B$
(c) $AB\neq BA$ (d) $AB=BA$

39. Which one of the following is not true **[Kurukshetra CEE 1998]**

(a) Matrix addition is commutative
(b) Matrix addition is associative
(c) Matrix multiplication is commutative
(d) Matrix multiplication is associative

40. If $U=[2\ -3\ 4], X=[0\ 2\ 3]$, $V=\begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix}$ and $Y=\begin{bmatrix} 2 \\ 2 \\ 4 \end{bmatrix}$, then $UV+XY=$ **[MP PET 1997]**

(a) 20 (b) $[-20]$
(c) -20 (d) $[20]$

41. If $A=\begin{bmatrix} 0 & i \\ -i & 0 \end{bmatrix}$, then the value of A^{40} is **[RPET 1999]**

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

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

42. The matrix product $AB = O$, then **[Kurukshetra CEE 1998; RPET 2001]**

(a) $A = O$ and $B = O$ (b) $A = O$ or $B = O$

(c) A is null matrix (d) None of these

43. If A and B are square matrices of order $n \times n$, then $(A-B)^2$ is equal to **[Karnataka CET 1999; Kerala (Engg.) 2002]**

(a) $A^2 - B^2$ (b) $A^2 - 2AB + B^2$

(c) $A^2 + 2AB + B^2$ (d) $A^2 - AB - BA + B^2$

44. Choose the correct answer **[Karnataka CET 1999]**

(a) Every identity matrix is a scalar matrix

(b) Every scalar matrix is an identity matrix

(c) Every diagonal matrix is an identity matrix

(d) A square matrix whose each element is 1 is an identity matrix

45. If $A = \begin{bmatrix} 1 & 0 \\ 2 & 0 \end{bmatrix}, B = \begin{bmatrix} 0 & 0 \\ 1 & 12 \end{bmatrix}$, then **[DCE 1999]**

(a) $AB = O, BA = O$ (b) $AB = O, BA \neq O$

(c) $AB \neq O, BA = O$ (d) $AB \neq O, BA \neq O$

46. $A = \begin{pmatrix} i & 1 \\ 0 & i \end{pmatrix}$, then A^4 equals **[AMU 1999]**

(a) $\begin{pmatrix} 1 & -4i \\ 0 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & -4i \\ 0 & -1 \end{pmatrix}$

(c) $\begin{pmatrix} -i & 4 \\ 0 & i \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 4 \\ 0 & 1 \end{pmatrix}$

47. $\begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix} [2 \ \ 1 \ \ -1] =$ **[MP PET 2000]**

(a) $[-1]$ (b) $\begin{bmatrix} 2 \\ -1 \\ -2 \end{bmatrix}$

(c) $\begin{bmatrix} 2 & 1 & -1 \\ -2 & -1 & 1 \\ 4 & 2 & -2 \end{bmatrix}$ (d) Not defined

48. If $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}, B = \begin{bmatrix} a & 1 \\ b & -1 \end{bmatrix}$ and $(A+B)^2 = A^2 + B^2$, then the value of a and b are **[Kurukshetra CEE 2002]**

(a) $a = 4, b = 1$ (b) $a = 1, b = 4$

(c) $a = 0, b = 4$ (d) $a = 2, b = 4$

49. If A, B are square matrices of order 3, A is non- singular and $AB = O$, then B is a **[EAMCET 2002]**

(a) Null matrix (b) Singular matrix

(c) Unit matrix (d) Non- singular matrix

50. If $A = \begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$, then $A^2 - 5A =$

(a) I (b) $14\, I$

(c) 0 (d) None of these

51. If matrix $A = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$, then $A^{16} =$ **[Karnataka CET 2002]**

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

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

52. If $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, then $A^{100} =$ **[UPSEAT 2002; MP PET 2004]**

(a) $2^{100} A$ (b) $2^{99} A$

(c) $2^{101} A$ (d) None of these

53. Which is true about matrix multiplication **[UPSEAT 2002]**

(a) It is commutative (b) It is associative

(c) Both (a) and (b) (d) None of these

54. Matrix $A = \begin{bmatrix} 1 & 0 & -k \\ 2 & 1 & 3 \\ k & 0 & 1 \end{bmatrix}$ is invertible for **[UPSEAT 2002]**

(a) $k = 1$ (b) $k = -1$

(c) $k = 0$ (d) All real k

55. If $\begin{bmatrix} x+y & 2x+z \\ x-y & 2z+w \end{bmatrix} = \begin{bmatrix} 4 & 7 \\ 0 & 10 \end{bmatrix}$, then values of x, y, z, w are **[RPET 2002]**

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

(c) 3, 3, 0, 1 (d) None of these

56. If $A = \begin{bmatrix} 1 & 2 & -1 \\ 3 & 0 & 2 \\ 4 & 5 & 0 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$, then AB is **[MP PET 2003]**

(a) $\begin{bmatrix} 5 & 1 & -3 \\ 3 & 2 & 6 \\ 14 & 5 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 11 & 4 & 3 \\ 1 & 2 & 3 \\ 0 & 3 & 3 \end{bmatrix}$

(c) $\begin{bmatrix} 1 & 8 & 4 \\ 2 & 9 & 6 \\ 0 & 2 & 0 \end{bmatrix}$ (d) $\begin{bmatrix} 0 & 1 & 2 \\ 5 & 4 & 3 \\ 1 & 8 & 2 \end{bmatrix}$

57. If A and B are 3×3 matrices such that $AB = A$ and $BA = B$, then **[Orissa JEE 2003]**

(a) $A^2 = A$ and $B^2 \neq B$ (b) $A^2 \neq A$ and $B^2 = B$

(c) $A^2 = A$ and $B^2 = B$ (d) $A^2 \neq A$ and $B^2 \neq B$

58. If $A = \begin{bmatrix} \alpha & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 5 & 1 \end{bmatrix}$, then value of α for which $A^2 = B$, is **[IIT Screening 2003]**

(a) 1 (b) −1

(c) 4 (d) No real values

59. $\begin{bmatrix} 7 & 1 & 2 \\ 9 & 2 & 1 \end{bmatrix} \begin{bmatrix} 3 \\ 4 \\ 5 \end{bmatrix} + 2 \begin{bmatrix} 4 \\ 2 \end{bmatrix}$ is equal to **[DCE 2002]**

(a) $\begin{bmatrix} 43 \\ 44 \end{bmatrix}$ (b) $\begin{bmatrix} 43 \\ 45 \end{bmatrix}$

(c) $\begin{bmatrix} 45 \\ 44 \end{bmatrix}$ (d) $\begin{bmatrix} 44 \\ 45 \end{bmatrix}$

60. Let $A = \begin{pmatrix} 0 & 0 & -1 \\ 0 & -1 & 0 \\ -1 & 0 & 0 \end{pmatrix}$, the only correct statement about the matrix A is **[AIEEE 2004]**

(a) $A^2 = I$

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

(c) A^{-1} does not exist

(d) A is a zero matrix

61. If $A+B = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ and $A - 2B = \begin{bmatrix} -1 & 1 \\ 0 & -1 \end{bmatrix}$, then $A =$ **[Karnataka CET 1994]**

(a) $\begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} 2/3 & 1/3 \\ 1/3 & 2/3 \end{bmatrix}$

(c) $\begin{bmatrix} 1/3 & 1/3 \\ 2/3 & 1/3 \end{bmatrix}$ (d) None of these

62. If $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then which one of the following holds for all $n \geq 1$, (by the principal of mathematical induction) **[AIEEE 2005]**

(a) $A^n = nA + (n-1)I$ (b) $A^n = 2^{n-1}A + (n-1)I$

(c) $A^n = nA - (n-1)I$ (d) $A^n = 2^{n-1}A - (n-1)I$

63. Inverse of the matrix $\begin{bmatrix} 3 & -2 & -1 \\ -4 & 1 & -1 \\ 2 & 0 & 1 \end{bmatrix}$ is **[MP PET 1990]**

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

(c) $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 7 \\ -2 & -4 & -5 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 2 & -4 \\ 8 & -4 & -5 \\ 3 & 5 & 2 \end{bmatrix}$

64. If A and B are non-singular matrices, then **[MP PET 1991; Kurukshetra CEE 1998]**

(a) $(AB)^{-1} = A^{-1}B^{-1}$ (b) $AB = BA$

(c) $(AB)' = A'B'$ (d) $(AB)^{-1} = B^{-1}A^{-1}$

65. Adjoint of the matrix $N = \begin{bmatrix} -4 & -3 & -3 \\ 1 & 0 & 1 \\ 4 & 4 & 3 \end{bmatrix}$ is **[MP PET 1989]**

(a) N (b) $2N$

(c) $-N$ (d) None of these

66. From the following find the correct relation **[MP PET 1990]**

(a) $(AB)' = A'B'$ (b) $(AB)' = B'A'$

(c) $A^{-1} = \frac{adjA}{A}$ (d) $(AB)^{-1} = A^{-1}B^{-1}$

ANSWERSHEET :

1. a 2.d 3.a 4.c 5.a 6.c 7.b 8.c 9.d 10.b 11.a 12.d

13.d 14.c 15.c 16.d 17.a 18.a 19.d 20.b 21.a 22.b

23.d 24.b 25.b 26.c 27.c 28.c 29.d 30.b 31.c 32.c

33.d 34.a 35. a 36.b 37.b38.c 39.c 40.d

41.b 42.d 43.d 44.a 45.b 46.a 47.c 48.b 49.a

50.b 51.d 52.b 53.b 54.d 55.a 56.a 57.c 58.d

59.a 60.a 61.c 62.c 63.c 64.d 65.a 66.b