

GUJARAT TECHNOLOGICAL UNIVERSITY**Diploma Engineering - SEMESTER-I (CtoD) • EXAMINATION – WINTER • 2014****Subject Code: C300001****Date: 01-01-2015****Subject Name: Basic Mathematics****Time: 10:30 am – 12:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumption wherever necessary.
3. Each question is of 1 mark.
4. Use of SIMPLE CALCULATOR is permissible. (Scientific/Higher Version not allowed)
5. English version is authentic.

Q. Fill in the blanks using appropriate choice from the given option.

1. Logarithmic form of $(25)^{\frac{-1}{2}} = \frac{1}{5}$ is _____.
 A. $\log_{\frac{1}{5}} 25 = \frac{-1}{2}$ B. $\log_{\frac{1}{5}}(\frac{-1}{2}) = 25$
 C. $\log_{25}(\frac{1}{5}) = \frac{-1}{2}$ D. $\log_{-\frac{1}{2}}(\frac{1}{5}) = 25$
2. $\log_{5\sqrt{2}} 2500 =$ _____.
 A. 4 B. 5
 C. 8 D. -5
3. $\log 32 \div \log 16 =$ _____.
 A. 2 B. $\frac{5}{4}$
 C. $\log 2$ D. $\log \frac{5}{4}$
4. $\log_2(\log_3 9) =$ _____.
 A. 3 B. 6
 C. 1 D. 9
5. $\log 1. \log 2. \log 3. \log 4. \dots \log 25 =$ _____.
 A. 25 B. 0
 C. 1 D. $1 \times 2 \times 3 \times \dots \times 25$
6. $\sqrt{3}^{\log_3 4} =$ _____.
 A. $\frac{1}{2}$ B. $\frac{1}{4}$
 C. 2 D. 4
7. $\log \frac{9}{14} - \log \frac{15}{16} + \log \frac{35}{24} =$ _____.
 A. 0 B. 1
 C. $\log 2$ D. $\log 7$
8. $\frac{1}{\log_5 15} + \frac{1}{\log_5 15} =$ _____.
 A. 15 B. $\frac{5}{3}$
 C. 0 D. 1
9. $\log_y x^2 \times \log_x y^3 =$ _____

- A. 2
C. 5
- B. 3
D. 6
10. If $\log\left(\frac{a+b}{2}\right) = \frac{1}{2}(\log a + \log b)$ then _____.
A. $a = b$
C. $a+b=1$
- B. $a^2 + b^2 = 1$
D. $2a = b$
11. If $\log x + \log(x-2) = \log 3$ then $x =$ _____.
A. 1
C. 3
- B. 2
D. 6
12. If $\log_x\left(\frac{9}{16}\right) = -2$ then $x =$ _____.
A. $\frac{3}{4}$
C. $\frac{81}{256}$
- B. $\frac{4}{3}$
D. $\frac{256}{81}$
13. $\begin{vmatrix} e^{2x} & e^x \\ 1 & e^{-x} \end{vmatrix} =$ _____.
A. 0
C. e^x
- B. 1
D. e^{2x}
14. $\begin{vmatrix} \sin \alpha & \cos \alpha \\ \cos \beta & \sin \beta \end{vmatrix} =$ _____.
A. $\cos(\alpha + \beta)$
C. $-\cos(\alpha + \beta)$
- B. $\cos(\alpha - \beta)$
D. $-\cos(\alpha - \beta)$
15. If $\begin{vmatrix} 3 & x \\ -5 & 7 \end{vmatrix} = 11$ then $x =$ _____.
A. 2
C. $\frac{32}{5}$
- B. -2
D. $\frac{-32}{5}$
16. $\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} =$ _____.
A. $a+b+c$
C. $b+c$
- B. $a+b$
D. 0
17. If $\begin{bmatrix} 2 & -7 \\ 9 & 4-3x \end{bmatrix} = \begin{bmatrix} 2 & -7 \\ 9 & 13 \end{bmatrix}$ then $x =$ _____.
A. 3
C. $\frac{1}{3}$
- B. -3
D. $\frac{-1}{3}$
18. If $A = \begin{bmatrix} 1 & 3 \\ 3 & 5 \end{bmatrix}$ then $A + A^T =$ _____.
A. $2A$
C. 0
- B. A
D. I
19. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -2 \\ 1 & 5 \end{bmatrix}$ and $X - A + B = 0$ then $x =$ _____.
A. $\begin{bmatrix} 2 & -1 \\ -2 & 4 \end{bmatrix}$
C. $\begin{bmatrix} -2 & 0 \\ 4 & 9 \end{bmatrix}$
- B. $\begin{bmatrix} -2 & 4 \\ 2 & -1 \end{bmatrix}$
D. $\begin{bmatrix} -2 & 4 \\ 2 & 9 \end{bmatrix}$
20. If $A = \begin{bmatrix} 2 & -4 \\ 3 & 2 \\ -1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 1 \\ 0 & 5 \\ 4 & -2 \end{bmatrix}$ then $A - 2B =$ _____.
A. $\begin{bmatrix} -8 & 6 \\ -3 & 8 \\ 9 & -5 \end{bmatrix}$
- B. $\begin{bmatrix} 6 & -8 \\ 3 & 7 \\ 5 & 11 \end{bmatrix}$

- C. $\begin{bmatrix} 6 & -8 \\ 3 & 5 \\ -15 & 9 \end{bmatrix}$ D. $\begin{bmatrix} 8 & -6 \\ 3 & -8 \\ -9 & 5 \end{bmatrix}$
21. If P is 3×4 and Q is 4×1 type matrix then $(PQ)^T$ is _____ type matrix.
 A. 1×3 B. 3×1
 C. 4×1 D. 4×4
22. If $A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 \\ 3 \\ 5 \end{bmatrix}$ then $AB =$ _____ .
 A. $[25]$ B. $\begin{bmatrix} 4 \\ 6 \\ 15 \end{bmatrix}$
 C. $\begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$ D. $\begin{bmatrix} 5 \\ 5 \\ 8 \end{bmatrix}$
23. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix}$ then $A^2 =$ _____ .
 A. $\begin{bmatrix} 4 & 9 \\ 16 & 1 \end{bmatrix}$ B. $\begin{bmatrix} 4 & 16 \\ 13 & 12 \end{bmatrix}$
 C. $\begin{bmatrix} 16 & 9 \\ 12 & 13 \end{bmatrix}$ D. $\begin{bmatrix} 13 & 11 \\ 11 & 17 \end{bmatrix}$
24. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ then $AB =$ _____ .
 A. $\begin{bmatrix} 1 & 3 \\ 3 & 7 \\ 5 & 11 \end{bmatrix}$ B. $\begin{bmatrix} 1 & -2 \\ 3 & -4 \\ 5 & -6 \end{bmatrix}$
 C. $\begin{bmatrix} -1 & 2 \\ -3 & 4 \\ -5 & 6 \end{bmatrix}$ D. not possible.
25. If $A = \begin{bmatrix} 2 & -3 \\ 4 & 5 \end{bmatrix}$ then $A(\text{adj}A) =$ _____ .
 A. $22A$ B. A^{-1}
 C. I_2 D. $22I_2$
26. If $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$ then $A^{-1} =$ _____ .
 A. $5 \begin{bmatrix} 3 & -2 \\ 1 & 1 \end{bmatrix}$ B. $\frac{1}{5} \begin{bmatrix} 3 & -2 \\ 1 & 1 \end{bmatrix}$
 C. $\frac{1}{5} \begin{bmatrix} -1 & -1 \\ 2 & 3 \end{bmatrix}$ D. $\frac{1}{5} \begin{bmatrix} 3 & 2 \\ -1 & 1 \end{bmatrix}$
27. If for square matrix A, $A^2 - 3A + 4I = 0$, then $A^{-1} =$ _____ .
 A. $\frac{1}{4}(3I - A)$ B. $\frac{1}{4}(A - 3I)$
 C. $\frac{1}{4}A$ D. $\frac{1}{3}(A + 4)$
28. If $A = \begin{bmatrix} 1 & 0 \\ 5 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ then $(AB)^{-1} =$ _____ .
 A. $\begin{bmatrix} 1 & 5 \\ 3 & 3 \\ 0 & 0 \end{bmatrix}$ B. $\begin{bmatrix} -5 & 1 \\ 3 & 3 \\ 1 & 0 \end{bmatrix}$
 C. $\begin{bmatrix} 0 & 1 \\ 5 & 3 \\ 5 & 0 \end{bmatrix}$ D. $\begin{bmatrix} 1 & 0 \\ 3 & 5 \\ 0 & -\frac{5}{3} \end{bmatrix}$
29. If A is singular matrix then _____ .
 A. $A^T = A$ B. $A^T = -A$

- C. $|A| \neq 0$ D. $|A| = 0$
30. $\begin{vmatrix} 1 & 2 & 3 \\ 7 & 8 & 9 \\ -3 & -6 & -9 \end{vmatrix} = \underline{\hspace{2cm}}$.
- A. 0 B. 1
C. -18 D. 54
31. $150^\circ = \underline{\hspace{2cm}}$ radian
- A. $\frac{\pi}{3}$ B. $\frac{5\pi}{6}$
C. $\frac{5\pi}{3}$ D. $\frac{7\pi}{3}$
32. The radius of 25 c.m. and length of arc 55 c.m. subtended the angle at centre in degree = $\underline{\hspace{2cm}}$.
- A. 56° B. 94°
C. 126° D. 144°
33. By Eliminating the parameter θ from the equation $x = \sec \theta + \tan \theta$ and $y = \sec \theta - \tan \theta$ we get the equation $\underline{\hspace{2cm}}$.
- A. $x^2 - y^2 = 1$ B. $xy = 1$
C. $xy + 1 = 0$ D. $x + y = xy$
34. If $0 < \alpha < \frac{\pi}{2}$, $\cos \alpha = \frac{4}{5}$ then $\sec \alpha + \tan \alpha = \underline{\hspace{2cm}}$.
- A. $\frac{1}{2}$ B. 4
C. 2 D. $\frac{1}{4}$
35. In $\triangle ABC$ $\sin\left(\frac{B+C}{2}\right) = \underline{\hspace{2cm}}$.
- A. $\sin\left(\frac{A}{2}\right)$ B. $\sin A$
C. $\cos\left(\frac{A}{2}\right)$ D. $\cos A$
36. $\sin\left(-\frac{11\pi}{6}\right) = \underline{\hspace{2cm}}$.
- A. $\frac{1}{2}$ B. $-\frac{1}{2}$
C. $\frac{\sqrt{3}}{2}$ D. $-\frac{\sqrt{3}}{2}$
37. $\cos \frac{\pi}{6} \cdot \cos \frac{\pi}{3} \cdot \cos \frac{\pi}{2} \cdot \cos \pi = \underline{\hspace{2cm}}$.
- A. 0 B. 1
C. $\frac{1}{2}$ D. $-\frac{\sqrt{3}}{4}$
38. $\frac{\tan\left(\frac{\pi}{2} - \theta\right)}{\cot(2\pi - \theta)} + \frac{\csc\left(\frac{3\pi}{2} + \theta\right)}{\sec(\pi - \theta)} = \underline{\hspace{2cm}}$.
- A. -2 B. 2
C. 1 D. 0
39. $3 \cos^2 \frac{\pi}{4} - \sec \frac{\pi}{3} + 5 \tan^2 \frac{\pi}{3} = \underline{\hspace{2cm}}$.

- A. $\frac{15}{2}$ B. $\frac{29}{2}$
 C. $\frac{21}{2}$ D. $\frac{11}{2}$
40. Period of $\sin(3x + 4) =$ _____ .
 A. $\frac{\pi}{2}$ B. $\frac{3\pi}{2}$
 C. $\frac{2\pi}{3}$ D. $\frac{4\pi}{3}$
41. $\sin^2 37\frac{1}{2} - \sin^2 7\frac{1}{2} =$ _____ .
 A. $\frac{1}{\sqrt{2}}$ B. $\frac{1}{2\sqrt{2}}$
 C. $\frac{-1}{2\sqrt{2}}$ D. $\frac{1}{2\sqrt{2}}$
42. If $\tan(A + B) = 2$ and $\tan(A - B) = 5$ then $\tan 2A =$ _____ .
 A. $\frac{-1}{8}$ B. $\frac{4}{7}$
 C. $\frac{-4}{7}$ D. $\frac{1}{8}$
43. $2 \cos \frac{7\pi}{12} \sin \frac{5\pi}{12} =$ _____ .
 A. 0 B. 1
 C. $\frac{1}{2}$ D. $\frac{-1}{2}$
44. $\sqrt{\frac{1 - \cos \theta}{1 + \cos \theta}} =$ _____ .
 A. $\tan \theta$ B. $\cot \theta$
 C. $\tan \frac{\theta}{2}$ D. $\cot \frac{\theta}{2}$
45. $\sin \frac{\pi}{8} =$ _____ .
 A. $\sqrt{\frac{2 - \sqrt{2}}{2}}$ B. $\sqrt{\frac{2 + \sqrt{2}}{2}}$
 C. $\frac{2 - \sqrt{2}}{2}$ D. $\frac{2 + \sqrt{2}}{4}$
46. $\frac{\cos 10 + \sin 10}{\cos 10 - \sin 10} =$ _____ .
 A. $\tan 55$ B. $\cot 55$
 C. $-\tan 35$ D. $-\cot 35$
47. $\tan\left(\frac{\pi}{2} - \cot^{-1} \frac{5}{6}\right) =$ _____ .
 A. $\frac{5}{6}$ B. $\frac{-5}{6}$
 C. $\frac{6}{5}$ D. $\frac{-6}{5}$
48. $\tan^{-1}(\infty) + \sin^{-1}\left(\frac{\sqrt{3}}{2}\right) + \cos^{-1}\left(\frac{1}{2}\right) =$ _____ .
 A. $\frac{\pi}{2}$ B. $\frac{5\pi}{6}$
 C. $\frac{7\pi}{6}$ D. $\frac{3\pi}{4}$
49. $|3i - 4j + 5k| =$ _____

- A. 2
C. $5\sqrt{2}$
- B. 4
D. 50
50. If $\vec{a} = a_1\vec{i} + a_2\vec{j} + a_3\vec{k}$ then $\frac{\vec{a}}{a} =$ _____ .
 A. $\frac{a_1\vec{i} + a_2\vec{j} + a_3\vec{k}}{\sqrt{a_1^2 + a_2^2 + a_3^2}}$
 B. $\frac{a_1\vec{i} + a_2\vec{j} + a_3\vec{k}}{a_1^2 + a_2^2 + a_3^2}$
 C. $\frac{a_1\vec{i} + a_2\vec{j} + a_3\vec{k}}{a_1 + a_2 + a_3}$
 D. $|a_1\vec{i} + a_2\vec{j} + a_3\vec{k}|$
51. If $\vec{x} = (2,1)$ and $\vec{y} = (-1,3)$ then $2\vec{x} + 2\vec{y} =$ _____ .
 A. (7,-7)
 B. (1,11)
 C. (4,9)
 D. (8,-3)
52. If $\vec{x} = (2,1)$ and $\vec{y} = (1,3)$ then direction cosine of $3\vec{x} - 2\vec{y}$ _____ .
 A. $\frac{4}{5}, -\frac{3}{5}$
 B. $-\frac{4}{5}, \frac{3}{5}$
 C. $-\frac{4}{5}, -\frac{3}{5}$
 D. None of these.
53. If $\vec{x} = (1,1,1), \vec{y} = (1,2,3), \vec{z} = (1,2,-1)$ then $\vec{x} \cdot (\vec{y} - \vec{z}) =$ _____ .
 A. 1
 B. 2
 C. 3
 D. 4
54. If $\vec{x} = (a, 4, 2a)$ and $\vec{y} = (2a, -1, a)$ are perpendicular to each other then $a =$ _____ .
 A. 1
 B. 2
 C. 4
 D. any real number
55. If $\vec{x} = \vec{i} + 3\vec{j} - 2\vec{k}$ and $\vec{y} = 4\vec{i} - 2\vec{j} - \vec{k}$ then $(\vec{x} \wedge \vec{y}) =$ _____ .
 A. 0
 B. π
 C. $\frac{\pi}{2}$
 D. $\frac{\pi}{3}$
56. If $\vec{x} = (1,2,1)$ and $\vec{y} = (1, -1, 1)$ then $(\vec{x} + \vec{y}) \cdot (\vec{x} - \vec{y}) =$ _____ .
 A. 0
 B. 3
 C. 6
 D. 9
57. If $\vec{x} \cdot \vec{y} = |\vec{x}| = |\vec{y}|$ then $(\vec{x} \wedge \vec{y}) =$ _____ .
 A. 0
 B. $\frac{\pi}{2}$
 C. $\frac{\pi}{3}$
 D. $\frac{\pi}{6}$
58. $\vec{x} \cdot (\vec{x} \times \vec{y}) =$ _____ .
 A. 0
 B. unit vector
 C. zero vector
 D. none of these.
59. If $\vec{x} = (1,2,3)$ and $\vec{y} = (-1,3,5)$ then $(\vec{x} \times \vec{y}) =$ _____ .
 A. (1,-8,5)
 B. (-1,8,-5)
 C. (-1,-8,5)
 D. (1,-8,-5)
60. If $|\vec{a}| = 3, |\vec{b}| = 4$ and $|\vec{a} + \vec{b}| = 5$ then $|\vec{a} - \vec{b}| =$ _____ .
 A. 3
 B. 4
 C. 5
 D. 6
61. If the constant forces $\vec{i} + \vec{j} - 2\vec{k}$ and $2\vec{i} + 2\vec{j} - 4\vec{k}$ act on a particle and it moves from point $\vec{i} - \vec{j}$ to point $3\vec{i} + \vec{k}$ then work done is _____ unit.
 A. 6
 B. 4
 C. 3
 D. 1
62. If force \vec{F} acting through the point P then moment about point A = _____ .
 A. $\vec{AP} \cdot \vec{F}$
 B. $\vec{AP} \times \vec{F}$
 C. $\vec{F} \times \vec{AP}$
 D. none of these.
63. Length of a side of an equilateral triangle is 4 c.m. then its area = _____ c.m.²
 A. $4\sqrt{3}$
 B. 64

- C. $16\sqrt{3}$ D. $3\sqrt{3}$
64. Area of a rhombus is 40 c.m.^2 . If the length of its one diagonal is 10 c.m. then the length of its other diagonal = _____ c.m.
A. 4 B. 8
C. 16 D. 2
65. The formula for the surface area of cuboid is _____.
A. lbh B. $lb+bh+hl$
C. $2(lb+bh+hl)$ D. $l+b+h$
66. એક શંકુ ના પાયા નો વ્યાસ 14 સે.મી. અને ત્રાસી ઉંચાઈ 15 સે.મી. છે. તો તેની વક્રસપાટી નું ક્ષેત્રફળ = _____ સે.મી.²
A. 105π B. 150π
C. 210π D. 15π
67. Total surface area of a hemisphere is 60 c.m.^2 . Then its curved surface area is = _____ c.m.²
A. 40 B. 20
C. 60 D. 120
68. Length, breadth and height of cuboid are 5 m, 3 m and 2 m respectively then its volume is _____ m³
A. 30 B. 60
C. 150 D. 90
69. Volume of cylinder is $343\pi \text{ c.m.}^3$. If its radius and height are equal then its diameter is _____ c.m..
A. 28 B. 14
C. 42 D. 7
70. Ratio of radius of two spheres is 3:4 then the ratio of their volume is _____.
A. 27:64 B. 9:16
C. 16:9 D. 64:27

ગુજરાતી

Q. યોગ્ય વિકલ્પ પસંદકરી ખાલી જગ્યા પૂરો.

1. $(25)^{-\frac{1}{2}} = \frac{1}{5}$ નું લઘુગુણકીય સ્વરૂપ _____ છે.
A. $\log_{\frac{1}{5}} 25 = \frac{-1}{2}$ B. $\log_{\frac{1}{5}} (\frac{-1}{2}) = 25$
C. $\log_{25} (\frac{1}{5}) = \frac{-1}{2}$ D. $\log_{-\frac{1}{2}} (\frac{1}{5}) = 25$
2. $\log_{5\sqrt{2}} 2500 = \underline{\hspace{2cm}}$
A. 4 B. 5
C. 8 D. -5
3. $\log 32 \div \log 16 = \underline{\hspace{2cm}}$
A. 2 B. $\frac{5}{4}$
C. $\log 2$ D. $\log \frac{5}{4}$
4. $\log_2 (\log_3 9) = \underline{\hspace{2cm}}$
A. 3 B. 6

- C. 1 D. 9
- $\log 1 \cdot \log 2 \cdot \log 3 \cdot \log 4 \dots \log 25 =$ _____
- A. 25 B. 0
- C. 1 D. $1 \times 2 \times 3 \times \dots \times 25$
6. $\sqrt{3}^{\log_3 4} =$ _____
- A. $\frac{1}{2}$ B. $\frac{1}{4}$
- C. 2 D. 4
7. $\log \frac{9}{14} - \log \frac{15}{16} + \log \frac{35}{24} =$ _____
- A. 0 B. 1
- C. $\log 2$ D. $\log 7$
8. $\frac{1}{\log_5 15} + \frac{1}{\log_3 15} =$ _____
- A. 15 B. $\frac{5}{3}$
- C. 0 D. 1
9. $\log_y x^2 \times \log_x y^3 =$ _____
- A. 2 B. 3
- C. 5 D. 6
10. જો $\log\left(\frac{a+b}{2}\right) = \frac{1}{2}(\log a + \log b)$ તો _____ .
- A. $a = b$ B. $a^2 + b^2 = 1$
- C. $a+b=1$ D. $2a = b$
11. જો $\log x + \log(x-2) = \log 3$ તો $x =$ _____.
- A. 1 B. 2
- C. 3 D. 6
12. જો $\log_x\left(\frac{9}{16}\right) = -2$ તો $x =$ _____.
- A. $\frac{3}{4}$ B. $\frac{4}{3}$
- C. $\frac{81}{256}$ D. $\frac{256}{81}$
13. $\begin{vmatrix} e^{2x} & e^x \\ 1 & e^{-x} \end{vmatrix} =$ _____ .
- A. 0 B. 1
- C. e^x D. e^{2x}
14. $\begin{vmatrix} \sin \alpha & \cos \alpha \\ \cos \beta & \sin \beta \end{vmatrix} =$ _____
- A. $\cos(\alpha + \beta)$ B. $\cos(\alpha - \beta)$
- C. $-\cos(\alpha + \beta)$ D. $-\cos(\alpha - \beta)$
15. જો $\begin{vmatrix} 3 & x \\ -5 & 7 \end{vmatrix} = 11$ તો $x =$ _____.
- A. 2 B. -2

- C. $\frac{32}{5}$ D. $\frac{-32}{5}$
16. $\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} = \underline{\hspace{2cm}}$.
- A. $a+b+c$ B. $a+b$
C. $b+c$ D. 0
17. જો $\begin{bmatrix} 2 & -7 \\ 9 & 4-3x \end{bmatrix} = \begin{bmatrix} 2 & -7 \\ 9 & 13 \end{bmatrix}$ હોય, તો $x = \underline{\hspace{2cm}}$.
- A. 3 B. -3
C. $\frac{1}{3}$ D. $\frac{-1}{3}$
18. જો $A = \begin{bmatrix} 1 & 3 \\ 3 & 5 \end{bmatrix}$ તો $A + A^T = \underline{\hspace{2cm}}$.
- A. $2A$ B. A
C. 0 D. I
19. જો $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -2 \\ 1 & 5 \end{bmatrix}$ અને $X - A + B = 0$ હોય, તો $X = \underline{\hspace{2cm}}$.
- A. $\begin{bmatrix} 2 & -1 \\ -2 & 4 \end{bmatrix}$ B. $\begin{bmatrix} -2 & 4 \\ 2 & -1 \end{bmatrix}$
C. $\begin{bmatrix} -2 & 0 \\ 4 & 9 \end{bmatrix}$ D. $\begin{bmatrix} -2 & 4 \\ 2 & 9 \end{bmatrix}$
20. જો $A = \begin{bmatrix} 2 & -4 \\ 3 & 2 \\ -1 & 1 \end{bmatrix}$ અને $B = \begin{bmatrix} -3 & 1 \\ 0 & 5 \\ 4 & -2 \end{bmatrix}$ હોય, તો $A - 2B = \underline{\hspace{2cm}}$.
- A. $\begin{bmatrix} -8 & 6 \\ -3 & 8 \\ 9 & -5 \end{bmatrix}$ B. $\begin{bmatrix} 6 & -8 \\ 3 & 7 \\ 5 & 11 \end{bmatrix}$
C. $\begin{bmatrix} 6 & -8 \\ 3 & 5 \\ -15 & 9 \end{bmatrix}$ D. $\begin{bmatrix} 8 & -6 \\ 3 & -8 \\ -9 & 5 \end{bmatrix}$
21. જો P એ 3×4 પ્રકાર નો અને Q એ 4×1 પ્રકાર નો શ્રેણિક હોય, તો $(PQ)^T$ એ $\underline{\hspace{2cm}}$ પ્રકાર નો શ્રેણિક થાય.
- A. 1×3 B. 3×1
C. 4×1 D. 4×4
22. જો $A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$ અને $B = \begin{bmatrix} 4 \\ 3 \\ 5 \end{bmatrix}$ હોય, તો $AB = \underline{\hspace{2cm}}$.
- A. $[25]$ B. $\begin{bmatrix} 4 \\ 6 \\ 15 \end{bmatrix}$
C. $\begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$ D. $\begin{bmatrix} 5 \\ 5 \\ 8 \end{bmatrix}$
23. જો $A = \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix}$, તો $A^2 = \underline{\hspace{2cm}}$.
- A. $\begin{bmatrix} 4 & 9 \\ 16 & 1 \end{bmatrix}$ B. $\begin{bmatrix} 4 & 16 \\ 13 & 12 \end{bmatrix}$
C. $\begin{bmatrix} 16 & 9 \\ 12 & 13 \end{bmatrix}$ D. $\begin{bmatrix} 13 & 11 \\ 11 & 17 \end{bmatrix}$
24. જો $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$ અને $B = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ હોય, તો $AB = \underline{\hspace{2cm}}$.

- A. $\begin{bmatrix} 1 & 3 \\ 3 & 7 \\ 5 & 11 \end{bmatrix}$ B. $\begin{bmatrix} 1 & -2 \\ 3 & -4 \\ 5 & -6 \end{bmatrix}$
- C. $\begin{bmatrix} -1 & 2 \\ -3 & 4 \\ -5 & 6 \end{bmatrix}$ D. શક્ય નથી .
25. જો $A = \begin{bmatrix} 2 & -3 \\ 4 & 5 \end{bmatrix}$, હોય તો $A(\text{adj}A) = \underline{\hspace{2cm}}$.
- A. $22A$ B. A^{-1}
- C. I_2 D. $22 I_2$
26. જો $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$, હોય તો $A^{-1} = \underline{\hspace{2cm}}$.
- A. $5 \begin{bmatrix} 3 & -2 \\ 1 & 1 \end{bmatrix}$ B. $\frac{1}{5} \begin{bmatrix} 3 & -2 \\ 1 & 1 \end{bmatrix}$
- C. $\frac{1}{5} \begin{bmatrix} -1 & -1 \\ 2 & 3 \end{bmatrix}$ D. $\frac{1}{5} \begin{bmatrix} 3 & 2 \\ -1 & 1 \end{bmatrix}$
27. જો કોઈ ચોરસ શ્રેણિક A માટે $A^2 - 3A + 4I = 0$, હોય તો $A^{-1} = \underline{\hspace{2cm}}$.
- A. $\frac{1}{4}(3I - A)$ B. $\frac{1}{4}(A - 3I)$
- C. $\frac{1}{4}A$ D. $\frac{1}{3}(A + 4)$
28. જો $A = \begin{bmatrix} 1 & 0 \\ 5 & 3 \end{bmatrix}$ અને $B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, હોય તો $(AB)^{-1} = \underline{\hspace{2cm}}$.
- A. $\begin{bmatrix} 1 & 5 \\ 3 & 3 \\ 0 & 0 \end{bmatrix}$ B. $\begin{bmatrix} -5 & 1 \\ 3 & 3 \\ 1 & 0 \end{bmatrix}$
- C. $\begin{bmatrix} 0 & 1 \\ 3 & 3 \\ 5 & 0 \end{bmatrix}$ D. $\begin{bmatrix} 1 & 0 \\ 3 & 0 \\ 0 & -\frac{5}{3} \end{bmatrix}$
29. જો A સામાન્ય શ્રેણિક હોય તો $\underline{\hspace{2cm}}$.
- A. $A^T = A$ B. $A^T = -A$
- C. $|A| \neq 0$ D. $|A| = 0$
30. $\begin{vmatrix} 1 & 2 & 3 \\ 7 & 8 & 9 \\ -3 & -6 & -9 \end{vmatrix} = \underline{\hspace{2cm}}$.
- A. 0 B. 1
- C. -18 D. 54
31. $150^\circ = \underline{\hspace{2cm}}$ રેડીયન
- A. $\frac{\pi}{3}$ B. $\frac{5\pi}{6}$
- C. $\frac{5\pi}{3}$ D. $\frac{7\pi}{3}$
32. 25 સે.મી. ત્રિજ્યાવાળી 55 સે.મી. લંબાઈની ચાપ દ્વારા કેન્દ્ર આગળ બનતા ખૂણાનું અંશ માપ = $\underline{\hspace{2cm}}$.
- A. 56° B. 94°
- C. 126° D. 144°
33. $x = \sec \theta + \tan \theta$ અને $y = \sec \theta - \tan \theta$ માંથી પ્રયત્ન θ નો લોપ કરતાં સમીકરણ

- _____ મળે.
- A. $x^2 - y^2 = 1$ B. $xy = 1$
 C. $xy + 1 = 0$ D. $x + y = xy$
34. જો $0 < \alpha < \frac{\pi}{2}$ માટે $\cos \alpha = \frac{4}{5}$ તો $\sec \alpha + \tan \alpha =$ _____ .
 A. $\frac{1}{2}$ B. 4
 C. 2 D. $\frac{1}{4}$
35. $\triangle ABC$ માં $\sin\left(\frac{B+C}{2}\right) =$ _____ .
 A. $\sin\left(\frac{A}{2}\right)$ B. $\sin A$
 C. $\cos\left(\frac{A}{2}\right)$ D. $\cos A$
36. $\sin\left(\frac{-11\pi}{6}\right) =$ _____ .
 A. $\frac{1}{2}$ B. $-\frac{1}{2}$
 C. $\frac{\sqrt{3}}{2}$ D. $-\frac{\sqrt{3}}{2}$
37. $\cos \frac{\pi}{6} \cdot \cos \frac{\pi}{3} \cdot \cos \frac{\pi}{2} \cdot \cos \pi =$ _____ .
 A. 0 B. 1
 C. $\frac{1}{2}$ D. $-\frac{\sqrt{3}}{4}$
38. $\frac{\tan\left(\frac{\pi}{2} - \theta\right)}{\cot(2\pi - \theta)} + \frac{\csc\left(\frac{3\pi}{2} + \theta\right)}{\sec(\pi - \theta)} =$ _____ .
 A. -2 B. 2
 C. 1 D. 0
39. $3 \cos^2 \frac{\pi}{4} - \sec \frac{\pi}{3} + 5 \tan^2 \frac{\pi}{3} =$ _____ .
 A. $\frac{15}{2}$ B. $\frac{29}{2}$
 C. $\frac{21}{2}$ D. $\frac{11}{2}$
40. $\sin(3x + 4)$ નું આવર્તમાન = _____ .
 A. $\frac{\pi}{2}$ B. $\frac{3\pi}{2}$
 C. $\frac{2\pi}{3}$ D. $\frac{4\pi}{3}$
41. $\sin^2 37\frac{1}{2} - \sin^2 7\frac{1}{2} =$ _____ .
 A. $\frac{1}{\sqrt{2}}$ B. $\frac{1}{2\sqrt{2}}$
 C. $\frac{-1}{2\sqrt{2}}$ D. $2\sqrt{2}$
42. જો $\tan(A + B) = 2$ અને $\tan(A - B) = 5$ હોય, તો $\tan 2A =$ _____ .
 A. $-\frac{1}{8}$ B. $\frac{4}{7}$

- C. $\frac{-4}{7}$ D. $\frac{1}{8}$
43. $2 \cos \frac{7\pi}{12} \sin \frac{5\pi}{12} = \underline{\hspace{2cm}}$.
 A. 0 B. 1
 C. $\frac{1}{2}$ D. $\frac{-1}{2}$
44. $\sqrt{\frac{1-\cos \theta}{1+\cos \theta}} = \underline{\hspace{2cm}}$.
 A. $\tan \theta$ B. $\cot \theta$
 C. $\tan \frac{\theta}{2}$ D. $\cot \frac{\theta}{2}$
45. $\sin \frac{\pi}{8} = \underline{\hspace{2cm}}$
 A. $\sqrt{\frac{2-\sqrt{2}}{2}}$ B. $\sqrt{\frac{2+\sqrt{2}}{2}}$
 C. $\frac{2-\sqrt{2}}{2}$ D. $\frac{2+\sqrt{2}}{4}$
46. $\frac{\cos 10 + \sin 10}{\cos 10 - \sin 10} = \underline{\hspace{2cm}}$.
 A. $\tan 55$ B. $\cot 55$
 C. $-\tan 35$ D. $-\cot 35$
47. $\tan\left(\frac{\pi}{2} - \cot^{-1} \frac{5}{6}\right) = \underline{\hspace{2cm}}$.
 A. $\frac{5}{6}$ B. $\frac{-5}{6}$
 C. $\frac{6}{5}$ D. $\frac{-6}{5}$
48. $\tan^{-1}(\infty) + \sin^{-1}\left(\frac{\sqrt{3}}{2}\right) + \cos^{-1}\left(\frac{1}{2}\right) = \underline{\hspace{2cm}}$.
 A. $\frac{\pi}{2}$ B. $\frac{5\pi}{6}$
 C. $\frac{7\pi}{6}$ D. $\frac{3\pi}{4}$
49. $|3i - 4j + 5k| = \underline{\hspace{2cm}}$
 A. 2 B. 4
 C. $5\sqrt{2}$ D. 50
50. જો $\vec{a} = a_1\mathbf{i} + a_2\mathbf{j} + a_3\mathbf{k}$ હોય, તો $\frac{\wedge}{a} = \underline{\hspace{2cm}}$.
 A. $\frac{a_1\mathbf{i} + a_2\mathbf{j} + a_3\mathbf{k}}{\sqrt{a_1^2 + a_2^2 + a_3^2}}$ B. $\frac{a_1\mathbf{i} + a_2\mathbf{j} + a_3\mathbf{k}}{a_1^2 + a_2^2 + a_3^2}$
 C. $\frac{a_1\mathbf{i} + a_2\mathbf{j} + a_3\mathbf{k}}{a_1 + a_2 + a_3}$ D. $|a_1\mathbf{i} + a_2\mathbf{j} + a_3\mathbf{k}|$
51. જો $\vec{x} = (2,1)$ અને $\vec{y} = (-1,3)$ હોય તો $2\vec{x} + 2\vec{y} = \underline{\hspace{2cm}}$.
 A. (7,-7) B. (1,11)
 C. (4,9) D. (8,-3)
52. જો $\vec{x} = (2,1)$ અને $\vec{y} = (1,3)$ હોય ,તો $3\vec{x} - 2\vec{y}$ ની દિઁકોસાઇનો $\underline{\hspace{2cm}}$ છે

- A. $\frac{4}{5}, -\frac{3}{5}$ B. $-\frac{4}{5}, \frac{3}{5}$
 C. $-\frac{4}{5}, -\frac{3}{5}$ D. આપેલા માંથી કોઈ નહિ.
53. જો $\bar{x} = (1,1,1), \bar{y} = (1,2,3), \bar{z} = (1,2,-1)$ હોય તો $\bar{x} \cdot (\bar{y} - \bar{z}) =$ _____ .
 A. 1 B. 2
 C. 3 D. 4
54. જો $\bar{x} = (a, 4, 2a)$ અને $\bar{y} = (2a, -1, a)$ પરસ્પર લંબ હોય , તો $a =$ _____ .
 A. 1 B. 2
 C. 4 D. કોઈ પણ વાસ્તવિક સંખ્યા.
55. જો $\bar{x} = i + 3j - 2k$ અને $\bar{y} = 4i - 2j - k$ હોય, તો $(\bar{x} \wedge \bar{y}) =$ _____ .
 A. 0 B. π
 C. $\frac{\pi}{2}$ D. $\frac{\pi}{3}$
56. જો $\bar{x} = (1,2,1)$ અને $\bar{y} = (1, -1, 1)$ હોય, તો $(\bar{x} + \bar{y}) \cdot (\bar{x} - \bar{y}) =$ _____ .
 A. 0 B. 3
 C. 6 D. 9
57. જો $\bar{x} \cdot \bar{y} = |\bar{x}| = |\bar{y}|$ હોય , તો $(\bar{x} \wedge \bar{y}) =$ _____ .
 A. 0 B. $\frac{\pi}{2}$
 C. $\frac{\pi}{3}$ D. $\frac{\pi}{6}$
58. $\bar{x} \cdot (\bar{x} \times \bar{y}) =$ _____ .
 A. શૂન્ય B. એકમ સદિશ
 C. શૂન્ય સદિશ D. આપેલા માંથી કોઈ નહિ.
59. જો $\bar{x} = (1,2,3)$ અને $\bar{y} = (-1, 3, 5)$ હોય, તો $(\bar{x} \times \bar{y}) =$ _____ .
 A. (1,-8,5) B. (-1,8,-5)
 C. (-1,-8,5) D. (1,-8,-5)
60. જો $|\bar{a}| = 3, |\bar{b}| = 4$ અને $|\bar{a} + \bar{b}| = 5$ હોય, તો $|\bar{a} - \bar{b}| =$ _____ .
 A. 3 B. 4
 C. 5 D. 6
61. એક કણ પર કાર્ય કરતા અચળ બળો $i+j-2k$ અને $2i+2j-4k$ તેનું બિંદુ $i-j$ થી બિંદુ $3i+k$ સુધી સ્થનાંતર કરે છે. તો થયેલ કાર્ય _____ એકમ થાય.
 A. 6 B. 4
 C. 3 D. 1
62. જો બળ \vec{F} બિંદુ P આગળ કાર્ય કરે તો તેની બિંદુ A આસપાસ ચાકમાત્રા = _____ .
 A. $\vec{AP} \cdot \vec{F}$ B. $\vec{AP} \times \vec{F}$
 C. $\vec{F} \times \vec{AP}$ D. આપેલા માંથી કોઈ નહિ.
63. એક સમબાજુ ત્રિકોણ ની બાજુ નું માપ 4 સે.મી. હોય તો તેનું ક્ષેત્રફળ = _____ સે.મી.²

- A. $4\sqrt{3}$ B. 64
C. $16\sqrt{3}$ D. $3\sqrt{3}$
64. એક સમબાજુ ચતુષ્કોણ નું ક્ષેત્રફળ 40 સે.મી.² છે . જો તેના એક વિકર્ણ નું માપ 10 સે.મી હોય તો બીજા વિકર્ણ નું માપ _____ સે.મી. હોય.
A. 4 B. 8
C. 16 D. 2
65. લંબઘન નું પૃષ્ઠફળ શોધવાનું સૂત્ર _____ છે
A. lbh B. lb+bh+hl
C. 2(lb+bh+hl) D. l+b+h
66. એક શંકુ ના પાયા નો વ્યાસ 14 સે.મી. અને ત્રાસી ઊંચાઈ 15 સે.મી. છે. તો તેની વક્રસપાટી નું ક્ષેત્રફળ= _____ સે.મી.²
A. 105π B. 150π
C. 210π D. 15π
67. એક ધાતુ ના અર્ધગોળાનું કુલ પૃષ્ઠફળ 60 સે.મી.² છે. તો તેની વક્રસપાટી નું ક્ષેત્રફળ= _____ સે.મી.²
A. 40 B. 20
C. 60 D. 120
68. એક લંબઘન ની લંબાઈ 5 મીટર , પહોળાઈ 3 મીટર અને ઊંચાઈ 2 મીટર છે. તો તેનું ઘનફળ=_____ મીટર³
A. 30 B. 60
C. 150 D. 90
69. એક નળાકાર નું ઘનફળ 343π સે.મી.³ છે. જો તેની ત્રિજ્યા અને ઊંચાઈ સરખા હોય , તો નળાકાર નો વ્યાસ= _____ સે.મી.
A. 28 B. 14
C. 42 D. 7
70. બે ગોળાઓની ત્રિજ્યાઓનો ગુણોત્તર 3:4, હોય તો તેમનાં ઘનફળો નો ગુણોત્તર_____ છે.
A. 27:64 B. 9:16
C. 16:9 D. 64:27
