SAIVEERA ACADEMY REVOLUTION FOR LEARNING

PEELAMEDU 8098850809

12TH APPLICATIONS OF MATRICES AND DETERMINANTS WISDOM TEST

NAME : **MARKS** :100

SUBJECT : **TIME : 2 hrs**

i.Answer the following questions

1.A = $\begin{bmatrix} 3 & -3 & 4 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ verify that $A^{-1} = A^3$

2. If A = $\frac{1}{3}\begin{bmatrix} 2 & 2 & 1 \\ -2 & 1 & 2 \\ 1 & -2 & 2 \end{bmatrix}$ prove that $A^T = A^{-1}$

3. Solve by matrix inversion method 2 x -y +3z = 9 , x +y +z = 6 , x -y + z = 2

4. If adj(A)= $\begin{bmatrix} 2 & -1 & -2 \\ 2 & -2 & -2 \\ 6 & -5 & -8 \end{bmatrix}$, find A

5. Solve by cramar's method 2x +y +z = 5 , x +y +z = 4 , x -y + 2z = 1

6.Solve by rank method x +y 2z = 6 , 3x +y -z = 2 , 4x +2y + z = 8

7.Solve by rank method x +y +2z = 4 , 2x +2y +4z = 8 ,3x +3y +6 z = 12

8. x +2y +3z = 6 , 2x +4y +6z = 12 , 3x +6y + 9z = 24 (by rank method)

9. A =$\begin{bmatrix} 1 & -1 \\ 2 & 0 \end{bmatrix}$ B = $\begin{bmatrix} 3 & -2 \\ 1 & 1 \end{bmatrix}$ and C = $\begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$, find a matric X such that AXB = C

10. Show that the matrix $\begin{bmatrix} 3 & 1 & 4 \\ 2 & 0 & -1 \\ 5 & 2 & 1 \end{bmatrix}$ is non singular and reduce it to the identity matrix by elementary row transformations

11. Find the inverse by Gauss-Jordan method $\begin{bmatrix} 2 & 1 & 1 \\ 3 & 2 & 1 \\ 2 & 1 & 2 \end{bmatrix}$

12. .If A= $\begin{bmatrix} -5 & 1 & 3 \\ 7 & 1 & -5 \\ 1 & -1 & 1 \end{bmatrix}$ & B = $\begin{bmatrix} 1 & 1 & 2 \\ 3 & 2 & 1 \\ 2 & 1 & 3 \end{bmatrix}$ find the products AB & BA & hence solve the equation x + y +2 z = 1 , 3x + 2y +z = 7 , 2x + y +3 z = 2

13. find λ&μ values for x+y+z=6 , x+2y+ 3z=10, x +2y+ λ z= μ i) no soln ii)unique soln iii)infinite soln

14. Find the value of *k* for which the equations kx+y+z=1, x+ky+z=-1 , x+y+kz=1 have (i) no solution (ii) unique solution (iii)infinitely many solution

15. The upward speed *v* (t)of a rocket at time *t* is approximated by $v(t) = at^2+bt+c$, $0\leq t \leq 100$ where *a,b* and c are constants. It has been found that the speed at times *t* = 3 , t = 6 and *t* = 9 seconds are respectively, 64, 133, and 208 miles per second respectively. Find the speed at time *t* =15 seconds. (Gaussian elimination)

16, An amount of Rs.65,000 is invested in three bonds at the rates of 6%, 8% and 9% per annum respectively. The total annual income is Rs.4,800. The income from the third bond is Rs. 600 more than that from the second bond. Determine the price of each bond (using matrix inversion method)

17. If ax^2+bx+c is divided by x+3 ,,x-5 and x-1 the remainders are 21,61 and 9 respectively. Find *a,b& c* (Cramar's method)

18.Swetha is selling bags of popcorn .A small bag sells for Rs.3 , the medium size for Rs.5 and a large bag for Rs.7 .She has sold a total of 15 bags and has made Rs.77 . She has sold two more medium bags than small bags . How many of each size did she sell ? (solve by your choice)

19.Balancing equations by Gaussian elimination method $Al + Fe_3N_2 \rightarrow AlN + Fe$

20.The second angle of a triangle is 50 degrees less than the 4 times the first angle .The third angle is 40 degrees less than the first . Find the measures of the three angles (by cramars method)

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12^{th} Complex numbers five marks
(creative and book sums)

Marks : 75
Time : 1hr 15 min

1.Find locus if
arg (z-1 / z + 3) = $\pi/2$
2. Find sixth roots of unity
3.Solve $z^3 + 8i = 0$
4.Show that $\left(\frac{\sqrt{3}}{2}+\frac{i}{2}\right)^5 + \left(\frac{\sqrt{3}}{2}-\frac{i}{2}\right)^5 = -\sqrt{3}$
5.Find quotient in rectangular form
$\frac{2(\cos\frac{9\pi}{4} - i\sin\frac{9\pi}{4})}{4(\cos\frac{(-3\pi)}{2} + i\sin\frac{(-3\pi)}{2})}$
6. .$\frac{1+z}{1-z} = \cos 2\theta + i\sin 2\theta$, show that
$z = i\tan\theta$
7. If .If $\left|z - \frac{2}{z}\right| = 2$ show that greatest value and least of |z| are $\sqrt{3} + 1, \sqrt{3}-1$
8. $2\cos\alpha = x + 1/x$ and $2\cos\beta = y + 1/y$
then show that
$x^m y^n + 1/ x^m y^n = 2\cos(m\alpha + n\beta)$
and $z = \cos\theta + i\sin\theta$ show that
$z^n + 1/z^n = 2\cos n\theta$ and $z^n - 1/z^n = 2i\sin n\theta$
9. Show that the points 7+9i , -3+7i , 3+3i form a right angled triangle on the argand diagram and show that z = 3+ 2i represent complex numbers z , iz and z+iz forms a isosceles triangle
10.Find the locus if Im $\left[\frac{2z+1}{iz+1}\right] = -2$
11.Show that points 7+5i , 5+2i , 4 + 7i , 2 + 4i form a parallelogram
12.Find locus if arg (z-1 / z + 1) = $\pi/4$
13.$(1+i)^{4n}$ and $(1+i)^{4n+2}$ are real and purely imaginary
14.If α,β are the roots of equation $x^2 - 2px + (p^2 + q^2) = 0$ and $\tan\theta = \frac{q}{y+p}$ show that
$\frac{(y+\alpha)^n - (y+\beta)^{-n}}{\alpha-\beta} = q^{n-1}\frac{\sin n\theta}{\sin^n\theta}$
15.Prove $(1+\cos\theta + i\sin\theta)^n + (1+\cos\theta - i\sin\theta)^{-n} = 2^{n+1} \cos^n(\theta/2)\cos n\theta/2$

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