KOMARASAMY GOUNDER MAT.HR.SEC.SCHOOL – VETTAYAMPALAYAM

UNIT TEST

X – STANDARD

MATHEMATICS (29.06.2023)

TIME : 1.30 HOURS **MAXIMU M MARKS : 50**

PART – A

I.CHOOSE THE CORRECT ANSWER : **7 X 1 = 7**

1. Find the matrix X if $2X + \begin{bmatrix} 1 & 3 \\ 5 & 7 \end{bmatrix} = \begin{bmatrix} 5 & 7 \\ 9 & 5 \end{bmatrix}$

a) $\begin{bmatrix} -2 & -2 \\ 2 & -1 \end{bmatrix}$ b) $\begin{bmatrix} 2 & 2 \\ 2 & -1 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 2 \\ 2 & 2 \end{bmatrix}$ d) $\begin{bmatrix} 2 & 1 \\ 2 & 2 \end{bmatrix}$

2. If P is a 2 X 3 matrix and Q is a 3 X 4 matrix , how many columns does PQ have.

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

3. If number of columns and rows are not equal in a matrix then it is said to be a

a) Identify matrix b) Square matrix

c) Rectangular matrix d) Diagonal matrix

4. In Diagonal matrix in which all the leading diagonal elements are

a) equal b) zero c) 1 d) 2

5. If x = a tan θ and y = b sec θ then

a) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ b) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

c) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ d) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

6. A tower is 60 m in heigh. Its shadow is x metres shorters when the sun's altitude is 45^0 than when it has been 30^0 ,then x is equal to

a) 41.92 m b) 43.92 m c) 43 m d) 45.6 m

7. Prove that $\tan^2\theta - \sin^2\theta = \tan^2\theta \sin^2\theta$

a) $\tan^2\theta \sin^2\theta$ b) $\frac{1-\cos A}{\sin A}$

C) tam θ sin θ d) 1 + (cosec θ -1) = cosec θ

PART – B

II.ANSWER ANY FIVE OF THE FOLLOWING : **5 X 2 = 10**

8. If A = $\begin{bmatrix} 0 & 4 & 9 \\ 8 & 3 & 7 \end{bmatrix}$, B = $\begin{bmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{bmatrix}$ Find the value of 3A – 9B.

9. If $A = \begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{bmatrix}$ then verify $(A_T)_T = A$

10. Verify that $A^2 = I$ When $A = \begin{bmatrix} 5 & -4 \\ 6 & -5 \end{bmatrix}$

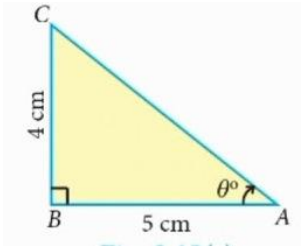
11. If Q is of order m x n and R is of order n x o . What is the order of QR and RQ ?

12. To prove following identities .

$$\frac{1-tan^2\theta}{cot^2\theta-1} = tan^2\theta$$

13. Prove that $\sec\theta - \cos\theta = \tan\theta \sin\theta$

14.



Calculate ∠BAC in the given triangle. ($\tan 38.7^0 = 0.8011$.)

15. From the top of a rock $50\sqrt{3}$ m high ,the angle of depression of a car on the ground is observed to be 30^0 . Find the distance of the car from the rock.

16. A player sitting on the top of a tower of height 20 m observes the angle of depression of a ball lying on the ground as 60^0 . Find the distance between the foot of the tower and the ball. ($\sqrt{3} = 1.732$)

17. Consider the following information regarding the number of men and woman workers in three School I ,II, III .

School	Men	Woman
I	12	8
II	23	18
III	7	8

Represent the above information in the form of a matrix. What does the entry in the second row and first column represent ?

PART – C

III.ANSWER ANY FIVE OF THE FOLLOWING : **5 X 5 = 25**

18. Find the value of a , b , c , d from the following matrix equation.

$$\begin{bmatrix} d & 8 \\ 3b & a \end{bmatrix} + \begin{bmatrix} 3 & a \\ -2 & -4 \end{bmatrix} = \begin{bmatrix} 2 & 2a \\ b & 4c \end{bmatrix} + \begin{bmatrix} 0 & 1 \\ -5 & 0 \end{bmatrix}$$

19. Find the values of a , b , c if ,

i) $\begin{bmatrix} a-3 & 3a-c \\ a+b+7 & a+b+c \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 1 & 6 \end{bmatrix}$

ii) $[a \quad b-c \quad c+3] + [b \quad 4 \quad 3] = [4 \quad 8 \quad 16]$

20. If A = $\begin{bmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{bmatrix}$, B = $\begin{bmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{bmatrix}$, Verify that $(AB)^T = B^T A^T$

21. If $\frac{\cos\theta}{1+\sin\theta} = \frac{1}{a}$, then prove that $\frac{a^2-1}{a^2+1} = \sin\theta$.

22. A traveler approaches a mountain on highway. He measures the angle of elevation to the peak at each milestone. At two consecutive milestones the angles measured are 4^0 and 8^0. What is the height of the beak if the distance between consecutive milestones is 1 mile. ($\tan 4^0 = 0.0699$, $8^0 = 0.1405$)

23 . From the top of a building 50 m high , the angles of depression of the top and bottom of a tree are observed to be 30^0 and 45^0 respectively . Find the height of the tree. ($\sqrt{3} = 1.732$)

24. Prove that $\frac{(1+\cot A+\tan A)(\sin A-\cos A)}{\sec^3 A-\operatorname{cosec}^3 A} = \sin^2 A \cos^2 A$.

PART – D

IV.ANSWER ANY ONE OF THE FOLLOWING : 1 X 8 = 8

25. Draw the graph of y = (x – 1) (x + 3) and hence solve $x^2 - x - 6 = 0$

26. Draw the Graph of $y = x^2 + 3x - 4$ and hence use it to solve $x^2 + 3x - 4 = 0$