

## SCHOOL EDUCATION DEPARTMENT-VIRUDHUNAGAR DISTRICT

## PREPARATORY TEST – II

Class : 10

Date: 11.01.2023

Subject : Mathematics

Duration : 1½ hours

Max.marks : 50

## I. Choose the best answer

(7 x 1 = 7)

- 1) If A is a 2 x 3 matrix and B is a 3 x 4 matrix, how many columns does AB have  
(a) 3 (b) 4 (c) 2 (d) 5
- 2) If the number of Rows and Columns are equal in a matrix, then it is said to be a  
(a) Row matrix (b) Rectangular matrix (c) Square matrix (d) Column matrix
- 3) Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?  
(a) 13 m (b) 14 m (c) 15 m (d) 12.8 m
- 4) A tower is 60 m height. Its shadow is x meters shorter when the Sun's altitude is  $45^\circ$  than when it has been  $30^\circ$ , then x is equal to  
(a) 41.92 m (b) 43.92 m (c) 43 m (d) 45.6 m
- 5) The ratio of the volumes of a Cylinder, a Cone and a Sphere, if each has the same diameter and same height is  
(a) 1 : 2 : 3 (b) 2 : 1 : 3 (c) 1 : 3 : 2 (d) 3 : 1 : 2
- 6) Variance of first 20 natural numbers is  
(a) 32.25 (b) 44.25 (c) 33.25 (d) 30
- 7)  $P(A) + P(\bar{A}) =$  \_\_\_\_\_  
(a) 0 (b) 1 (c) -1 (d) 0.5

## II) Answer any four questions (Question number 14 is compulsory) (5 x 2 = 10)

- 8) If  $A = \begin{pmatrix} \sqrt{7} & -3 \\ -\sqrt{5} & 2 \\ \sqrt{3} & -5 \end{pmatrix}$  then find the transpose of  $-A$ .
- 9) A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point ?
- 10) Find the range and coefficient of range of the data  
63, 89, 98, 125, 79, 108, 117, 68

- 11) The volume of a solid right circular cone is  $11088 \text{ cm}^3$ . If its height is 24 cm then find the radius of the cone.
- 12) Find the diameter of a sphere whose surface area is  $154 \text{ m}^2$ .
- 13) A coin is tossed thrice. What is the probability of getting two consecutive tails?
- 14) A tower stands vertically on the ground. From a point on the ground, which is 48 m away from the foot of the tower, the angle of elevation of the top of the tower is  $30^\circ$ . Find the height of the tower.

## III) Answer any four questions (Question number 21 is compulsory) (5 x 5 = 25)

- 15) If the radii of the circular ends of a frustum which is 45 cm height are 28 cm and 7 cm, find the volume of the frustum.
- 16) If  $A = \begin{pmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{pmatrix}$ ,  $B = \begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix}$  verify that  $(AB)^T = B^T A^T$ .
- 17) From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be  $30^\circ$  and  $60^\circ$ . If the height of the lighthouse is h meters and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships is  $\frac{4h}{\sqrt{3}}$  m.
- 18) Find the coefficient of variation of 24, 26, 33, 37, 29, 31.
- 19) Show that in a triangle, the medians are concurrent.
- 20) From a well-shuffled pack of 52 cards, a card is drawn at random. Find the probability of it being either a red king or a black queen.
- 21) A toy in the shape of a cylinder surmounted by a hemisphere. The height of the toy is 25 cm. Find the total surface area of the toy if its common diameter is 12 cm.

## IV) Answer any one question (1 x 8 = 8)

- 22) Draw a tangent at any point R on the circle of radius 3.4 cm and centre at P.
- 23) Draw the graph of  $y = 2x^2$  and hence solve  $2x^2 - x - 6 = 0$