SK EDU CARE ACADEMY - 7092681321, 9597410308 - MADURAI - 7

10th , 11th ,12th - Maths / Business Maths

[As Per Government Pattern] - Half Portion , Full Portion Question Papers AVILABLE – [OVER ALL TAMILNADU]

PRE – SECOND MID TERM EXAM - 2

Class: 10 **Maximum Marks: 100**
Subject: Mathematics **Time Allowed: 3 Hours**

Part I – Choose the Best Answer ***7 X 1 = 7***

1. If number of columns and rows are not equal in a matrix then it is said to be a
   (1) diagonal matrix (2) rectangular matrix (3) square matrix (4) identity matrix
2. If A is a 2 × 3 matrix and B is a 3 × 4 matrix, how many columns does AB have?
   (1) 3 (2) 4 (3) 2 (4) 5
3. A tangent is perpendicular to the radius at the
   1) centre 2) point of contact 3) infinity 4) chord
4. A pole 6m high cases a shadow 2 √3 m long on the ground, then the sun's elevation is
   1) 60^0 2) 45^0 3) 30^0 4) 90^0
5. If the ratio of the height of a tower and the length of its shadow is √3 : 1 , then the angle of elevation of the sun has measure
   (1) 45° (2) 30° (3) 90° (4) 60°
6. The height of a right circular cone whose radius is 5 cm and slant height is 13 cm will be
   (1) 12 cm (2) 10 cm (3) 13 cm (4) 5 cm
7. If the radius of the base of a cone is tri□pled and the height is doubled then the volume is
   (1) made 6 times (2) made 18 times (3) made 12 times (4) unchanged

Part II – 2 Marks – Q.No 15 is Compulsory **5 X 2 = 10**

8. Determine the nature of roots for the quadratic equations
   $9a^2 b^2 x^2 - 24abcdx + 16c^2 d^2 = 0, a \neq 0 \; b \neq 0$
9. Construct a 3 × 3 matrix whose elements are given by $a_{ij} = |i-2j|$
10. A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point?
11. A kite is flying at a height of 75 m above the ground. The string attached to the kite is tempo□rarily tied to a point on the ground. The incli□nation of the string with the ground is 60°. Find the length of the string, assuming that there is no slack in the string.

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12. The ratio of the volumes of two cones is 2 : 3. Find the ratio of their radii if the height of second cone is double the height of the first.
13. Find the volume of the iron used to make a hollow cylinder of height 9 cm and whose internal and external radii are 21 cm and 28 cm respectively
14. The outer and the inner surface areas of a spherical copper shell are 576π cm^2 and $324\ \pi$ cm^2 respectively. Find the volume of the material required to make the shell.
15. Solve for x, y $\begin{pmatrix} x^2 \\ y^2 \end{pmatrix} + 2\begin{pmatrix} -2x \\ y \end{pmatrix} = \begin{pmatrix} 5 \\ 8 \end{pmatrix}$

Part III –5 Marks – Q.No 22 is Compulsory ***5 X 5 = 25***

16. $A = \begin{bmatrix} 1 & 1 \\ -1 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 2 \\ -4 & 2 \end{bmatrix}$ $\begin{bmatrix} 1 & 1 \\ -1 & 3 \end{bmatrix}$ $C = \begin{bmatrix} -7 & 6 \\ 3 & 2 \end{bmatrix}$ verify that A(B +C) = AB + AC
17. Show that in a triangle, the medians are concurrent.
18. The perpendicular PS on the base QR of a ΔPQR intersects QR at S, such that QS = 3 SR. Prove that $2PQ^2 = 2PR^2 + QR^2$.
19. A pole 5 m high is fixed on the top of a tower. The angle of elevation of the top of the pole ob□ served from a point 'A' on the ground is 60° and the angle of depression to the point 'A' from the top of the tower is 45°. Find the height of the tower. ($\sqrt{3} = 1.732$)
20. From the top of the tower 60 m high the angles of depression of the top and bottom of a vertical lamp post are observed to be 38° and 60° respectively. Find the height of the lamp post. (tan 38° = 0.7813, $\sqrt{3} = 1.732$)
21. If the radii of the circular ends of a frustum which is 45 cm high are 28 cm and 7 cm, find the volume of the frustum.
22. A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. If the length of the entire capsule is 12 mm and the diameter of the capsule is 3 mm, how much medicine it can hold?

Part IV – 8 Marks ***1 X 8 = 8***

23. Draw the two tangents from a point which is 10 cm away from the centre of a circle of radius 5 cm. Also, measure the lengths of the tangents (or)
Draw the graph of $y = x^2 - 5x - 6$ and hence solve $x^2 - 5x - 14 = 0$

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