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 - 1

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

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

1. If the roots of the equation $q^2x^2 + p^2x + r^2 = 0$ are the squares of the roots of the equation $qx^2 + px + r = 0$, then q, p, r are in _____
   (1) A.P (2) G.P (3) Both A.P and G.P (4) none of these
2. Transpose of a column matrix is
   (1) unit matrix (2) diagonal matrix (3) column matrix (4) row matrix
3. How many tangents can be drawn to the circle from an exterior point?
   (1) one (2) two (3) infinite (4) zero
4. A tower is 60 m height. Its shadow is x metres shorter when the sun's altitude is 45° than when it has been 30° , then x is equal to
   (1) 41.92 m (2) 43.92 m (3) 43 m (4) 45.6 m
5. If two solid hemispheres of same base radius r units are joined together along their bases, then curved surface area of this new solid is
   (1) $4\pi r^2$ sq. units (2) $6\pi r^2$ sq. units (3) $3\pi r^2$ sq. units (4)$8\pi r^2$ sq. units
6. A spherical ball of radius r_1 units is melted to make 8 new identical balls each of radius r_2 units. Then $r_1 : r_2$ is
   (1) 2:1 (2) 1:2 (3) 4:1 (4) 1:4
7. A frustum of a right circular cone is of height 16cm with radii of its ends as 8cm and 20cm. Then, the volume of the frustum is
   (1) 3328π cm^3 (2) 3228π cm^3 (3) 3240πcm^3 (4) 3340π cm^3

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

8. Determine the nature of roots for the quadratic equations $2x^2 - 2x + 9 = 0$
9. If $A = \begin{pmatrix} 1 & 3 & -2 \\ 5 & -4 & 6 \\ -3 & 2 & 9 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 8 \\ 3 & 4 \\ 9 & 6 \end{pmatrix}$ find A + B
10. If radii of two concentric circles are 4 cm and 5 cm then find the length of the chord of one circle which is a tangent to the other circle
11. Find the angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of a tower of height $10\sqrt{3}$ m
12. Find the volume of a cylinder whose height is 2 m and whose base area is 250 m^2
13. The volumes of two cones of same base radius are 3600 cm3 and 5040 cm^3 . Find the ratio of heights.

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14. The slant height of a frustum of a cone is 5 cm and the radii of its ends are 4 cm and 1 cm. Find its curved surface area
15. If A = $\begin{pmatrix} 0 & 4 & 9 \\ 8 & 3 & 7 \end{pmatrix}$ and $\begin{pmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{pmatrix}$ find the value of 3A-9B

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

16. If the roots of the equation $(c^2 - ab)\, x^2 - 2\,(a^2 - bc)\, x + b^2 - ac = 0$ are real and equal prove that either a = 0 (or) $a^3 + b^3 + c^3 = 3abc$
17. If A = $\begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ show that $A^2 - 5A + 7I_2 = 0$
18. PQ is a chord of length 8 cm to a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length of the tangent TP
19. Two ships are sailing in the sea on either sides of a lighthouse. The angle of elevation of the top of the lighthouse as observed from the ships are 30° and 45°respectively. If the lighthouse is 200 m high, find the distance between the two ships. ($\sqrt{3} = 1.732$)
20. From the top of a tree of height 13 m the angle of elevation and depression of the top and bottom of another tree are 45° and 30° respectively. Find the height of the second tree. ($\sqrt{3} = 1.732$)
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 vessel is in the form of a hemispherical bowl mounted by a hollow cylinder. The diameter is 14 cm and the height of the vessel is 13 cm. Find the capacity of the vessel.

Part IV – 8 Marks ***1 X 8 = 8***

23. Draw a circle of radius 3 cm. Take a point P on this circle and draw a tangent at P

(or)

Draw the graph of $y = x^2 + 3x + 2$ and use it to solve $x^2 + 2x + 1 = 0$

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