UNIT TEST-7
X-STD

TIME: 3.00 HOURS   **MATHEMATICS**   **MARKS: 100**

ALPHA MATHS ACADAMY
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Instructions: **1)** *Check the question paper for fairness of printing. If there is any lack of fairness,*

inform the Hall Supervisor immediately.

2) *Use Blue or Black ink to write and underline and pencil to draw diagrams.*

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PART-A $14 \times 1 = 14$

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Note: **i)** *Answer all the questions.*

ii) *Choose the most appropriate answer from the given four alternatives and write the option*

code and the corresponding answer.

1.   The total surface area of a hemisphere is how much times the square of its radius

   $(a)\ 4\pi$ $(b)\ 3\pi$ $(c)\ 2\pi$ $(d)\ \pi$

2.   A shuttle cock used for playing badminton has the shape of the combination of

   (a) a cylinder and a sphere (b) a hemisphere and a cone

   (c) a sphere and a cone (d) frustum of a cone and a hemisphere

3.   A solid sphere of radius $x\ cm$ is melted and cast into a shape of a solid cone of a same radius. The height of

   the cone is

   $(a)\ 4x\ cm$ $(b)\ x\ cm$ $(c)\ 3x\ cm$ $(d)\ 2x\ cm$

4.   The 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

   $(a)\ 4:1$ $(b)\ 1:2$ $(c)\ 2:1$ $(d)\ 1:4$

5.   How many frustums can a right circular cone have

   $(a)\ 1$ $(b)\ 2$ $(c)\ 3$ $(d)\ 4$

6.   The curved surface area of a right circular cone of height $15\ cm$ and base diameter $16\ cm$ is

   $(a)\ 60\pi cm^2$ $(b)\ 68\pi cm^2$ $(c)\ 136\pi cm^2$ $(d)\ 120\pi cm^2$

7.   The height of a right circular cone whose radius is $5\ cm$ and slant height is $13\ cm$ will be

   $(a)\ 5\ cm$ $(b)\ 13\ cm$ $(c)\ 12\ cm$ $(d)\ 10\ cm$

8.   The ratio of the volumes of a cylinder, a cone, and a sphere if each has the same diameter and same height is

(a) 3 : 1 : 2 (b) 1 : 3 : 2 (c) 2 : 1 : 3 (d) 1 : 2 : 3

9. The volume of a sphere is the product of its surface area and

$(a) \frac{1}{2}r$ $(b) \frac{1}{3}r$ $(c) \frac{2}{3}r$ $(d) \frac{4}{3}r$

10. If the radius of the base of a cone is tripled and the height is doubled then the volume is

   (a) made 6 times (b) made 18 times (c) made 12 times (d) unchanged

11. A plane along a great circle will split the sphere into _____ parts.

   (a) one hemisphere (b) two hemisphere (c) three hemisphere (d) four hemisphere

12. The volume of the greatest sphere that can be cut off from a cylindrical log of wood of base radius 1 cm and

   height 5 cm is

   (a) 5 π (b) $\frac{4}{3}\pi$ (c) $\frac{10}{3}\pi$ (d) $\frac{20}{3}\pi$

13. Every section of a sphere by a plane is a

   (a) cone (b) cylinder (c) circle (d) square

14. The relationship between the height and radius of the hemisphere is

   (a) greater (b) lesser (c) not equal (d) equal

PART-B $\mathbf{10 \times 2 = 20}$

Note: **i)** *Answer any TEN questions.*

   ii) *Question No.28 is compulsory.*

15. A garden roller whose length is $3m$ long and whose diameter is $2.8m$ is rolled to level a garden. How much

   area will it cover in 8 revolutions?

16. If the total surface area of a cone of radius 7 cm is 704 cm^2, then find its slant height?

17. The radius of a spherical ballon increases from 12 cm to 16 cm as air being pumped into it. Find the ratio of

   the surface area of the balloon in two cases.

18. The volume of two cones of same base radius are 3600 cm^3 and 5040 cm^3. Find the ratio of Heights.

19. An aluminium sphere of radius $12cm$ is melted to make a cylinder of radius $8cm$. Find the height of the

   cylinder.

20. If the circumference of a conical wooden piece in $484cm$, then find its volume when its height is $105cm$.

21. A cylindrical drum has a height of $20\ cm$ and base radius of $14\ cm$. Find its total surface area.

22. Find the diameter of a sphere whose surface area is $154\ cm^2$.

23. A solid sphere and a solid hemisphere have equal total surface area. Prove that ratio of their volume is $3\sqrt{3} : 4$

24. A metallic sphere of radius $16\ cm$ is melted and recast into small spheres of radius is $2\ cm$ how many spheres can be obtained.

25. A $14\ m$ deep well with inner diameter $10\ m$ is dug and the earth taken out is evenly spread all around the well to form an embankment of width $5\ m$. Find the height of the embankment.

26. If the ratio of radii of two spheres is 4:7. Find the ratio of their volume.

27. The curved surface area of a right circular cylinder of height $14\ cm$ is $88\ cm^2$. Find the diameter of the cylinder.

28. Find the maximum volume of a cone that can be curved out of a solid hemisphere of radius r units.

PART-C $10 \times 5 = 50$

Note: **i) Answer any TEN questions.**

**   ii) Question No.42 is compulsory.**

29. A right circular cylindrical container of base radius $6\ cm$ and height $15\ cm$ is full of ice cream. The ice cream is to be filled in cones of height $9\ cm$ and base radius $3\ cm$, having a hemispherical cap. Find the number of cones needed to empty the container.

30. A capsule is in the shape of a cylinder with two hemispheres 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?

31. A funnel consists of a frustum of a cone attached to a cylindrical portion $12\ cm$ long attached at the bottom. If the total height be $20\ cm$, diameter of the cylindrical portion be $12\ cm$ and the diameter of the top of the funnel be $24\ cm$. Find the outer surface area of the funnel.

32. A container open at the top is in the form of a frustum of a cone of height $16\ cm$ with radii of its lower and upper ends are $8\ cm$ and $20\ cm$ respectively. Find the cost of milk which can completely fill a container at the rate of `40 $per\ litre$.

33. The volume of a solid hemisphere is $29106\ cm3$. Another hemisphere whose volume is two-third of the above is carved out. Find the radius of the new hemisphere.

34. The volume of a cylindrical water tank is $1.078 \times 10^6 \; litres$. If the diameter of the tank is $7m$, find its height.

35. State and prove converse of basic proportionality theorem.

36. A girl wishes to prepare birthday caps in the form of right circular cones for her birthday party, using a sheet of paper whose area is $5720 \; cm^2$, how many caps can be made with radius $5 \; cm$ and height $12 \; cm$.

37. Calculate the weight of a hollow brass sphere if the inner diameter is $14 \; cm$ and thickness is $1mm$, and whose density is $17.3 \; g/ \; cm3$.

38. The internal and external diameter of a hollow hemispherical shell are $6 \; cm$ and $10 \; cm$ respectively. If it is melted and recast into a solid cylinder of diameter $14 \; cm$, then find the height of the cylinder.

39. A metallic sheet in the form of a sector of a circle of radius $21 \; cm$ has central angle of 216°. The sector is made into a cone by bringing bounding radii together. Find the volume of the cone formed.

40. A right circular cylindrical container of base radius $6 \; cm$ and height $15 \; cm$ is full of ice cream. The ice cream is to be filled in cones of height 9 cm and base radius $3 \; cm$, having a hemispherical cap. Find the number of cones needed to empty the container.

41. The internal and external diameters of a hollow hemispherical vessel are $20 \; cm$ and $28 \; cm$ respectively. Find the cost to paint the vessel all over at ` $0.14 \; per \; cm^2$.

42. The volume of the cone is $1005\frac{5}{7} \; cu.cm$. The area of its base is $201\frac{1}{7} \; sq.cm$. Find the slant height of the cone?

PART-D   **$2 \times 8 = 16$**

Note: Answer ALL the questions.

43. (a) Construct a triangle PQR Such that $QR = 6.5cm, \angle P = 60^o$ and the altitude from P to QR is of length $4.5cm$. (or)

    (b) Draw a circle of radius $4 \; cm$. At a point L on it draw a tangent to the circle using alternate theorem.

44. (a) Nishanth is the winner in a marathon race of $12 \; km$ distance. He ran at the uniform speed of $12km/hr$ and reached the destination in $1hr$. He was followed by Aradhana, Ponmozhi, Jeyanth and swetha with the respective speed of $6 \; km/hr, 4 \; km/hr, 3 \; km/hr$ and $2 \; km/hr$. And, they have covered the distance in $2hr, 3hr, 4hr$ and $6 \; hr$ respectively. Draw the speed time graph and used it to

find the time take into Kaushik with his speed of $2.4\ km/hr$.   (**or**)

(*b*)   Draw the graph of $(2x - 3)(x + 2) = 0$ and state their nature of solution.

************** ***ALL THE BEST*** *************

PREPARED BY

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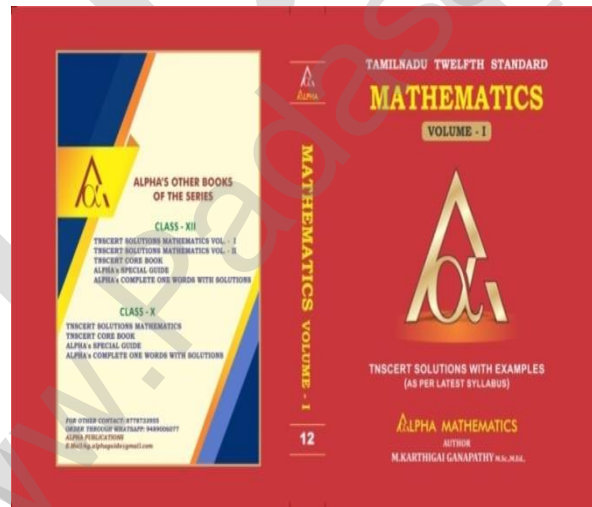&
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