SOLUTIONS _ TEST : PORTION : SURFACE AREA AND VOLUME

1. Height of the largest bamboo =
=diagonal of the room

$$= \sqrt{l^2+b^2+h^2} == \sqrt{12^2+9^2+8^2}$$
$$= \sqrt{144+81+64} = \sqrt{289} = 17m$$

2.
$$2r = 12m ==> r = 6m$$
$$h = 8m$$
$$l = \sqrt{h^2+r^2} = \sqrt{8^2+6^2 = 64+36} = 10$$
$$CSA = \pi rl = \frac{22}{7}x6x10 = 188.5m^2$$

3.
Radius of sphere = $\frac{1}{2}(side) = \frac{8}{2} = 4cm$

Volume = $= \frac{4}{3}\pi r^3 = \frac{4}{3}x\frac{22}{7}x4^3 = 26.81$

4. $x = 5.y = 10, z = 20$
$$x+y+z+\frac{xy+yz+zx}{100}+\frac{xyz}{(100)^2}$$
$$35+\frac{50+200+100}{100}+\frac{1000}{10000} = 35+3.5+0.1$$
$$= 38.6 increases$$

5.
3 cubes adjacent
Surface area of cubois S_1
Total surface area of 3 cubes S_2
$$\frac{S_1}{S_2} = \frac{2(lb+bh+hl)}{6(a^2+a^2+a^2)} = \frac{14a^2}{18a^2} = 7:9$$

11. side ratio : 3: 4:5
Sides of the cubes, 3k, 4k,5k
Volume of large cube =sum of the volumes of small cubes
$$V = (3k)^2+(4k)^3+(5k)^3$$
$$= 27k^3+64k^3+125k^3 = 216k^3$$
Side of the large cube =6k
Diagonal of large cube $12\sqrt{3}$
$$\sqrt{(6k)^2+(6k)^2+(6k)^2} = 12\sqrt{3}$$
$$6k\sqrt{3} = 12\sqrt{3} ===> k = 2$$
Sides are 6cm,8cm,10cm

12. x+y+z = 19
$$x^2+y^2+z^2 = (5\sqrt{5})^2 = 125$$
$$surfacearea = 2(xy+yz+zx)$$
$$S.A = (x+y+z)^2-(x^2+y^2+z^2)$$
$$= 361-125 = 236$$

13 $r = \sqrt{100-64} = \sqrt{36} = 6$

CSA = $\pi rl = \pi r\sqrt{r^2+h^2}$

$$= \frac{22}{7}x6x\sqrt{36+64} = \frac{1320}{7} = 188.5$$

14. $h = \frac{r}{2}$

Volume of cone = volume of sphere
$$\frac{1}{3}\pi r^2 h = \frac{4}{3}\pi R^3$$
$$r^2 x\frac{r}{2} = R^3 ==> \frac{R^3}{r^3} = \frac{1}{8}$$
Ratio of radii : 1 : 2

15. l =35cm, b =30cm,h=55cm
S.A of cover =
$$2(lh+bh)+lb = 2(l+b)h+lb$$
$$= 2(35+30)x55+35x30$$
$$= 7150+1050 = 8200cm^2 = 82m^2$$
Area of 2 covers =164m²
Cost = $164x75 = 123$

21.
$$2\pi R = 44 ==> R = 7cm$$
$$2\pi r = 8.4\pi ==> r = 4.2cm$$
h =14 cm
$$V\frac{1}{3}\pi h[R^2+r^2+Rr]$$
$$= \frac{1}{3}x\frac{22}{7}x14\left(7^2+(4.2)^2+7x4.2\right)$$
$$= = \frac{44}{3}(49+17.6+29.4) = 1408.6$$

22.
$$r = Totalheight - 8cm = 3.5cm$$
$$TSA = CSA_H + CSA_c$$
$$= 2\pi r^2 + 2\pi rh = 2\pi r(r+h)$$
$$= 2x\frac{22}{7}x3.5(3.5+8) = 253cm^2$$

23 $2r = 14m ==> r = 7m$
Volume of sand = volume of cuboid
$$\pi r^2 h = LBH$$
$$\frac{22}{7}x7x7x20 = 20x14xH$$
$$H = \frac{22x7x20}{20x14} = 11cm$$

24
$$TSA = 200\pi$$
$$2\pi(rl+r^{2)} = 200\pi$$
$$5l+25 = 100 ==> l = \frac{75}{5} = 15$$
$$r+l = 5+15 = 20cm$$

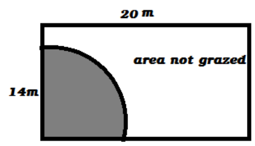
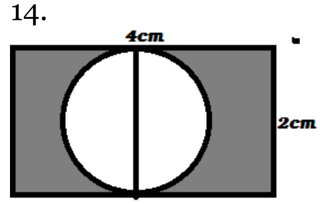
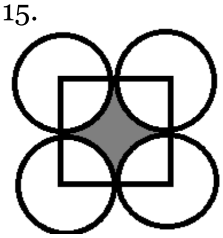
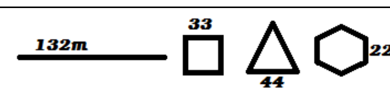
25.
$$4\pi r^2 = 36\pi : r = 3$$
$$V = \frac{4}{3}x\pi x(3)^3 = 36\pi$$

6. Volume of the wall =lbh = $=10x\frac{40}{100}x5=20m^3$ Volume of the mortar =10% of 20=2 Volume of occupied by bricks =20-2=18 No of bricks $=\frac{volume\ of\ wall}{volume\ of\ brick}=\frac{18}{3}x1000=6000$	16 $2r=7 ==> r=3.5m$ Area for riding = $4\pi r^2=\pi(2r)^2=\frac{22}{7}x7x7=154m^2$	26. $r_1=\frac{r_2}{2}$ $\frac{V_1}{V_2}=\frac{r_1^3}{r_2^3}=\frac{r_2^3}{8r_2^3}=1:8$
7. Ratio of radii $\frac{r_1}{r_2}=\frac{2}{3}$ ratio of height $\frac{h_1}{h_2}=\frac{5}{3}$ Ratio of volumes $=\frac{\pi r_1^2h_1}{\pi r_2^2h_2}=\left(\frac{r_1}{r_2}\right)^2\left(\frac{h_1}{h_2}\right)=\frac{4}{9}x\frac{5}{3}=\frac{20}{27}$	17. $V_1:V_2:V_3=\frac{1}{3}\pi r^2h:\frac{2}{3}\pi r^3:\pi r^2$ r = h $=\frac{1}{3}:\frac{2}{3}:1=1:2;:3$	27.CSA= 24 cm^2 $4\pi r^2=24 ===> \pi r^2=6$ T.SA of one hemisphere $T.SA=2\pi r^2+\pi r^2=3\pi r^2$ $=3(6)=18cm^2$
8. Volume of cylinder = 3 times the volume of cone with same base and height	18. TSA = CSA + $2\pi r^2$ $2\pi r^2=TSA-\frac{2}{3}TSA=\frac{1}{3}TSA$ $2\pi r^2=\frac{231}{3}=77 ==> r^2=\frac{77x7}{2x22}=\frac{49}{4}$ $r=\frac{7}{2}=3.5cm$	28. $\frac{r_1}{r_2}=\frac{1}{1}$; $\frac{h_1}{h_2}=\frac{4}{3}$ $\frac{CSA_1}{CSA_2}=\frac{\pi r_1^2h_1}{\pi r_2^2h_2}=\left(\frac{1}{1}\right)^2\left(\frac{4}{3}\right)$ = 4 : 3
9 Radius of the sphere = R Radius of the wire = r Given :D = 10 d➔ R = 10r Volume of sphere = volume of wire $\frac{4}{3}\pi R^3=\pi r^2l ==> r^2=\frac{4}{3}\frac{R^3}{l}=\frac{4}{3}\frac{(10r)^3}{400}$ $r=\frac{1200}{4x1000}=\frac{300}{1000}=0.3cm=3mm$	19. Let R be the radius of sector, r be the radius of the cone $2\pi r=lengthofarc=\frac{\theta}{360}x2\pi R$ $r=\frac{180}{360}x21=10.5cm$	29 $2r=12 ===> r=6$ $l=\sqrt{r^2+h^2}=\sqrt{6^2+8^2}$ $l=\sqrt{36+64}=\sqrt{100}=10$
10. Volume of cylinder = volume of cone(heap) $\pi r^2h=\frac{1}{3}\pi R^2H$ $==> R^2=\frac{3r^2h}{H}=\frac{3x21x21x36}{12}=3x21x3x21$ $R=63cm$	$20.\ 2\pi r=66 ==> r=\frac{21}{2}$ V= $\pi r^2h=\frac{22}{7}x\frac{21}{2}x\frac{21}{2}x12=22x21x9$ $=4158cm^3$	30. $R=15cm \quad r=8cm$ h =63 cm $V\frac{1}{3}\pi h[R^2+r^2+Rr]$ = $=\frac{1}{3}x\frac{22}{7}x63(15^2+8^2+15x8)$ $=26994cm^3=\frac{26994}{1000}=26.9L$

All the best

TMK

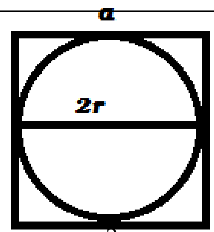
SOLUTIONS _ TEST : PORTION : AREA AND PERIMETER

1. Height of the equilateral triangle = $h = \frac{\sqrt{3}}{2}(side)^2 = \frac{\sqrt{3}}{2}\left(\frac{4}{\sqrt{3}}\right) = 2cm$	11. A = $\pi r^2 = a^2 \rightarrow a = r\sqrt{\pi}$ Perimeter = 4a = $4r\sqrt{\pi}$	P = 3+8+10+8+3+5+4+5 =46cm
2. Area = $\frac{b}{4}\sqrt{4a^2-b^2} = \frac{10}{4}\sqrt{4(13)^2-(10)^2}$ $= \frac{10}{4}\sqrt{676-100} = \frac{10}{4}\sqrt{576} = \frac{10x24}{4} = 60cm$	12.  Area not grazed= $A_R - A_Q$ A= $20x16 - \frac{1}{4}\frac{22}{7}x(14)^2 = 320-154$ $= 166m^2$	22. Area of triangle = $A = \frac{1}{2}lb = \frac{1}{2}x10x10 = 50$ Area of the shaded = $A = A_Q - A_T = \frac{1}{4}x\pi r^2 - 50$ $A = 25\pi - 50$ Area of entire shaded portion = 2 A= 2(25π-50)=50π-100
3. l = 16cm d= 20 cm b= $\sqrt{d^2-l^2} = \sqrt{(20)^2-(16)^2} = \sqrt{144} = 12cm$ Area = lxb = 16 x12 = 192 cm²	13. Distance coverd in 1 hour = 66 km = 6600000cm Distance coverd in 1 minute $= \frac{6600000}{60}cm = 110000$ cm Circumference of Wheel= $= 2\pi r = \frac{22}{7}x70 = 220cm$ No of rotation = $\frac{Distance}{circumference} = \frac{110000}{220} = 500$	23 $A = \frac{1}{2}(a+b)h$ $h = \frac{2A}{(a+b)} = \frac{2(180)}{28+12} = 9cm$
4. Area = $d_1x\sqrt{a^2-\left(\frac{d_2}{2}\right)^2} = 24x\sqrt{(13)^2-(12)^2}$ $= 24x\sqrt{169-144} = 24x5 = 120cm^2$	14.  2r= 2cm → r = 1 cm Area of remaining part= $A_R - A_c = 4x2 - \pi r^2 = 8 - \pi$	24 $d_1^2 + d_2^2 = 2(a^2+b^2)$ $d_2^2 = 2(a^2+b^2) - d_1^2$ $= 2(144+196) - (16)^2$ $= 2(340) - 256 = 424$ $d_2 = \sqrt{424} = 20.6$
5. A= $\frac{a+b}{l}\sqrt{s(s-b)(s-c)(s-d)}$ Here a = 24; b = 52 c = 26; d= 30 l = b – a = 52-24 =28 $S = \frac{c+d+l}{2} = \frac{26+30+28}{2} = 42$ A= $A = \frac{24+52}{28}\sqrt{42x14x16x12} = 912m^2$	15.  Area bounded by coins $= A_s - 4A_Q$ $= 14x14 - \pi(r)^2 = 156 - 22x7$ $= 196 - 154 = 42cm^2$	 4a=132 = > a=33=>A=1089 3a=132= a = 44→A = $\frac{\sqrt{3}}{4}(44)^2$ =838 m² a=22→ A $\frac{3\sqrt{3}}{2}(22)^2 = 1257.4m^2$ $2\pi r = 132 ==> r = \frac{132x7}{2x22} = 21$ $A = \pi r^2 = \frac{22}{7}x21x21 = 1386$ Circle has largest area

6. length of the arc = $\frac{2\pi r\theta}{180}$

$$r = \frac{180xl}{2\pi\theta} = \frac{180 \text{ x } 9.42x7}{2 \text{ x } 22 \text{ x } 60} = 9cm$$

7.



$$2r = a ==> r = \frac{a}{2}$$

Area of the circle = $\pi r^2 = \pi\left(\frac{a}{2}\right)^2 = \frac{\pi a^4}{4}$

8. $2\pi r = 308 ==> r = \frac{308x7}{2x22} = 49$

$$r = \frac{a}{\sqrt{2}} ==> a = r\sqrt{2} = 49\sqrt{2}cm$$

9. A=150 cm²

$$\frac{b}{h} = \frac{3}{4} \rightarrow b = \frac{3h}{4}$$

$$A = \frac{1}{2}b.h = \frac{1}{2}x\frac{3}{4}h^2$$

$$h^2 = \frac{150x8}{3} = 400 ==> h = 20$$

10.

$$\frac{a}{b} = \frac{5}{4} ==> a = \frac{5b}{4}$$

Perimeter $P = 2a + b$

$$14 = \frac{10b}{4} + b = \frac{14b}{4} ==> b = 4$$

$a = 5$

Area =

$$\frac{b}{4}\sqrt{4a^2 - b^2} = \frac{4}{4}\sqrt{4(5)^2 - 4^2} = \sqrt{100 - 16}$$

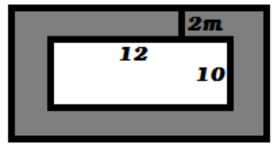
$$\sqrt{84} = \sqrt{21x4} = 2\sqrt{21}$$

16

$$2\pi r = 4a ===> r = \frac{4a}{2\pi} = \frac{4x22x7}{2x22}$$

$= 14m$

17.



Area of path =

$$A_o - A_i = 16x14 - 12x10$$

$$= 224 - 120 = 104m^2$$

$$\frac{l}{b} = \frac{3}{2} ==> l = \frac{3b}{2}$$

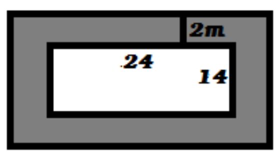
18 $Area = lxb = \frac{3b^2}{2} - 216$

$$3b^2 = 432 ==> b^2 = 144$$

$b = 12m$

Perimeter = 2(l +b) = 2(12+18)=60 m

19.

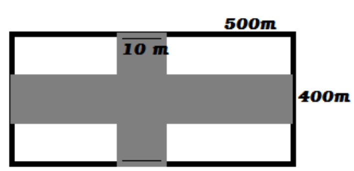


No of tiles = $\frac{A_o - A_i}{A_s}$

$$= \frac{26x16 - 24x14}{0.2x0.2} = \frac{416 - 336}{0.04}$$

$$= \frac{80}{0.04} = \frac{8000}{4} = 2000$$

20



A = 10x400+10x490

= 4000+4900=8900

All the best