

## SCHOLASTIC APTITUDE TEST (SAT) HINTS & SOLUTIONS

|       |    |    |    |    |    |    |    |    |    |     |    |    |       |    |    |
|-------|----|----|----|----|----|----|----|----|----|-----|----|----|-------|----|----|
| Ques. | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10  | 11 | 12 | 13    | 14 | 15 |
| Ans.  | 4  | 4  | 1  | 4  | 2  | 1  | 2  | 1  | 1  | 1   | 2  | 1  | 2     | 1  | 3  |
| Ques. | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25  | 26 | 27 | 28    | 29 | 30 |
| Ans.  | 4  | 1  | 4  | 4  | 1  | 2  | 3  | 3  | 2  | 3   | 2  | 2  | 3     | 3  | 4  |
| Ques. | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40  | 41 | 42 | 43    | 44 | 45 |
| Ans.  | 3  | 3  | 3  | 4  | 2  | 3  | 2* | 2  | 1  | 4   | 3  | 1  | Bonus | 1  | 2  |
| Ques. | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55  | 56 | 57 | 58    | 59 | 60 |
| Ans.  | 3  | 2  | 1  | 1  | 3  | 4  | 3  | 4  | 4  | 4   | 3  | 4  | 1     | 3  | 4  |
| Ques. | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70  | 71 | 72 | 73    | 74 | 75 |
| Ans.  | 1  | 1  | 4  | 2  | 3* | 1  | 2  | 4  | 1  | 3   | 2  | 3  | 1     | 3  | 3  |
| Ques. | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85  | 86 | 87 | 88    | 89 | 90 |
| Ans.  | 2  | 2  | 4  | 4  | 1  | 3  | 3  | 2* | 1  | 2   | 1  | 4  | 3     | 3  | 4  |
| Ques. | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |    |    |       |    |    |
| Ans.  | 2  | 3  | 3  | 2  | 3  | 1  | 2  | 2  | 2  | 4   |    |    |       |    |    |

15. (3)

Since mass of Oxygen and Helium is same which is = 100 g,

$$\text{Number of moles of oxygen} = \frac{100}{32} = \frac{25}{8} \text{ mole}$$

$$\text{Number of moles of He} = \frac{100}{4} = 25 \text{ mole}$$

So helium contains more number of molecule than oxygen therefore helium exerts more pressure than oxygen.

16. (4)

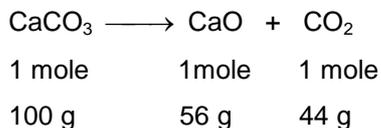
$$\text{Number of moles} = \frac{\text{Given Mass}}{\text{Gram Atomic / Molecular Mass}}$$

$$\text{Average molecular velocity} \propto \frac{1}{\sqrt{\text{Molecular mass}}} \text{ (Since mass of all gases is same)}$$

then increasing order of molecular mass =  $\text{H}_2$  (2u) < He(4u) <  $\text{NH}_3$  (17u) <  $\text{O}_2$ (32u)

∴ increasing order of average molecular velocity =  $\text{O}_2$  <  $\text{NH}_3$  < He <  $\text{H}_2$

17. (1)



$$4.4 \text{ g CO}_2 = 0.1 \text{ mole}$$

According to give data 4.4 g CO<sub>2</sub> will produce along with 5.6 g of CaO due to decomposition of 10 gram of calcium carbonate CaCO<sub>3</sub>.

Mass of CaCO<sub>3</sub> along with test tube = 30.08 g

Mass of CaCO<sub>3</sub> taking in Reaction = 10 g

So mass of empty test tube = 30.08 g – 10 g = 20.08 g.

18. (4)

Petroleum product are separated by fractional distillation method

camphor and rock salt are separated by sublimation method because camphor is sublimable substance with changes is into gaseous state on direct heating.

Cream from milk is separated by centrifugation method.

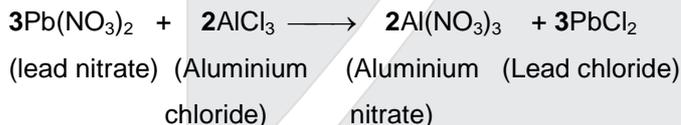
Coloured component in a dye are separated by chromatography method.

∴ A - IV, B-III, C-II, D-I

19. (4)



Balance chemical equation :



∴ a = 3, b = 2, c = 2, d = 3

20. (1)

Since decreasing order of the size of atom or nucleus :

Au > Ag > Cu > Al

∴ The correct order of increasing number of alpha particles passing undeflected through the foils of Au, Ag, Cu and Al of 1000 atoms thickness each in a simulated alpha particle scattering experiment of Rutherford would be

Au < Ag < Cu < Al

Reason : As the size of nucleus increases, the deflection of alpha particles also increases for same thickness of foil.

21. (2)

Rock salts (NaCl) - Neutral salt

Baking soda (NaHCO<sub>3</sub>) - Basic salt

Washing soda (Na<sub>2</sub>CO<sub>3</sub> · 10H<sub>2</sub>O) - basic salt

Slaked lime (Ca(OH)<sub>2</sub>) - Base

Increasing order of pH : Acid < Salt < Base

∴ correct order of increasing pH values of aqueous solution of :

Rock Salt < Baking soda < Washing soda < Slaked lime

22. (2)

Third member of alkyne series is Butyne (C<sub>4</sub>H<sub>6</sub>)

C<sub>4</sub>H<sub>6</sub> + O<sub>2</sub> → CO<sub>2</sub> + H<sub>2</sub>O (Skeletal equation)

2C<sub>4</sub>H<sub>6</sub> + 11O<sub>2</sub> → 8CO<sub>2</sub> + 3H<sub>2</sub>O (Balance equation)

For complete combustion of two moles of butyne, 11 moles of oxygen gas are needed

∴ Number of moles =  $\frac{\text{Given Mass}}{\text{Gram Atomic / Molecular Mass}}$

∴ mass of oxygen gas needed = number of moles × gram molecular mass of O<sub>2</sub>  
= 11 × 32 = 352 g

23. (3)

In metallurgical process metal is obtained from their ore on the basis of activity series of metal.

Metal present in the bottom of the activity series are least reactive therefore they are found in the native state.

The metal present in the lower regions of the activity series are less reactive therefore they are reduced by heating alone.

Metal present in the middle of the activity series are moderately reactive therefore they are reduced by using carbon or some other reducing agents.

Metals present in the top of the activity series are highly reactive therefore they cannot be reduced by using carbon or some other reducing agents or by heating. Such metals are reduced by using electrolysis.

Therefore, A - III, B-I, C-II, D-IV

24. (2)

Chemical properties of an elements is predicted by

-Position of element in the periodic table

- Atomic number of element

-Number of valance electrons in an atom

-Number of electrons in the outer most shell

Therefore correct option is (2)

25. (3)

| Element | Atomic number | Symbol of element |
|---------|---------------|-------------------|
| A       | 6             | C                 |
| B       | 7             | N                 |
| C       | 14            | Si                |
| D       | 15            | P                 |

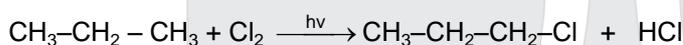
Nitrogen (Element B) will gain electron more easily than Silicon (Element C)

Silicon (Element C) has largest atomic size among them.

The electron negativity of Nitrogen (Element B) is highest among them.

∴ (Option 3 is correct)

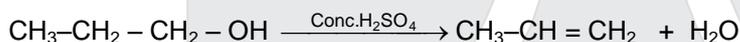
26. (2)



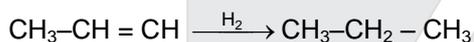
(A) (Substitution reaction)



(Substitution reaction)



(Dehydration)



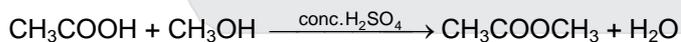
(Addition reaction)

Substitution, Substitution, dehydration, addition reaction

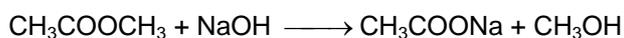
27. (2)



(A) (B)



(C)



(E) (D)

Product (D) methanol is poisonous in nature which effect optic nerve and causes blindness, its intake in small amount can also lead to death.

∴ A = Ethanol, B = Ethanoic acid, C = Methyl Ethanoate, D = Methanol, E = Sodium acetate.

28. **Ans.**

Given

$$l_A = l_B$$

$$r_A = 1 \text{ cm}$$

$$r_B = 3 \text{ cm}$$

$$\text{Now from Ohm's Law } V_A = IR_A = \frac{l\rho l_A}{\pi(r_A)^2}$$

$$\text{and } V_B = \frac{l\rho l_B}{\pi(r_B)^2}$$

$$\text{So } \frac{V_A}{V_B} = \frac{l\rho l_A}{\pi(r_A)^2} \times \frac{\pi(r_B)^2}{l\rho l_B} (\because l_A = l_B)$$

$$= \frac{(r_B)^2}{(r_A)^2}$$

$$= \frac{9}{1}$$

29. **Ans. 3**

For lens A

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{30} = \frac{1}{v} - \left(-\frac{1}{40}\right)$$

$$\frac{1}{30} = \frac{1}{v} + \frac{1}{40}$$

$$\frac{1}{v} = \frac{1}{30} - \frac{1}{40}$$

$$\frac{1}{v} = \frac{40 - 30}{1200} = \frac{10}{1200}$$

$$v = 120 \text{ cm.}$$

For lens B

$$u = 90 \text{ cm}$$

$$f = 30 \text{ cm}$$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

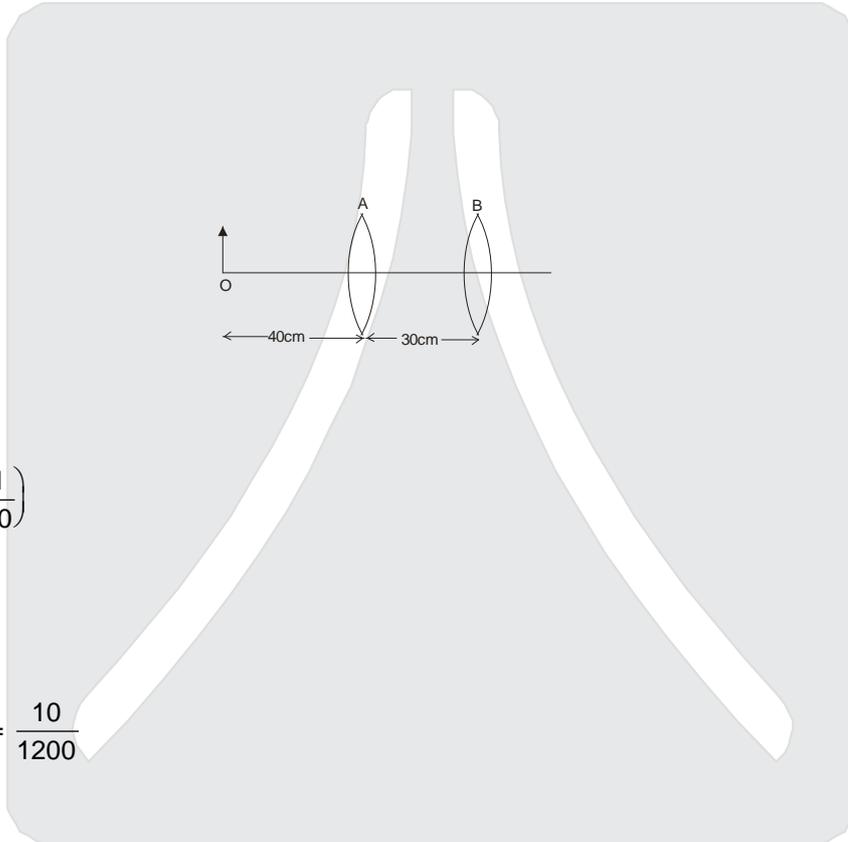
$$\frac{1}{30} = \frac{1}{v} - \frac{1}{90}$$

$$\frac{1}{v} = \frac{1}{30} + \frac{1}{90}$$

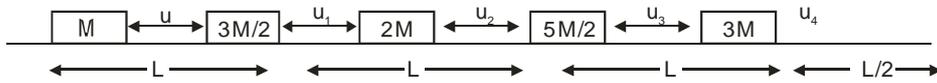
$$= \frac{3+1}{90}$$

$$v = 22.5 \text{ cm}$$

Which is positive so that it is 22.5 cm from Lens B.



30. Ans. 4



From A to B

speed is  $u$  so time  $t_{AB} = \frac{L}{u}$  ... (i)

From B to C

By conservation of momentum

$$Mu = \left(M + \frac{M}{2}\right)u_1 \Rightarrow u_1 = \frac{2}{3}u$$

So time from B to C is  $t_{BC} = \frac{L}{\left(\frac{2}{3}u\right)}$  .... (ii)

From C to D

By conservation of momentum

$$\frac{3}{2}Mu_1 = 2Mu_2$$

$$\frac{3}{2}M \times \frac{2}{3}u = 2Mu_2$$

$$u_2 = u/2$$

Time C to D

$$t_{CD} = \frac{L}{\left(\frac{u}{2}\right)}$$
 ... (iii)

From D to E

By conservation of momentum

$$2Mu_2 = \frac{5M}{2}u_3$$

$$2M \frac{u}{2} = \frac{5M}{2}u_3 \Rightarrow u_3 = \frac{2}{5}u$$

Time from D to E

$$t_{DE} = \frac{L}{\left(\frac{2u}{5}\right)}$$
 .... (iv)

From E to F

By conservation of momentum

$$\frac{5M}{2}u_3 = 3Mu_4$$

$$\frac{5M}{2} \times \frac{2u}{5} = 3Mu_4 \Rightarrow u_4 = u/3$$

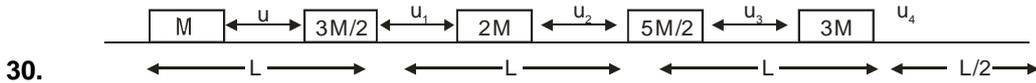
Time taken from E to F

$$t_{EF} = \frac{L/2}{u_4} = \frac{L}{2(u/3)}$$
 .... (v)

Total time  $t = t_{AB} + t_{BC} + t_{CD} + t_{DE} + t_{EF}$

$$t = \frac{L}{u} + \frac{3L}{2u} + \frac{2L}{u} + \frac{5L}{2u} + \frac{3L}{2u} = \frac{17L}{2u}$$

**Second Method**



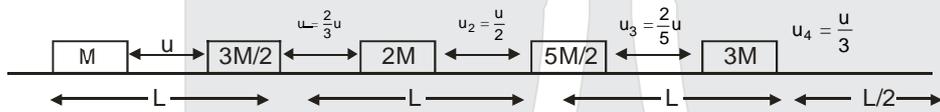
By conservation of momentum

$$\text{Final velocity} = \frac{M}{M'}u$$

Since M and u are const. so

$$\text{Final velocity} \propto \frac{1}{M'}$$

That mean



So From speed =  $\frac{\text{dist}}{\text{time}} \Rightarrow \text{time} = \frac{\text{dist}}{\text{speed}}$

$$t \left[ \frac{L}{u} + \frac{3L}{2u} + \frac{2L}{u} + \frac{5L}{2u} + \frac{3L}{2u} \right] = \frac{17L}{2u}$$

31.

$$v = u' - g(T/2)$$

$$u' = \frac{gT}{2}$$

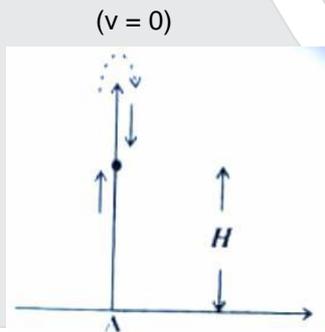
$$\therefore v^2 = u'^2 + 2gH$$

$$(u')^2 = u^2 - 2gH$$

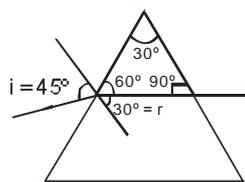
$$\frac{g^2T^2}{4} + 2gH = u^2$$

$$u = \sqrt{\frac{g^2T^2}{4} + 2gH}$$

$$u = \frac{\sqrt{g^2T^2 + 8gH}}{2}$$



32.



$$\mu = \frac{\sin 45^\circ}{\sin 30^\circ} = \frac{2}{\sqrt{2}} = \sqrt{2} \text{ (Doesn't change means incident at } 90^\circ \text{ on another surface, so } \angle r = 30^\circ)$$

33. Ans. 3  
 $B = Adg\rho$   
 l, A, g &  $\rho$  are constant  
 So  $B \propto d$   
 when it is dipped completely then B becomes constant

34. Let u is the initial velocity at height H.  
 By conservation of Mechanical energy between height & ground

$$\text{For A : } \frac{1}{2}mu^2 + mgh = \frac{1}{2}mv_A^2 \Rightarrow V_A = \sqrt{u^2 + 2gH}$$

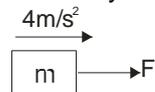
$$\text{For B : } \frac{1}{2}mu^2 + mgH = \frac{1}{2}mv_B^2 \Rightarrow V_B = \sqrt{u^2 + 2gH}$$

$$\text{For C : } \frac{1}{2}mu^2 + mgH = \frac{1}{2}mv_C^2 \Rightarrow V_C = \sqrt{u^2 + 2gH}$$

$$\text{or } V_A = V_B = V_C$$

35.  $a = \frac{36}{1+2+1+5} = 4\text{m/s}^2$

For body 1



$$F = m \times a$$

$$F = 1 \times 4$$

$$F = 4 \text{ N}$$

36. Ans. 3  
 Slope of car A is constant and slope of car B will be same between origin to  $t_0$

37. 40 W – 200 V, 50 W – 200 V, 100 W – 200 V

$$R_{40} = \frac{V^2}{P_{40}} = \frac{200 \times 200}{40} = 1000 \Omega$$

$$R_{50} = \frac{200 \times 200}{50} = 800 \Omega$$

$$R_{100} = \frac{200 \times 200}{100} = 400 \Omega$$

$$I = \frac{600}{100 + 800 + 400} = \frac{600}{2200} = 0.2727 \text{ A}$$

$$I_{40} = \frac{P_1}{V} = \frac{40}{200} = 0.2 \text{ A}$$

$$I_{50} = \frac{P_2}{V} = \frac{50}{200} = \frac{5}{20} = 0.25 \text{ A}$$

$$I_{100} = \frac{P_3}{V} = \frac{100}{200} = .5 \text{ A}$$

0.27 amp current is flowing but current capacity of 40W and 50W is low. Hence first of all 40W will gets fused.

38. Ans. 2

Speed of sound is more in solids

39. Ans. 1

$$\frac{F}{\ell} = \frac{\mu_0 I_a I_b}{2\pi d}$$

$F_1 = F_2$  So, they will repel each other.

40. (i) When  $K_1$  is closed and  $K_2$  is open

$$\text{than } R_{eq} = \frac{R_1 R_2}{R_1 + R_2} = \frac{3 \times 12}{3 + 12} = \frac{12}{5}$$

$$\text{So } I_1 = \frac{12}{\frac{12}{5}} = 5 \text{ A}$$

(ii) When  $K_2$  is closed and  $K_1$  is open

$$\text{than } R_{eq} = \frac{4 \times 12}{16} = 3\Omega$$

$$\text{So } I_2 = \frac{12}{3} = 4 \text{ A}$$

$$\text{So } \frac{I_1}{I_2} = \frac{5}{4}$$

41.  $\frac{1}{7} = \overline{0.142857}$

$$\frac{1}{13} = \overline{0.076923}$$

$$\frac{1}{21} = \overline{0.047619}$$

So values of  $x = 7, 13, 21$

$$\text{Sum} = 7 + 13 + 21 = 41$$

42.  $12^n + 1$

By cyclicity  $(12)^n$  always gives

Unit digit 2, 4, 6, 8

So  $12^n + 1$  will give out digit 3, 5, 7, 9

So 1 cannot be unit digit of  $12^n + 1$

**Option (1)**

44. General Term =  $n(2n)^2$

$$= 4n \times n^2 = 4n^3$$

$$\therefore \text{In 10th group sum} = 4 \times 10^3 = 4000$$

(For sum)

$$\begin{array}{r}
 x^2 - 4x + (8 - k) \\
 x^2 - 2x + k \left\{ \begin{array}{l} x^2 - 8x^2 + 16x^2 - 25x + 10 \\ x^2 - 2x^2 + kx^2 \\ - \quad + \quad - \end{array} \right. \\
 \hline
 -4x^2 + (16 - k)x^2 - 25x \\
 -4x^2 + 8x^2 - 4kx \\
 + \quad - \quad + \\
 \hline
 (8 - k)x^2 + (4k - 25)x + 10 \\
 (8 - k)x^2 + (-16 + 2k)x + k(8 - k) \\
 \hline
 (4k - 25 + 16 - 2k)x + 10 - k(8 - k)
 \end{array}$$

45.

$$\begin{aligned}
 2k - 9 &= 1 \\
 2k &= 10 \\
 k &= 5 \\
 10 - k(8 - k) &= a \\
 10 - 5(3) &= a \\
 -15 &= a
 \end{aligned}$$

$$\begin{array}{r}
 2^2 + k - 5 = 0 \\
 2^2 - 6 - 8 = 0 \\
 - \quad + \quad + \\
 (k + 6) + 3 = 0
 \end{array}$$

46.

$$\alpha = \frac{-3}{k+6}$$

$$2\left(\frac{-3}{k+6}\right)^2 + k\left(\frac{-3}{k+6}\right) - 5 = 0$$

$$\frac{18}{(k+6)^2} + \frac{-3}{k+6} - 5 = 0$$

$$18 - 3k(k+6) - 5(k+6)^2 = 0$$

$$18 - 3k^2 - 18k - 5k^2 - 180 - 60k = 0$$

$$-8k^2 - 78k - 162 = 0$$

$$8k^2 + 78k + 162 = 0$$

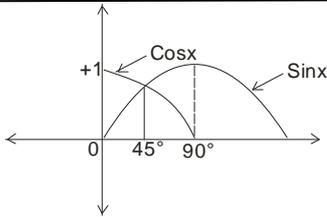
$$4k^2 + 39k + 81 = 0$$

$$4k^2 + 27k + 12k + 81 = 0$$

$$k(4k + 27) + 3(4k + 27) = 0$$

$$(k + 3)(4k + 27) = 0$$

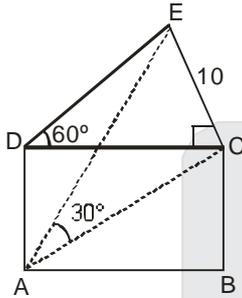
$$x = -3, -\frac{27}{4}$$



47.

From the graph we conclude that  $\cos x > \sin x$  when  $0 \leq x < 45^\circ$   
 $\therefore \cos x - \sin x > 0$

48.



$\triangle ACE$

$$\tan 30^\circ = \frac{10}{AC}$$

$$\frac{1}{\sqrt{3}} = \frac{10}{AC}$$

$$\sqrt{\ell^2 + b^2} = AC = 10\sqrt{3}$$

$$\ell^2 + b^2 = 100 \times 3 = 300 \quad \dots (1)$$

$$b^2 = 300 - \frac{100}{3} = \frac{800}{3}$$

$$\ell^2 b^2 = \frac{100}{3} \times \frac{800}{3} = \frac{80000}{9}$$

$$\ell b = \sqrt{\frac{80000}{9}} = \frac{200\sqrt{2}}{3}$$

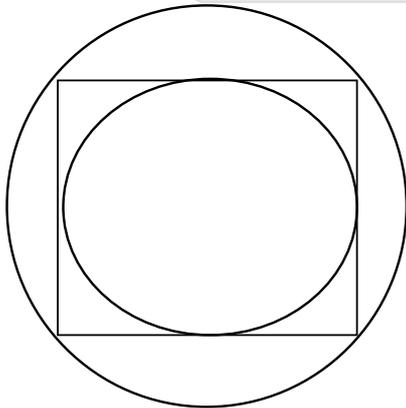
In  $\triangle DCE$

$$\tan 60^\circ = \frac{10}{DC}$$

$$\sqrt{3} = \frac{10}{DC}$$

$$DC = \frac{10}{\sqrt{3}} = \ell$$

$$\ell^2 = \frac{100}{3} \quad \dots (2)$$



49.

Radius of inner circle = half of side square =  $\frac{a}{2}$ .

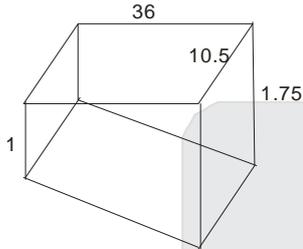
$$\text{Area of inner circle} = \frac{a^2}{4}$$

$$\text{Radius of outer circle} = \text{half of diagonal of square} = \frac{\sqrt{2}a}{2}$$

$$\text{Area of Outer Circle} = \frac{2a^2}{4}$$

$$\text{ratio} \rightarrow \frac{a^2}{4} : \frac{2a^2}{4}$$

$$1 : 2$$



50.

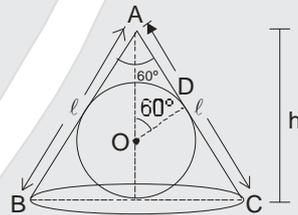
Volume of water in swimming pool = Area of cross section  $\times$  Speed  $\times$  Time

$$\left[ \frac{1}{2}(1+1.75) \times 36 \right] 10.5 = \frac{22}{7} \times \frac{7}{100} \times \frac{7}{100} \times 5000 \times T$$

$$T = \frac{27}{4} = 6\frac{3}{4} \text{ Hr.}$$

51.

Vertical angle =  $60^\circ$



$$h = \frac{\sqrt{3}}{2} l$$

$$\Rightarrow l = \frac{2h}{\sqrt{3}}$$

$$\angle OAD = 30^\circ$$

$\therefore$  In  $\triangle OAD$

$$AD = \frac{l}{2} = \frac{h}{\sqrt{3}} \quad \dots (1)$$

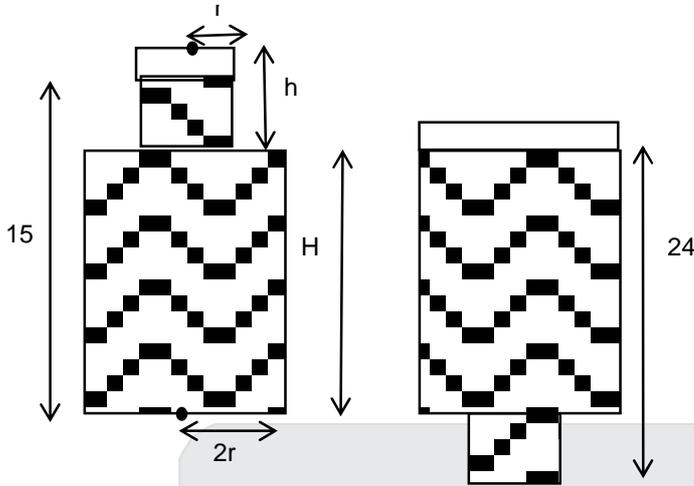
$$\therefore \frac{OD}{AD} = \tan 30^\circ$$

$$\Rightarrow \frac{OD}{AD} = \frac{1}{\sqrt{3}}$$

$$\Rightarrow OD = \frac{AD}{\sqrt{3}} = \frac{h}{\sqrt{3}\sqrt{3}} = \frac{h}{3}$$

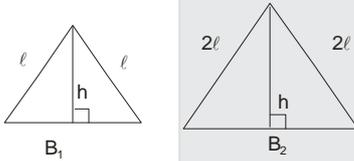
$$\therefore \text{Volume of sphere} = \frac{4}{3} \pi r^3$$

$$= \frac{4}{3} \pi \left( \frac{h}{3} \right)^3 = \frac{4\pi h^3}{81} \quad \text{Option (4) Ans.}$$



52.

$$\begin{aligned} & \pi (2r)^2 h + \pi r^2 (15 - H) \\ &= \pi r^2 h + \pi (2r)^2 (24 - h) \\ 4H + 15 - H &= h + 4(24 - h) \\ 3H + 15 &= h + 96 - 4h \\ 3H + 15 &= 96 - 3h \\ H + 5 &= 32 - h \\ H + h &= 27 \end{aligned}$$



53.

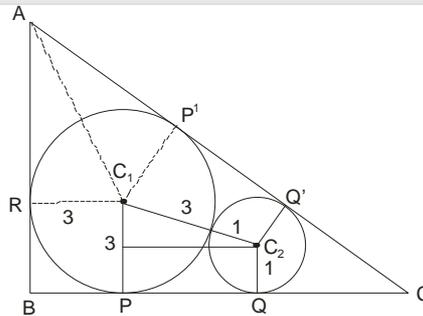
$$\begin{aligned} B_1 &= 2\sqrt{l^2 - h^2} & B_2 &= 2\sqrt{4l^2 - h^2} \\ B_2^2 - B_1^2 &= 4(4l^2 - h^2) - 4(l^2 - h^2) \\ &= 4[4l^2 - h^2 - l^2 + h^2] \\ &= 4[3l^2] = 12l^2 \end{aligned}$$

54.

In  $\Delta C_1 C_2 R$  :

$$\cos \theta = \frac{2}{4} = \frac{1}{2}$$

$$\theta = 60^\circ$$



Similarly

$$\begin{aligned} \angle P' C_1 C_2 &= 60^\circ \\ \text{So } \angle RC_1 P' &= 360 - (60 + 60 + 90) = 150 \\ \therefore \angle BAC &= 180 - 150 = 30 \\ \angle RAC_1 &= 15^\circ \end{aligned}$$

In  $\triangle RAC$ ,

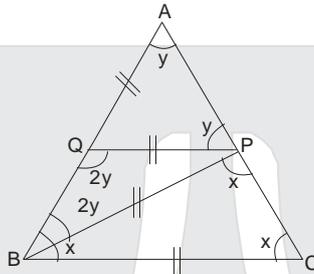
$$\tan 15^\circ = \frac{3}{AR}$$

$$\frac{\sqrt{3}-1}{\sqrt{3}+1} = \frac{3}{AR}$$

$$AR = \frac{\sqrt{3}+1}{\sqrt{3}-1} \times 3 = \left( \frac{4+2\sqrt{3}}{2} \right) \times 3 = (2+\sqrt{3}) \times 3 = 6+3\sqrt{3}$$

So,  $AB = AR + BR$   
 $= 6+3\sqrt{3}+3 = 9+3\sqrt{3}$

55. In  $\triangle ABC$   $AB = AC$



$$\Rightarrow y + 2x = 180^\circ \quad \dots (1)$$

In  $\triangle QPB$

$$\Rightarrow \angle QPB = 180 - 4y$$

$\Rightarrow$  Since 'APC' is a Straight line

$$\Rightarrow 180 - 4y + x + y = 180^\circ$$

$$\Rightarrow x = 3y \quad \dots (2)$$

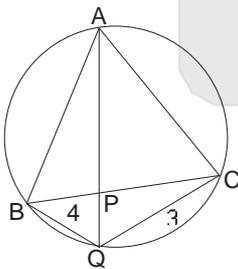
From (1) & (2)

$$y + 2(3y) = 180^\circ$$

$$y = \frac{180^\circ}{7} = \frac{\pi}{7}$$

$$\angle AQP = 180^\circ - 2\left(\frac{180}{7}\right) = \frac{5}{7}\pi$$

56.



We know that  $\frac{1}{PQ} = \frac{1}{BQ} + \frac{1}{CQ}$

$$= \frac{1}{4} + \frac{1}{3} = \frac{3+4}{12} = \frac{7}{12}$$

$$\therefore PQ = \frac{12}{7}$$

57.  $(x - 1)^2 + (y - 2)^2 = 4$

It is possible only

**Case I**

$(x - 1)^2 = 0$  and  $(y - 2)^2 = 4$

$\Rightarrow x = 1$  and  $y = 0, 4$

so the points are  $(1, 0), (1, 4)$

**Case II**

$(x - 1)^2 = 4$  and  $(y - 2)^2 = 0$

$\Rightarrow x = 3, -1$  and  $y = 2$

so the points are  $(3, 2), (3, -1)$

So total four points are

58. Let the vertex be  $(x_r, y_r), r = 1, 2, 3$ , where both  $x_r$  and  $y_r$  are integers. Hence its area

$$= \frac{1}{2} \sum x_i(y_2 - y_3) = \text{rational number} \dots\dots\dots(1)$$

Also if  $a$  be its side then

$a^2 = (x_1 - x_2)^2 + (y_1 - y_2)^2 = \text{a positive integer.}$

But the area of an equilateral triangle =  $\frac{\sqrt{3}}{4} a^2$ .

$\therefore \text{Area} = \left(\frac{\sqrt{3}}{4}\right) a^2$ , which is irrational, since  $a^2$  is a positive integer.

Thus the two statements (1) and (2) for area are contradictory. Therefore if the vertices are integers, then that triangle cannot be an equilateral triangle.

59. Possible products are 1, 4, 9, 16, 2, 8, 18, 32, 3, 12, 27, 48, 4, 16, 36, 64

So required probability =  $\frac{6}{16} = \frac{3}{8}$

60.  $\frac{a + a + 1 + \dots + a + 10}{11} = m$

$11a + 55 = 11m$

$a + 5 = m \qquad a = m - 5$

$\frac{a + a + 1 + \dots + a + 16}{17} = m'$

$17a + \frac{16 \times 17}{2} = 17m'$

$17a + 8 \times 17 = 17m'$

$m - 5 + 8 = m'$

$m' = m + 3$

$\% \text{ change} = \frac{m' - m}{m} \times 100 = \frac{m + 3 - m}{m} \times 100 = \frac{300}{m} \%$

रेजोनॅस के विद्यार्थी ने जेईई-मेन (JEE-MAIN)  
में लगातार दूसरे वर्ष देश भर में  
उच्चतम अंक (350) प्राप्त किये।

**AIR 6**  
**PAWAN GOYAL**  
Reso Roll No.: 13401293  
Classroom student since class VIII  
**350/360**

— ★ —  
**ALL INDIA RANKS  
IN TOP 200**  
13 STUDENTS FROM  
CLASSROOM PROGRAMS



**AIR - 81**  
**SUKHMANJIT S. MANN**  
Roll No. 16153841



**AIR - 97**  
**UDDHARSH KOTAHWALA**  
Roll No. 15436811



**AIR - 108**  
**AYUSH SRIVASTAV**  
Roll No. 16108129



**AIR - 110**  
**SHASHANK ROY**  
Roll No. 16140446



**AIR - 128**  
**PRAKHAR NEEMA**  
Roll No. 16108146



**AIR - 137**  
**P. NITISH**  
Roll No. 16172084



**AIR - 143**  
**HARSH PATEL**  
Roll No. 13415035



**AIR - 184**  
**LAVISH GUPTA**  
Roll No. 13400690



**AIR - 186**  
**RISHABH GUPTA**  
Roll No. 15402071



**AIR - 190**  
**RAHUL ATUL JAIN**  
Roll No. 14401178



**AIR - 191**  
**YASH SANJEEV**  
Roll No. 16153892



**AIR - 197**  
**ARPIT AGARWAL**  
Roll No. 12403093



**AIR - 2 (ST)**  
**JATINI MEENA**  
Roll No. 17107811

### Result at Resonance

Total Students Qualified for JEE (Advanced)

**12614**

Classroom: 9425 | DLP+ELP: 3189

Total Students selected in JEE (Main)

**22557**

Classroom: 17751 | DLP+ELP: 4806

### ResoNET Dates

**27<sup>th</sup> MAY & 10<sup>th</sup> JUN 2018**

Test Timings: 9 AM to 12 Noon

**ADMISSIONS OPEN FOR 2018-19**

Classes: V to XII & XII+

Target: JEE (Main+Advanced) | JEE (Main) | AIIMS/ NEET | Pre-foundation | Commerce & CLAT

### Resonance Eduventures Limited

Registered & Corporate Office: CG Tower, A-46 & 52, IPIA, Near City Mall, Jhalawar Road, Kota (Rajasthan) - 324005

Tel. No.: 0744-6607777, 6635555 | CIN: U80302RJ2007PLC024029

To know more: sms RESO at 56677 | website: www.resonance.ac.in | e-mail: contact@resonance.ac.in

facebook.com/ResonanceEdu | twitter.com/ResonanceEdu | www.youtube.com/resowatch | blog.resonance.ac.in

**Toll Free**

**1800 258 5555**