

SOLUTION BOOKLET

8th moving 9th

SECTION – A

EASY LEVEL

PHYSICS

- Sol.1 [B]** The force of attraction or repulsion between two electric charges is called electrostatic force. As electron is negatively charged and nucleus has positive charge.
- Sol.2 [D]** Gravitational pull due to earth and frictional force from air (air drag).
- Sol.3 [C]** Pitch of voice depends on frequency. Females have more pitch than males, so female voices have higher frequency than male voices. So lower the pitch, lower will be the frequency.
- Sol.4 [C]** We can hear sound whose frequency lies between 20 Hz to 20000 Hz.
- Sol.5 [D]** Frictional force on an object in a fluid depends on all the factors given in options.

CHEMISTRY

- Sol.6 [C]** Distilled water is one type of purified water. In which no ion is present. So it does not conduct electricity.
- Sol.7 [C]** To produce fire in other words to initiate a combustion reaction, to start a combustion reaction. We need combustible fuel, air (oxygen) and some heat (Ignition Temperature) to start the oxidation process hence all the 3 components are needed.
- Sol.8 [A]** This is a process by which we can prevent a substance from corrosion.
- Sol.9 [D]**
- Sol.10 [C]** NaHCO_3 (aq) Sodium hydrogen carbonate + H_2SO_4 (aq) Sulphuric acid \rightarrow Na_2SO_4 (s) Sodium sulphate + $2\text{H}_2\text{O}$ (l) Water + CO_2 (g) Carbon dioxide.
This carbon dioxide generates a region around fire and removes oxygen from that region.

BIOLOGY

- Sol.11 [B]**
- Sol.12 [D]**
- Sol.13 [A]**
- Sol.14 [D]**
- Sol.15 [D]**

MATHS

- Sol.16 [B]**
- Sol.17 [A]** $\angle ABC = \angle ACB$ (Isosceles triangle property)
 $\angle ACD + \angle ACB = 180^\circ$ (Linear pair)
 $\angle ACB = 50^\circ$
 $\angle A + \angle B + \angle C = 180$ (Angle sum property)
 $\angle A = 80^\circ$
- Sol.18 [D]** $(15.093)^2 = 227.798649$
- Sol.19 [B]** $(225)^2 = 50625$
 $50730 - 50625 = 105$

Sol.20 [B]

Sol.21 [A]

Sol.22 [B] Let exterior angle = $2x$

Interior angle = $3x$

$$2x + 3x = 180^\circ \quad (\text{linear pair})$$

$$5x = 180^\circ$$

$$x = 36$$

$$\text{Exterior angle} = 2 \times 36 = 72^\circ$$

$$\text{Number of sides of polygon} = \frac{360^\circ}{72^\circ} = 5$$

Sol.23 [C]

Sol.24 [C] Let the numbers are x , $2x$ and $3x$.

$$\text{Given : } x^3 + (2x)^3 + (3x)^3 = 98784$$

$$\Rightarrow x^3 + 8x^3 + 27x^3 = 98784$$

$$\Rightarrow 36x^3 = 98784$$

$$\Rightarrow x^3 = \frac{98784}{36} = 2744$$

$$\Rightarrow x^3 = 14 \times 14 \times 14$$

$$\Rightarrow x = \sqrt[3]{14 \times 14 \times 14} = 14$$

$$\Rightarrow 2x = 28 \text{ and } 3x = 42.$$

\therefore The required numbers are 14, 28 and 42.

Sol.25 [A]

Sol.26 [B]

Sol.27 [B] $3^0 + 3^{-1} = 1 + \frac{1}{3} = \frac{4}{3}$

Sol.28 [B] Interior angle of 6 sides of regular polygon = $\frac{180^\circ \times (6-2)}{6} = \frac{180^\circ \times 4}{6} = 120^\circ$

Sol.29 [B]

Sol.30 [B] Exterior angle of a regular polygon having 20 sides = $\frac{360^\circ}{20} = 18^\circ$

Sol.31 [B] $\sqrt{0.0025} \times \sqrt{2.25} \times \sqrt{0.0001} = 0.05 \times 1.5 \times 0.01 = 0.00075$

MODERATE LEVEL

PHYSICS

Sol.32 [D] Pressure inside a liquid does not depend on the shape of the container (base area). ($P=h\rho g$)

Sol.33 [D] Shadow will look like as shown in option D.

Sol.34 [D] Pressure inside the balloon is maximum at point S.

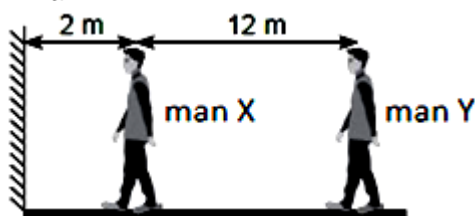
$P = h\rho g$

$h \rightarrow$ height of liquid column above points S.

$\rho \rightarrow$ density of liquid

$g \rightarrow$ acceleration due to gravity

Sol.35 [B] Image of man Y will be form ($2m+12m=14m$) behind the plane mirror. So the distance of image of man Y will be at a distance of 16m from man x.



Sol.36 [D] Certain conditions have to be satisfied to hear an echo distinctly (as a separate sound). The sensation of any sound persists in our ear for about 0.1 seconds. This is known as the persistence of hearing. If the echo is heard within this time interval, the original sound and its echo cannot be distinguished. So the most important condition for hearing an echo is that the reflected sound should reach the ear only after a lapse of at least 0.1 second after the original sound dies off. As the speed of sound is 340 m/s, the distance travelled by sound in 0.1 second is 34 m. This is twice the minimum distance between a source of sound and the reflector. So if the obstacle is at a distance of 17 m at least the reflected sound or the echo is heard after 0.1 second distinctly.

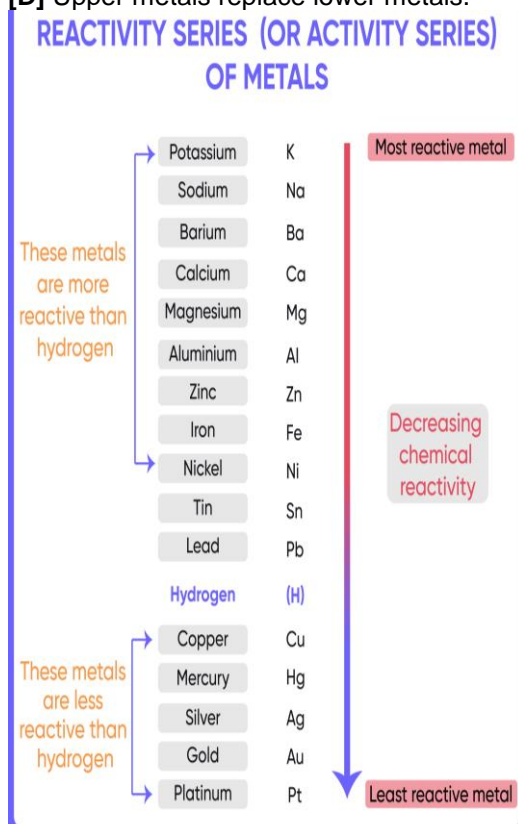
CHEMISTRY

Sol.37 [A] Which gas have low boiling point that convert first into gas and this gas convert into liquid by condensation process.

Sol.38 [B]

Sol.39 [D] A candle flame points upwards because flame is extremely hot, and thus less dense than air (by a routine approximation using the Ideal Gas Law), and thus rises. A hot air balloon floats for the exact same reason.

Sol.40 [D] Upper metals replace lower metals.



Sol.41 [B] $\text{CaCO}_3 + 2\text{HCl} \longrightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$

BIOLOGY

Sol.42 [A]

Sol.43 [C]

Sol.44 [A]

Sol.45 [A]

Sol.46 [C]

MATHS

Sol.47 [D] $\sqrt[3]{32} = 2^x$

$$\left(2^5\right)^{\frac{1}{3}} = 2^x$$

$$2^{\frac{5}{3}} = 2^x$$

$$x = \frac{5}{3}$$

Sol.48 [B]

Sol.49 [C] $12x^2 - x - 6$
 $= 12x^2 - 9x + 8x - 6$
 $= 3x(4x - 3) + 2(4x - 3)$
 $= (3x + 2)(4x - 3)$

Sol.50 [A]

Sol.51 [A]

Sol.52 [C] $\sqrt{\sqrt{2}\sqrt{3}}$

$$= \left((2)^{\frac{1}{2}} \times 3^{\frac{1}{2}} \right)^{\frac{1}{2}} = \left((2 \times 3)^{\frac{1}{2}} \right)^{\frac{1}{2}}$$

$$= 6^{\frac{1}{4}}$$

Sol.53 [C]

Sol.54 [A]

Sol.55 [B] $(x^4 - 11x^2y^2 + y^4)$
 $= (x^2)^2 - 11x^2y^2 + (y^2)^2$

For perfect square we need polynomial $(x^2)^2 - 2x^2y^2 + (y^2)^2$ | NTSE

So we need term $9x^2y^2$ to add in given polynomial.

Sol.56 [A] $(3x - 1)^2 = 9x^2 + 4x - 4$
 $9x^2 + 1 - 6x = 9x^2 + 4x - 4$
 $-10x + 3 = 0$

Sol.57 [B] $\left[2x^2 - \frac{1}{400} y^2 \right]^2 - \left[2x^2 + \frac{1}{400} y^2 \right]^2$

$$\left[4x^4 + \frac{y^4}{160000} - \frac{4x^2y^2}{400} \right] - \left[4x^4 + \frac{y^4}{160000} + \frac{4x^2y^2}{400} \right]$$

$$4x^4 + \frac{y^4}{160000} - \frac{4x^2y^2}{400} - 4x^4 - \frac{y^4}{160000} - \frac{4x^2y^2}{400}$$

$$\frac{-8x^2y^2}{400} = \frac{-x^2y^2}{50}$$

Sol.58 [C]

Sol.59 [B] $\left(x - \frac{1}{x} \right)^2 = x^2 + \frac{1}{x^2} - 2$

$$\left(x - \frac{1}{x} \right)^2 = 102 - 2$$

$$\left(x - \frac{1}{x}\right)^2 = 100$$

$$x - \frac{1}{x} = 10$$

Sol.60 [A] $\sqrt{58x^2 + \sqrt{36x^4}}$

$$\sqrt{58x^2 + 6x^2} = \sqrt{64x^2} = 8x$$

Sol.61 [B]

Sol.62 [A]

DIFFICULT LEVEL

PHYSICS

Sol.63 [C] Pitch of sound depends on frequency. Frequency of sound produced by string depends upon the tension in the string. (Greater tension (stretch) mean greater frequency)

Sol.64 [C]

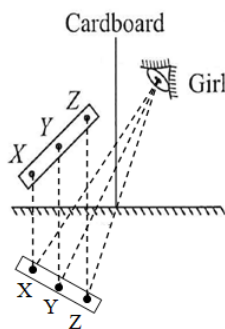


Image of the object closer to cardboard seen first as the cardboard is removed vertically upward.

Sol.65 [C] Pressure = $\frac{\text{force}}{\text{area}} \Rightarrow P \propto \frac{1}{A}$, as area decreases pressure increases.

CHEMISTRY

Sol.66 [C]

Sol.67 [B] Metal + Acid \longrightarrow Salt + Hydrogen

Sol.68 [D]

BIOLOGY

Sol.69 [C]

Sol.70 [A]

Sol.71 [A]

Sol.72 [C]

MATHS

Sol.73 [B]
$$\frac{(0.6)^0 - (0.1)^{-1}}{(3/2^3)^{-1}(3/2)^3 + \left(-\frac{1}{3}\right)^{-1}}$$

$$\begin{aligned} & \frac{1 - \frac{1}{0.1}}{\left(\frac{3}{8}\right)^{-1} \times \frac{27}{8} + (-3)} \\ &= \frac{1 - 10}{\frac{8}{3} \times \frac{27}{8} - 3} = \frac{-9}{9 - 3} \\ &= \frac{-9}{6} = \frac{-3}{2} \end{aligned}$$

Sol.74 [A] We can construct two congruent triangles with common diagonal.

Sol.75 [C]
$$\frac{(x+y)^2 - (x-y)^2}{x^2y - xy^2}$$

$$\frac{x^2 + y^2 + 2xy - x^2 - y^2 + 2xy}{xy(x-y)}$$

$$\frac{4xy}{xy(x-y)} = \frac{4}{x-y}$$

Sol.76 [D] Area of left side triangle = $\frac{1}{2} \times 1 \times 3 = \frac{3}{2}$ unit square

Area of square = $3 \times 3 = 9$ unit square

Area of right side triangle = $\frac{1}{2} \times 3 \times 3 = \frac{9}{2}$ unit square

Total area = $9 + \frac{3}{2} + \frac{9}{2} = 15$ unit square

Sol.77 [C]

In given figure,

$$\angle BAC + \angle ABC + \angle ACB = 180^\circ \text{ (Angles of same triangle)}$$

$$\Rightarrow \angle BAC + 65^\circ + 33^\circ = 180^\circ$$

$$\Rightarrow \angle BAC = 82^\circ$$

$$\angle CAN = \frac{\angle BAC}{2} = 41^\circ \text{ (Given that AN is an angle bisector).}$$

$$\text{Now, } \angle CAN + \angle ANC + \angle ACN = 180^\circ \text{ (Angles of same triangle)}$$

$$\Rightarrow 41^\circ + \angle ANC + 33^\circ = 180^\circ$$

$$\Rightarrow \angle ANC = 106^\circ$$

$$\angle ANC + \angle ANM = 180^\circ \text{ (Linear pair)}$$

$$\Rightarrow 106^\circ + \angle ANM = 180^\circ$$

$$\Rightarrow \angle ANM = 74^\circ$$

$$\angle ANM + \angle AMN + \angle MAN = 180^\circ$$

$$\Rightarrow 74^\circ + 90^\circ + \angle MAN = 180^\circ$$

$$\Rightarrow \angle MAN = 16^\circ$$

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Sol.78 [B] Let the numerator be x

Therefore according to given condition denominator = x + 10

According to question

$$\frac{x+5}{x+10-1} = \frac{3}{4}$$

$$4x + 20 = 3x + 27$$

$$x = 7$$

so number is $\frac{7}{17}$

Sol.79 [B]

$$\begin{aligned} P. \frac{(243)^{0.13} \times (243)^{0.07}}{(7)^{0.25} \times (49)^{0.075} \times (343)^{0.2}} &= \frac{(243)^{0.13+0.07}}{(7)^{0.25} \times (7)^{0.15} \times (7)^{0.6}} \\ &= \frac{(3^5)^{0.2}}{7^1} = \frac{3^1}{7^1} = \left(\frac{3}{7}\right)^1 \end{aligned}$$

$$x = 1$$

Q. $(256)^{0.16} \times (256)^{0.09} = 2^x$

$$(256)^{0.16+0.09} = (2^8)^{0.25}$$

$$= (2^8)^{\frac{1}{4}} = 2^2$$

$$x = 2$$

$$R. \quad \frac{2^{x-1} \cdot 4^{2x+1}}{8^{x-1}} = 32$$

$$\frac{2^{x-1} \times (2^2)^{2x+1}}{(2^3)^{x-1}} = 32$$

$$\frac{2^{x-1} \times 2^{4x+2}}{2^{3x-3}} = 2^5$$

$$2^{x-1+4x+2-3x+3} = 2^5$$

$$2^{2x+4} = 2^5$$

$$2x + 4 = 5$$

$$x = \frac{1}{2}$$

$$S. \quad 3^x - 3^{x-1} = 54$$

$$3^x \left[1 - \frac{1}{3} \right] = 54$$

$$3^x \left[\frac{2}{3} \right] = 54$$

$$3^x = 81$$

$$x = 4$$

Sol.80 [B]

SECTION - B

MENTAL ABILITY

Sol.81 [A]

Sol.82 [A]

Sol.83 [C] Clearly, the series is of pattern = $x, x \times 3$ and so on.

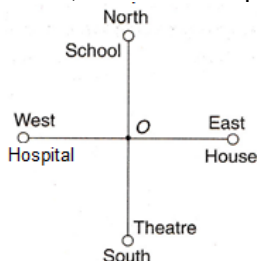
Sol.84 [D] Clearly as except (D) all are divisible by 3.

Sol.85 [B] By comparing the word 'SKY' and coded word 'RJK'. We get R is used for S, J is used for K and X is used for Y. Hence, it is clear that each letter of word SKY stands as corresponding letter of word RJK. By applying same principle for SNOW. We get coded word 'RMNV'. Therefore 'b' is the correct answer.

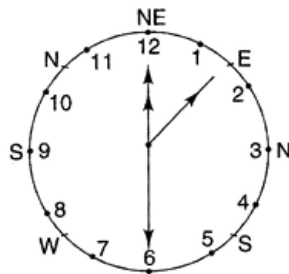
Sol.86 [D] In the second and third statements, the common word is 'gives' and the common code is 'wop'. So 'wop' means 'gives'. Hence, the answer the (D).

Sol.87 [D] From 2nd and 3rd statements, we can find the code for 'home'. To find the code for 'they', we need the code for 'go' which can not be determined from the data. Thus data is inadequate to find the code for 'they'.

Sol.88 [A] Starting from his house which is eastward, and moves westward comes at O, the crossing. To his left is theatre (South) and straight i.e. towards West, there is a hospital. So obviously his school is toward North.



Sol.89 [C] Diagram is shown as per the conditions in the question. Clearly at 1 : 30 p.m. the hour hand shall point East.



Sol.90 [C] Sohan's son's uncle means Sohan's brother. So, the old man's son is Sohan's brother, i.e. the old man is the father of Sohan. The answer is (C).

Sol.91 [D] Studying the statements carefully, we find that B is the brother of A and A's son is the brother of D, so D is the daughter of A. Since C and D are sisters, so C is also the daughter of A. Thus B is the uncle of C.

Sol.92 [B]

Sol.93 [A OR D]

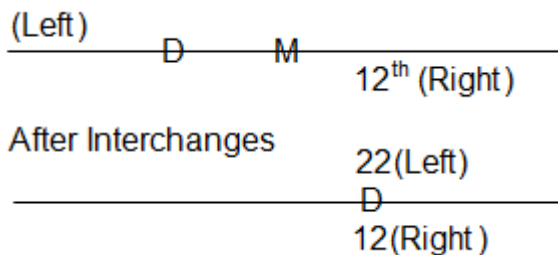
Sol.94 [B]

Sol.95 [D]

Sol.96 [B] As 1990 was not a leap year, it would have one odd day. Thus, the same date in the following year would fall on Tuesday.

Sol.97 [B] Number of odd days in 1600 years = 0
 Number of odd days in 300 years = 1
 Number of leap years in 46 years = 11
 Number of odd days in 46 years = 35
 $11 \times 2 + 35 \times 1 = 22 + 35 = 57 = 1$
 Number of odd days in year 1980 up to 15th August = $31 + 28 + 31 + 30 + 31 + 30 + 31 + 15 = 227 = 1$
 Total number of odd days = $1 + 1 + 3 = 5$
 Therefore, the day on 15th August, 1947 was Friday.

Sol.98 [C]



Total students = $22 + 12 - 1 = 33$

Sol.99 [D] If first figure cube is rotated anticlockwise then it will look like third figure, so opposite to number 2, it is number 5.

Sol.100 [C] From figures-1 and 2 only we can see that opposite to face with number 6 is number 1.