

SOLUTION BOOKLET

7th moving 8th

SUNDAY, 01 OCTOBER 2023

SECTION – A

EASY LEVEL

PHYSICS

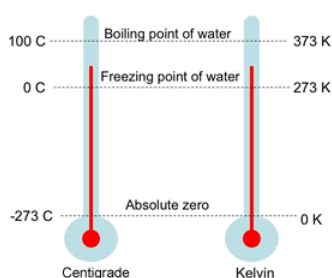
Sol.1 [A] Light year is the unit of distance.

Sol.2 [D] Hair dryer, iron & light bulb works on principle of heating effect of electric current.

Sol.3 [D] As the number of turns is highest in the diagram shown in option (D) and also the current is highest.

Sol.4 [A] Electroplating → The process of plating a metal onto the other by hydrolysis to prevent corrosion of metal or for decoration.

Sol.5 [C] As no. of division in between the freezing point and boiling point are same on the Celsius and Kelvin Scale.



CHEMISTRY

Sol.6 [C] Concept: Physical Change: Properties like size, shape, state (solid, liquid, or gas), temperature, pressure, etc., are physical properties. Those changes in which only physical properties of a substance change are called physical changes. There is no change in chemical composition. Chemical Change: The change in which a new substance is formed and the chemical composition of a substance are changed is called a chemical change. A substance loses its identity in a chemical change and cannot get back into its original form.

Sol.7 [C] A physical change is a process in which the physical state of the substance is changed. Melting of wax is physical change as the solid wax is converted to a liquid state, so it changes its physical state.

Sol.8 [C] The substance which lowers the acidity of stomach is called antacid. Antacid is a base and neutralizes excess acid in stomach. It controls the symptoms and not the cause. Examples of antacid include sodiumbicarbonate, magnesiumhydroxide and aluminumhydroxide

Sol.9 [D] When we mix 1 liter of water whose temperature is 30°C with 1 liter of water having a temperature of 50°C, then the temperature of the whole water will be around 40 degrees, which will be an average number between 50 and 30.

Sol.10 [D] Concept Applied: Color change of an indicator indicates the nature of the substance.

BIOLOGY

Sol.11 [A]

Sol.12 [D]

Sol.13 [C]

Sol.14 [B]

Sol.15 [C]

MATHS

- Sol.16 [B]** Calculation: There are 10 prime number between 1 to 30 viz.. 2, 3, 5, 7, 11, 13, 17, 19, 23, 29.
- Sol.17 [D]**
- Sol.18 [D]**
- Sol.19 [B]**
- Sol.20 [D]** $x = 3889 + 12.952 - 3854.002 = 47.95$.
- Sol.21 [B]**
- Sol.22 [A]** Let age of Ram = x years
Age of Ram's father = $2x + 3$
 $45 = 2x + 3$
- Sol.23 [D]** Percentage of no. of females = $100 - 65 = 35\%$
Let total number of population = x
 $\frac{35}{100} \times x = 504$
 $x = 1440$
No. of males = $1440 - 504$
 $= 936$
- Sol.24 [D]** Travelled Journey is $\left(1 - \frac{2}{5}\right) = \frac{3}{5}$
Let total distance = x km
Then $\frac{3}{5}$ of $x = 27$
 $x = 45$
- Sol.25 [A]**
- Sol.26 [A]** $\frac{9^3 \times 27 \times 81^4}{3^2 \times 3^4 \times 81^2}$
 $= \frac{3^6 \times 3^3 \times 3^{16}}{3^2 \times 3^4 \times 3^8}$
 $= \frac{3^{25}}{3^{14}} = 3^{11}$
- Sol.27 [A]** Let age of person = x years
According to question
 $\frac{1}{3}x = x - 20$
 $20 = \frac{2x}{3}$
 $x = 30$
- Sol.28 [D]** $BC \parallel ED$ and CD is the transversal.
Then,
 $\angle BCD + \angle CDE = 180^\circ$ Angles on the same side of a transversal line are supplementary
 $\Rightarrow \angle BCD + 75 = 180$
 $\Rightarrow \angle BCD = 105^\circ$
 $AB \parallel CD$ and BC is the transversal.
 $\angle ABC = \angle BCD$ (alternate angles)
 $\Rightarrow x = 105^\circ$

Sol.29 [A] $2^x + 2^x + 2^x = 192$

$$3 \times 2^x = 192$$

$$2^x = 64$$

$$x = 6$$

Sol.30 [B] $\left(\frac{-7}{18} \times \frac{15}{-7}\right) - \left(1 \times \frac{1}{4}\right) + \left(\frac{1}{2} \times \frac{1}{4}\right)$
 $= \frac{5}{6} - \frac{1}{4} + \frac{1}{8} = \frac{17}{24}$

Sol.31 [C]

MODERATE LEVEL

PHYSICS

Sol.32 [D] Number = $\frac{\text{total distances he wants to run}}{\text{length of track}} = \frac{3 \text{ km}}{1/4 \text{ km}} = 12.$

Sol.33 [A] See image in solution of question no. 5,

Sol.34 [A] To light up bulb I only switches S_1, S_2 & S_5 must be closed. So that current passes through bulb I reaches the other (opposite) terminal of dry cell.

Sol.35 [D] Electric current flow in closed circuit. As in question no. 34.

Sol.36 [C] speed = $\frac{\text{distance}}{\text{time}} \Rightarrow \text{distance} = \text{speed} \times \text{time} = 60 \times \frac{10}{60} = 10 \text{ km}$

CHEMISTRY

Sol.37 [A] A neutralization reaction can be defined as a chemical reaction in which an acid and base quantitatively react together to form a salt and water as products. In a neutralization reaction, there is a combination of H^+ ions and OH^- ions which form water.

Sol.38 [C] Galvanisation or galvanization (or galvanizing as it is most commonly called) is the process of applying a protective zinc coating to iron or steel, to prevent rusting. The most common method is hot dip galvanizing, in which steel sections are submerged in a bath of molten zinc.

Sol.39 [B] As both the bodies (iron ball and water) have the same temperature of 40°C , no heat will flow between them. Because heat flow from high temperature to low temperature.

Sol.40 [A] wooden spoon is dipped in a cup of ice cream. It's another end does not become cold as wood is a bad conductor of heat

Sol.41 [C] Stainless steel pans are usually provided with copper bottoms. The answer will be copper is a better conductor of heat than the stainless steel is a alloy and copper is a metal. That is why the copper is a good conductor of heat.

BIOLOGY

Sol.42 [A]

Sol.43 [C]

Sol.44 [D]

Sol.45 [C]

Sol.46 [B]

MATHS

Sol.47 [A] Let number is x

$$x \times \frac{3}{5} = \frac{11}{5}$$

$$x = \frac{11}{3}$$

$$\frac{11}{3} + \frac{3}{5} = \frac{64}{15}$$

$$= 4\frac{4}{15}$$

Sol.48 [D]

Let the numbers be $3x$ and $5x$.

$$\text{Then, } \frac{3x+10}{5x+10} = \frac{5}{7} \text{ or } 7(3x+10) = 5(5x+10)$$

$$\therefore 4x = 20 \text{ or } x = 5$$

So, the numbers are 15, 25.

Sol.49 [D]

Sol.50 [B] Let weight in beginning is x kg

According to question

$$x - \frac{11}{2} + \frac{9}{4} - \frac{15}{4} = 95$$

$$x = 102.$$

Sol.51 [C] $\left(\frac{2}{9}\right)^3 \times \left(\frac{2}{9}\right)^{-6} = \left(\frac{2}{9}\right)^{2m-1}$:

$$\left(\frac{2}{9}\right)^{3-6} = \left(\frac{2}{9}\right)^{2m-1}$$

$$m = -1$$

Sol.52 [A] $x + 48^\circ = 112^\circ$

$$x = 64^\circ \text{ (exterior angle property)}$$

Sol.53 [C] $\angle A + \angle B + \angle C = 180^\circ$ (Angle sum property of triangle)

$$\angle A = \angle B + \angle C \text{ (given)}$$

$$\text{then } \angle A = 90^\circ$$

Sol.54 [C] $x = 45$

$$y = 90$$

$$\frac{x}{y} = \frac{45}{90} = 0.5$$

Sol.55 [A] Let second edge is x

$$\frac{25}{4} \times x = \frac{725}{16}$$

$$x = \frac{29}{4} \text{ cm}$$

Sol.56 [A]

Sol.57 [C] $\theta + \phi = 180^\circ$ (Linear pair)

$$\theta = 3\phi \text{ (given)}$$

$$\phi = 45^\circ$$

Sol.58 [B] $\angle AFC + 95^\circ = 180^\circ$ (Linear pair)

$$\angle AFC = 85^\circ$$

$$x + 85^\circ = 120^\circ \text{ (exterior angle property)}$$

$$x = 35^\circ$$

Sol.59 [B] $0.1 - 0.04 = 0.06$

Sol.60 [A] On dividing the given number by 342 let k be the quotient and 47 as remainder. Then number $342k + 47 = 19 \times 18k + 19 \times 2 + 9 = 19(18k + 2) + 9$. The given number when divided by 19 gives $18k + 2$ as quotient and 9 as remainder.

Sol.61 [D]

$$\text{Sol.62 [B]} \quad \frac{6^6 + 6^6 + 6^6 + 6^6 + 6^6 + 6^6}{3^6 + 3^6 + 3^6} \div \frac{4^6 + 4^6 + 4^6 + 4^6}{2^6 + 2^6}$$

$$= \frac{6^7}{3^7} \div \frac{4^7}{2^7}$$

$$\frac{2^7 \times 3^7}{3^7} \div \frac{2^{14}}{2^7}$$

$$2^7 \times \frac{1}{2^7} = 2^0$$

$$n = 0$$

MAGNET
INSTITUTE

DIFFICULT LEVEL

PHYSICS

Sol.63 [A] The time period of pendulum does not depend on the mass of the bob, but it depends on the length of the string. So the pendulum with longer string have higher time period than other.

Sol.64 [B] Thermal expansion, there is a property of material. Due to heating the metal expands causing the diameter to increase and ball having a smaller diameter can pass through the ring.

Sol.65 [C] The slope of displacement-time graph gives us the
(I) velocity (speed) of the lift at any instant.

$$\text{slope (m)} = \tan \theta$$

$\theta \rightarrow$ angle made by tangent with the +ve direction of x-axis.

tangent \rightarrow touching line drawn to graph at any point.

so, if we draw tangent to graph curve at point P, it is along x-axis of angle made by tangent with x-axis is zero.

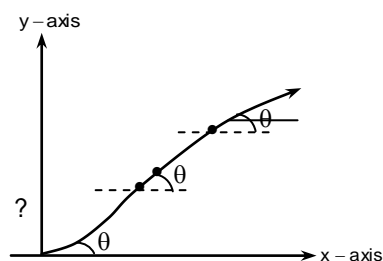
So, slope of graph at $p = \tan 0^\circ = 0$, so lift is stationary at P.

(II) in the same manner slope of graph at Q is more then the slope of graph at R.

i.e. lift is slowing down from Q to R.

(III) again the graph line becomes parallel to x-axis at point R, so tangent drawn to the graph at point R makes zero angle with the x-axis. So, slope of graph at point R = $\tan \theta^\circ = 0$.

So, at point R, the lift is again stationary.



CHEMISTRY

Sol.66 [B] Fact

Sol.67 [D]

Sol.68 [C]

BIOLOGY

Sol.69 [A]

Sol.70 [A]

Sol.71 [C]

Sol.72 [B]

MATHS

Sol.73 [C] Let first part is x

2nd part is 184 - x

According to question

$$\frac{x}{3} - \frac{184 - x}{7} = 8$$

$$7x - 3 \times 184 + 3x = 21 \times 8$$

$$10x - 552 = 168$$

$$10x = 168 + 552$$

$$10x = 720$$

$$x = 72$$

$$\text{Greatest part} = 184 - 72 = 112$$

Sol.74 [A] $b = 105^\circ$ (corresponding angles)

$$\angle WVQ = \angle SVT = 10^\circ \text{ (vertical opposite angle)}$$

$$\angle VTU + b = 180^\circ \text{ (Co interior angles are supplementary)}$$

$$\angle VTU = 105^\circ$$

$$\angle VTU = a + \angle SVT \text{ (exterior angle property)}$$

$$105^\circ = a + 10^\circ$$

$$a = 95^\circ$$

$$\text{So, } a + b = 95^\circ + 75^\circ = 170^\circ$$

Sol.75 [B] (i) $x = 40^\circ$ (vertically opposite angles)

$$x + 65^\circ + y = 180^\circ$$

$$40 + 65^\circ + y = 180^\circ$$

$$y = 75^\circ$$

$$z = y = 75^\circ \text{ (Vertical opposite angles)}$$

$$z - x = 35^\circ$$

(ii) $2a + 80^\circ = 180^\circ$ (Linear pair)

$$a = 50^\circ$$

$$a + b + 90^\circ = 180^\circ \text{ (straight angle)}$$

$$50 + b = 90^\circ$$

$$b = 40^\circ$$

$$\therefore a + 2b = 50^\circ + 2 \times 40^\circ = 130^\circ$$

Sol.76 [D] (i)
$$\frac{\left(\frac{8}{9}\right)^2 \times (3)^7 \times \left(\frac{1}{2}\right)^3}{(27)^2 \times 64}$$

$$\frac{2^6}{3^4} \times 3^7 \times \frac{1}{2^3} = \frac{2^6 \times 3^7}{2^9 \times 3^{10}} = \frac{1}{2^3 \times 3^3} = \frac{1}{6^3}$$

$$x = 3$$

$$(ii) \frac{(4^3)^2 \times (2 \times 5)^2 \times 2^3}{(2^2)^3 \times (5 \times 4)^2}$$

$$= \frac{2^{12} \times 2^2 \times 5^2 \times 2^3}{2^6 \times 5^2 \times 2^4} = \frac{2^{17} \times 5^2}{2^{10} \times 5^2}$$

$$2^7 = 2^{x+2}$$

$$x = 5$$

$$(iii) 6^{2x} \times 36^2 = 6^{16}$$

$$6^{2x} \times 6^4 = 6^{16}$$

$$6^{2x+4} = 6^{16}$$

$$2x + 4 = 16$$

$$x = 6$$

Sol.77 [C] Let the amount with ram, shyam, Tarun & varun

be r, s, t and v

$$r + s + t + v = 240$$

$$r = 1/2(s + t + v)$$

$$r = 1/2(240 - r)$$

$$r = 240/3$$

$$r = 80rs$$

$$s = 1/3(r + v + t)$$

$$s = 1/2(240 - s)$$

$$s = 240/4 = 60rs$$

$$t = 1/4(240 - t)$$

$$t = 240/5$$

$$t = 48rs$$

$$v = 240 - (t + s + r)$$

$$v = 240 - (48 + 60 + 80)$$

$$v = 52rs$$

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Sol.78 [A]

Sol.79 [B] $\left(\frac{6}{7} + \frac{y-x}{y+x}\right)$

$$\frac{6}{7} + \frac{\left(\frac{y-x}{y}\right)}{\left(\frac{y+x}{y}\right)}$$

$$\frac{6}{7} + \frac{\left(\frac{y-x}{y} - \frac{x}{y}\right)}{\left(\frac{y+x}{y}\right)}$$

$$\frac{6}{7} + \frac{\left(1 - \frac{9}{8}\right)}{\left(1 + \frac{9}{8}\right)}$$

$$\frac{6}{7} - \frac{1}{17} = \frac{95}{119}$$

Sol.80 [C] $\left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\dots\dots\left(1-\frac{1}{10}\right)$
 $= \frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \dots\dots\dots \frac{8}{9} \times \frac{9}{10} = \frac{1}{10}$

SECTION – B

MENTAL ABILITY

Sol.81 [A]

Sol.82 [A]

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

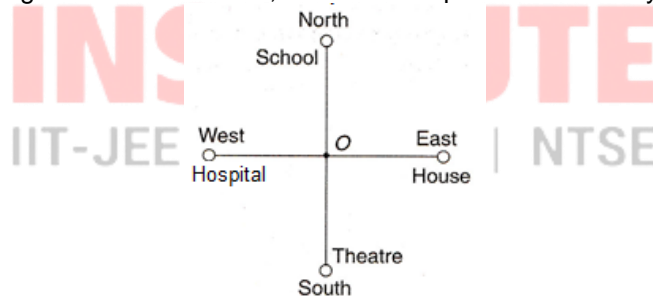
Sol.84 [D] Clearly as except (D) all are divisible by 3.

Sol.85 [B] By comparing the word ‘SKY’ and coded word ‘RJX’. 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 RJX. By applying same principle for SNOW. We get coded word ‘RMNV’. Therefore ‘b’ is the correct answer.

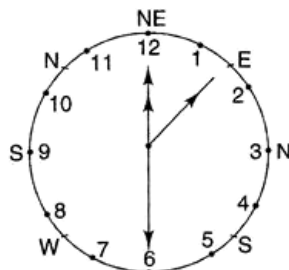
Sol.86 [D] In the second and third statements, the common word is ‘gives’ and the common code is ‘wop’. So ‘wop’ means ‘gives’. Hence, the answer the (D).

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, was 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

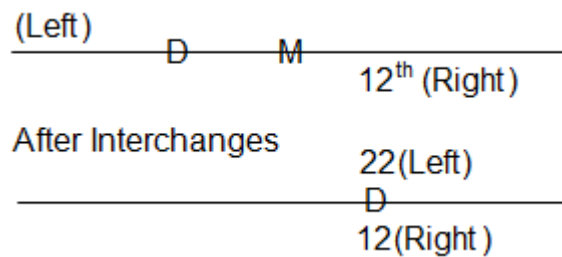
$11 \times 2 + 35 \times 1 = 22 + 35 = 57 = 1$

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.

