KHOJ-2026
Hunt for Young Talents

CLASS X

Physics

Q.1 All three bodies start from the same height, so each has the same vertical displacement up to the ground. However, their vertical initial velocities are different: A is upward, B has zero vertical component, and C is downward. Therefore their final velocities and times are not generally equal. Hence the definitely correct statement is that they have equal vertical displacements.

Correct Answer: B

Q.2 Power P = -0.5 D is negative, so the correcting lens is concave (diverging). A concave lens is used to correct myopia.

Correct Answer: A

Q.3 The frequency of light is fixed by the source and remains unchanged even when light enters another medium. Its speed and wavelength change.

Correct Answer: B

Q.4 A convex mirror gives a wide field of view, and produces virtual and errect images and is used as a rear-view mirror in vehicles.

Correct Answer: C

Q.5 For a wire, $R = \rho L/A$ and $V = AL$. Therefore $A = V/L$, so

Substituing for A we get.

$\Rightarrow R = \rho L^2/V.$

Given $R = 3\Omega$ and $V = 3\ m^3$:

$\Rightarrow 3=\rho L^2/3 \qquad \Rightarrow L^2 = 9/\rho \qquad \Rightarrow L = 3/\sqrt{\rho}.$

Correct Answer: D

Q.6 For constant resistance power is given as, $P = I^2R$.

Hence a small fractional change in power is given by

$$\frac{\Delta P}{P}\times 100 \cong 2\times\frac{\Delta I}{I}\times 100$$

$\Rightarrow$ If current changes by 1%, power changes by approximately 2%.

Correct Answer: A

Q.7 In a series circuit, the same current flows through every component. Therefore the currents through the 50 W and 25 W bulbs are equal.

$I_1 : I_2 = 1 : 1.$

Correct Answer: C

Q.8 Using $P = VI$: $\Rightarrow I = \frac{P}{V}$

$\Rightarrow$ For 100 W, 200 V bulb : $I_1 = 100/200 = 0.5$ A.

$\Rightarrow$ For 200 W, 100 V bulb : $I_2 = 200/100 = 2$ A.

$\Rightarrow$ Therefore $I_1 : I_2 = 0.5 : 2 = 1 : 4$.

Correct Answer: B

Q.9 Power = 2 kW. It operates for 1 hour per day for 30 days.

$\Rightarrow$ Energy = $Pt = 2 \times 1 \times 30 = 60$ kWh.

$\Rightarrow$ Since 1 kWh = 1 unit,

$\therefore$ Energy consumed = 60 units.

Correct Answer: B

Q.10 From the connections in the diagram, the top wire makes the junction after the first 2R resistor directly connected to B. The lower wire makes A directly connected to the junction between the second 2R resistor and R.

$\Rightarrow$ Thus the two 2R resistors and the R resistor are all connected between A and B, i.e. in parallel.

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{2R} + \frac{1}{2R} + \frac{1}{R} = \frac{4}{2R} = \frac{2}{R}$$

$\Rightarrow$ Therefore $R_p = \frac{R}{2}$

Correct Answer: A

Chemistry

Q.11 When aluminium oxide breaks down, the equation is $2Al_2O_3 \rightarrow 4Al + 3O_2$. So 4 moles of aluminium come out for every 3 moles of oxygen gas.

Correct Answer: B

Q.12 Zinc sulphate is made from a strong acid (sulphuric acid) and a weak base (zinc hydroxide). The strong acid wins, so the solution turns acidic.

Correct Answer: D

Q.13 In refining, the impure metal is the anode and the pure metal collects on the cathode. The electrolyte is a solution of a silver salt, which is acidified silver nitrate.

Correct Answer: D

Q.14 X gives away electrons and Y takes them, so Z is an ionic compound. Ionic compounds have a high melting point, so a low melting point is the property Z does not show.

Correct Answer: A

Q.15 One mole of CO_2 weighs 44 g, so 880 g ÷ 44 = 20 moles. One mole has 6.022×10^{23} molecules, so 20 moles have 1.2044×10^{25} molecules.

Correct Answer: D

Q.16 Starch particles are bigger than sugar particles but much smaller than sand. They keep moving about (Brownian motion) and carry the same charge, so they push each other away and never settle.

Correct Answer: C

Q.17 When we cool things down, gases get easier to compress, more gas dissolves in a liquid, and liquids become denser. Diffusion, evaporation and expansion of gases all slow down.

Correct Answer: C

Q.18 Purple $KMnO_4$ takes electrons from $FeSO_4$, which means it oxidises $FeSO_4$. As the $KMnO_4$ gets used up, its purple colour fades and disappears.

Correct Answer: A

Q.19 We need a lead compound that dissolves in water, so that it can give lead ions for the yellow lead iodide. Lead acetate dissolves, but lead sulphate does not, and the other two have no lead at all.

Correct Answer: B

Q.20 H_2O. The reducing agent is the one that loses electrons, which is the one that gets oxidised. Oxygen in H_2O goes from -2 to 0 in HOF, while fluorine goes from 0 to -1, so F_2 is the oxidising agent.

Correct Answer: B

Mathematics

Q.21

- Sum = 70, so average = $\frac{70}{10} = 7$

7 APPEARS 3 TIMES

- Therefore the probability is $\frac{3}{10}$

Correct Answer: B

Q.22

- Let the edge of each cube be a.
- Cuboid dimensions = $3a \times a \times a$, so TSA = $14a^2$.
- Three cubes have total surface area = $18a^2$.
- Ratio = 14:18 = 7:9.

Correct Answer: D

Q.23

- Cube volume = 44^3.
- Bullet radius = 2 cm; volume = $\left(\frac{4}{3}\right)\pi(2^3)$.
- using $\pi = \frac{22}{7}$, Number of bullets = $44^3 \div \left[\frac{4}{3}\pi(8)\right] = 2541$

Correct Answer: B

Q.24 • CB = CE + EB = 10 + 2 = 12cm

Since $\angle A = \angle CED$ and $\angle C$ is common

• Therefore $\Delta CED \sim \Delta CAB$

$$\frac{CD}{CB} = \frac{CE}{CA} = \frac{ED}{AB}$$

$$\frac{8}{12} = \frac{10}{CA} = \frac{a}{9} = \frac{2}{3}$$

• Hence,

$$CA = 15cm,\ a = 9 \times \frac{2}{3} = 6cm$$

• Therefore, b = AD = CA - CD = 15 - 8 = 7cm

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a + b = 6 + 7 = 13 cm

Correct Answer: A

Q.25 • BC is the diameter, so $\angle A = 90^{\circ}$

• AB = AC = a hence $BC = a\sqrt{2}$ and $r = \frac{a}{\sqrt{2}}$

• Shaded area: $2\left(\frac{\pi r^2}{4} - \frac{r^2}{2}\right) = \frac{a^2}{2}\left(\frac{\pi}{2} - 1\right)$

Correct Answer: D

Q.26 A fundamental property of a parallelogram is that its diagonals bisect each other.

Midpoint of diagonal AC = midpoint of diagonal BD

$$\left(\frac{15}{2}, \frac{5}{2}\right) = \left(\frac{8+P}{2}, \frac{5}{2}\right)$$

$$\frac{15}{2} = \frac{8+P}{2}$$

15 = 8 + p

• Therefore P = 7.

Correct Answer: A

Q.27 • $2\beta + \beta = 90^{\circ} \Rightarrow \beta = 30^{\circ}, \alpha = 60^{\circ}$.

• $\cos^2 60^{\circ} + \sin^2 30^{\circ} = \frac{1}{4} + \frac{1}{4} = \frac{1}{2}$.

Correct Answer: A

Q.28 • Sum of 5 numbers = 5×18 = 90.

• Sum of remaining 4 = 4×16 = 64.

• Excluded number = 90-64 = 26.

Correct Answer: A

Q.29
- Opposite sides are equal: x-y = -3 and 2x+y = 15.
- Solving gives x = 4, y = 7; hence sides are 36 cm and 15 cm.
- Diagonal = $\sqrt{36^2+15^2} = 39$ cm; perimeter = 2(36+15) = 102 cm.
- Area = 36×15 = 540 cm².

Correct Answer: C

Q.30
- Possible integral scores are 0 to 100: 101 outcomes.
- Only one outcome corresponds to 75 marks.
- Probability = $\frac{1}{101}$.

Correct Answer: A

Q.31
- Hypotenuse $=\sqrt{6^2+8^2} = 10$ cm.
- For a right triangle, radius of in circle $r = \frac{p+b-h}{2}$.
- $r = \frac{6+8-10}{2} = 2$ cm

Correct Answer: B

Q.32

Centroid (x, y) $=\left(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right)$

- $\frac{7+x+9}{3} = 6 \Rightarrow x = 2.$
- $\frac{y-6+10}{3} = 3 \Rightarrow y = 5.$

Correct Answer: A

Q.33
- Sum of roots = R+7; product = 4R-4.
- 4R - 4 = 3(R+7).
- 4R - 4 = 3R + 21
- R = 25.

Correct Answer: A

Q.34
- $a_{20} = a + 19d$ and $a_{25} = a+24d$.
- $a_{20}-a_{25} = -5d = 15$.
- Therefore d = -3.

Correct Answer: D

Q.35 Let the total length of the straight wire be 2L. When cut into two equal halves, the length of each half is L.

The area of the square (A_1) is: $A_1 = s^2 = \left(\frac{L}{4}\right)^2 = \frac{L^2}{16}$

The total perimeter (length L) is given by:

$L = \text{Arc length} + 2r = \frac{\pi r\theta}{180^\circ} + 2r$

$L = r\left(\frac{2\pi}{3}\right) + 2r = r\left(\frac{2\pi+6}{3}\right)$

$r = \frac{3L}{2\pi+6} = \frac{3L}{2(\pi+3)}$

$A_2 = \frac{1}{2} \cdot \frac{9L^2}{4(\pi+3)^2} \cdot \frac{2\pi}{3} = \frac{3\pi L^2}{4(\pi+3)^2}$

$\frac{A_1}{A_2} = \frac{1}{16} \times \frac{4(\pi+3)^2}{3\pi} = \frac{(\pi+3)^2}{12\pi}$

Correct Answer: C

Q.36
- x-intercept: $y=0 \Rightarrow x=7$, so A(7,0).
- y-intercept: $x=0 \Rightarrow y=24$, so B(0,24).
- $AB = \sqrt{7^2+24^2} = 25$.

Correct Answer: A

Q.37
- Perimeter = $\pi r + 2r = 72$.
- Using $\pi = \frac{22}{7}$: $\left(\frac{22}{7}+2\right) r = 72 \Rightarrow r = 14$ cm.
- Diameter = $2r = 28$ cm.

Correct Answer: A

Q.38
- $\sqrt{8} = 2\sqrt{2}$, $\sqrt{18} = 3\sqrt{2}$ and $\sqrt{32} = 4\sqrt{2}$.
- The terms form an AP with common difference $\sqrt{2}$.
- Next term = $5\sqrt{2}$.

Correct Answer: A

Q.39
- PR is the hypotenuse.
- $\cos P = \frac{PQ}{PR} = \frac{3}{6} = \frac{1}{2}$
- $\cos P = \cos 60^\circ$
- $\angle P = 60^\circ$

Correct Answer: D

Q.40
- At 45°, shadow = 50 m. (By Iso. triangle property)
- At 30°, shadow = $50/\tan 30^\circ = 50\sqrt{3}$ m.
- Difference = $50\sqrt{3} - 50 = 50(\sqrt{3}-1)$ m.

Correct Answer: D

Q.41 • Minor segment = area of 90° sector - area of triangle.

• Minor segment = $25\pi - 50$.

• Major segment = area of circle - area of minor segment

• Major segment = $100\pi - (25\pi-50) = 75\pi+50$

Correct Answer: B

Q.42 • If side = a, then $x = y = z = a^2$.

• Thus $xyz = a^6$.

• Since $V = a^3$, $V^2 = a^6 = xyz$.

Correct Answer: C

Q.43 Let radius larger and smaller sphere be R = 6 cm and r = 2

• Number = $\frac{\text{volume of large sphere}}{\text{volume of one small sphere}}$

• $=(6/2)^3 = 3^3 = 27$.

Correct Answer: C

Q.44 • OP bisects the angle between the two tangents, so $\Delta APO = 40°$.

• $OA \perp PA$, so $\angle OAP = 90°$.

• Therefore $\angle POA = 180°-90°-40° = 50°$.

Correct Answer: D

Q.45 • For LCM, take the highest power of each prime.

• Highest power of a is a^3 and of b is b^2.

Correct Answer: C

Q.46

• Mode = $\ell+\left[\frac{(f_1-f_0)}{(2f_1-f_0-f_2)}\right]h$.

• $32.5 + \frac{(15-12)}{(30-12-8)}\times 8$.

• 32.5+2.4 = 34.9.

Correct Answer: D

Q.47 • There are 8 observations, so median = average of 4th and 5th terms.

• $23 = [(x+2)+(x+4)]/2 = x+3$.

• Therefore x = 20.

Correct Answer: C

Q.48 • By Remainder Theorem, put $x=-\pi$.

• Remainder = $(-\pi)^3+3(-\pi)^2+3(-\pi)+1$

$= -\pi^3+3\pi^2-3\pi+1$

Correct Answer: A

Q.49 • Sum of zeroes = 3: (a-b)+a+(a+b)=3 $\Rightarrow$ a=1.

• Product of zeroes = -1: (1-b)(1)(1+b)=-1.

• $1-b^2=-1 \Rightarrow b=\pm\sqrt{2}$

• Hence a+b = $1\pm\sqrt{2}$

Correct Answer: A

Q.50 • Let $x = \sqrt{6+x}$.

• $x^2-x-6=0 \Rightarrow (x-3)(x+2)=0$.

• Since a square root is non-negative, x=3.

Correct Answer: B

Biology

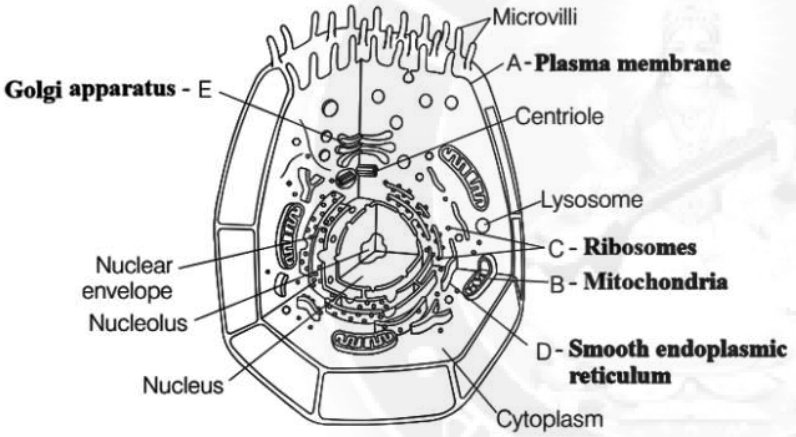
Q.51 The tissue, in which cells lose the power of cell division called as permanent tissue

Correct Answer: C

Q.52 Goblet cells are a type of unicellular gland. Some of the columnar or cuboidal cells get specialised for secretion and are called glandular epithelium. They may be unicellular, e.g. goblet cells of alimentary canal or multicellular, e.g. salivary glands

Correct Answer: C

Q.53



Correct Answer: C

Q.54 Option (a) is incorrect and can be corrected as Robert Brown discovered the nucleus. Rest of the options are correct.

Correct Answer: A

Q.55 The statement in option (d) correctly describes the process of nutrition. Nutrition can be defined as 'the sum total of process which provides necessary nutritive elements for growth, maintenance and to meet their energy need'. Food or Diet is composed of necessary nutrients, which provides the basic requirements of life, i.e. energy and raw materials.

Correct Answer: B

Q.56 Larynx is the portion of human respiratory system called as sound box. It is a cartilaginous box present in the neck region which helps in sound production in mammals.

Correct Answer: A

Q.57

A. Superior vena cava	4. Brings deoxygenated blood from upper part of body to right atrium
B. Inferior vena cava	3. Brings deoxygenated blood from lower part of body to right atrium
C. Pulmonary artery	2. Carries deoxygenated blood
D. Pulmonary vein	1. Carries oxygenated blood

Correct Answer: B

Q.58 Bowman's capsule and glomerulus together form the 'Renal corpuscle' or 'Malpighian body'

Correct Answer: C

Q.59 A typical neuron has three main parts – 1. Cell body, 2. Axon and 3. Dendrites

Correct Answer: D

Q.60 Self-fertilization is the fusion of male and female gametes from the same flower. Bisexual flowers have both male and female reproductive organs.

Correct Answer: A

Mental Ability

Q.61
- Sumit's rank from the start = 39-17+1 = 23.
- Ravi is 7 ranks ahead: 23-7 = 16.

Correct Answer: C

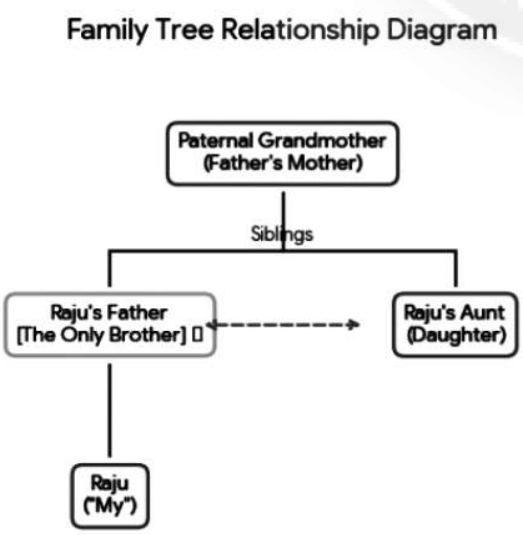
Q.62 General Rule: The hands of a clock overlap exactly 11 times every 12 hours. They overlap once every hour, except during the 2-hour window between 11:00 and 1:00, where they only meet once—exactly at 12:00.
- The interval is 9 hours.
- Therefor in this interval they coincide 8 times.

Correct Answer: D

Q.63
- 2000 is a leap year, but the complete 2000-year block contributes 0 odd days.
- Counting odd days from 1 January to 5 June 2001 gives 2 odd days.
- Hence the day is Tuesday.

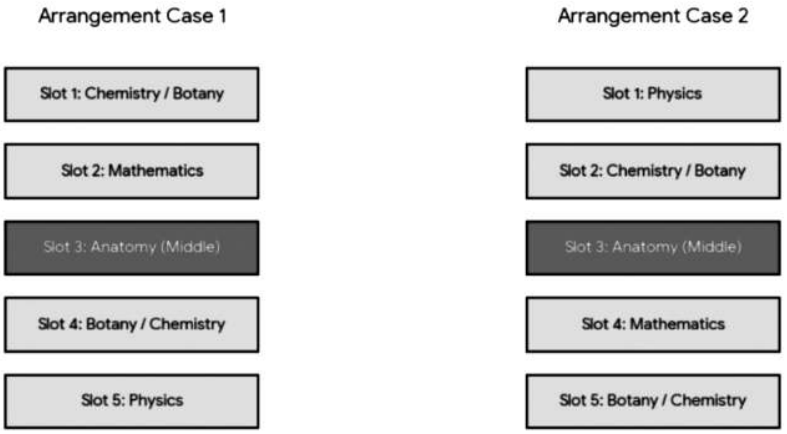
Correct Answer: B

Q.64



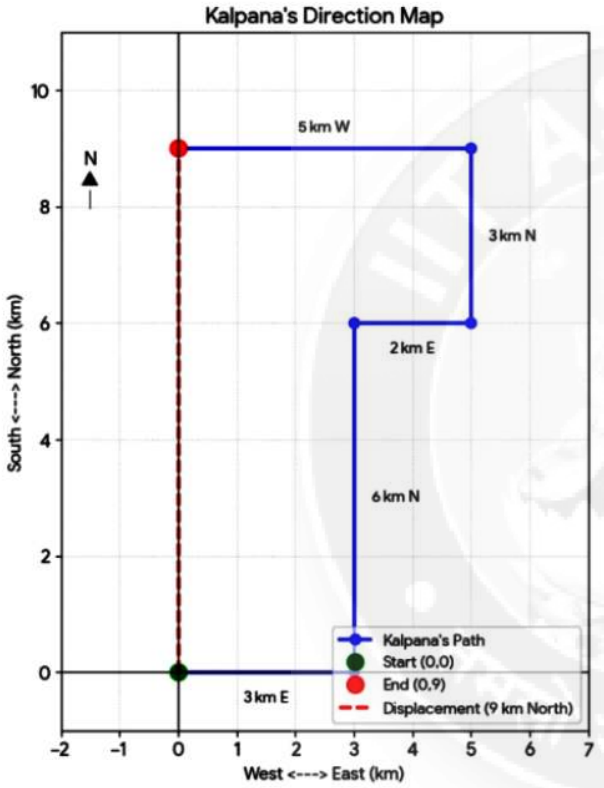
Correct Answer: B

Q.65



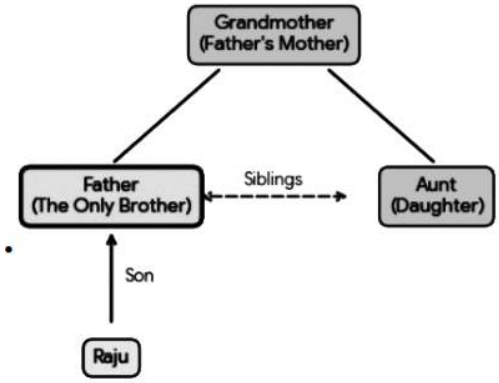
Correct Answer: C

Q.66



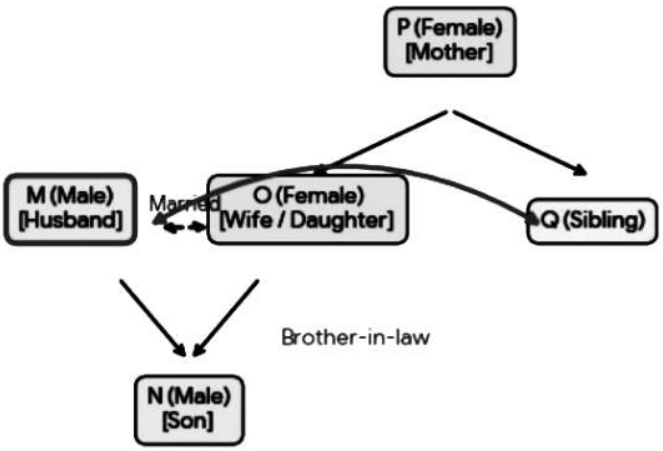
Correct Answer: D

Q.67



Correct Answer: B

Q.68



Correct Answer: C

Q.69 • Minute hand at 40 min = 40×6° = 240°.

• Hour hand at 3:40 = 3×30° + 40×0.5° = 110°.

• Difference = 240°-110° = 130°.

Correct Answer: D

Q.70 • I(9)=1, N(14)=2, D(4)=2, I(9)=1, A(1)=1, N(14)=2.

• Therefore the code is 122112.

Correct Answer: D

Q.71 The series is a b c d / b c d e a / c d e a b / **d e a b c**

Thus the letters are written in a cyclic order.

Correct Answer: A

Q.72 In first figure $12\times\frac{14}{2}=84$. In second figure $9\times\frac{18}{2}=81$

Let the missing number In third figure be x.

Then $11\times\frac{x}{2}=88$ or $x=\frac{88\times2}{11}=16$.

Correct Answer: C

Q.73 In the first and second statements, the common code word is **green** and the common word is **sac**. So, **green** means **sac**. In the first and third statements, the common code word is **tasty** and the common word is **tir**. So, **tasty** means **tir**. Thus, in second and above statements tomato is **tasty** means for **tir dic**.

Correct Answer: A

Q.74 • From the two shown positions, the faces adjacent to 1 are identified.

• The face opposite 1 is 6.

Correct Answer: D

Q.75 • A century year is a leap year only if divisible by 400; hence 2100 and 1900 are not leap years.

• 2102 is not divisible by 4.

• 2108 is divisible by 4 and is not a century year.

Correct Answer: D