

Answers

1. Answer: d

Explanation:

700007.

The face value of a digit is the digit itself, independent of the position it occupies. In 3728456 the digit 7 appears once, so its face value is simply 7.

The place value of a digit is the digit multiplied by the value of its position. The 7 sits in the lakhs position (the sixth place from the right in 3,7,28,456), so its place value is $7 \times 100000 = 700000$.

Adding the two values: $7 + 700000 = 700007$.

2. Answer: a

Explanation:

0.

Step 1 – Use the cubic identity $(a + \frac{1}{a})^3 = a^3 + \frac{1}{a^3} + 3(a + \frac{1}{a})$, so $a^3 + \frac{1}{a^3} = (a + \frac{1}{a})^3 - 3(a + \frac{1}{a})$.

Step 2 – Substitute $a + \frac{1}{a} = \sqrt{3}$: $a^3 + \frac{1}{a^3} = (\sqrt{3})^3 - 3\sqrt{3} = 3\sqrt{3} - 3\sqrt{3} = 0$.

3. Answer: a

Explanation:

A.

In pattern-completion problems the missing cell must continue the transformation rule the surrounding cells follow — typically the shape, rotation, shading or count of elements changes in a fixed way as the eye moves across each row and down each column.

Matching that rule against the four choices, figure A is the only one that preserves every attribute (shape outline, internal detail and orientation) demanded by both the row and the column passing through the empty cell. The other three figures break at least one of the attributes and are therefore rejected.

4. Answer: a

Explanation:

Berzelius.

The Swedish chemist Jons Jacob Berzelius proposed in 1813 that each element be represented by a short symbol taken from the first letter, or the first two letters, of its Latin or English name — H for hydrogen, Fe for iron (from *ferrum*), and so on. The scheme replaced the clumsy pictorial symbols that John Dalton had used earlier and is still followed today.

Dalton drew circular pictographs, not letter symbols. Lavoisier helped standardise element names but not letter-based symbols, and Democritus belonged to ancient Greek atomism and had no role in modern symbol notation.

5. Answer: d

Explanation:

Neither 1 nor 2 is strong.

A strong argument must be directly relevant to the question, grounded in a verifiable fact and large enough to decide national policy. Argument 1 makes a sweeping,

factually incorrect claim that other countries do not rely on non-violence; it is both unsupported and off-point — the behaviour of other countries does not itself establish whether a specific country needs an army.

Argument 2 confuses the cultural temperament of citizens with the strategic requirement of a state. Even peace-loving nations maintain defence forces to deter aggression and protect sovereignty, so the personal character of ordinary people is not a sufficient reason to disband an army. Since neither argument withstands scrutiny, the correct choice is that neither is strong.

6. Answer: c

Explanation:

C.

In a classification question the task is to find the single figure whose structure, orientation or internal element breaks the common rule that the other three figures share. The usual shared rule is the type of shape, the number of sides, the direction of an arrow or line, or the kind of shading used inside the figure.

Comparing the four options against each other, three figures — A, B and D — obey the same construction (same number of elements and the same orientation of the leading shape), while figure C differs on at least one of these attributes. That makes C the odd one out, so it is the figure that is different from the rest.

7. Answer: b

Explanation:

7 lakh.

In a pie or percentage chart the income from any single item equals the total sales multiplied by that item's share. Reading the chart, sandwiches account for 20 % of the

November-2017 sales mix for restaurant XYZ.

Step 1 — Total sales = Rs. 35 lakh and sandwich share = 20 %.

Step 2 — Sandwich income = $35 \times \frac{20}{100} = 7$ lakh.

8. Answer: b

Explanation:

$$24 - 4\pi.$$

Step 1 — Since angle X is the right angle, YZ is the hypotenuse. The third side XZ follows from the Pythagoras theorem: $XZ = \sqrt{YZ^2 - XY^2} = \sqrt{100 - 36} = 8$ cm.

Step 2 — Area of triangle = $\frac{1}{2} \times XY \times XZ = \frac{1}{2} \times 6 \times 8 = 24$ cm².

Step 3 — For a right triangle the inradius is $r = \frac{a + b - c}{2}$, where c is the hypotenuse. So $r = \frac{6 + 8 - 10}{2} = 2$ cm, and the incircle area = $\pi r^2 = 4\pi$ cm².

Step 4 — Required area outside the incircle = $24 - 4\pi$ cm².

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9. Answer: c

Explanation:

P. Parameswaran.

Parameshwaran Nambudiripad, popularly known as P. Parameswaran, was conferred the Padma Vibhushan in 2018 in the field of literature and education. A long-time ideologue and the founder-director of the Bharatheeya Vichara Kendram think-tank in Thiruvananthapuram, he wrote extensively on Indian philosophy, culture and nationalism in Malayalam and English.

Ramoji Rao received the Padma Vibhushan in journalism and literature in 2016; Girija Devi was a Hindustani classical vocalist whose Padma Vibhushan (2016) was in art, not literature; and film-maker K. Vishwanath received the Padma Shri and later the Dadasaheb Phalke Award, not the Padma Vibhushan.

Hence, P. Parameswaran.

10. Answer: b

Explanation:

Disc.

The first pair compares Earth with a ball because the shape of the Earth is spherical – a ball is the everyday object whose geometry matches the Earth's shape.

Applying the same shape-of-the-object rule to the second pair, a pancake is flat and circular, so the everyday object whose geometry matches that shape is a disc. Flat is an adjective, not an object; a soccer ball is spherical and matches Earth, not a pancake; a flag is rectangular. Only disc fits the shape analogy.

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11. Answer: d

Explanation:

Only I is implicit.

An assumption is implicit only when the statement cannot stand without it. The statement says many young people suffer from stress-induced diabetes, which can be made only if the speaker already takes it as given that stress is at least one of the possible causes of diabetes. Assumption I captures exactly that minimum requirement, so it is implicit.

Assumption II is far stronger: it claims that stress is the sole cause of diabetes. The statement never excludes genetic, dietary or lifestyle factors; it only highlights one subgroup of patients. Reading II into the statement would overclaim, so it is not implicit. Hence only assumption I is implicit.

12. Answer: d

Explanation:

465 m.

When a train crosses a platform the distance covered equals the length of the train plus the length of the platform.

Step 1 — Convert the speed to metres per second: $57 \text{ km/hr} = 57 \times \frac{5}{18} = \frac{95}{6} \text{ m/s}$.

Step 2 — Distance covered in 39 s = $\frac{95}{6} \times 39 = \frac{3705}{6} = 617.5 \text{ m}$.

Step 3 — Length of platform = $617.5 - 152.5 = 465 \text{ m}$.

13. Answer: d

Explanation:

Shows neutralisation.

The defining chemical property shared by every acid is the ability to react with a base to form a salt and water — the neutralisation reaction $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$. This behaviour follows directly from the acid releasing H^+ ions and is the single property that identifies all acids.

Turning red litmus blue is the behaviour of bases, not acids — acids turn blue litmus red. Conducting electricity in aqueous or molten state is a shared property of both acids and bases that supply free ions, so it does not describe acids uniquely.

Releasing OH^- ions in solution is again the defining property of alkalis, not acids. Hence the correct property for acidity is neutralisation.

14. Answer: b

Explanation:

Sound wave is a longitudinal wave but light wave is transverse.

In a longitudinal wave the particles of the medium oscillate parallel to the direction in which the wave travels, producing compressions and rarefactions. Sound travels through air exactly this way: the air molecules move back and forth along the direction the sound is moving.

Light, on the other hand, is an electromagnetic wave in which the electric and magnetic field vectors oscillate perpendicular to the direction of propagation, which is the definition of a transverse wave. Light does not even need a material medium, while sound cannot travel through vacuum — so the two differ in both wave type and the need for a medium.

15. Answer: a

Explanation:

2.5 seconds.

At the highest point of the trajectory the ball comes momentarily to rest, so its final velocity is zero. Taking the upward direction positive and gravity acting downward, the first equation of motion gives $v = u - gt$, so $t = \frac{u - v}{g}$.

Step 1 — Substitute $u = 25 \text{ m/s}$, $v = 0$ and $g = 10 \text{ m/s}^2$.

Step 2 — $t = \frac{25 - 0}{10} = 2.5 \text{ seconds}$.

16. Answer: a

Explanation:

Mother.

Preetam is the only son of Tanu's father, which means Preetam is Tanu's only brother.

Saumya is the mother of Tanu's only brother, that is, the mother of Preetam. So Saumya is Preetam's mother.

17. Answer: c

Explanation:

Universal gravitational constant.

Newton's law of gravitation gives the force between two masses as $F = G \frac{m_1 m_2}{r^2}$, where G is the universal gravitational constant.

Rearranging, $G = \frac{F r^2}{m_1 m_2}$, so its SI unit is $\frac{\text{N} \cdot \text{m}^2}{\text{kg}^2} = \text{Nm}^2\text{kg}^{-2}$ (value $6.674 \times 10^{-11} \text{ Nm}^2\text{kg}^{-2}$).

Acceleration due to gravity is measured in m s^{-2} , momentum in kg m s^{-1} and pressure in N m^{-2} , none of which equals $\text{Nm}^2\text{kg}^{-2}$.

Hence, Universal gravitational constant.

Note: RRB did not award marks for this question in the official key.

18. Answer: b

Explanation:

Renowned Hindi littérateur.

Krishna Sobti was one of the most celebrated Hindi fiction writers of post-independence India, author of landmark works like *Mitro Marjani*, *Zindaginama* and *Dil-o-Danish*. In 2017 she was conferred the Jnanpith Award, India's highest literary honour, for her lifetime contribution to Hindi literature.

She was not a Sufi musician, had no association with the National Institute of Design, and was not a mathematician. All of her recognition – the Sahitya Akademi Award (1980), the Padma Bhushan (2010) and the Jnanpith (2017) – was for Hindi literature.

19. Answer: a

Explanation:

-189.

The bar (vinculum) over $7 - 5$ is solved first, before any other bracket or operation:
 $\overline{7 - 5} = 2$.

Step 1 – Inside the round bracket apply division and multiplication from left to right:
 $5 \div 2 \times 2 = 2.5 \times 2 = 5$, so $20 - 5 = 15$.

Step 2 – Curly bracket: $26 - 15 \times 15 = 26 - 225 = -199$.

Step 3 – $10 + (-199) = -189$.

Hence, -189.

20. Answer: d

Explanation:

Respiration.

Cellular respiration breaks the chemical bonds of glucose in the presence of oxygen and releases the stored chemical energy as ATP and heat. The heat liberated during this oxidation is exactly the thermal energy that keeps the body warm, which is why warm-blooded animals maintain a steady internal temperature even in cold surroundings.

Nutrition supplies the food that stores the chemical energy but does not itself convert it; locomotion is the use of energy for movement, not the chemical-to-thermal conversion; and excretion removes metabolic wastes without releasing heat. Only respiration directly turns chemical energy into thermal energy.

21. Answer: b

Explanation:

-28.

Step 1 — Simplify the innermost curly bracket: $7 - (-4) = 7 + 4 = 11$.

Step 2 — Evaluate the division inside the square bracket: $44 \div 11 = 4$.

Step 3 — Multiply by the leading -7 : $(-7) \times 4 = -28$.

22. Answer: b

Explanation:

2.2.

Let the height of the aeroplane above the road be h km. Let the horizontal distance from the point directly below the plane to the nearer road point (depression 45°) be x and to the farther point (depression 30°) be y . The two points are on the same side, so the distance between them is $y - x = 1.61$ km.

Step 1 – From the 45° triangle: $\tan 45^\circ = \frac{h}{x} \Rightarrow x = h$.

Step 2 – From the 30° triangle: $\tan 30^\circ = \frac{h}{y} \Rightarrow y = h\sqrt{3}$.

Step 3 – Subtract: $y - x = h(\sqrt{3} - 1) = 1.61$, so $h = \frac{1.61}{\sqrt{3} - 1} = \frac{1.61(\sqrt{3} + 1)}{2} \approx \frac{1.61 \times 2.732}{2} \approx 2.2$ km.

23. Answer: a

Explanation:

1942.

The Quit India Movement was launched by Mahatma Gandhi at the Bombay session of the All India Congress Committee on 8 August 1942, with the famous call of 'Do or Die'. It was the final mass movement against British rule and demanded an immediate end to colonial administration.

In response, the British arrested the entire Congress leadership the next day, but the movement spread spontaneously across the country through protests, strikes and parallel governments at places like Satara and Tamluk. The movement, therefore, belongs to the year 1942, not 1943, 1944 or 1945.

24. Answer: b

Explanation:

2 ohm.

By Ohm's law, the resistance of a conductor is the ratio of the potential difference across its ends to the current flowing through it: $R = \frac{V}{I}$.

Step 1 – Substitute $V = 4\text{ V}$ and $I = 2\text{ A}$.

Step 2 – $R = \frac{4}{2} = 2\text{ ohm}$.

25. Answer: d

Explanation:

4.375.

Apply BODMAS from the innermost brackets outward.

Step 1 – innermost parentheses: $25 - 15 - 5 = 5$ and $22 - 6 = 16$.

Step 2 – curly braces: $-14 \times 5 = -70$.

Step 3 – square brackets with the division: $\frac{-70}{16} = -\frac{35}{8} = -4.375$.

Step 4 – multiply by the leading fraction: $\frac{1}{7} \times (-4.375) = -0.625$.

Step 5 – add 5: $5 + (-0.625) = 4.375$.

Hence, 4.375.

Note: RRB did not award marks for this question in the official key.

26. Answer: d

Explanation:

Bharat QR code.

Bharat QR was launched in February 2017 by the National Payments Corporation of India together with Visa, MasterCard and American Express under the guidance of the Reserve Bank of India. It is the world's first interoperable Quick Response code

payment system, which lets a merchant display a single QR code and accept payments from the mobile app of any participating card network or bank.

The scheme was designed to reduce dependence on point-of-sale card-swipe machines and to encourage digital payments after demonetisation. The other options — State QR code, Govt QR code and India QR code — are not actual payment systems launched by the Government of India.

27. Answer: d

Explanation:

10.5 A.

Step 1 — The heater's resistance stays essentially constant, so Ohm's law gives $R = V/I = 60/4 = 15\ \Omega$.

Step 2 — At the new potential difference, the current drawn is $I' = V'/R = 157.5/15 = 10.5\text{ A}$.

So raising the applied voltage from 60 V to 157.5 V across the same 15-ohm heating element lifts the current from 4 A to 10.5 A, in direct proportion with voltage as expected for an ohmic conductor.

28. Answer: d

Explanation:

24.

Step 1 — Apply BODMAS: evaluate division and multiplication before addition and subtraction, working left to right.

Step 2 — $6 \times 2 = 12$, $21 \div 7 = 3$, then $3 \times 3 = 9$, and $4 \times 2 = 8$.

Step 3 — Substitute back: $23 - 12 + 9 - 8 + 12$.

Step 4 — Adding and subtracting left to right: $23 - 12 = 11$, $11 + 9 = 20$, $20 - 8 = 12$, $12 + 12 = 24$.

29. Answer: d

Explanation:

B.

Step 1 — Track how the inner element rotates and how shading or position shifts between successive frames of the question series.

Step 2 — The movement from one frame to the next is uniform, so the next frame must extend the same rotational and positional change by one more step.

Step 3 — Of the four answer figures, only figure B carries the inner element to the position that continues the established pattern without breaking symmetry.

30. Answer: c

Explanation:

4 days.

Step 1 — Take the LCM of 42, 56 and 32 as the tank's capacity: $\text{LCM}(42, 56, 32) = 672$ units.

Step 2 — The filling pipes contribute $672/42 = 16$ and $672/56 = 12$ units per hour; the emptying pipe removes $672/32 = 21$ units per hour.

Step 3 — Net rate with all three open: $16 + 12 - 21 = 7$ units per hour.

Step 4 — Time to fill 672 units: $672/7 = 96$ hours, which is $96/24 = 4$ days.

31. Answer: c

Explanation:

533.

Step 1 — Replace each sign by its meaning: ' $\times$ ' becomes ' $\div$ ', ' $-$ ' becomes ' $\times$ ', ' $+$ ' becomes ' $-$ ' and ' $\div$ ' becomes ' $+$ '. The expression becomes $400 \div 5 \times 6 - 22 + 75$.

Step 2 — By BODMAS, division and multiplication from left to right: $400 \div 5 = 80$ and $80 \times 6 = 480$.

Step 3 — Then $480 - 22 + 75 = 533$.

Hence, 533.

32. Answer: c

Explanation:

Virat Kohli.

ESPN's World Fame 100 ranks athletes by a composite of search traffic, social-media followers and endorsement earnings, and the Indian captain featured on the list on the strength of his massive social-media footprint and endorsement portfolio.

Among the four names given, only he commanded the global search volume and brand presence that the list requires; the other three Test regulars had a far lower international consumer footprint and did not break into the ranking.

33. Answer: c

Explanation:

175.

Step 1 — Let the number be x . The condition gives $\frac{32}{100} \times x = 56$.

Step 2 — Solving for x : $x = \frac{56 \times 100}{32} = \frac{5600}{32} = 175$.

Check: $32\% \text{ of } 175 = 0.32 \times 175 = 56$, confirming the answer.

34. Answer: a

Explanation:

5 : 9.

Step 1 — A profit of $16\frac{2}{3}\% = \frac{1}{6}$ means $SP = \frac{7}{6} CP$, so the cost price of the mixture is $6.30 \times \frac{6}{7} = 5.40$ rupees per kg.

Step 2 — By alligation, (quantity at ₹7.20) : (quantity at ₹4.40) = $(5.40 - 4.40) : (7.20 - 5.40) = 1.00 : 1.80 = 5 : 9$.

Step 3 — Check: $\frac{5 \times 7.20 + 9 \times 4.40}{14} = \frac{36 + 39.6}{14} = 5.40$, and $\frac{6.30 - 5.40}{5.40} \times 100 = 16\frac{2}{3}\%$.

Hence, 5 : 9.

Note: RRB did not award marks for this question in the official key.

35. Answer: b

Explanation:

The correct mirror image is the figure with the vertical line near its left end, the long diagonal running from the top-left corner down to the right point, and the short slanted stroke in the upper-right part.

Step 1 — In a mirror placed to the right of (or left of) the figure, left and right interchange while top and bottom stay as they are.

Step 2 — In the question figure the vertical line is near the right end and the short stroke meets the long diagonal from the left; after reflection the vertical line must move to the left end and the short stroke to the right, with nothing turned upside down.

Step 3 — The other figures either keep the vertical line on the right, or place the short stroke in the lower part, so they are not true mirror images.

Hence, the figure with the vertical line at the left end and the short stroke in the upper right.

36. Answer: a

Explanation:

15 kg.

Step 1 — Kinetic energy of a moving body is given by $KE = \frac{1}{2}mv^2$.

Step 2 — Rearranging for mass: $m = \frac{2 \cdot KE}{v^2} = \frac{2 \times 120}{4^2} = \frac{240}{16} = 15 \text{ kg.}$

The newton options are discarded because mass is measured in kilograms, not newtons; only 15 kg is both numerically correct and dimensionally valid for the quantity being asked.

37. Answer: c

Explanation:

B.

Step 1 — To spot an embedded figure, scan the question image for a region whose line segments and angles match a candidate answer shape in its original orientation and size.

Step 2 — Test each option in turn: three of the four figures either need rotation, scaling or an unmatched line to fit inside the question image.

Step 3 — Figure B sits cleanly inside the question figure with every edge aligning on the existing strokes, so it is the embedded shape.

38. Answer: d

Explanation:

South-West.

Step 1 — East moving to North-East is a 45° rotation of the entire compass in the anti-clockwise direction.

Step 2 — Apply the same 45° anti-clockwise rotation to West: starting from West and turning 45° towards the south places the direction at South-West.

Step 3 — Since the whole compass turns together, West must land on the direction that is 45° south of its original position, which is South-West.

39. Answer: a

Explanation:

Power.

Power is defined as the time rate of doing work, $P = W/t$, with the SI unit watt (one joule per second).

Velocity is the time rate of change of displacement, force is a push or pull causing acceleration, and energy is the capacity to do work — none of them is the rate of doing work itself.

So among the four quantities, only power captures how fast work is being performed and is the correct choice.

40. Answer: a

Explanation:

56.

Step 1 — Let Usha's present age be U . Then Roshan's present age is $R = 2.5U - 4$.

Step 2 — Twelve years ago, Usha was $U - 12$ and Roshan was $R - 12$. The second condition gives $U - 12 = \frac{1}{4}(R - 12) + 1$.

Step 3 — Substitute $R = 2.5U - 4$: $U - 12 = \frac{1}{4}(2.5U - 16) + 1 = 0.625U - 3$, giving $0.375U = 9$ and $U = 24$.

Step 4 — Therefore Roshan's present age is $R = 2.5 \times 24 - 4 = 60 - 4 = 56$ years.

41. Answer: d

Explanation:

Iodine.

Non-metals are typically dull, but solid iodine is a well-known exception: it forms shiny grey-violet crystals with a metallic sheen on freshly cut surfaces.

Chlorine and fluorine are yellow-green and pale yellow reactive gases, respectively, while neon is a colourless inert gas; none of them displays lustre.

So iodine is the only lustrous non-metal in the list, often cited alongside graphite as an exception to the dullness rule for non-metals.

42. Answer: d

Explanation:

weight and force.

The newton is defined as the force required to accelerate a one-kilogram mass by one metre per second squared, so it is the SI unit of force in general.

Weight is the gravitational force acting on a body, equal to mass times gravitational acceleration, and is therefore also measured in newtons rather than in kilograms.

Mass has the SI unit kilogram, acceleration is measured in metres per second squared, and momentum is in kilogram metres per second, so only the pair weight and force shares the newton as its SI unit.

43. Answer: c

Explanation:

Vikas Sathaye.

The Academy of Motion Picture Arts and Sciences presented the Scientific and Engineering Academy Award in 2018 to a four-member team from Shotover Camera Systems for the concept, design and engineering of the Shotover K1 aerial camera stabilisation system.

The Indian-origin engineer on that team was recognised for his contribution to the gyro-stabilised multi-axis platform used widely in aerial cinematography.

The other three names belong to a corporate executive and unrelated personalities who were not part of the Shotover award citation.

44. Answer: a

Explanation:

A.

Step 1 — Read the two frames before the question mark to detect how the inner elements are rotating or shifting from one step to the next.

Step 2 — The change between frames is uniform, so the figure replacing the question mark must advance the same rotation and shading rule by one more step.

Step 3 — Among the four answer figures, only figure A continues the orientation and element placement without introducing any extra stroke or mirror flip, so it fills the blank.

45. Answer: c

Explanation:

4.

Step 1 — Prime factorisation: $729 = 3^6$, so every factor has the form 3^k with $k = 0, 1, \dots, 6$ (seven factors in all).

Step 2 — A factor is a perfect square exactly when its exponent is even: $k = 0, 2, 4, 6$.

Step 3 — These give $3^0 = 1$, $3^2 = 9$, $3^4 = 81$, $3^6 = 729$, i.e. four perfect-square factors.

Hence, 4.

Note: The official RRB answer key marks 3 for this question. Counting every factor of 729, including 1 and 729 itself, there are four perfect squares (1, 9, 81 and 729), so 4 is the mathematically correct answer.

46. Answer: c

Explanation:

15.

Step 1 – In a Pythagorean triple the largest number is the hypotenuse, so 17 is the hypotenuse and 8 and p are the two legs.

Step 2 – By the Pythagorean theorem, $8^2 + p^2 = 17^2$, i.e. $64 + p^2 = 289$.

Step 3 – Therefore $p^2 = 225$ and $p = 15$, giving the well-known primitive triple (8, 15, 17).

47. Answer: c

Explanation:

Döbereiner, Newlands and Mendeleev.

Döbereiner's triads grouped elements in sets of three where the atomic mass of the middle element was close to the mean of the other two.

Newlands' law of octaves arranged elements in increasing order of atomic mass and noted that every eighth element shared similar properties, and Mendeleev's periodic table was explicitly built on increasing atomic mass with gaps left for undiscovered elements.

Moseley later re-ordered the periodic table using atomic number rather than atomic mass, so any option including Moseley cannot describe a mass-based

classification.

48. Answer: c

Explanation:

26.5.

Step 1 — The total sum of all four numbers is $4 \times 23 = 92$.

Step 2 — The sum of a and b is $2 \times 19.5 = 39$, so the sum of c and d is $92 - 39 = 53$.

Step 3 — The average of c and d is therefore $53/2 = 26.5$.

49. Answer: a

Explanation:

Mehbooba Mufti Sayeed.

She took oath as the first woman Chief Minister of Jammu and Kashmir on 4 April 2016, leading the PDP-BJP coalition after the death of her father Mufti Mohammed Sayeed, and continued in office through 2017.

Her tenure ended in June 2018 when the BJP withdrew support and the state moved under Governor's Rule, so she was the CM throughout 2017.

Manohar Parrikar was the CM of Goa in that period; Farooq and Omar Abdullah had served earlier terms as J&K CM but were not in office in 2017.

50. Answer: b

Explanation:

Vacuum.

Light travels fastest in a vacuum at $c = 3 \times 10^8 \text{ m/s}$; any material medium slows it down because its atoms interact with the oscillating electromagnetic field.

The slowdown is captured by the refractive index $n = c/v$, which is greater than one for air, water and glass; glass slows light the most, water next, then air, and the vacuum sits at $n = 1$.

So among the four media listed, light attains its maximum possible speed only in a vacuum.

51. Answer: a

Explanation:

Australia.

The 2017 FIBA Asia Cup was held in Beirut, Lebanon from 8 to 20 August, with Australia and New Zealand participating for the first time after moving from the Oceania zone to the FIBA Asia region.

Australia defeated Iran 79–56 in the final to claim their first-ever FIBA Asia Cup title, with New Zealand finishing third after beating South Korea in the bronze-medal play-off.

So Iran took silver and South Korea finished fourth, confirming Australia as the champion of the 2017 edition.

52. Answer: c

Explanation:

16 days.

Step 1 — Let B alone finish the job in x days; then A alone takes $x - 60$ days. Since A works four times as fast as B, A's rate is $4 \times$ B's rate, so B's time is $4 \times$ A's time: $x = 4(x - 60)$.

Step 2 — Solving, $x = 4x - 240$ gives $x = 80$. So B takes 80 days and A takes 20 days.

Step 3 — Combined one-day work $= \frac{1}{20} + \frac{1}{80} = \frac{4+1}{80} = \frac{5}{80} = \frac{1}{16}$, so together they finish in 16 days.

53. Answer: d

Explanation:

Two separate inner circles inside a larger circle.

Mobiles and laptops are two distinct categories of electronic devices; neither is a mobile nor is a mobile a laptop, but both are electronic devices. Hence Mobile and Laptop are two non-overlapping sets that lie entirely within the larger set of Electronic devices.

The correct Venn diagram shows one large circle labelled Electronic devices with two smaller, mutually exclusive circles for Mobile and Laptop sitting inside it without touching each other.

54. Answer: b

Explanation:

Sclerenchyma.

Sclerenchyma is a simple, permanent plant tissue made of dead cells with a thick, heavily lignified cell wall. The deposition of lignin makes the wall extremely rigid, giving the plant mechanical strength and support.

In contrast, collenchyma cells have unevenly thickened cellulose and pectin walls that remain flexible, parenchyma cells are living and have thin cellulose walls meant for storage and photosynthesis, and aerenchyma is a modified parenchyma with large air spaces found in aquatic plants.

55. Answer: b

Explanation:

Almora.

Marchula is a picturesque riverside village situated on the banks of the Ramganga river in the Almora district of Uttarakhand, close to the boundary of the Jim Corbett National Park. The location referred to in the question lies within Almora district.

Ranikhet and Nainital are separate hill stations in Uttarakhand but Marchula does not fall under them, while Moradabad is a city in Uttar Pradesh and is unrelated to this Uttarakhand location.

56. Answer: b

Explanation:

$50\sqrt{3} \text{ cm}^2$.

Step 1 — Perimeter of the rectangle $= 2(12 + 8) = 40 \text{ cm}$. The rhombus has the same perimeter, and all four sides of a rhombus are equal, so each side $= \frac{40}{4} = 10 \text{ cm}$.

Step 2 — Area of a rhombus with side a and included angle θ is $a^2 \sin \theta$.

Step 3 — Substituting $a = 10$, $\theta = 120^\circ$: $10^2 \sin 120^\circ = 100 \times \frac{\sqrt{3}}{2} = 50\sqrt{3} \text{ cm}^2$.

57. Answer: d

Explanation:

Negative acceleration.

Acceleration is the rate of change of velocity with time. When the velocity of a body decreases with time, its acceleration acts opposite to the direction of motion and so is taken as negative. This decrease in speed is called retardation or deceleration.

Hence retardation is simply acceleration with a negative sign; it is not necessarily uniform or variable, and it is never positive, because a positive acceleration would increase the speed instead of reducing it.

58. Answer: d

Explanation:

C.

Step 1 — After reversing the alphabet, the series reads:
ZYXWVUTSRQPONMLKJIHGFEDCBA.

Step 2 — Counting from the left in this reversed series, the 18th letter is I (Z-1, Y-2, X-3, W-4, V-5, U-6, T-7, S-8, R-9, Q-10, P-11, O-12, N-13, M-14, L-15, K-16, J-17, I-18).

Step 3 — The sixth letter to the right of I is: H (1), G (2), F (3), E (4), D (5), C (6). So the required letter is C.

59. Answer: d

Explanation:

Both conclusions I and II are logical.

Conclusion I follows directly from the definition of a one-way street: traffic is allowed to flow only in the direction indicated by the signboard arrow, which is the very meaning being communicated by the boy.

Conclusion II also follows, because for the boy to identify the sign and correctly call it a one-way street he must already know what that road sign means. Hence both conclusions are logically supported by the statement.

60. Answer: b

Explanation:

Two separate inner circles inside a bigger circle.

Trains and buses are two distinct modes of public transport; a train is never a bus and a bus is never a train, but both come under the wider category of public transport systems.

Hence Train and Bus are two mutually exclusive sets that lie completely within the larger set of Public Transport System, which is exactly the configuration shown in the selected Venn diagram.

61. Answer: c

Explanation:

Rekha.

The National Yash Chopra Memorial Award was instituted by the T. Subbarami Reddy Foundation in memory of the legendary filmmaker Yash Chopra, and is presented every year on his birth anniversary to a cinema personality for lifetime contribution to Indian film.

The third edition of the award, presented in 2016, went to veteran actress Rekha, honouring her decades-long body of work and her lasting influence on Hindi cinema. Earlier recipients include Lata Mangeshkar and Amitabh Bachchan.

62. Answer: a

Explanation:

Both conclusions 1 and 2 are logical.

From "All suns are moons" and "All moons are stars", by the transitive A-A chain of syllogism we get "All suns are stars", which validates conclusion 1 directly.

For conclusion 2, since every sun is a moon, the set of suns is a sub-set of moons, so at least that sub-set of moons is also suns. By immediate conversion of "All suns are moons", we can validly deduce "Some moons are suns". Thus both conclusions follow.

63. Answer: d

Explanation:

135.

Step 1 – Take total work as the LCM 270 units. Then combined rate $A + B + C = \frac{270}{45} = 6$ units/day, $A + B = \frac{270}{54} = 5$ units/day and $B + C = \frac{270}{90} = 3$ units/day.

Step 2 – Individual rates: $C = (A + B + C) - (A + B) = 6 - 5 = 1$ and $A = (A + B + C) - (B + C) = 6 - 3 = 3$, so $B = 6 - A - C = 6 - 3 - 1 = 2$ units/day.

Step 3 – Time for B alone = $\frac{270}{2} = 135$ days.

64. Answer: a

Explanation:

134.

Step 1 — Take successive differences of the series: $17 - 4 = 13$, $43 - 17 = 26$, $82 - 43 = 39$.

Step 2 — These differences 13, 26, 39 form an arithmetic progression with common difference 13, so the next difference is $39 + 13 = 52$.

Step 3 — Therefore the next term of the series is $82 + 52 = 134$.

65. Answer: d

Explanation:

Smriti Irani.

In the Union Cabinet reshuffle, Smriti Irani was given the Ministry of Information and Broadcasting and held the portfolio in February 2018. She also simultaneously held the Ministry of Textiles.

Earlier the Information and Broadcasting portfolio had been held by M. Venkaiah Naidu, who vacated it when he was elected Vice President of India. Prakash Javadekar handled Human Resource Development at that time, and Arun Jaitley headed Finance and Defence.

66. Answer: a

Explanation:

24 years.

Step 1 — Let the present ages of Suresh and Chiraj be $5x$ and $4x$ years. After 3 years their ages are $5x + 3$ and $4x + 3$.

Step 2 — Given $\frac{5x + 3}{4x + 3} = \frac{11}{9}$, cross-multiplying gives $9(5x + 3) = 11(4x + 3)$, i.e. $45x + 27 = 44x + 33$, so $x = 6$.

Step 3 — Chiraj's present age = $4x = 4 \times 6 = 24$ years.

67. Answer: a

Explanation:

Alkanes.

Hydrocarbons that contain only carbon-carbon single bonds, with every carbon atom fully bonded to the maximum possible number of hydrogen atoms, are called saturated hydrocarbons and belong to the alkane family with the general formula C_nH_{2n+2} .

Alkenes contain at least one carbon-carbon double bond and alkynes contain at least one triple bond, so both are unsaturated; isotopes are atoms of the same element with different mass numbers and have nothing to do with saturation of hydrocarbons.

68. Answer: d

Explanation:

Sumitra Mahajan.

Sumitra Mahajan, a senior BJP parliamentarian from Indore, was elected Speaker of the 16th Lok Sabha in June 2014 and continued to hold the chair through the entire

term of that House, which was the position at the time of this examination.

Meira Kumar had served as Speaker of the preceding 15th Lok Sabha, while M. Venkaiah Naidu was the sitting Vice President of India and ex-officio Chairman of the Rajya Sabha, not the Lok Sabha.

69. Answer: d

Explanation:

D.

A water image is the reflection of a figure as it would appear in still water placed horizontally below it. The image is therefore inverted top-to-bottom, while the left and right sides remain unchanged.

Of the four options presented, only the figure labelled D shows the given shape flipped vertically about a horizontal axis with its left-right orientation preserved, which is the characteristic transformation of a water image.

70. Answer: c

Explanation:

13.28%.

Step 1 — Mass of solute (common salt) = 49 g and mass of solvent (water) = 320 g, so total mass of the solution = 49 + 320 = 369 g.

Step 2 — Mass percent of the solute is $\frac{\text{mass of solute}}{\text{mass of solution}} \times 100$, i.e. $\frac{49}{369} \times 100$.

Step 3 — Evaluating: $\frac{49}{369} \times 100 \approx 13.28\%$. Note that the option quoted in grams is incorrect in units; concentration by mass is a percentage.

71. Answer: a

Explanation:

Mother.

A human male carries the sex chromosomes XY. During gamete formation, the X chromosome in his sperm cells has to originate from one of his parents. He inherits his single X chromosome from his mother (who contributes an X in her egg), and his Y chromosome from his father.

Therefore, every X-bearing sperm that a male produces carries the X chromosome that he himself received from his mother. The Y chromosome in his Y-bearing sperm is the one that came from his father.

72. Answer: c

Explanation:

A-ii, B-iii, C-i.

Zinc is a bluish-grey transition metal in its solid form, so A matches with Grey (ii).

Sulphur dioxide, SO_2 , is a colourless gas with a sharp, suffocating smell, which is why B matches with Pungent (iii).

Lead iodide, PbI_2 , is a well-known bright yellow crystalline precipitate often produced in the test tube reaction between lead nitrate and potassium iodide, so C matches with Yellow (i). The combined matching is therefore A-ii, B-iii, C-i.

73. Answer: d

Explanation:

Only argument I is strong.

Argument I directly supports the statement by giving a universally accepted and relevant reason: medical entrance examinations are highly competitive, and consistent hard work is a well-established requirement to clear them. This makes it a strong argument.

Argument II is weak because having a fallback private college does not remove the need to prepare seriously for the entrance; it merely offers an alternative, which is irrelevant to whether the student should work hard for the exam itself.

74. Answer: b

Explanation:

Uttarakhand.

The Valley of Flowers National Park lies in the Chamoli district of Uttarakhand, high in the western Himalayas. It is renowned for its vast meadows carpeted with endemic alpine flowers and is home to rare species such as the Asiatic black bear, snow leopard, brown bear and blue sheep.

Along with the adjoining Nanda Devi National Park, it has been inscribed as a UNESCO World Heritage Site. It does not fall in Himachal Pradesh, Sikkim or Jammu and Kashmir.

75. Answer: c

Explanation:

Pink Revolution.

India's agricultural growth phases are named by colour. The answer key for this paper links the sharp rise in apple production in Himachal Pradesh and Jammu and

Kashmir to the Pink Revolution, a term also used for growth in onion, prawn and meat output.

The White Revolution refers to the rise in milk production under Operation Flood, the Green Revolution to the surge in food-grain output from the 1960s, and the Red Revolution to growth in meat and tomato production; none of these is tied to apples.

Hence, Pink Revolution.

76. Answer: d

Explanation:

P.

The series advances by a fixed gap of three positions in the English alphabet: $A \rightarrow D \rightarrow G \rightarrow J \rightarrow M$, each step adding three letters to the previous term.

Applying the same rule to the last known term, M plus three positions gives P, which is therefore the next letter in the pattern.

77. Answer: c

Explanation:

9.60%.

Step 1 — Three months equals $\frac{3}{12} = \frac{1}{4}$ year, with principal $P = 875$ and interest $I = 21$.

Step 2 — The simple interest formula gives $R = \frac{100 I}{P T} = \frac{100 \times 21}{875 \times 0.25} = \frac{2100}{218.75} = 9.6$, so the annual rate of simple interest works out to 9.60 percent per annum.

78. Answer: a

Explanation:

Father-in-law.

Ajay's mother's grandson is a boy whose grandmother is Ajay's mother, which makes that grandson Ajay's own son, because Ajay's own children are the grandchildren of his mother.

The girl is married to that grandson, so she is Ajay's daughter-in-law, and therefore Ajay stands to her in the relation of her father-in-law.

79. Answer: a

Explanation:

40.

Calcium (symbol Ca) is a Group 2 alkaline earth metal whose atomic number is 20, meaning its nucleus holds 20 protons and a neutral atom holds 20 electrons.

Its most abundant stable isotope is ^{40}Ca , which carries 20 neutrons alongside the 20 protons; the resulting mass number of 40 is adopted as the standard atomic mass of calcium in unified atomic mass units.

80. Answer: c

Explanation:

48 m.

Step 1 — Let the tower height be h metres. The horizontal distance from the platform to the base of the tower is $40\sqrt{3}$ m, and the top of the platform sits 8 m above ground, so the vertical rise from the observer to the top of the tower is $h - 8$.

Step 2 — Using $\tan 30^\circ = \frac{h - 8}{40\sqrt{3}}$ with $\tan 30^\circ = \frac{1}{\sqrt{3}}$, we get $h - 8 = \frac{40\sqrt{3}}{\sqrt{3}} = 40$, giving $h = 48$ m for the tower height.

81. Answer: a

Explanation:

Neither 1 nor 2 is sufficient.

Statement 1 only gives the pass percentage (80 percent) without naming the total number of students who appeared, so the absolute count of pass-outs cannot be computed from a bare percentage figure.

Statement 2 only says the pass count is split equally between boys and girls, which is a ratio and still cannot fix the actual number. Combining the two still lacks the total appearance count, so no exact pass total can be determined.

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82. Answer: d

Explanation:

Muhammad-bin-Tughlaq.

In 1327 CE Muhammad-bin-Tughlaq, the second ruler of the Tughlaq dynasty of the Delhi Sultanate, ordered the capital shifted from Delhi to Devagiri in the Deccan, chiefly to govern the southern provinces more effectively and to insulate the court from Mongol raids on Delhi.

He renamed Devagiri as Daulatabad and compelled a large part of Delhi's population to migrate there. The transfer caused immense hardship, failed within a few years, and the court eventually moved back to Delhi.

83. Answer: a

Explanation:

Birds.

In the standard zoological classification, Aves is the taxonomic class comprising warm-blooded, feather-covered vertebrates whose forelimbs are modified into wings and whose eggs are enclosed in a hard calcareous shell.

Every creature commonly called a bird — sparrows, eagles, penguins, ostriches, parrots and so on — belongs to Aves. Mammals form the separate class Mammalia and fishes are grouped under Pisces, so neither category fits inside Aves.

84. Answer: b

Explanation:

YMYQ.

Step 1 — The cipher replaces each letter by $(27 - \text{its alphabet position}) + 1$, i.e. by the letter one place after its mirror in the alphabet. For HEN: $H(8) \rightarrow (27-8)+1 = 20 = T$, $E(5) \rightarrow (27-5)+1 = 23 = W$, $N(14) \rightarrow (27-14)+1 = 14 = N$, which yields TWN as given.

Step 2 — Applying the same rule to COCK: $C(3) \rightarrow 25 = Y$, $O(15) \rightarrow 13 = M$, $C(3) \rightarrow 25 = Y$, $K(11) \rightarrow 17 = Q$. The required code for COCK is therefore YMYQ.

85. Answer: d

Explanation:

Narendra Modi.

By convention the Leader of the Lok Sabha is the Prime Minister of India, provided the Prime Minister is a member of the Lok Sabha. In 2017 Narendra Modi — Member of Parliament from the Varanasi constituency — was serving as the fourteenth Prime Minister of India after the 2014 general election.

He therefore acted as Leader of the House in the Lok Sabha, directing the ruling party's floor agenda and representing the government in parliamentary business.

86. Answer: a**Explanation:**

Anshu Jamsenpa.

Anshu Jamsenpa, a mountaineer from Bomdila in Arunachal Pradesh, first climbed Mount Everest twice in May 2011 and again in May 2013.

On 16 May 2017 she reached the summit for the fourth time, becoming the first Indian woman to climb Everest four times; five days later, on 21 May 2017, she summited again, completing the fastest double ascent by a woman.

Hence, Anshu Jamsenpa.

87. Answer: b**Explanation:**

Reprimand.

'Want' and 'Yearn' are synonyms expressing a desire for something, with 'yearn' carrying greater emotional intensity than 'want' — one word is simply the sharpened form of the other, so the pair is held together by a synonym relation.

Applying the same relation, Punish pairs with Reprimand, since to reprimand means formally to express sharp disapproval or rebuke, a close synonym of punish. Snub is a social slight, Jail is one specific legal act, and Shout only means raising the voice — none captures the synonym link.

88. Answer: b

Explanation:

Atoms are indivisible particles of matter.

John Dalton's 1808 atomic theory held that all matter is composed of extremely small particles called atoms, that atoms of a given element are identical in mass and chemical properties, and crucially that atoms are indivisible and cannot be created or destroyed in a chemical reaction.

The later discovery of protons, electrons and neutrons modified this picture, but the given option faithfully captures Dalton's original postulate; the other three statements directly contradict his model.

89. Answer: b

Explanation:

Both statements 1 and 2 together are not sufficient.

Statement 1 only reveals that $A = I$, the 2×2 identity matrix. This conveys no information about the unknown entry x of matrix B.

Statement 2 names B's entries with x unknown and asserts $AB = B$, but without A being specified, this one relation cannot isolate x on its own.

Combining both, $AB = B$ reduces to $IB = B$ — a trivial identity that holds for every value of x — so x cannot be pinned down even with both statements together.

90. Answer: c

Explanation:

₹22.50.

Step 1 — Principal $P = 250$, rate $R = 4.5\%$ per annum, time $T = 2$ years.

Step 2 — Using the simple interest formula $SI = \frac{PRT}{100} = \frac{250 \times 4.5 \times 2}{100} = \frac{2250}{100} = 22.5$, the simple interest earned over two years is ₹22.50.

91. Answer: d

Explanation:

5.

The 2017 Asian Junior Wrestling Championships were held in Taichung, Taiwan, in June 2017.

India won 5 medals there: gold for Pooja Gehlot (women's 51 kg), silver for Sonu (women's 44 kg), bronze for Manju Kumari (women's 59 kg), silver for S. Satish (Greco-Roman 120 kg) and bronze for Manish (Greco-Roman 50 kg).

That is 1 gold, 2 silver and 2 bronze, a total of $1 + 2 + 2 = 5$ medals.

Hence, 5.

Note: RRB did not award marks for this question in the official key.

92. Answer: d

Explanation:

North-East.

Step 1 — Mallika faces north at the start and covers 1 km, so she is 1 km due north of her starting point when she stops.

Step 2 — A right turn while facing north leaves her facing east. Walking 500 m east places her final position 1 km north and 500 m east of the starting point — a point that lies in the north-east quadrant relative to her original position.

93. Answer: a

Explanation:

Two types.

In biology, fission is an asexual mode of reproduction in which a parent organism splits to form two or more identical daughter organisms, and it is classified into two broad categories according to how many daughters are produced.

Binary fission produces two equal-sized daughter cells (as in bacteria, amoeba and paramecium), while multiple fission produces many daughter cells simultaneously from one parent (as in Plasmodium and in encysted amoebae). These two cover every natural example of fission.

94. Answer: b

Explanation:

₹ 50,574.

Step 1 — Let the amount A receives from his father's property be S . He donates one third of it, so $\frac{S}{3} = 16858$.

Step 2 — $S = 16858 \times 3 = 50574$ rupees.

Step 3 — As a check, this share is $\frac{2}{5}$ of the whole property, so the father's total property is $50574 \times \frac{5}{2} = 126435$ rupees, and $\frac{1}{3} \times 50574 = 16858$ matches the donation.

Hence, ₹50,574.

Note: The official RRB answer key marks ₹1,26,435, which is the father's total property. The question asks how much A received from that property, which is ₹50,574.

95. Answer: a

Explanation:

60,000 tonnes.

Step 1 — Read Chennai's share from the pie chart; the sector labelled Chennai accounts for 30 percent of the total rice consumption shown for the year 2012.

Step 2 — The total consumption is 2 lakh tonnes = 2,00,000 tonnes. Chennai's share is $\frac{30}{100} \times 2,00,000 = 60,000$, so Chennai alone consumes 60,000 tonnes of rice in 2012.

96. Answer: c

Explanation:

Neerja.

The 18th International Indian Film Academy (IIFA) Awards were held in July 2017 in New York, honouring the best Hindi films released in 2016.

Ram Madhvani's biographical thriller *Neerja* — starring Sonam Kapoor as flight attendant Neerja Bhanot, who sacrificed her life during the 1986 Pan Am 73 hijacking in Karachi — won the IIFA Best Film trophy, defeating *Rustom*, *Dangal* and other contenders at the ceremony.

97. Answer: d

Explanation:

Mechanical.

In classical physics, mechanical energy is the energy possessed by an object by virtue of its motion or its position in a conservative force field, and it is defined as the sum of two components that always coexist in a mechanical system.

Kinetic energy associated with motion, $KE = \frac{1}{2}mv^2$, and potential energy associated with position, e.g. $PE = mgh$, together constitute mechanical energy — so it inherently contains two types of energy within it.

98. Answer: a

Explanation:

4.

Under the Reserve Bank of India's May 2017 'Banking Outlet' notification, a brick-and-mortar banking outlet is defined as a fixed-point service delivery unit, manned by either bank staff or a business correspondent, that is open for a minimum of four hours per day on at least five days of the week.

This definition replaced the older 'bank branch' concept, allowing business-correspondent shops and similar touchpoints to be counted for financial-inclusion purposes, with four hours per day being the floor requirement.

99. Answer: a

Explanation:

126.

Step 1 — The fixed ratio of blue to red balls is $\frac{36}{84} = \frac{3}{7}$, so blue : red = 3 : 7, and this proportion must hold whenever the contents of the bag change.

Step 2 — With 54 blue balls, let the red count be r . Then $\frac{54}{r} = \frac{3}{7}$, giving $r = \frac{54 \times 7}{3} = 126$. The bag should contain 126 red balls.

100. Answer: d

Explanation:

Two disjoint inner circles inside one larger Animal circle.

Zebras and rhinoceroses are two entirely different species, so the sets Zebra and Rhinoceros are disjoint — no single creature can belong to both groups at the same time.

However, both zebras and rhinoceroses are animals, so each of these two sets is wholly contained within the larger set 'Animal'. The correct Venn diagram therefore shows two separate, non-overlapping small circles both lying inside one big circle representing Animal.