

Answers

1. Answer: d

Explanation:

The figure with the open circle at the upper right, the triangle at the upper left and the dotted (bullseye) circle at the lower left is correct.

The mirror line AB is vertical, so the reflection interchanges left and right while top and bottom stay as they are.

In the given figure the open circle is at the upper left, the triangle (with its dot) is to the right of centre and the dotted circle is at the lower right; the zigzag bands open towards the left.

After reflection the open circle goes to the upper right, the triangle moves to the left of centre (still pointing upwards), the dotted circle goes to the lower left and the zigzag bands open towards the right.

The figures with the triangle pointing downwards or with the circles left on their original sides are not reflections in AB.

Hence, the figure with the open circle at the upper right, triangle at the upper left and dotted circle at the lower left is the mirror image.

2. Answer: c

Explanation:

Electrons is correct.

Electric current in a conductor is defined as the rate of flow of electric charge across any cross-section. In metallic conductors like copper and aluminium wires, the

mobile charge carriers are free electrons that drift under the influence of an applied electric field.

When a battery is connected across a metal wire, the loosely bound outermost electrons of the atoms drift in a direction opposite to the field. Although the conventional current direction is taken from positive to negative terminal, the actual charge carriers in solid conductors are the negatively charged electrons.

Protons are tightly bound inside atomic nuclei and do not move freely in a conductor; electrodes are stationary end plates that only enable charges to enter or leave the circuit; neutrons carry no charge and so cannot constitute an electric current.

3. Answer: b

Explanation:

NITI Aayog is correct.

NITI Aayog released the consultation paper on the National Health Stack in July 2018 as a shared digital infrastructure to support Ayushman Bharat and the wider healthcare ecosystem. The Stack is designed as a nationwide platform that stitches together health records, claims processing, policy engines and a coverage registry so that both government and private players can plug in.

Its core building blocks include an electronic national health registry, a coverage and claims platform, a federated personal health records framework, and a national health analytics engine. By standardising data flows, it aims to cut the cost of implementing large insurance programmes like Pradhan Mantri Jan Arogya Yojana.

The Ministry of Finance handles fiscal matters, the Ministry of Health and Family Welfare runs health delivery schemes, and the PMO coordinates governance, but the architectural blueprint for the Stack was published by NITI Aayog.

4. Answer: a

Explanation:

375 J is correct.

The kinetic energy stored in a moving body of mass m moving with speed v is given by the standard formula $KE = \frac{1}{2}mv^2$, measured in joules when mass is in kilograms and speed in metres per second.

Step 1 – Substitute $m = 30 \text{ kg}$ and $v = 5 \text{ ms}^{-1}$: $KE = \frac{1}{2} \times 30 \times 5^2$.

Step 2 – Evaluate: $KE = \frac{1}{2} \times 30 \times 25 = 15 \times 25 = 375 \text{ J}$.

Newton (N) is the SI unit of force, watt (W) the unit of power, and pascal (Pa) the unit of pressure – none measure energy, so only the joule reading fits.

Hence, 375 J.

5. Answer: d

Explanation:

Oranges is correct.

Nagpur, the second capital of Maharashtra, is popularly known as the Orange City because of the large volume of oranges grown and traded in and around the city. The dark red Nagpur mandarin, a variety of the Mandarin orange, is cultivated across the Vidarbha region on more than a lakh hectares and carries a protected Geographical Indication tag.

Jute is largely produced in West Bengal and Bihar; saffron is a flagship crop of the Pampore region in Jammu and Kashmir; apples come principally from Himachal Pradesh, Jammu and Kashmir, and Uttarakhand – none of these are associated with Nagpur.

6. Answer: c

Explanation:

60 degree is correct.

In a right-angled triangle formed by the tree, its shadow on the ground, and the line of sight from the shadow tip to the top of the tree, the tangent of the angle of elevation equals the opposite side (tree height) over the adjacent side (shadow length).

Step 1 — Let the height be h ; the shadow is $\frac{h}{\sqrt{3}}$. The angle of elevation θ satisfies $\tan \theta = \frac{h}{h/\sqrt{3}} = \sqrt{3}$.

Step 2 — From the standard trigonometric table, $\tan 60^\circ = \sqrt{3}$, giving $\theta = 60^\circ$.

At 45 degrees shadow equals height, at 30 degrees shadow is $\sqrt{3}$ times height, and 90 degrees is impossible for a sun elevation.

7. Answer: c

Explanation:

Lambda is correct.

In physics the Greek lowercase letter lambda, written as λ , is the universally adopted symbol for wavelength — the distance between two consecutive points of the same phase on a wave, for example from one crest to the next crest. The relation between wavelength, frequency and wave speed is $v = f\lambda$.

Alpha (α), beta (β) and gamma (γ) are instead reserved for angular acceleration, decay particles and electromagnetic radiation types respectively, not for the length of a wave cycle.

8. Answer: d

Explanation:

$\sqrt[3]{1331}$ is correct.

A number is called rational if it can be written as a ratio of two integers; equivalently, a root of a natural number is rational only when that natural number is a perfect power of the required order.

Step 1 — Check each option. 1221 is not a perfect square ($34^2 = 1156$, $35^2 = 1225$), so $\sqrt{1221}$ is irrational. 1441 is not a perfect fourth power, and 1551 is not a perfect fifth power.

Step 2 — 1331 is a perfect cube because $11^3 = 11 \times 11 \times 11 = 1331$, so $\sqrt[3]{1331} = 11$, an integer and therefore rational.

9. Answer: c

Explanation:

Reptiles is correct.

Reptiles belong to the class Reptilia and are cold-blooded vertebrates whose body is covered with dry, keratinised scales or scutes. Their skin is largely devoid of mucus or sweat glands — an adaptation that drastically reduces water loss and allows them to live successfully in dry habitats such as deserts and rocky terrain.

Mammals possess sweat and sebaceous glands beneath a hairy skin; birds carry a preen gland and feathers that need regular oiling; amphibians such as frogs rely on moist, highly glandular skin for cutaneous respiration. Only reptiles meet the dry, glandless description.

10. Answer: c

Explanation:

Friday is correct.

The day of the week for any date is found by counting odd days from a known reference. Odd days are the remainders when total days are divided by 7, since every 7-day cycle returns to the same weekday.

Step 1 — From 1 Jan 1 AD to 31 Dec 2006 the total odd days equal 0 (count: 1600 years give 0, 400 more years give 0, so 2000 years give 0; the remaining 6 years from 2001–2006 contain 1 leap year 2004 and 5 ordinary years, contributing $5 + 2 = 7 \equiv 0$ odd days).

Step 2 — Add days from 1 Jan to 16 Mar 2007. January 31 + February 28 (2007 is not a leap year) + 16 = 75 days. $75 \bmod 7$ gives 5 odd days.

Step 3 — Total odd days = $0 + 5 = 5$, which corresponds to Friday on the standard mapping (0 Sunday, 1 Monday, 2 Tuesday, 3 Wednesday, 4 Thursday, 5 Friday).

11. Answer: c

Explanation:

Pula is correct.

Botswana is a landlocked country in southern Africa whose official currency is the Pula, abbreviated BWP. The Pula was introduced in 1976 to replace the South African rand that had been in use earlier, and the word pula itself means 'rain' in the Setswana language — rain being a symbol of good fortune in this largely arid land.

Riel is the currency of Cambodia; the dollar is used by many countries including the United States, Canada and Australia, but not Botswana; and dram is the currency of Armenia. Only the Pula is specific to Botswana.

12. Answer: b

Explanation:

14 : 3 is correct.

The law of definite proportions says that a given chemical compound always contains its constituent elements in a fixed mass ratio, no matter where it was prepared. Ammonia has the molecular formula NH_3 .

Step 1 — Atomic masses: nitrogen = 14 u, hydrogen = 1 u. One molecule of NH_3 contains 1 nitrogen atom (mass 14) and 3 hydrogen atoms (total mass 3).

Step 2 — Mass of nitrogen to mass of hydrogen = 14 : 3, which is a direct consequence of the fixed composition of ammonia and holds for any sample, whether the hydrogen or nitrogen comes as atoms, as the diatomic gases H_2 and N_2 , or in any other form before reaction.

13. Answer: b

Explanation:

Dublin is correct.

Dublin, situated on the east coast of the island of Ireland at the mouth of the river Liffey, is the capital and largest city of the Republic of Ireland. It is the political, economic and cultural centre of the country, hosts the Dail Eireann (lower house of parliament) and the Government Buildings, and uses the Euro as its currency.

Edinburgh is the capital of Scotland (within the United Kingdom), Cardiff is the capital of Wales, and Newport is a city in Wales — none of them are capitals of the Republic of Ireland.

14. Answer: d

Explanation:

Cousin is correct.

Blood-relation problems are solved by replacing each term with the precise family link and then following the chain from the speaker to the target person.

Step 1 — 'My friend's father's brother-in-law' means the brother-in-law of the friend's father. This is either the friend's father's wife's brother (maternal uncle of the friend) or the friend's father's sister's husband (uncle by marriage). Both are collateral uncles of the friend.

Step 2 — The eldest daughter of this uncle is a child of the friend's father's generation on a parallel branch, which makes her a cousin of Kirti's friend.

She is not the friend's daughter (that would need a direct downward link), not a sister-in-law (requires marriage link), and not a niece (that would require being the daughter of the friend's brother or sister).

15. Answer: c

Explanation:

Copper and Zinc is correct.

Brass is a substitutional alloy made chiefly of copper and zinc. Typical composition is about 60–70% copper with 30–40% zinc, though the exact proportions can be tuned to control strength, colour and corrosion resistance. The addition of zinc to copper gives brass greater hardness than pure copper and a characteristic golden-yellow lustre.

Copper + tin forms bronze, not brass. Lead + tin is a soldering alloy. Chromium + nickel are mixed with iron to form stainless steel. Only copper and zinc together are

classified as brass.

16. Answer: c

Explanation:

D is correct.

The question figure is a complete wire-frame cuboid: a back rectangle and a front rectangle joined by all four slanting edges, with a panel having notched (cut-in) corners on its front face.

Figure D shows exactly this solid turned through 90 degrees (standing upright): all four connecting edges are present and the notched-corner panel sits on the front face.

Figures A, B and C keep the horizontal position but drop one or more of the slanting edges joining the two rectangles, so they are not the same solid.

Hence, D bears the closest resemblance to the question figure.

17. Answer: b

Explanation:

Lord Dalhousie is correct.

The Doctrine of Lapse was an annexation policy devised by Lord Dalhousie, Governor-General of India from 1848 to 1856. Under this doctrine, any princely state under the paramountcy of the East India Company whose ruler died without a natural (biological) male heir would 'lapse' to the Company, and the adopted son's claim would not be recognised.

Your Personal Exams Guide

Using this policy Dalhousie annexed Satara (1848), Jaitpur and Sambalpur (1849), Baghat (1850), Udaipur (1852), Jhansi (1853) and Nagpur (1854), among others. The resentment this caused was one of the immediate factors behind the 1857 Revolt.

Lord Canning was Governor-General during the 1857 uprising and later abolished the doctrine; Lord Salisbury served as Secretary of State for India; and Lord Irwin was Viceroy during the Civil Disobedience Movement — none devised the Doctrine of Lapse.

18. Answer: d

Explanation:

Only 1 follows. is correct.

A syllogism conclusion follows only if it is true in every situation that satisfies all the premises. We test each conclusion against this standard.

Step 1 — Draw the Venn diagram. 'All Sticks are Rockets' puts the Sticks circle entirely inside the Rockets circle. 'Some Bats are Sticks' means the Bats and Sticks circles must overlap, so this overlap region lies inside Rockets as well.

Step 2 — Conclusion 1: 'Some Bats are Rockets.' The overlap of Bats and Sticks is also inside Rockets, so some Bats are necessarily Rockets. This conclusion follows.

Step 3 — Conclusion 2: 'No Stick is a Bat.' This directly contradicts the given premise 'Some Bats are Sticks', because if some Bats are Sticks then some Sticks are also Bats. So this conclusion cannot follow.

19. Answer: d

Explanation:

70 is correct.

In a bar graph each vertical bar's height represents the value plotted on the Y-axis for the category labelled on the X-axis. To read sales for a specific year, locate that year's bar and project its top horizontally onto the Y-axis grid.

Locating the bar labelled 2013 and projecting its top onto the Y-axis, the reading lands at 70 lakh units. The 2013 bar is noticeably taller than the 60-lakh bar but clearly shorter than the 80- and 90-lakh bars on the same chart, confirming the figure as 70 lakh personal computers sold that year.

20. Answer: a

Explanation:

2 is correct.

The expression hides a standard algebraic identity. Expanding and combining is far quicker than evaluating the large squares directly.

Step 1 — Use $(a + b)^2 + (a - b)^2 = 2(a^2 + b^2)$ with $a = 843$, $b = 375$. The numerator becomes $2(843^2 + 375^2)$.

Step 2 — The denominator is $843 \times 843 + 375 \times 375 = 843^2 + 375^2$, exactly the quantity multiplied by 2 in the numerator.

Step 3 — The expression simplifies to $\frac{2(843^2 + 375^2)}{843^2 + 375^2} = 2$.

21. Answer: a

Explanation:

Cricket is correct.

Kuldeep Yadav is an Indian international cricketer who plays as a left-arm wrist spinner (chinaman) for the national team across all three formats and represents

Uttar Pradesh in domestic cricket. He made his Test, ODI and T20I debuts in 2017 and was the first Indian left-arm wrist spinner (chinaman bowler) to play Test cricket.

Among several notable feats, he took a hat-trick in an ODI against Australia at Kolkata in September 2017, becoming only the third Indian bowler, after Chetan Sharma and Kapil Dev, to take an ODI hat-trick. He has no association with wrestling, kabaddi or boxing.

22. Answer: d

Explanation:

Grandmother is correct.

In a blood-relation problem, each described link is replaced by its exact family role and the chain is then followed to the target person.

Step 1 — Mani is Sanjana's father's mother. The mother of one's father is called the paternal grandmother.

Step 2 — Sanjana's sister shares the same parents as Sanjana. Hence her father is also Sanjana's father, and so Mani — the mother of that same father — is also the paternal grandmother of Sanjana's sister.

Mother and sister need a direct parent or sibling link, which does not exist here; aunt would require Mani to be Sanjana's father's sister rather than his mother, so these alternatives do not fit.

23. Answer: b

Explanation:

Narendra Modi is correct.

'Exam Warriors' is a book written by Prime Minister Narendra Modi, published by Penguin Random House India and released in February 2018. The book is addressed to students appearing in school examinations and offers 25 mantras of advice to help them deal with exam stress, cultivate good study habits, and approach the exam period with a calm, warrior-like mindset.

Kamlesh D. Patel (Daaji) is the global guide of the Heartfulness movement; Satya Nadella is the CEO of Microsoft and author of 'Hit Refresh'; Shashi Tharoor is an Indian politician who has written many non-fiction titles. None of them wrote 'Exam Warriors'.

24. Answer: c

Explanation:

Anupam Kher is correct.

Veteran Indian film actor Anupam Kher was appointed Chairperson of the governing council of the Film and Television Institute of India (FTII), Pune, in October 2017. He succeeded Gajendra Chauhan, whose earlier appointment had triggered a prolonged student agitation on campus.

Kher's appointment was welcomed as that of a widely respected craftsman with over 500 film credits. He later resigned from the post in October 2018 citing commitments to his US television series. Praseen Joshi was appointed Chairperson of the Central Board of Film Certification (CBFC); Sambit Patra is a BJP spokesperson; Rajat Sharma is a journalist and news anchor — none headed FTII in 2017.

25. Answer: c

Explanation:

The diagram of three circles in a row, where the middle circle overlaps the left and right circles and the outer two do not touch is correct.

A Venn diagram must show the true relationship between the three classes.

Step 1 — Some tables are made of wood and some are not (steel, plastic, glass), so the Table circle partly overlaps the Wood circle.

Step 2 — In the same way, some doors are wooden and some are not, so the Door circle also partly overlaps the Wood circle.

Step 3 — No table is a door, so the Table and Door circles do not meet each other.

Concentric circles, three separate circles, or two small circles inside one big circle would claim that every table and door is wooden or that none is, which is not true.

Hence, the three-circle chain with Wood in the middle overlapping Table and Door is the correct diagram.

26. Answer: a

Explanation:

3 : 5 is correct.

When two ingredients of different values are mixed to achieve a desired mean, the Rule of Alligation gives the ratio of the quantities directly. The cheaper (lower-value) ingredient's quantity is proportional to the gap between the costlier value and the mean, and the costlier ingredient's quantity is proportional to the gap between the mean and the cheaper value.

Here the two densities are 17 (gold) and 9 (copper), with the target mean density 12. Using alligation, the ratio of gold to copper is $(12 - 9) : (17 - 12) = 3 : 5$. Any other option would displace the weighted mean away from 12 — a 7:1 share of gold would overshoot to about 16, while 4:3 and 3:2 both end above 13, so none of the other ratios can yield a density of 12.

27. Answer: d

Explanation:

The figure of a rectangle drawn inside another rectangle is correct.

Three of the figures are standard mathematical symbols: the derivative operator d/dx , the integral sign and the summation sign (capital sigma).

The rectangle within a rectangle is only a geometric drawing and is not a mathematical symbol or operator.

Hence, the rectangle inside a rectangle is the odd one out.

28. Answer: a

Explanation:

Only conclusion 2 follows. is correct.

A syllogistic conclusion is accepted only when it is forced by the statements. A particular affirmative like "Some A are B" always permits its converse "Some B are A", while a universal affirmative like "All A are B" never permits reversing the subject and predicate.

Statement II says some solids are metals, so the converse "some metals are solids" is forced — conclusion 2 follows. Conclusion 1 claims every metal is an instrument, which would need a universal link from metals to instruments; the statements only tell us that instruments are a subset of solids and that metals overlap with solids, which leaves open the possibility of metals outside the instruments set. So conclusion 1 does not follow.

29. Answer: b

Explanation:

70 is correct.

When two workers do the same kind of job independently, their combined output in a fixed time equals the sum of their individual rates multiplied by that time. Each person's rate is simply the number of units done divided by the time taken.

Amit's rate is 20 chocolates in 40 minutes, i.e. $\frac{1}{2}$ chocolate per minute. Guneet's rate is 30 chocolates in 45 minutes, i.e. $\frac{2}{3}$ chocolate per minute. Their combined rate is $\frac{1}{2} + \frac{2}{3} = \frac{3+4}{6} = \frac{7}{6}$ chocolates per minute. In 60 minutes they together pack $\frac{7}{6} \times 60 = 70$ chocolates.

30. Answer: a

Explanation:

4 is correct.

The median of a data set is the middle value after the data have been arranged in ascending order. When the count is even, say $2n$, the median is the mean of the n -th and $(n+1)$ -th values.

Starting with 0 and 1, each subsequent Fibonacci number is the sum of the previous two: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34. There are ten numbers, so the median is the mean of the 5th and 6th values, which are 3 and 5. Their mean is $\frac{3+5}{2} = 4$, giving a median of 4.

31. Answer: c

Explanation:

$8\frac{4}{7}$ minutes is correct.

When two pipes fill the same tank together, the fraction of the tank filled per minute is the sum of each pipe's individual fill rate. The total time to fill the tank is the reciprocal of that combined rate.

Pipe J fills $\frac{1}{15}$ of the tank per minute and pipe K fills $\frac{1}{20}$. Together they fill $\frac{1}{15} + \frac{1}{20} = \frac{4+3}{60} = \frac{7}{60}$ of the tank per minute. The time to fill the full tank is $\frac{60}{7} = 8\frac{4}{7}$ minutes.

32. Answer: c

Explanation:

8 is correct.

Problems where two kinds of workers are compared with each other are solved by first converting everyone into a single common unit, computing the total work in those units, and then equating the two situations through that total.

Given 15 trainees do the work of 4 experts in a day, 1 expert equals $\frac{15}{4}$ trainees. First team: 12 experts + 9 trainees = $12 \times \frac{15}{4} + 9 = 45 + 9 = 54$ trainee-equivalents per day; over 8 days the pond's total work is $54 \times 8 = 432$ trainee-days. For the second team to finish the same work in 9 days, their daily output must be $\frac{432}{9} = 48$ trainee-equivalents. If x experts work with 18 trainees, then $x \times \frac{15}{4} + 18 = 48$, giving $\frac{15x}{4} = 30$, so $x = 8$.

33. Answer: b

Explanation:

A is correct.

The series uses two shapes, a square and then a circle, each drawn in two arrangements.

First figure: a small square inside a big square. Second figure: a small square placed above a big square. Third figure: a small circle inside a big circle.

So the fourth figure must show the circle in the second arrangement: a small circle placed above a big circle. Figure A shows exactly this; B has two equal circles and C and D use squares.

Hence, A is the next figure in the series.

34. Answer: a

Explanation:

D is correct as per the official answer key.

The question figure is a cross-shaped outline with an arrowhead on each of its four arms and a crescent at the centre whose horns point to the right.

All four option figures keep the same arrowed outline, so the comparison rests on the crescent. In figure D the crescent is turned through 90 degrees so that its horns point downwards; the official key treats this figure as the closest match.

Hence, D is the answer marked by the official key.

Note: As printed, figure A appears identical to the question figure (same outline, crescent with horns to the right), so A is strictly the closer match; the official green-tick key nonetheless marks D, which is retained here.

35. Answer: d

Explanation:

Charles Darwin is correct.

Charles Darwin, better remembered for the theory of natural selection, devoted the last book of his life — "The Formation of Vegetable Mould through the Action of Worms, with Observations on their Habits" (1881) — to earthworms. He showed through decades of patient measurement that earthworms continually ingest, mix and bring soil to the surface as castings, so they are the principal natural agents of soil formation and fertility.

Stanley L. Miller and Harold C. Urey are known for the 1953 Miller–Urey experiment that produced amino acids from simulated primordial-atmosphere gases, and J.B.S. Haldane proposed the primordial-soup hypothesis of life's origin — none of these three worked on soil ecology.

36. Answer: c

Explanation:

30 is correct.

In a bar graph showing year-wise results, each vertical bar's height on the Y-axis gives the count for the year labelled on the X-axis. To answer a "how many ranks in year Y" question, we locate the bar for that year and read where its top aligns on the Y-axis gridlines.

Locating the 2012 bar and projecting its top onto the Y-axis, the reading comes out at 30 ranks. The 2012 bar is clearly taller than any bar reaching only 10 or 20 ranks and noticeably shorter than any bar reaching 50 ranks on the same scale, confirming the value as 30.

37. Answer: c

Explanation:

Only Assumption II is implicit. is correct.

An implicit assumption is an unstated idea the speaker must take for granted for the statement to make sense. Each assumption is tested against the statement to see whether the statement would still be purposeful without it.

Assumption I pins the arrival to exactly 11.00 a.m., which is a precise travel time nowhere mentioned in the statement — the five-hour gap doesn't force any particular arrival time, so this is not implicit. Assumption II says Anu will reach before 3.00 p.m., which is the very reason she leaves five hours in advance; a person who did not expect to arrive before the meeting would not leave so early. Hence only Assumption II is built into the statement.

38. Answer: a

Explanation:

40 is correct.

The Know India Programme is a three-week flagship engagement run by the Ministry of External Affairs for young persons of Indian origin aged 18–30 from across the diaspora. It is designed to familiarise them with contemporary India — its governance, industry, culture, education and tourism — and to build lasting bonds with the country.

The 46th edition of the programme, held in early 2018, hosted 40 young participants of Indian origin drawn from several countries. The partnering state governments and the Indian Council for Cultural Relations manage the on-ground visits.

39. Answer: c

Explanation:

539 J is correct.

The gravitational potential energy of a body raised to a height h above a reference level in a uniform gravitational field is $PE = mgh$, where m is its mass and g is the acceleration due to gravity. The quantity is scalar and measured in joules.

Substituting $m = 11 \text{ kg}$, $g = 9.8 \text{ m s}^{-2}$ and $h = 5 \text{ m}$ gives $PE = 11 \times 9.8 \times 5 = 539 \text{ J}$. The other values (528, 520, 588) do not correspond to any correct combination of the given mass, height and g .

40. Answer: a

Explanation:

6 and 13 is correct.

Step 1 — In Newlands' arrangement every eighth element, counting from any element, repeats the properties of the first.

Step 2 — Nearest case: X at position 1 and Y at position 8, leaving 6 elements between them (positions 2 to 7).

Step 3 — Farthest case within two octaves: Y at position 15, leaving 13 elements between X and Y (positions 2 to 14).

Hence, 6 and 13.

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

41. Answer: b

Explanation:

$12\sqrt{17} \text{ sq. cm}$ is correct.

When the three sides of a triangle are known, its area is obtained from Heron's formula: with semi-perimeter $s = \frac{a+b+c}{2}$, the area is $\sqrt{s(s-a)(s-b)(s-c)}$.

Here two sides are 9 cm and 11 cm and the perimeter is 34 cm, so the third side $c = 34 - 9 - 11 = 14$ cm. Semi-perimeter $s = \frac{34}{2} = 17$ cm. Then $s - a = 8$, $s - b = 6$ and $s - c = 3$, so the area is $\sqrt{17 \times 8 \times 6 \times 3} = \sqrt{17 \times 144} = 12\sqrt{17}$ sq. cm.

42. Answer: a

Explanation:

14 is correct.

A positive integer is a perfect square exactly when every prime in its factorisation appears to an even power. To make $N \times y$ a perfect square with the smallest y , we take the primes of N that appear to an odd power and multiply them together once each — this "pairs up" every odd exponent.

Factorising 3150 gives $3150 = 2^1 \times 3^2 \times 5^2 \times 7^1$. The primes 3 and 5 already appear to even powers; 2 and 7 appear to odd powers. So the smallest y is $2 \times 7 = 14$, and $3150 \times 14 = 44100 = 210^2$ confirms the result.

43. Answer: b

Explanation:

₹ 221.01 is correct.

Step 1 — Outer surface of the open box (no top): base $80 \times 60 = 4800$ cm²; four outer walls $2(80 \times 40) + 2(60 \times 40) = 11200$ cm². Outer total = 16000 cm².

Step 2 — With 3 cm thick walls and base, the inside measures $74 \times 54 \times 37$ cm. Inner base $74 \times 54 = 3996$ cm²; inner walls $2(74 \times 37) + 2(54 \times 37) = 9472$ cm². Inner total = 13468 cm².

Step 3 — Area to be painted = 16000 + 13468 = 29468 cm².

Step 4 — At 75 paise per 100 cm²: cost = $\frac{29468}{100} \times 0.75 = 221.01$ rupees.

Hence, ₹ 221.01.

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

44. Answer: a

Explanation:

High is correct.

Ionic compounds consist of a three-dimensional lattice of oppositely charged ions held together by strong electrostatic (Coulombic) forces of attraction extending in every direction. Melting or boiling the solid requires separating these ions, which means supplying enough energy to overcome the entire network of attractions.

Because that energy requirement is very large, ionic compounds show characteristically high melting and boiling points — sodium chloride, for example, melts at 801°C and boils at 1465°C. "Low" and "medium" are features of molecular (covalent) compounds with weak intermolecular forces, and "constant" is not a meaningful classification of these temperatures.

45. Answer: b

Explanation:

Taapsee Pannu is correct.

The International Indian Film Academy (IIFA) Awards "Woman of the Year" honour recognises a female performer whose work in the preceding year has been especially impactful on Indian cinema. The 18th edition of the IIFA Awards was held in New York in July 2017 and honoured work from the 2016 release calendar.

At that edition the Woman of the Year award was presented to Taapsee Pannu for her acclaimed lead role in "Pink" (2016), among other performances in that year. Alia Bhatt, Kareena Kapoor and Shraddha Kapoor were not recipients of this particular honour at the 18th IIFA.

46. Answer: b

Explanation:

B is correct.

In the first pair, a white circle with three black triangles becomes a black circle with three white triangles: the shape and the inner pieces stay the same, only the colours are interchanged.

Applying the same rule to a white hexagon with four black diamonds gives a black hexagon with four white diamonds, arranged in the same way.

Figure B is this black hexagon with four white diamonds; the others change the number or shape of the inner pieces or do not reverse the colours.

Hence, B fits in the blank space.

47. Answer: a

Explanation:

Governor of Bihar is correct.

Ram Nath Kovind was sworn in as the 14th President of India on 25 July 2017, succeeding Pranab Mukherjee. The post he held immediately before that was a gubernatorial one — appointed by the President of India to represent the Union at a state level.

Kovind served as the 36th Governor of Bihar from 16 August 2015 until he resigned on 20 June 2017 after being nominated as the NDA's presidential candidate. He had never been Vice President, Chief Minister of Bihar, or Speaker of the Lok Sabha, so the other three posts are incorrect.

48. Answer: c

Explanation:

Aruna Budda Reddy is correct.

The Gymnastics World Cup held at the Hisense Arena in Melbourne in February 2018 was a FIG-recognised individual apparatus World Cup event. India had never previously won an individual medal at this competition, so a podium finish by any Indian gymnast would be a first-of-its-kind achievement.

Aruna Budda Reddy of Hyderabad won the bronze medal in the women's vault at the Melbourne event, becoming the first Indian gymnast to win an individual World Cup medal. Dipa Karmakar is remembered for her Rio 2016 Olympic fourth place and Pranati Nayak competes internationally for India, but neither claimed this specific first; Sakshi Malik is a wrestler, not a gymnast.

Your Personal Exams Guide

49. Answer: b

Explanation:

3 is correct.

Nested arithmetic expressions are evaluated using the BODMAS / PEMDAS order: solve the innermost brackets first, then division and multiplication from left to right, and finally addition and subtraction, working outward one bracket at a time.

Innermost parenthesis: $16 - 19 = -3$. Inside the curly braces: $48 \div 24 + (-3) = 2 - 3 = -1$. Inside the square brackets: $35 - (-1) = 36$. Finally $108 \div 36 = 3$, so the value of the

expression is 3.

50. Answer: c

Explanation:

Mother is correct.

In Indian family terminology the maternal grandmother (nani) of a person is that person's mother's mother. So Shrilekha, as Shrivalli's maternal grandmother, is the mother of Shrivalli's mother.

The question says Shrilekha has only one daughter. That one daughter must therefore be Shrivalli's mother — the only candidate on Shrilekha's daughters' side who connects to Shrivalli as her maternal grandchild. The other options cannot hold: a paternal aunt (bua) would be the father's sister, maternal grandmother is Shrilekha herself, and "sister" would require Shrilekha's daughter to share a parent with Shrivalli, which the generation gap rules out.

51. Answer: c

Explanation:

18 years is correct.

Let Nitu's present age be N years. Dalia is 20 years older, so Dalia's present age is $N + 20$ years. The second condition is a relation that holds two years from now, when each age increases by 2.

Step 1 — Two years from now Dalia's age is $N + 22$ and Nitu's age is $N + 2$.

Step 2 — The condition says Dalia's future age equals twice Nitu's future age, giving $N + 22 = 2(N + 2)$.

Step 3 — Expanding the right side gives $N + 22 = 2N + 4$, so $N = 18$. Check: Dalia today is 38; in two years Dalia is 40 and Nitu is 20, and 40 is exactly twice 20.

52. Answer: b

Explanation:

Propene is correct.

In organic nomenclature the suffix of a hydrocarbon's name tells us about the carbon-carbon bonding: “-ane” marks an alkane (only single bonds), “-ene” marks an alkene (one carbon-carbon double bond) and “-yne” marks an alkyne (one carbon-carbon triple bond). The suffix “-ol” indicates an alcohol with an -OH group.

Propene has the formula $CH_3 - CH = CH_2$, where the “=” sign is the carbon-carbon double bond. Propane (C_3H_8) has only single bonds; propyne ($CH_3 - C \equiv CH$) has a triple bond; propanol is a saturated alcohol with no multiple bonds between carbons.

53. Answer: d

Explanation:

Black is correct.

The blue colour of the daytime sky on Earth is caused by Rayleigh scattering: short-wavelength blue light from the Sun is scattered in all directions by molecules of nitrogen and oxygen in the atmosphere, so the sky appears bright blue in every direction we look away from the Sun.

Beyond the Earth's atmosphere there are almost no air molecules to scatter sunlight, so no diffuse blue glow reaches the astronaut's eye. Only objects that directly emit or reflect light — stars, planets and the Sun itself — appear bright against the empty background. The rest of space appears black, which is why

photographs taken from spacecraft show a jet-black sky even during full daylight on the sunlit side.

54. Answer: a

Explanation:

Kiran is 18 years and Abhi is 14 years is correct.

Two conditions are given: the sum of the siblings' ages is a fixed number, and one is a fixed number of years younger than the other. These convert directly to a pair of linear equations that can be solved by substitution.

Step 1 — Let Kiran's age be K and Abhi's age be A . Then $K + A = 32$ and $K - A = 4$, because Abhi is 4 years younger.

Step 2 — Adding the two equations gives $2K = 36$, so $K = 18$. Substituting into either equation gives $A = 14$. Check: $18 + 14 = 32$ and $18 - 14 = 4$, so both conditions are satisfied.

55. Answer: c

Explanation:

0.5 A is correct.

Electric current is defined as the rate of flow of charge through a cross-section of a conductor. The defining relation is $I = \frac{Q}{t}$, where Q is the total charge in coulombs and t is the time in seconds. The SI unit of current, the ampere, is one coulomb per second.

Step 1 — Convert the time to seconds: $t = 10 \text{ min} = 10 \times 60 = 600 \text{ s}$.

Step 2 — Apply the formula: $I = \frac{Q}{t} = \frac{300}{600} = 0.5 \text{ A}$.

56. Answer: d

Explanation:

Both I and II are implicit. is correct.

An implicit assumption is an unstated idea that the speaker must have taken for granted in order for the statement to make sense. Each assumption is tested against the facts asserted in the statement.

Assumption I says tickets can be booked in advance. Sharni booked today for a show that happens tomorrow; the act of buying a ticket before the show date is only possible if advance booking is allowed, so this idea underpins the statement. Assumption II says tickets can be booked online. The statement explicitly reports that she booked the ticket online, which cannot be true unless online booking is available. Both ideas are therefore built into the statement.

57. Answer: d

Explanation:

Jordan is correct.

The Union Cabinet of India, chaired by Prime Minister Narendra Modi, approved on 1 March 2018 a Memorandum of Understanding between the Government of the Republic of India and the Government of the Hashemite Kingdom of Jordan on cooperation in the field of health and medicine.

The MoU aimed to encourage cooperation in medical education, medical research, exchange of experts and training of health professionals, and procurement of generic and essential medicines. The agreement was signed in the lead-up to Jordanian King Abdullah II's state visit to India later that month.

58. Answer: c

Explanation:

Pressure is correct.

In mechanics, thrust is the force that acts perpendicular to a surface. When this perpendicular force is spread over a surface, the quantity that measures how concentrated the push is on each unit of that surface is called pressure. The defining relation is $P = \frac{F}{A}$, where F is the thrust and A is the area.

The SI unit of pressure is the pascal ($1 Pa = 1 N/m^2$). Mass is a measure of the amount of matter and force is an interaction; neither is a per-area quantity. Area itself is only the denominator in the ratio, not the ratio.

59. Answer: c

Explanation:

686 cm^3 is correct.

Each cube has volume 343 cm^3 . When two identical cubes are joined edge to edge (face to face), the two cubes share one square face and the resulting solid is a cuboid whose length doubles while the breadth and height remain equal to the cube's edge.

Step 1 — Find the edge of each cube: $a = \sqrt[3]{343} = 7 \text{ cm}$.

Step 2 — Dimensions of the cuboid are $7 \times 7 \times 14 \text{ cm}$, so its volume is $7 \times 7 \times 14 = 686 \text{ cm}^3$. Equivalently, the volume is simply twice that of a single cube: $2 \times 343 = 686 \text{ cm}^3$.

60. Answer: a

Explanation:

Grandfather is correct.

Step 1 — “The wife of X’s only son” is X’s daughter-in-law.

Step 2 — “The son of X’s daughter-in-law” (through X’s only son) is X’s son’s son, that is, X’s grandson.

Step 3 — So Y is X’s grandson, which makes X the grandfather of Y.

Hence, grandfather.

61. Answer: d**Explanation:**

$2as = v^2 - u^2$ is correct.

For a body moving with uniform acceleration a , there are three standard kinematic equations. Each links a different trio of variables chosen from initial velocity u , final velocity v , time t , acceleration a and displacement s .

$v = u + at$ is the velocity–time relation; it has no displacement in it. $s = ut + \frac{1}{2}at^2$ is the position–time relation; it links displacement to time but not to final velocity. The equation $v^2 - u^2 = 2as$ links the two velocities with the displacement and eliminates time altogether, which is why it is called the position–velocity relation.

62. Answer: c**Explanation:**

8, 4, 6, 3 is correct.

Each letter stands for a single digit. The relation $9a5b - 3701 = c15d$ is a 4-digit minus 4-digit subtraction, so the fastest route is to test each option by substitution and check the arithmetic.

Step 1 — Substitute $a = 8$, $b = 4$, $c = 6$, $d = 3$. The minuend becomes 9854 and the difference should be 6153.

Step 2 — Compute $9854 - 3701 = 6153$. The result matches exactly, so the assignment 8, 4, 6, 3 is correct. The other options fail: for example, with $a = 3$, $b = 4$ the subtraction gives $9354 - 3701 = 5653$, not 6158.

Hence, $a, b, c, d = 8, 4, 6, 3$.

63. Answer: a

Explanation:

It has two parts, which are called cerebral hemispheres. is correct.

The human brain has three major divisions: forebrain, midbrain and hindbrain. The cerebrum is the largest part of the forebrain and is divided into two cerebral hemispheres. The cerebellum is a separate, smaller structure of the hindbrain.

Describing the cerebellum as having two cerebral hemispheres mixes up two different organs. The cerebellum does have two lateral lobes, but they are called cerebellar hemispheres, not cerebral hemispheres. The other three statements are factually correct: the cerebellum is part of the hindbrain, accounts for roughly 10–12% of the brain by volume, and sits at the posterior/back region behind the brainstem.

64. Answer: b

Explanation:

10 is correct.

In compound interest the amount after n years at an annual rate $P\%$ is $A = P_0 \left(1 + \frac{P}{100}\right)^n$, where P_0 is the principal. The "extra" amount received is the interest $A - P_0$.

Step 1 — Here $P_0 = 5000$, $n = 3$ and the interest is 1655, so $A = 5000 + 1655 = 6655$.

Step 2 — Substituting: $6655 = 5000 \left(1 + \frac{P}{100}\right)^3$, so $\left(1 + \frac{P}{100}\right)^3 = \frac{6655}{5000} = 1.331$.

Step 3 — Note that $1.331 = 1.1^3$, so $1 + \frac{P}{100} = 1.1$ and $P = 10$.

65. Answer: d

Explanation:

Only Conclusion II follows is correct.

A conclusion follows a statement only if it is a direct, necessary restatement of what the statement already asserts. Each conclusion is tested against this standard.

Conclusion II says Mr X is one of the great artists. The statement explicitly says Mr X is a great artist whose work is popular worldwide; identifying him as one among great artists is a direct restatement and therefore follows. Conclusion I says many artists exist in the world. The statement talks only about Mr X; it never counts or compares other artists, so claiming the existence of many artists adds information the statement does not supply. Hence only Conclusion II can be drawn.

66. Answer: a

Explanation:

Pen, 16; Pencil, 2 is correct.

Two conditions on the two unknowns — cost of a pen p and cost of a pencil q — give a pair of linear equations in two variables, solved by elimination.

Step 1 — Translate the conditions: $9p + 5q = 154$ and $13p + 7q = 222$.

Step 2 — Multiply the first equation by 7 and the second by 5 to equalise the q -coefficients: $63p + 35q = 1078$ and $65p + 35q = 1110$. Subtract to get $2p = 32$, so $p = 16$.

Step 3 — Substitute into the first equation: $9(16) + 5q = 154 \Rightarrow 144 + 5q = 154 \Rightarrow q = 2$. Check with the second equation: $13(16) + 7(2) = 208 + 14 = 222$, which matches.

67. Answer: d

Explanation:

Plasmodium is correct.

Fission is a form of asexual reproduction. In binary fission a parent cell splits into two daughter cells; in multiple fission the parent nucleus divides repeatedly inside a cyst and the cell then splits into many daughter cells, all at once.

Plasmodium, the malarial parasite, is a classical textbook example of multiple fission: inside a human liver or red blood cell it undergoes schizogony, in which many merozoites are produced from a single parent cell. Hydra reproduces mainly by budding, yeast by budding (and sometimes binary fission in a few species), and Planaria by regeneration/fragmentation — none of these is multiple fission.

68. Answer: a

Explanation:

Rohan Bopanna and Gabriela Dabrowski is correct.

The 2017 French Open Mixed Doubles final was played on 8 June 2017 at Roland Garros. Rohan Bopanna of India partnered Canadian player Gabriela Dabrowski and defeated the German-Colombian pair of Anna-Lena Groenefeld and Robert Farah 2-6, 6-2, [12-10] in a match tie-break.

It was Bopanna's first Grand Slam title in any discipline and the first Mixed Doubles Grand Slam for both players. The other distractors mix in Bopanna's doubles partners (Farah on the men's circuit, Sania Mirza as a fellow Indian doubles star) with runner-up Groenefeld, but the actual winning pair was Bopanna-Dabrowski.

69. Answer: b

Explanation:

9 ms^{-1} is correct.

A body released from rest and allowed to fall freely has initial velocity $u = 0$, and its only acceleration is g acting downwards. Final velocity after time t follows the first equation of motion $v = u + gt$.

Step 1 — Substitute the given values: $u = 0$, $g = 10 \text{ ms}^{-2}$ and $t = 0.9 \text{ s}$.

Step 2 — $v = 0 + 10 \times 0.9 = 9 \text{ ms}^{-1}$. The last option (9 ms^{-2}) cannot be the answer: its unit is that of acceleration, not speed, so it cannot be a value of the final velocity.

70. Answer: d

Explanation:

Both conclusions follow. is correct.

A conclusion follows a statement when it is a direct restatement or an unavoidable implication of what is said. Each conclusion is examined against the CEO's words.

Conclusion I says a day-care centre has been announced at the workplace. The CEO's exact words — that a day-care centre “will be provided to our employees” — are precisely such an announcement, so this conclusion follows directly. Conclusion II says the CEO expects women employees to use the facility to stay stress-free from domestic duties. The CEO explicitly mentions “young mothers” who otherwise leave children at home; the whole motivation of the announcement is to free them from that worry, so this is clearly implied. Hence both conclusions follow.

71. Answer: d

Explanation:

47 is correct.

Polling for the 17th Uttar Pradesh Legislative Assembly was held in seven phases from 11 February to 8 March 2017 for 403 constituencies. Counting took place on 11 March 2017 and the result was a landslide for the Bharatiya Janata Party, which won 312 seats.

The Samajwadi Party, in alliance with the Indian National Congress, won 47 seats out of the 311 it contested. The Bahujan Samaj Party took 19 seats and the Congress 7, with the remaining seats shared by RLD and smaller parties. The 47-seat tally was a sharp fall from the 224 seats the SP had won in 2012.

72. Answer: d

Explanation:

1348 is correct.

Each term is obtained by multiplying the previous term by a number that increases by 1 each time and then adding 4.

Step 1 — $2 \times 3 + 4 = 10$, $10 \times 4 + 4 = 44$, $44 \times 5 + 4 = 224$.

Step 2 — The next multiplier is 6: $224 \times 6 + 4 = 1344 + 4 = 1348$.

Hence, the next number is 1348.

73. Answer: b

Explanation:

$35 : 45 : 99$ is correct.

When two ratios share a common term with different numerical values, both ratios must be scaled so that the shared term matches. Then the three quantities can be lined up on a single scale.

Step 1 — In $a : b = 7 : 9$, b is 9. In $b : c = 5 : 11$, b is 5. The LCM of 9 and 5 is 45, so scale both ratios to make $b = 45$.

Step 2 — Multiply $a : b = 7 : 9$ by 5 to get $35 : 45$; multiply $b : c = 5 : 11$ by 9 to get $45 : 99$.

Step 3 — Combine on the common $b = 45$: $a : b : c = 35 : 45 : 99$.

74. Answer: d

Explanation:

Both A and B are true is correct.

Matter exists in three common states — solid, liquid and gas — distinguished by the arrangement of their particles. Shape and fluidity are two defining properties that depend directly on how tightly those particles are packed and how freely they can move.

Statement A is accurate: particles of a solid are packed in a rigid lattice and give it a definite shape; particles of a liquid are loosely held and so take the shape of the container; particles of a gas move freely and fill any available volume, with no

shape of their own. Statement B is also accurate: fluidity is the ability to flow and deform under an applied force, and because both liquids and gases have free-moving particles, both are classified as fluids. Both statements are therefore correct.

75. Answer: c

Explanation:

Section 3 and Section 5 is correct.

In a bar graph each vertical bar's height equals the value plotted on the Y-axis for the category marked on the X-axis. To find which categories exceed a given threshold, we draw a horizontal line at that threshold and pick out the bars whose tops lie above it.

Reading the Y-axis at the 360-book mark and projecting it horizontally across the chart, the bars for Section 3 and Section 5 are the only two whose tops lie above the line — both carry more than 360 books. The bars for Section 4 and Section 6 fall short of the 360 line, as do Sections 1 and 2, so they do not meet the condition.

76. Answer: a

Explanation:

Irrigated land is correct.

A source of energy is any natural reservoir from which usable energy can be extracted, typically by converting potential, kinetic, thermal, or nuclear forms into mechanical or electrical work. The interior of the Earth, atomic nuclei, and the tides each satisfy this requirement.

Geothermal plants tap heat from the Earth's interior to raise steam. Nuclear reactors release huge amounts of energy by splitting atomic nuclei, and tidal barrages convert the kinetic energy of ocean tides into electricity. Irrigated land, by contrast,

is agricultural land that has been supplied with water for crops; it is a resource for food production, not a reservoir of energy that can be harnessed to do mechanical or electrical work.

77. Answer: d

Explanation:

N. R. Narayana Murthy is correct.

N. R. Narayana Murthy is an Indian software engineer and businessman who co-founded Infosys Limited in Pune in 1981 together with six colleagues. Infosys grew into one of India's largest multinational corporations, offering business consulting, information technology, engineering, and business process outsourcing services from offices in more than fifty countries.

Shailesh Vara, Rishi Sunak, and Alok Sharma are all British politicians of Indian origin who have served in the United Kingdom government; none of them founded an IT company. Only Narayana Murthy matches the description of an Indian IT entrepreneur who co-founded a multinational technology services firm.

Your Personal Exams Guide

78. Answer: a

Explanation:

D is correct as per the released key.

Step 1 — In the given figure a line rises on the left and turns right along the top, ending in an arrowhead pointing right; a separate arrow runs from the lower left up towards the right.

Step 2 — In the vertical mirror MN, left and right interchange: the line should rise on the right and turn left along the top with the arrowhead pointing left, and the separate arrow should run from the lower right up towards the left.

Step 3 — Figure D keeps the bent line with its arrowhead pointing left, as the released key records.

Hence, the released key gives D.

Note: RRB ignored this question for all candidates. As printed, none of the four figures is an exact mirror image: the arrowhead-left bend in D (and C) is drawn at the bottom, and A and B each lose one of the two elements. The released answer D is retained.

79. Answer: b

Explanation:

0 is correct.

The pH scale runs from 0 to 14: 7 is neutral, values below 7 are acidic and values above 7 are basic; the lower the pH, the stronger the acid.

A highly acidic mixture therefore lies at the lowest end of the scale, pH 0. A pH of 7 is neutral, while 10 and 14 are basic.

Hence, 0.

80. Answer: d

Explanation:

1 is correct.

In the modern periodic table, horizontal rows are called periods and the elements in each period show a gradation in properties from metals on the left to non-metals on the right. From period 2 onwards every row contains metals: lithium starts period 2, sodium starts period 3, potassium and calcium sit in period 4, and so on.

Period 1 is the exception. It contains only two elements, hydrogen and helium. Hydrogen is treated as a non-metal (it is placed above the alkali metals for convenience, but its properties are non-metallic), and helium is a noble gas. There is no metal in period 1, which makes it the only period in the modern table with no metallic element.

81. Answer: c

Explanation:

Force is correct.

Step 1 — Newton's first law states that a body stays at rest or in uniform straight-line motion unless an external unbalanced force acts on it.

Step 2 — The law therefore tells us what a force is: the agent that changes a body's state of rest or of uniform motion. This is the qualitative definition of force; the second law later gives its measure, $F = ma$.

Step 3 — Acceleration, momentum and oscillation are not defined by the first law.

Hence, force.

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

82. Answer: a

Explanation:

1 is correct.

The fundamental Pythagorean identity in trigonometry states that for any angle θ , $\sin^2 \theta + \cos^2 \theta = 1$. This identity holds for every real value of the angle and does not depend on the particular triangle or the other angles.

Here $\angle A = 60^\circ$, so one can also verify numerically.

Step 1 — $\sin 60^\circ = \frac{\sqrt{3}}{2}$, so $\sin^2 60^\circ = \frac{3}{4}$.

Step 2 — $\cos 60^\circ = \frac{1}{2}$, so $\cos^2 60^\circ = \frac{1}{4}$.

Step 3 — adding, $\frac{3}{4} + \frac{1}{4} = 1$, which matches the identity.

83. Answer: b

Explanation:

South - West is correct.

In the standard seating position for carrom, two opposing players sit on opposite sides of the board directly across from each other. Opposite directions on a compass differ by 180 degrees, so whatever direction one player is facing, the player seated across must be facing the exactly opposite direction.

Surabhi faces North-East. The direction opposite to North-East on the compass is South-West (North is opposite South and East is opposite West, so NE pairs with SW). Therefore her opponent Madhura, sitting directly across from her, faces South-West.

84. Answer: c

Explanation:

D is correct.

In figures A, B and C the two letters form a mirror pair: the second letter is the first letter reflected left to right (Z with its reversed form, a reversed J-shape with L, N with its reversed form).

In figure D the second letter is the first letter turned upside down (V and an inverted V, that is a water image), not a left-right mirror image.

Hence, D is the odd one out.

85. Answer: b

Explanation:

Ministry of Communications is correct.

DARPAN stands for Digital Advancement of Rural Post Office for A New India. It is an initiative of the Department of Posts, which functions under the Ministry of Communications of the Government of India. The scheme aims to provide low-power, hand-held devices to about 1.3 lakh Branch Post Masters across rural Branch Post Offices so that routine postal and financial transactions can be carried out online instead of being recorded manually.

By bringing rural post offices onto a digital platform, DARPAN improves the quality and speed of service, enables the delivery of value-added services such as e-Money orders and India Post Payments Bank products, and extends banking facilities to large sections of the un-banked rural population. The Ministries of Education, HRD, and Finance are not involved in running the postal network.

86. Answer: d

Explanation:

Prakrit is correct.

In the sixth century BCE Sanskrit was the language of priests and scholars, while ordinary people spoke the vernaculars collectively called Prakrit.

Gautam Buddha chose to preach in the Prakrit speech of the common people so that his teaching reached ordinary listeners directly. Sanskrit was the learned language, Tamil belonged to the far south, and Persian had no role in the Gangetic plain of his time.

Hence, Prakrit.

87. Answer: a

Explanation:

₹ 6,000 is correct.

When a total amount is split into percentage segments, each segment's actual value equals that percentage of the total. Here segment 3 is 15% of the total expenditure and is given as ₹3,000, which fixes the total expenditure.

Step 1 — let the total expenditure be T . Then 15% of $T = 3000$, giving $T = \frac{3000 \times 100}{15} = 20,000$.

Step 2 — segment 2 accounts for 20% of T , i.e. $0.20 \times 20000 = 4000$, and segment 5 accounts for 10%, i.e. $0.10 \times 20000 = 2000$.

Step 3 — combined expenditure on segments 2 and 5 is $4000 + 2000 = 6000$, so Emma spends ₹6,000.

88. Answer: b

Explanation:

15 is correct.

The figure is a pentagon (top vertex, top-right corner, bottom vertex, and two left corners) with a point O on the vertical line from the top vertex to the bottom vertex.

Lines run from O to every boundary point.

Step 1 — Right of the vertical line: triangles with the top vertex, O and the top-right corner; O, the top-right corner and the point on the right edge; O, that point and the bottom vertex; O, the top-right corner and the bottom vertex; and the large triangle top vertex, top-right corner, bottom vertex. That gives 5.

Step 2 — Left of the vertical line, O is joined to each of the three left edges, and each edge carries one middle point. On every such edge there are 2 small triangles and 1 combined triangle with apex O, so $3 \times 3 = 9$.

Step 3 — The line from the top-right corner passes straight through O to the lower-left corner, so the lower-left corner, the bottom vertex and the top-right corner form one more triangle: 1.

Total = $5 + 9 + 1 = 15$.

Hence, there are 15 triangles in the figure.

89. Answer: c

Explanation:

C-81 is correct.

Each term pairs a letter with a number, so the series has two patterns running in parallel. The letters are T, W, Z, ?, F and the numbers are 36, 49, 64, ?, 100.

Step 1 — the number pattern is a sequence of consecutive squares: $6^2 = 36$, $7^2 = 49$, $8^2 = 64$, so the missing number is $9^2 = 81$ and the last confirms as $10^2 = 100$.

Step 2 — the letter pattern skips three positions each time. T (20) + 3 = W (23); W (23) + 3 = Z (26); treating the alphabet as cyclic, Z (26) + 3 wraps to C (3), and C (3) + 3 = F (6). So the missing letter is C.

Step 3 — combining both patterns gives C-81 as the missing term.

90. Answer: a

Explanation:

70% is correct.

Profit percentage is calculated on the cost price. The formula is $\text{Profit}\% = \frac{\text{Selling Price} - \text{Cost Price}}{\text{Cost Price}} \times 100$.

Step 1 — here cost price = ₹500 and selling price = ₹850, so profit = $850 - 500 = 350$.

Step 2 — apply the formula: $\text{Profit}\% = \frac{350}{500} \times 100 = 70\%$.

60%, 50%, and 75% would require the profit to be ₹300, ₹250, or ₹375 respectively on a ₹500 cost, none of which match the given selling price.

91. Answer: c

Explanation:

98 m is correct.

When a measurement is given correct to the nearest integer, the true value lies within half a unit of the stated integer. A measurement reported as 28 m could lie anywhere in the interval 27.5 m to just under 28.5 m, and a measurement reported as 22 m could lie in the interval 21.5 m to just under 22.5 m.

Step 1 — the minimum perimeter occurs when both length and breadth take their smallest possible true values, i.e. length = 27.5 m and breadth = 21.5 m.

Step 2 — perimeter of a rectangle = $2(\text{length} + \text{breadth}) = 2(27.5 + 21.5) = 2 \times 49 = 98$ m.

100 m corresponds to using 28 and 22 directly, which gives the mid-value perimeter, not the minimum; 50 m and 49 m misread the formula by halving it.

92. Answer: d

Explanation:

25 years is correct.

Article 84 of the Indian Constitution lays down the qualifications required to be chosen as a Member of Parliament. For membership of the Lok Sabha (House of the People), it specifies that a person must be a citizen of India, must not hold any office of profit under the Government, and must have completed the age of 25 years.

The other options correspond to different offices: 35 years is the minimum for the President, Vice-President, and a Governor; 30 years is the minimum age for a Member of the Rajya Sabha (Council of States); 21 years is the minimum age for contesting panchayat and municipal elections, not for Parliament; a Member of a State Legislative Assembly must also be at least 25. For the Lok Sabha itself, the Constitution fixes the floor at 25 years.

Hence, the minimum age is 25 years.

93. Answer: d

Explanation:

5040 is correct.

The question asks for the option that is a common multiple of all the integers between 1 and 10. A number is a common multiple of 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 if and only if it is divisible by each of these numbers.

Step 1 — the LCM of the integers 1 to 10 can be built from prime powers: $2^3 \times 3^2 \times 5 \times 7 = 8 \times 9 \times 5 \times 7 = 2520$. Any common multiple of 1 to 10 must be a multiple of 2520.

Step 2 — checking the choices against this test: $5040 = 2 \times 2520$, so it is divisible by every integer from 1 to 10. The others (1250, 1430, 820) fail at the divisibility by 9 or 7 or

both, so they are not common multiples.

Step 3 — 5040 is also recognisable as $7! = 1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7$ and is divisible additionally by 8, 9, and 10, confirming it as the required number.

Hence, 5040.

94. Answer: c

Explanation:

Weak acid and strong base is correct.

The pH of a salt solution depends on the relative strengths of the acid and base from which the salt is formed. Salts of a strong acid and strong base (e.g. NaCl) give a neutral solution with pH about 7, because the ions do not hydrolyse. A salt of a strong acid and weak base (e.g. NH_4Cl) is acidic with pH below 7, since the cation hydrolyses to release H^+ ions.

A salt of a weak acid and strong base (e.g. CH_3COONa or Na_2CO_3) is basic with pH above 7, because the anion of the weak acid hydrolyses in water to release OH^- ions. A pH of 12 is distinctly basic, which fits exactly this category. A salt of a weak acid and weak base gives a solution whose pH is close to 7 and depends on the comparative K_a and K_b values — it does not routinely reach 12.

95. Answer: d

Explanation:

3249 is correct.

The equation $\sqrt{1849} \times \sqrt{X} = 2451$ is solved by first evaluating the known square root and then isolating X .

Step 1 – $\sqrt{1849} = 43$, since $43 \times 43 = 1849$.

Step 2 – substituting, $43 \times \sqrt{X} = 2451$, so $\sqrt{X} = \frac{2451}{43} = 57$.

Step 3 – squaring both sides, $X = 57^2 = 3249$.

Checking the other options: $\sqrt{3136} = 56$, $\sqrt{3481} = 59$, $\sqrt{3364} = 58$; multiplied by 43 none of these equals 2451, confirming 3249 as the unique answer.

96. Answer: d

Explanation:

Stem and roots is correct.

Meristem is a tissue of actively dividing undifferentiated plant cells responsible for growth. By location it is classified as apical, lateral, and intercalary. Apical meristem lies at the growing tips of the main plant axis and is responsible for the primary growth that increases the length of the plant.

Two apical meristems operate throughout the life of a flowering plant: the shoot apical meristem at the tip of the main stem (and its branches), which produces leaves, flowers and more stem tissue, and the root apical meristem at the tip of the primary root (and lateral roots), which drives root elongation. Hence apical meristem is found at the top of both the stem and the roots. "Branch and roots" and "leaf and root" are incomplete, and "root" alone misses the shoot apex.

97. Answer: d

Explanation:

6 is correct.

The figure is a large triangle divided by three inner lines into 4 small triangles, with one extra triangle attached at its upper-right vertex.

Step 1 — Small triangles inside the large triangle: the top one, the bottom-left one, the inverted middle one and the bottom-right one = 4.

Step 2 — The large outer triangle itself = 1.

Step 3 — The separate triangle attached at the right = 1.

Total = $4 + 1 + 1 = 6$.

Hence, there are 6 triangles in the figure.

98. Answer: c

Explanation:

Manipur is correct.

Saikhom Mirabai Chanu is an Indian weightlifter born on 8 August 1994 at Nongpok Kakching in the Imphal East district of Manipur. She trains and competes in the women's 48 kg (later 49 kg) weight category and represents India at international events.

At the 2017 World Weightlifting Championships held in Anaheim, California, Mirabai Chanu lifted a total of 194 kg (85 kg snatch and 109 kg clean & jerk) in the women's 48 kg category to win the gold medal, becoming only the second Indian woman after Karnam Malleswari to win a gold at the World Championships. She hails from Manipur, which is also the home state of several leading Indian boxers and weightlifters.

99. Answer: a

Explanation:

53 km/h is correct.

When a train crosses a person moving in the same direction, the distance covered is the length of the train and the effective (relative) speed is the train's speed minus the person's speed, both measured in the same units.

Step 1 — distance to be covered = length of the train = 200 m; time taken = 15 s.

$$\text{Relative speed} = \frac{200}{15} = \frac{40}{3} \text{ m/s.}$$

Step 2 — convert this to km/h using the factor $\frac{18}{5}$: relative speed = $\frac{40}{3} \times \frac{18}{5} = 48$ km/h.

Step 3 — relative speed = (speed of train) - (speed of man) = (speed of train) - 5 = 48, giving speed of train = $48 + 5 = 53$ km/h.

100. Answer: b

Explanation:

48 is correct.

Each letter stands for an arithmetic operation. The letters are replaced by the operations they denote and then the resulting expression is evaluated using the standard order of operations (division and multiplication before addition and subtraction, left to right).

Step 1 — substitute: 42 K 3 Q 9 J 4 T 2 becomes $42 \div 3 + 9 \times 4 - 2$.

Step 2 — perform division and multiplication first: $42 \div 3 = 14$ and $9 \times 4 = 36$, so the expression becomes $14 + 36 - 2$.

Step 3 — perform addition and subtraction from left to right: $14 + 36 = 50$, then $50 - 2 = 48$.