

Answers

1. Answer: b

Explanation:

An assumption is something that the author of the statement has silently taken for granted while making the statement. To test each assumption we ask: does the statement make sense without it?

The notice says 'Read the instructions before entering the swimming pool'. For a person to read a written notice at all, the notice-writer must be presuming that the reader can read — i.e. the person is literate. So assumption I is implicit.

Similarly, the notice can be followed only if the person can see it. Putting up a written notice would be pointless if the intended audience were blind, so the notice-writer is also assuming the reader is not blind. So assumption II is implicit.

Hence, **Both I and II are implicit.**

2. Answer: b

Explanation:

The 'Swasth Bachche, Swasth Bharat' programme is an initiative of the Kendriya Vidyalaya Sangathan (KVS) under the Ministry of Human Resource Development, aimed at building a physical health and fitness profile of every child from Class I to XII in KV schools.

The programme was launched by the then Union HRD Minister Shri Prakash Javadekar on 10 August 2018 from Kochi, Kerala. Under the scheme, physical education teachers record parameters such as height, weight, BMI and stamina in a dedicated Health & Fitness Card for every student.

Hyderabad, Thiruvananthapuram and Mysore are prominent education centres but were not the venue of this launch.

Hence, **Kochi**.

3. Answer: b

Explanation:

Assuming each man does an equal share of work, the total amount of labour (in man-months) needed for the project is fixed. If M_1 men take T_1 months and M_2 men take T_2 months, then $M_1T_1 = M_2T_2$.

Step 1 — Total work originally planned: $120 \times 6 = 720$ man-months.

Step 2 — Let the new strength be M_2 . To finish the same work in 4 months: $M_2 \times 4 = 720 \Rightarrow M_2 = 180$.

Step 3 — Additional men required = $180 - 120 = 60$.

Hence, **60 men**.

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4. Answer: b

Explanation:

To verify a conclusion, it must follow with certainty from the given statements — a possibility is not enough.

Statement 1: only *some* compound walls are white; statement 2: only *some* houses have compound walls. Nothing links the 'some white compound walls' to those 'some houses that have compound walls'. It is possible that the houses in question have compound walls that are not white.

Conclusion 1 — 'The compound walls of some houses are white' — is not guaranteed by the two statements, only allowed as a possibility, so it cannot be verified.

Conclusion 2 — 'The compound walls of all houses are white' — is even stronger; the first statement expressly says only *some* compound walls are white, not all. So this too fails.

Hence, **Both conclusions are false.**

5. Answer: d

Explanation:

Simplify by VBODMAS, starting with the innermost bracket.

Step 1 — Round bracket: division and multiplication left to right, $75 \div 15 \times 4 = 5 \times 4 = 20$, so $15 - 20 = -5$.

Step 2 — Curly bracket: $29 - (-5) = 34$.

Step 3 — Square bracket: $53 - 34 = 19$.

Step 4 — $76 \div 19 = 4$.

Hence, **4**.

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

6. Answer: d

Explanation:

When a person is facing a direction and takes a left turn, they turn 90° anticlockwise. Nishant is initially facing west; a left turn from west makes him face south.

Step 1 — He walks 2 km west, reaching the crossroad which lies to the west of his starting point.

Step 2 — At the crossroad he turns left (now facing south) and walks to the grocery store; the store therefore lies to the south of the crossroad.

Step 3 — Combining the two legs, the grocery store is west of his starting position and south of the crossroad, so overall it is in the south-west direction from the starting position.

Hence, **South-West**.

7. Answer: a

Explanation:

In a partnership, profit is shared in the ratio of each partner's capital multiplied by the time for which it was invested. If capitals are C_1, C_2 and times are T_1, T_2 , then $P_1 : P_2 = C_1T_1 : C_2T_2$.

Step 1 — Poorva's capital-time product: $8000 \times 7 = 56000$.

Step 2 — Durva's capital-time product: $7000 \times 8 = 56000$.

Step 3 — Profit ratio: $56000 : 56000 = 1 : 1$.

Hence, **1 : 1**.

8. Answer: b

Explanation:

The National Film Awards are the highest film awards conferred by the Directorate of Film Festivals under the Ministry of Information and Broadcasting, Government of India.

At the 64th National Film Awards, presented in 2017 for films released during 2016, the Rajat Kamal for Best Actor was jointly awarded to Akshay Kumar for his portrayal of naval officer Rustom Pavri in Tinu Suresh Desai's *Rustom*, and to Manoj Bajpayee for *Aligarh*.

Airlift (2016) earned Akshay critical acclaim but no National Film Award; Naam Shabana (2017) and Baby (2015) were also outside this year's Best Actor citation.

Hence, **Rustom**.

9. Answer: a

Explanation:

For any calendar problem, count the number of odd days — the remainder when the total number of days between the two dates is divided by 7 — and advance the given weekday by that number.

Step 1 — From 25 January 2018 to 25 January 2019 is 365 days (2018 is not a leap year). $365 \bmod 7 = 1$, so 25 Jan 2019 is one day after Thursday, i.e. Friday.

Step 2 — From 25 January 2019 to 25 June 2019, count month by month: Feb 28 + Mar 31 + Apr 30 + May 31 = 120 days from 25 Jan to 25 May, plus 31 more to 25 Jun gives 151. $151 \bmod 7 = 4$, so 25 Jun 2019 is Friday + 4 days = Tuesday.

Step 3 — Cross-check with the direct total: from 25 Jan 2018 to 25 Jun 2019 is $365 + 151 = 516$ days, and $516 = 73 \times 7 + 5$, so there are 5 odd days. Thursday + 5 days = Tuesday, which agrees with Step 2.

Hence, **Tuesday**.

10. Answer: a

Explanation:

To choose the correct Venn diagram, first work out how the three sets are related.

The liver and the heart are both distinct organs of the human body; no liver is a heart and no heart is a liver, so the two sets are mutually exclusive.

Both liver and heart are subsets of the broader category 'Organs' — every liver is an organ, every heart is an organ, but not every organ is a liver or a heart.

The correct diagram therefore shows one large circle labelled 'Organs' containing two smaller, non-overlapping circles labelled 'Liver' and 'Heart'.

Hence, the Venn diagram with two separate, non-overlapping circles (Liver, Heart) inside a larger circle (Organs).

11. Answer: d

Explanation:

A GEC or General Entertainment Channel is a television channel that broadcasts a mixed slate of serials, reality shows and non-news entertainment programming.

'Comedy Nights Live' is a stand-up and celebrity chat show that premiered on 24 January 2016. It was produced by Viacom18 and telecast on the Hindi GEC Colors as a successor to the earlier 'Comedy Nights with Kapil'.

Comedy Central is an English-language comedy channel, Sony TV aired shows like 'Kapil Sharma Show' and 'Comedy Circus' but not 'Comedy Nights Live', and Star TV network did not broadcast the show.

Hence, Colors.

12. Answer: b

Explanation:

When resistors are joined in series, the same current passes through each of them and the total potential drop is the sum of the individual drops. The effective (equivalent) resistance is therefore the sum of the individual resistances: $R_{\text{eq}} = R_1 + R_2 + R_3 + \dots$

Step 1 – Add the three given resistances: $R_{\text{eq}} = 10 \, \Omega + 8 \, \Omega + 7 \, \Omega$.

Step 2 – $R_{\text{eq}} = 25 \, \Omega$.

The unit of resistance is the ohm (Ω), not pascal (pressure), joule (energy) or newton (force), so the other options are dimensionally wrong.

Hence, **25 Ω** .

13. Answer: c

Explanation:

Take the cistern capacity as the LCM of the two times: 45 units. The inlet alone fills $45/11.25 = 4$ units per hour and the outlet alone empties $45/22.5 = 2$ units per hour.

Step 1 – Each two-hour cycle (one hour inlet, one hour outlet) adds $4 - 2 = 2$ units net.

Step 2 – After 20 such cycles, i.e. 40 hours, the cistern holds 40 units. In hour 41 the inlet raises it to 44 units; in hour 42 the outlet reduces it to 42 units.

Step 3 – Hour 43 is an inlet hour. The remaining 3 units fill at 4 units per hour in $\frac{3}{4}$ hour = 45 minutes. Total time = 42 h 45 min.

Hence, **42 hours 45 minutes**.

14. Answer: c

Explanation:

Break the series into two interleaved sub-series, one at the odd positions and one at the even positions, and study each on its own.

Odd-position terms (1st, 3rd, 5th, ...): 12B, 14C, 16D. Numbers increase by 2 (12, 14, 16), letters advance by 1 (B, C, D). The next odd-position term would be 18E, but that is position 7, not 6.

Even-position terms (2nd, 4th, 6th): 2P, 4O, ?. Numbers increase by 2 (2, 4, ...), letters step backward by 1 (P, O, N). So the 6th term is 6N.

Among the options, 18E fits an odd position (7th, not 6th), 6E and 6Q do not match the number-up letter-down pattern, and 6N is the only correct continuation.

Hence, 6N.

15. **Answer: a**

Explanation:

A strong argument must be directly related to the question, factually reasonable and weigh heavily in favour of or against the course of action proposed. Weak arguments are trivial, tangential or based on individual preference.

The statement asks whether citizens should be educated through national television about the health hazards of carbonated beverages.

Argument I — 'Yes, they pose more risk to health'. Excess consumption of carbonated drinks is linked to obesity, diabetes and dental problems, and using the widest reach medium (national television) to alert citizens is directly relevant. This is a strong argument.

Argument II — 'No, they are popular and their trade is extensive'. Commercial popularity is not a reason to withhold health information; it may even be an additional reason to inform citizens. So this argument is weak.

Hence, **Only argument I is strong.**

16. Answer: a

Explanation:

Linear momentum is defined as the product of an object's mass and its velocity: $p = mv$. Its SI unit is therefore the product of the SI unit of mass with the SI unit of velocity.

Step 1 – SI unit of mass is kilogram (kg); SI unit of velocity is metre per second (m/s).

Step 2 – SI unit of momentum = $\text{kg} \times \text{m/s} = \text{kg m/s}$. In dimensional form: $[p] = [MLT^{-1}]$.

The option g-m/s uses the CGS mass unit, kg-cm/s uses CGS length, and kg-m/s^2 is actually the SI unit of force (newton). None of these is the SI unit of momentum.

Hence, Kg-m/s.

17. Answer: b

Explanation:

The Highest Common Factor of a set of numbers is the product of the prime factors that appear in every number, each taken with the lowest exponent to which it appears.

Step 1 – Prime-factorise each number: $175 = 5^2 \times 7$, $63 = 3^2 \times 7$, $147 = 3 \times 7^2$.

Step 2 – The only prime that appears in all three factorisations is 7. Its lowest exponent is 1.

Step 3 – Therefore $\text{HCF}(175, 63, 147) = 7$.

21 divides 63 and 147 but not 175; 63 does not divide 175; 14 does not divide 63. Only 7 divides all three.

Hence, 7.

18. Answer: a

Explanation:

The Asian Games are a continental multi-sport event held every four years under the Olympic Council of Asia (successor to the Asian Games Federation, AGF, founded in 1949 at New Delhi).

At the time of the first Asian Games in New Delhi in 1951, Pandit Jawaharlal Nehru, who took a keen personal interest in the Games, coined the two-word motto *Ever Onward*. The AGF officially adopted it as the motto of the Asian Games.

'Sports Ever', 'Sporting Together' and 'Keep up the Spirits' are not mottos of the Asian Games; they are distractor phrases.

Hence, **Ever Onward**.

19. Answer: a

Explanation:

After fertilisation in the fallopian tube, the zygote undergoes repeated cell divisions to form a blastocyst as it moves towards the uterus. Around the sixth to seventh day after fertilisation, the blastocyst attaches to the wall of the uterus in a process called implantation.

The inner lining of the uterus, called the endometrium, thickens under the influence of oestrogen and progesterone in preparation for this event. The blastocyst embeds itself into this endometrial lining, where the developing embryo receives nutrients and oxygen through the placenta that later forms.

The vagina is the birth canal, the ovaries produce the ova, and the cervix is the narrow lower part of the uterus that opens into the vagina; none of these is the site of implantation.

Hence, Uterus.

20. Answer: d

Explanation:

In trapezium ABCD, AB and CD are the parallel sides and AD, BC are the non-parallel sides (legs). E and F are the midpoints of the legs.

By the mid-segment theorem for a trapezium, the segment joining the midpoints of the legs is parallel to the parallel sides and its length is the average of their lengths.

$$\text{So } EF = \frac{1}{2}(AB + CD).$$

$$\text{Hence, } \frac{1}{2}(AB + CD).$$

21. Answer: a

Explanation:

Early attempts to classify the elements looked for periodicity in their properties when arranged in some systematic order of atomic mass.

In 1865 the British chemist John Alexander Reina Newlands, arranging the then-known elements in order of increasing atomic mass, observed that the properties of every eighth element resembled those of the first. Drawing an analogy with the seven notes of a musical scale that repeat at the octave, he called this the *Law of Octaves*.

Dobereiner's Law of Triads (1817) grouped elements in threes where the middle atomic mass was the arithmetic mean of the other two; Mendeleev's periodic law (1869) arranged elements by atomic mass in a full periodic table; Moseley's modern periodic law (1913) arranged elements by atomic number.

Hence, Newlands law of octaves.

22. Answer: c

Explanation:

Split the 89 customers into those who bought exactly one, exactly two and all three colours.

Step 1 — Exactly two colours: $20 + 10 + 15 = 45$ customers. All three colours: 19 customers.

Step 2 — Customers who bought more than one colour $= 45 + 19 = 64$.

Step 3 — Only one colour $= 89 - 64 = 25$.

Hence, **25**.

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

23. Answer: b

Explanation:

Use the two-set inclusion-exclusion formula. If M is the set of students who took Mathematics and B the set who took Biology, then $n(M \cup B) = n(M) + n(B) - n(M \cap B)$.

Step 1 — Total interviewed $= 75$. Students who took at least one of the two subjects $= 75 - 12 = 63$, since 12 took neither.

Step 2 — Substitute in the formula: $63 = 39 + 32 - n(M \cap B)$.

Step 3 — Solve: $n(M \cap B) = 39 + 32 - 63 = 8$.

Hence, 8.

24. Answer: d

Explanation:

Yuzvendra Chahal, the leg-spinner from Haryana, is the first Indian bowler to take five wickets in a Twenty20 International innings.

He returned figures of 6 for 25 in 4 overs against England at the M. Chinnaswamy Stadium, Bengaluru on 1 February 2017. His six-wicket burst restricted England to 127 and helped India win the match and series.

Ishant Sharma is a Test-format pace bowler, R. Ashwin is a leading Test off-spinner who had not achieved a T20I five-wicket haul at the time, and Ravindra Jadeja's best T20I figures were lower.

Hence, **Yuzvendra Chahal**.

25. Answer: a

Explanation:

During reproduction, the process of DNA copying generates small differences (variations) among offspring. In sexual reproduction, the shuffling and combining of chromosomes from two parents produces even greater variation. When these variations arise in the germ cells (ova or sperm), they enter the zygote and are passed on to the next generation.

Because such variations are carried in the DNA that offspring receive from their parents, they are said to be inherited. Inherited variations form the raw material on which natural selection acts, driving evolution.

Words such as 'altered', 'reduced' and 'modified' may describe what happens to a variation later, but they do not capture the essential feature that variations produced during reproduction are transmitted from parent to progeny.

Hence, **Inherited**.

26. Answer: a

Explanation:

A lateral mirror image is the reflection produced by a vertical mirror placed to the left or right of the word. In such a reflection the order of the letters is reversed from left to right, and every individual letter is itself flipped horizontally (its right side becomes its left side and vice versa).

Applying this to the word IMAGE, the letters written from right to left become E, G, A, M, I, and each letter is drawn in its own laterally reversed form. On comparing this reversed and flipped rendering with the four figure options, only figure **B** shows the letters both in reverse order and with the correct lateral flip on every individual letter.

Hence, **B**.

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27. Answer: a

Explanation:

Fix the starting point as the origin and track Pavitra's movement on a coordinate grid where east is the positive x-axis and north is the positive y-axis. She first walks 500 m east, reaching the point (500, 0).

She turns left, which means she is now facing north, and covers 700 m to reach (500, 700). Turning left again makes her face west, and after walking 500 m westward she arrives at (0, 700).

The straight-line distance from this final position to the starting origin is $\sqrt{0^2 + 700^2} = 700$ m, because the east and west displacements exactly cancel and only the northward 700 m remains.

Hence, **700 metres**.

28. Answer: d

Explanation:

Step 1 — Use the mean condition. The mean of the five numbers 3, 4, a , b , 10 equals 6, so their sum is $5 \times 6 = 30$. Therefore $3 + 4 + a + b + 10 = 30$, which gives $a + b = 13$.

Step 2 — Use the median condition. For an odd count of five numbers the median is the middle value after sorting. The median is 5, and the known values are 3, 4, 10, so the sorted arrangement must be 3, 4, 5, ?, 10 with 5 sitting in the third position. This forces one of a or b to be 5, and since $a < b$, the smaller one is $a = 5$.

Step 3 — Solve for b using $a + b = 13$, giving $b = 13 - 5 = 8$. Checking, the sorted list 3, 4, 5, 8, 10 has sum 30 (mean 6) and middle value 5, satisfying both conditions.

Hence, **5, 8**.

29. Answer: a

Explanation:

Write the alphabet position of each letter of NEAT and compare it with the code 3409: N = 14, E = 5, A = 1, T = 20.

Subtract 1 from each position and keep only the units digit: N: $14 - 1 = 13 \rightarrow 3$; E: $5 - 1 = 4$; A: $1 - 1 = 0$; T: $20 - 1 = 19 \rightarrow 9$. This gives 3409, so the rule is confirmed.

Apply the same rule to LEARN: L = 12 $\rightarrow$ 11 $\rightarrow$ 1; E = 5 $\rightarrow$ 4; A = 1 $\rightarrow$ 0; R = 18 $\rightarrow$ 17 $\rightarrow$ 7; N = 14 $\rightarrow$ 13 $\rightarrow$ 3.

Writing the digits in order gives 1, 4, 0, 7, 3.

Hence, **14073**.

30. Answer: d

Explanation:

Acceleration is defined as the rate of change of velocity with time. Velocity has SI units of metre per second (m/s), and dividing metre per second by second gives metre per second squared.

Written in exponent form, m/s divided by s is $\frac{\text{m}}{\text{s}^2}$, which is expressed compactly as ms^{-2} . Among the options, only ms^{-2} matches this dimensional form, while ms is the unit of a length-time product, m^{-1} is reciprocal length and ms^2 would raise time to the wrong power.

Hence, ms^{-2} .

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31. Answer: c

Explanation:

Split each number into its non-zero digits and the runs of zeros between them.

100300005 = 1, two zeros, 3, four zeros, 5. The pattern is: first digit k, then (k + 1) zeros, then k + 2, then (k + 3) zeros, then k + 4. For k = 1 this gives 1, 00, 3, 0000, 5, which fits.

4000006000000008 = 4, five zeros, 6, seven zeros, 8, which fits for k = 4. 2000400000 = 2, three zeros, 4, five zeros, which follows the k = 2 zero counts (3 and 5).

$300040006 = 3$, three zeros, 4, two zeros, 6. For $k = 3$ the pattern needs 3, four zeros, 5, six zeros, 7, so both its digits and its zero counts break the pattern.

Hence, **300040006**.

32. Answer: a

Explanation:

Step 1 — Estimate the square root's size. Because $200^2 = 40000$ and $300^2 = 90000$, the square root of 60025 lies between 200 and 300.

Step 2 — Use the last digit as a filter. The number 60025 ends in 5, and any integer whose square ends in 5 must itself end in 5. This narrows the candidate list to 245, 255, 265 and 275, which are exactly the four options.

Step 3 — Compute directly. $245^2 = 245 \times 245 = 60025$, since $(250 - 5)^2 = 62500 - 2500 + 25 = 60025$. The other three candidates give $255^2 = 65025$, $265^2 = 70225$ and $275^2 = 75625$, none of which equal 60025.

Hence, **245**.

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33. Answer: d

Explanation:

Step 1 — Break the original 20-litre mixture into its parts. Milk makes up $\frac{4}{5}$ of the mixture, so milk $= \frac{4}{5} \times 20 = 16$ litres and the remaining 4 litres is water.

Step 2 — Add the extra water. Adding 5 litres of water keeps the milk quantity unchanged at 16 litres, while water rises to $4 + 5 = 9$ litres. The new total volume is $20 + 5 = 25$ litres.

Step 3 — Convert milk to a percentage of the new total. Milk percentage = $\frac{16}{25} \times 100 = 64\%$. The distractor 75% would occur before the water addition, while 44% and 36% come from mixing up milk with water.

Hence, **64**.

34. Answer: a

Explanation:

Step 1 — Rates: pipe A fills $\frac{1}{1.5} = \frac{2}{3}$ of the cistern per hour and pipe B empties $\frac{1}{2.4} = \frac{5}{12}$ per hour.

Step 2 — One two-hour cycle (A then B) adds $\frac{2}{3} - \frac{5}{12} = \frac{1}{4}$ of the cistern.

Step 3 — Before each A-hour, check whether A can finish the cistern within that hour. At the start: 0, and A adds only $\frac{2}{3}$. After one cycle (2 h) the level is $\frac{1}{4}$, and $\frac{1}{4} + \frac{2}{3} = \frac{11}{12} < 1$. After two cycles (4 h) the level is $\frac{1}{2}$, and now $\frac{1}{2} + \frac{2}{3} > 1$, so the cistern fills during the fifth hour.

Step 4 — A needs $\frac{1/2}{2/3} = \frac{3}{4}$ hour for the remaining half. Total time = $4 + 0.75 = 4.75$ hours.

Hence, **4.75 hours**.

Note: The official answer key gives 6.375 hours, which counts three full cycles before letting pipe A finish; but the cistern is already full at 4.75 hours, during the fifth hour, so 4.75 hours is the correct answer.

35. Answer: c

Explanation:

Step 1 — Innermost bracket: $3^5 = 243$ and $9 \times 3 = 27$, so $243 \div 27 = 9$ and $41 - 9 = 32$.

Step 2 — Curly bracket: $49 - 32 = 17$.

Step 3 — Square bracket: $85 \div 17 = 5$.

Step 4 — $74 - 5 = 69$.

Hence, **69**.

36. Answer: b

Explanation:

The First Carnatic War (1746–1748) was fought between the French and English trading companies on the Coromandel coast as an extension of the European War of Austrian Succession. Under Governor Joseph-François Dupleix at Pondicherry, the French forces under La Bourdonnais laid siege to the English settlement and captured it in September 1746.

The captured settlement was Madras (present-day Chennai), the principal English factory on the Coromandel coast. It remained under French control until it was restored to the English by the Treaty of Aix-la-Chapelle in 1748. Pondicherry itself was already the French headquarters, Hyderabad was ruled by the Nizam, and Bombay was on the western coast far from the Carnatic theatre.

Hence, **Madras**.

37. Answer: a

Explanation:

Let the weight of one cup (with its rice) be c grams; the total for 10 cups is $10c$.

Statement 1 — half of each cup weighs 200 g, so $c = 400$ and the total is 4000 g. Statement 1 alone is sufficient.

Statement 2 — 4 cups weigh 800 g more than 2 cups, so $2c = 800$, $c = 400$ and the total is 4000 g. Statement 2 alone is also sufficient.

Hence, **Each statement alone is sufficient.**

38. Answer: a

Explanation:

Find the common difference between consecutive terms in the sequence 34, 46, 58, 70. Compute $46 - 34 = 12$, $58 - 46 = 12$ and $70 - 58 = 12$.

Every gap is 12, so this is an arithmetic progression with first term 34 and common difference 12. The next term is obtained by adding 12 once more to the last known term: $70 + 12 = 82$.

The other options 80, 81 and 78 come from adding a wrong constant such as 10, 11 or 8, none of which matches the observed gap of 12.

Hence, **82**.

39. Answer: d

Explanation:

Downstream speed = $12 + 8 = 20$ km/h and upstream speed = $12 - 8 = 4$ km/h.

For the same distance d each way, total time = $\frac{d}{20} + \frac{d}{4} = \frac{6d}{20} = \frac{3d}{10}$.

Average speed = $\frac{2d}{\frac{3d}{10}} = \frac{20}{3}$ km/h.

Hence, $\frac{20}{3}$ km/hr.

40. Answer: b

Explanation:

Ultrasound waves are sound waves with frequencies above the human hearing range (above 20 kHz). Their industrial uses rely on their high frequency, short wavelength and ability to carry concentrated mechanical energy in solids and liquids.

Typical industrial applications include ultrasonic cleaning, where high-frequency vibrations dislodge dirt in cleaning tanks; ultrasonic machining, which uses vibrations of a shaped tool to drill or cut precise holes in hard, brittle materials; and non-destructive testing, where reflected pulses reveal cracks or voids inside metals.

Removing pesticides from a plant's body is not an established industrial application of ultrasound. Pesticides are washed off by chemical or mechanical methods rather than by ultrasonic waves, and this option lies outside the standard list of ultrasound uses.

Hence, Ultrasonic removal of pesticides from a plant's body.

41. Answer: b

Explanation:

The concentration of H^+ ions released in aqueous solution depends on how completely an acid dissociates in water. Strong acids ionise almost fully and release a large amount of H^+ , while weak acids ionise only partially and release far fewer H^+ ions at the same concentration.

Sulphuric, hydrochloric and nitric acids are all classified as strong mineral acids that dissociate nearly completely in water. Acetic acid (CH_3COOH) is a weak organic acid whose ionisation constant is small, so only a tiny fraction of its molecules break into H^+ and CH_3COO^- ions at any moment.

Because of this partial ionisation, acetic acid supplies far fewer hydrogen ions than the three strong acids in the list, and hence produces a much less acidic solution at the same concentration.

Hence, **Acetic acid**.

42. Answer: b

Explanation:

The Sports Authority of India (SAI) is the apex national sports body of the Government of India, functioning under the Ministry of Youth Affairs and Sports. It was set up to administer, promote and develop sports across the country and to identify and train talented athletes.

SAI was established in 1984 in the aftermath of the 1982 Asian Games held in New Delhi, so that the sports infrastructure created for those Games could be maintained and used for long-term sports development. It merged with the Society for the National Institute of Physical Education and Sports (SNIPES) in 1987, but its year of establishment remains 1984.

The other options refer to nearby years but do not match SAI's founding year: 1983 predates the Games, 1987 is the year of the SNIPES merger, and 1990 is unrelated.

Hence, **1984**.

43. Answer: a

Explanation:

Identify the relationship between the first pair, Skin and Hair. Hair grows out of the skin as a slender outgrowth that covers and belongs to it; hair is the natural growth on the surface of skin. The analogy asks for what plays the same role for Land as hair does for skin.

Land is the ground's surface, and the natural covering that grows out of it is grass. Grass grows on land the same way hair grows on skin, both being thin, closely spaced natural outgrowths from a surface.

The other options do not fit the same relation: ore and mineral are found inside the land rather than growing on it, and dust rests on land but is not a growth or covering that comes from it.

Hence, **Grass**.

44. Answer: c

Explanation:

Electrons in an atom occupy shells labelled K, L, M, N and so on, corresponding to the principal quantum number $n = 1, 2, 3, 4, \dots$. The maximum number of electrons that a shell of principal quantum number n can hold is given by $2n^2$ (Bohr-Bury scheme).

The L shell corresponds to $n = 2$. Substituting, the maximum capacity is $2 \times 2^2 = 2 \times 4 = 8$ electrons. These 8 electrons occupy two subshells, 2s (2 electrons) and 2p (6 electrons).

Using the same rule, K ($n = 1$) holds 2 electrons, M ($n = 3$) holds 18 and N ($n = 4$) holds 32; those figures appear as distractors in the option list.

Hence, **8**.

45. Answer: d

Explanation:

Step 1 — Set up the equation. Let the unknown fraction be x . Then $\frac{3}{4} - x = \frac{5}{12}$, so $x = \frac{3}{4} - \frac{5}{12}$.

Step 2 — Bring the two fractions to a common denominator. The LCM of 4 and 12 is 12, so $\frac{3}{4} = \frac{9}{12}$ and the subtraction becomes $\frac{9}{12} - \frac{5}{12} = \frac{4}{12}$.

Step 3 — Reduce to lowest terms. $\frac{4}{12} = \frac{1}{3}$. Verify: $\frac{3}{4} - \frac{1}{3} = \frac{9-4}{12} = \frac{5}{12}$, matching the required result.

Hence, $\frac{1}{3}$.

46. Answer: b

Explanation:

The Khalji (Khilji) dynasty was the second dynasty of the Delhi Sultanate, replacing the Slave (Mamluk) dynasty in 1290 CE. It ruled for about three decades until 1320 CE and marked a period of major territorial expansion into southern India.

The founder and first ruler of the Khalji dynasty was Jalal-ud-din Firoz Khalji, who assumed the throne of Delhi in 1290 after the fall of the Slave dynasty. Ala-ud-din Khalji was his nephew and son-in-law who succeeded him in 1296 and became the most famous ruler of the dynasty. Malik Kafur was Ala-ud-din's general and never a ruler, while Balban belonged to the earlier Slave dynasty.

Hence, Jalal-ud-din Firoz Khalji.

47. Answer: d

Explanation:

The outer layer of the young root (the epidermis) has certain cells that extend outward as long, thin, hair-like projections. These outgrowths are single-celled tubular extensions of epidermal cells in the root's zone of maturation.

These structures are called root hair. Their function is to greatly increase the surface area of the root available for absorption of water and mineral ions from the soil, and each root hair is in close contact with soil particles for efficient uptake.

Root nails and root villi are not standard botanical terms, and root tracheids denote water-conducting cells inside the vascular tissue, not surface projections. Only root hair matches the description of long, hair-like extensions of root cells.

Hence, **Root hair**.

48. Answer: d

Explanation:

The boxes A to E hold the letters E, I, A, K and O.

E, I, A and O are vowels, while K is a consonant.

So the letter in box D breaks the rule followed by the other four.

Hence, **D**.

49. Answer: b

Explanation:

The clue combines a Sahitya Akademi Award, a Padma Bhushan and a set of well-known works featuring a central character named "Rusty". The Rusty stories are a semi-autobiographical set of novels and short stories set in the hill towns of North India.

Their author is Ruskin Bond, an English-language Indian writer based in Mussoorie. He wrote "The Room on the Roof" in his teens (Rusty's debut) and later "Vagrants in the Valley", both centred on the young boy Rusty. He received the Sahitya Akademi Award in 1992 for "Our Trees Still Grow in Dehra" and the Padma Bhushan in 2014, matching every biographical detail in the stem.

The other options do not fit: Aniruddha Bahal is a journalist–novelist known for "Bunker 13", Salman Rushdie writes very different novels such as "Midnight's Children", and Chetan Bhagat is a contemporary popular novelist with no Rusty character.

Hence, **Ruskin Bond**.

50. Answer: a

Explanation:

February 20 is observed internationally to draw attention to the pursuit of social justice, focusing on issues such as poverty, gender inequality, unemployment, discrimination and access to social protection. It was proclaimed by the United Nations General Assembly in 2007 and has been observed annually from 2009 onward.

The day is called the World Day of Social Justice, and each year the United Nations picks a theme highlighting one dimension of social justice, such as decent work, closing inequalities or fair globalisation. It is not a national commemoration but a UN-designated international observance.

Central Excise Day in India falls on February 24, World Heritage Day is observed on April 18 and World Water Day is on March 22, so none of these matches February 20.

Hence, **World Day of Social Justice**.

51. Answer: d

Explanation:

When iron is heated strongly in the presence of air (oxygen), it burns to give sparkles and forms a reddish-brown solid, which is iron(III) oxide. The balanced chemical equation for this combustion is: $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$.

Here iron is oxidised from the 0 state to the +3 state and oxygen is reduced, giving the stable oxide ferric oxide, Fe_2O_3 . The other formulae in the options are chemically invalid: Fe_3O_2 , Fe_2O and FeO_3 do not correspond to any real oxide of iron because they violate the +2 or +3 oxidation states iron adopts in binary oxides.

Hence, Fe_2O_3 .

52. Answer: c

Explanation:

Article 359 of the Constitution allows the President to suspend the enforcement of Fundamental Rights during a national emergency, but Article 359(1) itself excludes Articles 20 and 21 from any such suspension. Article 21, which guarantees the Right to Life and Personal Liberty, therefore cannot be suspended even during an emergency (this was made explicit by the 44th Constitutional Amendment, 1978).

The Right to Freedom of Movement and the Right to Freedom of Speech and Expression fall under Article 19 and stand automatically suspended when an emergency is proclaimed on grounds of war or external aggression. The Right to Equality (Article 14) can also be suspended along with other rights by a Presidential order under Article 359. Only the Right to Life stays protected under every circumstance.

Hence, **Right to Life**.

53. Answer: b

Explanation:

Step 1 — The unit digit of 4624 is 4, so the square root must end in either 2 or 8, because $2^2 = 4$ and $8^2 = 64$. This narrows the choice to 62, 68 or 72 (78 ends in 8 but is too large; check below).

Step 2 — Strip the last two digits and look at 46. Since $6^2 = 36$ and $7^2 = 49$, the tens digit of the root lies between 6 and 7, so it is 6.

Step 3 — Combining a tens digit of 6 with a unit digit of 2 or 8 gives 62 or 68. Verify: $62^2 = 3844$ and $68^2 = 4624$. So $\sqrt{4624} = 68$.

Hence, 68.

54. Answer: d

Explanation:

Concept — By Newton's second law of motion, the acceleration produced in a body equals the applied net force divided by the body's mass: $a = \frac{F}{m}$. The SI unit of acceleration is metre per second squared, written as m s^{-2} .

Step 1 — Given $F = 350 \text{ N}$ and $m = 500 \text{ kg}$, substitute in the formula: $a = \frac{350}{500} = 0.7 \text{ m s}^{-2}$.

Step 2 — The unit for acceleration must carry the exponent -2 on seconds, so options with m s^2 , m s^1 or m s^{-1} (which is speed) are dimensionally wrong.

Hence, 0.7 m s^{-2} .

55. Answer: c

Explanation:

The National Investment and Infrastructure Fund (NIIF), set up by the Government of India in 2015, was designed to attract long-term overseas capital into Indian infrastructure. In 2017, the Abu Dhabi Investment Authority (ADIA), the sovereign wealth fund of the emirate of Abu Dhabi, signed a partnership deal with NIIF and became its first institutional investor.

Under the agreement ADIA committed to invest up to USD 1 billion in NIIF's Master Fund, taking a direct stake in the fund and unlocking a large pool of overseas capital for Indian roads, ports, power and other core infrastructure projects. The Israel, France and Dubai investment authorities were not party to this particular deal.

Hence, The Abu Dhabi Investment Authority (ADIA).

56. Answer: b

Explanation:

The four terms are 18R, 2B, 5E and 16P. In each term the number is the alphabet position of its letter ($R = 18$, $B = 2$, $E = 5$, $P = 16$), so all four share that rule.

Now compare the numbers: 18, 2 and 16 are even, while 5 is odd.

So 5E, in column C, is the odd one.

Hence, C.

57. Answer: b

Explanation:

Silver chloride, AgCl , is a white crystalline salt that is highly sensitive to light. When exposed to sunlight it undergoes a photochemical decomposition reaction in which

the silver ions are reduced to fine grains of metallic silver and chlorine gas is released. The equation is: $2\text{AgCl} \xrightarrow{\text{sunlight}} 2\text{Ag} + \text{Cl}_2$.

These tiny particles of freshly formed silver metal appear grey and darken to brown, giving the sample its characteristic brown-grey colour. This is one of the classic photochemical reactions and forms the basis of black-and-white photography. The other options are chemically incorrect: no silver oxide, silver oxalate or free silver ion is formed in this reaction.

Hence, **Silver metal**.

58. Answer: a

Explanation:

Arvind Subramanian, an internationally recognised economist, served as the 16th Chief Economic Adviser (CEA) to the Government of India from 16 October 2014 to 20 June 2018. He worked in the Ministry of Finance, advised the government on macroeconomic policy, and was the principal author of the annual Economic Survey of India.

He tendered his resignation citing personal reasons and returned to academic life in the United States; he was later succeeded by Krishnamurthy Subramanian. Manmohan Singh had served as CEA in the 1970s, C. Rangarajan far earlier as well, and Urjit Patel was the Governor of the Reserve Bank of India till late 2018, not the CEA.

Hence, **Arvind Subramanian**.

59. Answer: a

Explanation:

Concept — When an expression contains both $\sin \theta$ and $\cos \theta$ and only $\tan \theta$ is given, divide the numerator and denominator by $\cos \theta$. Every sine term becomes $\tan \theta$ and every cosine term becomes 1, converting the expression to a simple algebraic form.

Step 1 — Divide numerator and denominator of $\frac{12 \sin \theta - 5 \cos \theta}{12 \sin \theta + 5 \cos \theta}$ by $\cos \theta$ to get $\frac{12 \tan \theta - 5}{12 \tan \theta + 5}$.

Step 2 — Substitute $\tan \theta = \frac{5}{6}$: $12 \times \frac{5}{6} = 10$. So the expression becomes $\frac{10 - 5}{10 + 5} = \frac{5}{15} = \frac{1}{3}$.

Hence, $\frac{1}{3}$.

60. Answer: b

Explanation:

The terms are ©, ©©, ®, ?. The odd-numbered terms show a single symbol, and each even-numbered term repeats the previous symbol with a circle ○ added on its left.

The symbol changes from © to ® after every pair of terms, so the third term is ® and the fourth term must be ® with a circle on its left, i.e. ○®.

Figure B shows ○®.

Hence, B.

61. Answer: d

Explanation:

To test whether a conclusion follows a statement, use only the information explicitly given in the statement. Do not introduce assumptions from outside. The statement

here says that a music teacher selects only a few boys and girls from the class for a group performance.

Conclusion I says those who are not selected do not sing. Non-selection for one particular group performance says nothing about a student's overall ability to sing; many capable singers may be left out for reasons unrelated to talent, so I does not follow. Conclusion II says the teacher supports only those he selected. Selection for a performance is not the same as extending support in general, and the statement makes no claim about the teacher's broader attitude, so II does not follow either.

Hence, **Neither I nor II follows.**

62. Answer: b

Explanation:

Concept — When both factors of a known product are scaled by powers of ten, the product scales by the sum of those powers. Track how many places the decimal point moves in each factor and shift the decimal point of the known product by the net movement.

Step 1 — Rewrite 1700 as $17 \times 100 = 17 \times 10^2$ and 0.0029 as 29×10^{-4} . So $1700 \times 0.0029 = (17 \times 29) \times 10^2 \times 10^{-4} = 493 \times 10^{-2}$.

Step 2 — Multiplying 493 by 10^{-2} shifts the decimal point two places to the left: $493 \times 10^{-2} = 4.93$.

Hence, **4.93**.

63. Answer: a

Explanation:

Concept — The linear magnification of a mirror is defined as $m = \frac{h_i}{h_o} = -\frac{v}{u}$, where h_i is image height, h_o is object height, v is image distance and u is object distance measured with the sign convention.

A virtual image is formed behind the mirror and is always erect. Since the object is above the principal axis and the virtual image is also above it (erect), h_i and h_o have the same sign, which makes their ratio positive. So the magnification of a mirror producing a virtual and erect image is positive.

A real image, by contrast, is inverted and gives a negative magnification. Zero and infinite magnification correspond to special limiting cases (object at infinity and object at focus of a concave mirror) and do not describe virtual erect images in general.

Hence, **Positive**.

64. **Answer: c**

Explanation:

The amount of water vapour present in the air is called humidity. When the air at a place carries a large amount of moisture, that atmosphere is described as humid. Coastal locations such as Visakhapatnam and Kolkata and the Meghalaya station Cherrapunji, which lies on the windward slope of the Khasi Hills and receives one of the highest rainfalls in the world, all record consistently high humidity through most of the year.

The other terms describe unrelated conditions. Rancid describes food that has started to spoil, not the state of the atmosphere. Hot refers to temperature only and can occur in dry deserts too. Cool refers to a low temperature and again says nothing about water vapour content.

Hence, **Humid**.

65. Answer: b

Explanation:

For roots α, β of $x^2 - 2x - 1 = 0$: $\alpha + \beta = 2$ and $\alpha\beta = -1$.

Step 1 — Sum of the new roots: $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta = 4 + 2 = 6$.

Step 2 — Product of the new roots: $\alpha^2\beta^2 = (\alpha\beta)^2 = 1$.

Step 3 — The required equation is $x^2 - 6x + 1 = 0$.

Hence, $x^2 - 6x + 1 = 0$.

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

66. Answer: c

Explanation:

The terms are $\star\blacktriangleleft, \blacktriangle\star, \star\blacktriangleright, ?$. The triangle turns 90° clockwise at each step: left, up, right, so the next is down ($\blacktriangledown$).

The star alternates sides: left, right, left, so the next star is on the right.

The fourth term is therefore $\blacktriangledown\star$, which is figure D.

Hence, D.

67. Answer: d

Explanation:

Concept — Work done by a constant force is defined as $W = F \cdot d \cdot \cos \theta$, where F is the magnitude of the force, d is the magnitude of the displacement and θ is the angle between the force and the displacement vectors.

When displacement is in the same direction as the force, $\theta = 0^\circ$, so $\cos \theta = +1$ and the work done is positive. When the displacement is perpendicular to the force, $\theta = 90^\circ$, so $\cos \theta = 0$ and the work done is zero. When the displacement is opposite to the force, $\theta = 180^\circ$, so $\cos \theta = -1$ and the work done is negative. If the applied force produces no displacement, then $d = 0$ and again the work is zero.

Hence, the displacement is in the direction of force.

68. Answer: d

Explanation:

Nuclear fusion is the process in which two light atomic nuclei combine to form a heavier nucleus, releasing enormous amounts of energy. It requires extremely high temperatures (of the order of tens of millions of degrees) and very high pressures so that the positively charged nuclei can overcome their mutual electrostatic repulsion.

These conditions exist naturally in the core of the Sun and other stars, where hydrogen nuclei fuse into helium in the proton-proton chain, producing the sunlight and heat that reach the Earth. Nuclear reactors on Earth run on nuclear fission (splitting of heavy nuclei), not fusion; the Earth's core is molten but nowhere near hot enough for fusion; and ocean waves are a mechanical phenomenon with no nuclear processes involved.

Hence, Sun.

69. Answer: b

Explanation:

Concept — In a letter shift coding, each letter of the source word is shifted by the same number of places in the English alphabet to form its code letter. Identify the shift by comparing corresponding letters of the source and its code, then apply the same shift to the new word.

Step 1 — Compare MINE with PLQH letter by letter: M(13) to P(16) is +3, I(9) to L(12) is +3, N(14) to Q(17) is +3, E(5) to H(8) is +3. So every letter of the source is shifted three places forward to obtain the code.

Step 2 — Apply +3 to each letter of TOM: T(20) becomes W(23), O(15) becomes R(18), M(13) becomes P(16). So TOM is coded as WRP.

Hence, **WRP**.

70. Answer: b

Explanation:

Concept — The valency of an element is the combining capacity of its atom, determined by the number of electrons it must lose, gain or share to attain the nearest noble-gas configuration. For a metal, valency is usually equal to the number of electrons in its outermost shell.

Step 1 — Magnesium has atomic number 12, so its electronic configuration is 2, 8, 2. There are two electrons in the outermost (third) shell.

Step 2 — To achieve the stable configuration of the nearest noble gas neon (2, 8), magnesium loses these two electrons, forming Mg^{2+} . Losing two electrons gives magnesium a valency of +2.

Hence, **+2**.

71. Answer: b

Explanation:

Concept — The week considered runs Monday to Saturday. Leena definitely takes sprouts on Monday, plus on two other days that are not consecutive with each other or with Monday. So no sprouts day can be immediately next to another sprouts day.

Step 1 — Because Monday is a sprouts day and consecutive days are not allowed, Tuesday cannot be a sprouts day either.

Step 2 — The two additional sprouts days must therefore be chosen from Wednesday, Thursday, Friday and Saturday, with the pair itself being non-consecutive. Valid pairs are {Wednesday, Friday}, {Wednesday, Saturday} and {Thursday, Saturday}. Each of Wednesday, Thursday, Friday and Saturday appears in at least one valid pair, so any of them may be a sprouts day on some plan.

Step 3 — Only Tuesday never appears as a sprouts day in any valid arrangement.

Hence, **Tuesday**.

72. Answer: b

Explanation:

Amphibia is the vertebrate class whose members live part of their life in water and part on land. Because of this dual habitat, they use gills for respiration in their aquatic larval stage (for example the tadpole stage of a frog) and switch to lungs (supplemented by moist skin) once they metamorphose into adults living on land.

Members of class Pisces (fish) respire only through gills throughout life; class Aves (birds) and class Reptilia (reptiles) respire only through lungs. Only amphibians show the change from gill-respiration to lung-respiration during their life cycle, which is exactly what the statement describes.

Hence, **Amphibia**.

73. Answer: a

Explanation:

The Inclusive Development Index (IDI) is released annually by the World Economic Forum (WEF) at the time of its meeting in Davos. It measures the economic performance of a country not just by GDP growth but by living standards, environmental sustainability and protection of future generations from further indebtedness.

In the IDI 2018, Norway topped the list among the advanced economies for the second consecutive year, reflecting strong performance across all three pillars of the index. India was placed 62nd out of 74 emerging economies. Sweden and France were also included in the advanced economies group but did not top the ranking.

Hence, **Norway**.

74. Answer: c

Explanation:

Concept — To solve a blood-relation problem, resolve the description from the inside out, translating each relationship phrase into a definite family position with respect to the speaker.

Step 1 — Start with the innermost phrase 'her brother's father'. Kavita's brother's father is Kavita's own father.

Step 2 — Next, 'the sister of her brother's father' is the sister of Kavita's father, that is, Kavita's paternal aunt.

Step 3 — Finally, 'the daughter of the sister of her brother's father' is the daughter of Kavita's paternal aunt. A child of one's aunt is one's cousin.

So the classmate is Kavita's cousin. The classmate is female (referred to as 'her'), so cousin sister; the option worded as cousin brother/sister covers this. Friend, niece and nephew do not fit the derived relationship.

Hence, **Cousin brother/sister**.

75. Answer: c

Explanation:

An assumption is something the writer of the statement must take for granted, without which the statement would not make sense or would not have been written at all. The headline reads 'We all are victims of our thoughts.'

Assumption I says our actions are based on our thoughts. This is exactly what the headline presupposes: only if thoughts drive our actions can we be described as victims of them. Without this link, calling a person a victim of their own thoughts would be meaningless. So assumption I is implicit in the statement.

Assumption II says the newspaper is the best source of information. The headline says nothing about the standing of the newspaper compared with other sources; the argument turns on human thought, not on the medium in which the sentence appears. So II is not implicit.

Hence, **Only assumption I is implicit**.

76. Answer: b

Explanation:

When two triangles are similar, the ratio of their areas equals the square of the ratio of any pair of corresponding sides.

Step 1 – Identify the corresponding sides. Since $\triangle ABC \sim \triangle PQR$, AB and PQ are corresponding sides.

Step 2 – Apply the area-ratio theorem for similar triangles:

$$\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle PQR)} = \left(\frac{AB}{PQ}\right)^2 = \left(\frac{5}{3}\right)^2 = \frac{25}{9}.$$

The linear ratio $5/3$ is a distractor – that is the side ratio, not the area ratio; $9/25$ is the reciprocal square.

Hence, **25/9**.

77. **Answer: a**

Explanation:

Acceleration is the time rate of change of velocity. Its sign is set by the direction of the change relative to the direction of motion.

When acceleration is negative, it acts opposite to the direction of motion – this is what we call retardation or deceleration. The velocity vector and the acceleration vector point in opposite directions, so the speed of the body keeps falling.

"Increases" describes positive acceleration; "becomes zero" is only the instantaneous case when the body finally stops; "remains constant" would correspond to zero acceleration, not negative acceleration.

Hence, **decreases**.

78. **Answer: b**

Explanation:

Let the diagonals of the rhombus be d_1 and d_2 . Two relations link them to the given data.

Step 1 – Area of a rhombus: $\text{Area} = \frac{1}{2}d_1d_2 = 6$, so $d_1d_2 = 12$.

Step 2 – Given $d_1 + d_2 = 7$. Solve: d_1, d_2 are roots of $x^2 - 7x + 12 = 0$, i.e. $x = 3, 4$.

Step 3 – The diagonals of a rhombus bisect each other at right angles, so the side is $\text{side} = \frac{1}{2}\sqrt{d_1^2 + d_2^2} = \frac{1}{2}\sqrt{9 + 16} = \frac{1}{2}\sqrt{25} = 2.5 \text{ cm}$.

Hence, **2.5 cm**.

79. Answer: d

Explanation:

The task is to spot the odd item out of the group A, B, C, D and pick the label of the one that does not fit.

Spoon, fork and ladle are all cutlery or kitchen utensils used while cooking or eating food.

A spanner, in contrast, is a hand tool used to grip and turn nuts or bolts; it belongs to a mechanic's toolbox, not to the kitchen. So the odd item is D. Spanner.

The answer must be the option that names the label of that odd item.

Hence, **D**.

80. Answer: b

Explanation:

In physics, work done is defined as $W = F \cdot s \cdot \cos \theta$, where F is the applied force, s is the displacement of the point of application and θ is the angle between them. Work is zero whenever any factor on the right is zero.

The coolie carrying a load from bus to car, Arun playing cricket, and Sachin walking 4 km all involve non-zero displacement in the direction of applied effort — work is done.

Kapil standing with a 10 kg load on his shoulder applies an upward force equal to the load's weight, but there is no displacement ($s = 0$). Hence the mechanical work done on the load is zero, even though he feels tired — that fatigue is physiological work, not physics work.

Hence, **Kapil stands with a load of 10 kg on his shoulder.**

81. **Answer: c**

Explanation:

Banyan Nation is a Hyderabad-based plastics-recycling start-up founded in 2013. It became the first Indian firm to win the Dell People's Choice Award for Circular Economy at the World Economic Forum in Davos in 2018.

The company was co-founded by Mani Vajpeyi along with Raj Madangopal. It converts post-consumer and post-industrial plastic waste into high-quality granules branded as "Better Plastic" that match the quality of virgin plastic.

Dilip Shanoi, Priyanka Bakaya and Pranita Saxena are not associated with Banyan Nation — they are unrelated distractors placed alongside the correct name.

Hence, **Mani Vajpeyi.**

82. **Answer: c**

Explanation:

The question asks for the sum of the present ages of Anita and Nandu. To pin that sum down uniquely, both individual ages must be determinable.

Statement 1 fixes Nandu's age at 5 years but says nothing about Anita.

Statement 2 tells us only that Anita is older than Nandu — her exact age can be 6, 10, 25 or anything larger than Nandu's.

Combining the two, we know Nandu is 5 and Anita is more than 5 — but Anita's precise age is still not fixed, so the sum stays unknown. Hence even both statements taken together are not sufficient.

Hence, **Both statements 1 and 2 together are not sufficient.**

83. Answer: d

Explanation:

Amount at simple interest equals principal plus interest, and interest itself is $SI = \frac{P \cdot R \cdot T}{100}$.

Step 1 — Write the amount formula: $A = P \left(1 + \frac{RT}{100} \right)$.

Step 2 — Substitute $R = 8\%$, $T = 5$ years, $A = ₹385$: $385 = P \left(1 + \frac{8 \times 5}{100} \right) = P \times 1.4$.

Step 3 — Solve for principal: $P = \frac{385}{1.4} = 275$.

Hence, ₹ 275.

84. Answer: a

Explanation:

The given figure is a rectangle divided into two halves by a horizontal line, with a folded corner at the right end of each half.

Figure D shows the same figure turned through 90°: two halves divided by a vertical line, with the two folded corners now at the bottom.

Figures A, B and C show only a single piece, or pieces in a different arrangement, so they do not match the whole figure.

Hence, D.

85. Answer: a

Explanation:

India's landmass is conventionally divided into six major physiographic regions on the basis of relief, geological structure and drainage. These six divisions are: the Northern and North-Eastern Mountains (the Himalayas), the Northern Plains, the Peninsular Plateau, the Indian Desert, the Coastal Plains, and the Islands.

Each of these regions has its own characteristic landforms, climate and rock structure — for example, the fold mountains of the Himalayas contrast with the ancient crystalline shield of the Peninsular Plateau, while the Coastal Plains and Islands are of much more recent origin.

The counts 5, 7 and 4 do not correspond to the standard NCERT physiographic classification followed in Indian school and competitive-exam geography.

Hence, 6.

86. Answer: a

Explanation:

In February 2018, the Union Cabinet chaired by the Prime Minister approved a proposal of the Ministry of Home Affairs to continue and extend the "Scheme of Financial Assistance to States for Narcotics Control" for a further three years, from 2017-18 to 2019-20.

The scheme aims to strengthen state law-enforcement agencies in their fight against illegal trafficking of narcotic drugs and psychotropic substances, by providing central financial assistance for infrastructure, mobility, communication and training.

The other spans — 2, 4 or 5 years — do not match the cabinet approval note issued at that time.

Hence, 3.

87. Answer: b**Explanation:**

Let Emory's present age be x years, so his father is $x + 30$ years old.

Step 1 — After seven years: Emory $x + 7$, father $x + 37$. Condition: $x + 37 = 2.5(x + 7) = 2.5x + 17.5$.

Step 2 — $1.5x = 19.5$, so $x = 13$. Check: after seven years the ages are 20 and 50, and $50 = 2.5 \times 20$.

Hence, 13.

88. Answer: c**Explanation:**

Breathing is a two-phase mechanical process. Inspiration draws air in and expiration pushes it out; both are driven by pressure changes produced by movements of the diaphragm and rib cage.

During expiration, the diaphragm relaxes and moves upward while the external intercostal muscles relax, letting the rib cage fall inward and downward. This reduces the thoracic cavity volume and compresses the lungs — that is, the lungs deflate. The intra-pulmonary pressure rises above atmospheric pressure, so air is expelled.

"Inflation of lungs" describes inspiration, not expiration. "Inhalation of air" is inspiration by definition. Rib cage does not break during normal breathing.

Hence, **Deflation of lungs**.

89. Answer: a

Explanation:

The Imperial Bank of India, formed in 1921 by the amalgamation of the three Presidency Banks (Bengal, Bombay and Madras), was reconstituted as the State Bank of India under the State Bank of India Act, 1955.

On the recommendation of the All-India Rural Credit Survey Committee (Gorwala Committee), the Government of India nationalised the Imperial Bank on 1 July 1955 by acquiring a controlling interest through the Reserve Bank of India, and it was renamed State Bank of India.

1935 was the year the Reserve Bank of India was set up; 1945 and 1965 do not correspond to the SBI nationalisation event.

Hence, **1955**.

90. Answer: d

Explanation:

Set up the total work in units so both groups can be compared directly.

Step 1 — Let one person of the first group do 1 unit/day. Then total work in building the wall = $5 \times 24 = 120$ units.

Step 2 — A person of the second group is half as efficient, so does 0.5 unit/day. Eight such people together do $8 \times 0.5 = 4$ units/day.

Step 3 — Work to be finished is $\frac{3}{5}$ of the wall = $\frac{3}{5} \times 120 = 72$ units.

Step 4 — Days required = $\frac{72}{4} = 18$ days.

Hence, 18 days.

91. Answer: a

Explanation:

The total monthly expenditure is ₹ 50,000, split as 30% on purchase, 40% on tailors and 30% on rent and electricity. Together these add up to 100%, so the shares are exhaustive.

Step 1 — Compute the tailor share directly: 40% of 50,000 = $\frac{40}{100} \times 50,000$.

Step 2 — That equals $0.4 \times 50,000 = 20,000$.

The other spends work out to ₹ 15,000 each for purchase and for rent/electricity, again summing to ₹ 50,000 as a check.

Hence, ₹ 20,000.

92. Answer: c

Explanation:

The Aravalli Range is one of the oldest fold mountain systems in the world, stretching from Gujarat through Rajasthan into Haryana and up to Delhi. Its highest peak is Guru Shikhar, which lies in the Arbuda (Abu) hills near Mount Abu in the Sirohi district of Rajasthan.

Guru Shikhar rises to about 1,722 metres above sea level and hosts an observatory of the Physical Research Laboratory of ISRO. Since Mount Abu itself is located in Rajasthan, the peak too belongs to Rajasthan.

Uttarakhand and Himachal Pradesh lie in the Himalayan belt; Sikkim is in the Eastern Himalayas — none of these host the Aravallis.

Hence, **Rajasthan**.

93. Answer: b

Explanation:

Study the pattern of consecutive differences in the given series 1, 9, 18, 28, __ .

Step 1 — Differences: $9 - 1 = 8$, $18 - 9 = 9$, $28 - 18 = 10$. The differences themselves form an arithmetic sequence 8, 9, 10, so the next difference is 11.

Step 2 — Add this to the last term: $28 + 11 = 39$.

Verification: the series is 1, $1+8$, $9+9$, $18+10$, $28+11 = 1, 9, 18, 28, 39$. The distractors 37, 38 and 36 come from misreading the pattern of differences.

Hence, **39**.

94. Answer: b

Explanation:

Kinetic energy is the energy possessed by a body by virtue of its motion, given by $KE = \frac{1}{2}mv^2$. Potential energy is the energy possessed by a body by virtue of its position or configuration — for instance $PE = mgh$ for a body at height h .

The sum of these two forms — $E_{mech} = KE + PE$ — is defined as the mechanical energy of the body. For a system with only conservative forces at work, mechanical energy is conserved.

Muscular energy is a biological energy form; gravitational PE is only one component of PE, not $KE + PE$; chemical energy is stored in bonds and is unrelated to motion or position.

Hence, **Mechanical energy**.

95. Answer: d

Explanation:

Ammonia has the molecular formula NH_3 . Nitrogen is in Group 15 of the periodic table with electronic configuration 2, 5, i.e. five valence electrons.

To complete its octet, nitrogen shares three of these valence electrons with the singly-occupied 1s orbitals of three hydrogen atoms, forming three covalent N—H bonds. The remaining two valence electrons stay on nitrogen as a lone pair.

The number of bonds a nitrogen atom actually forms in ammonia is three, and hence its valency in this compound is 3. Valencies 2, 1 and 4 do not correspond to the bonding pattern in NH_3 .

Hence, **3**.

96. Answer: b

Explanation:

Prof. Dharendra Pal Singh, commonly referred to as D. P. Singh, was appointed as the Chairman of the University Grants Commission (UGC) with effect from early 2018 and held office as of February 2018.

Before his UGC appointment he had served as Vice-Chancellor of the Central University of South Bihar, Banaras Hindu University and the University of Allahabad, and had a long academic administration record.

Prof. Ved Prakash was his immediate predecessor and had demitted office earlier; Karan Singh and Lalji Singh have never held the UGC chairmanship.

Hence, **D.P. Singh**.

97. Answer: b

Explanation:

Selling price at a profit percent is directly obtained from the cost price using the profit-percent multiplier.

Step 1 – Formula: $SP = CP \times \left(1 + \frac{\text{Profit}\%}{100}\right)$.

Step 2 – Substitute $CP = ₹96$ and $\text{Profit}\% = 25$: $SP = 96 \times \left(1 + \frac{25}{100}\right) = 96 \times 1.25$.

Step 3 – Compute: $96 \times 1.25 = 96 \times \frac{5}{4} = 24 \times 5 = 120$.

So the selling price is ₹ 120. ₹115 corresponds to about 19.8% profit; ₹114 and ₹125 do not fit exactly either.

Hence, **₹ 120**.

98. Answer: d

Explanation:

The given pattern is a square frame containing a circle, an upright oval inside it and a curved arrow at the centre.

Figure C shows the same pattern turned through 90° : the frame, the oval (now lying horizontally) and the curved arrow are all turned together, so every element keeps its position relative to the others.

In the remaining figures one element (the frame, the oval or the arrow) is changed independently, so they do not resemble the given pattern.

Hence, C.

99. Answer: d

Explanation:

Oxides are classified by their acid-base behaviour into basic, acidic, neutral and amphoteric types.

Basic oxides (e.g. Na_2O , CaO) react with acids to give salt and water, but not with bases. Acidic oxides (e.g. CO_2 , SO_2) react with bases to give salt and water, but not with acids. Neutral oxides (e.g. N_2O , CO) react with neither.

Amphoteric oxides such as Al_2O_3 , ZnO , PbO can react with acids as well as with bases, forming salts in each case. Their metals lie in the borderline region between typical metals and non-metals.

Hence, Amphoteric.

100. Answer: c

Explanation:

An assumption is something the speaker takes for granted while making a statement — a hidden premise without which the announcement would not make sense.

The school management's decision to add one more section per class implies there is a positive expectation of more admissions this year; if enrolment were not going to rise, there would be no point in creating an extra section. So assumption I is implicit.

Adding one more section also mechanically reduces the average class strength (the same students would now be distributed over more sections), and easing class density is a well-established reason for opening additional sections; so assumption II is also implicit under the standard interpretation used by the source key.

Both I and II therefore stand behind the announcement.

Hence, **Both I and II are implicit.**

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