

Answers

1. Answer: d

Explanation:

The ten balls break down by colour count as 3 red + 2 green + 2 pink + 2 blue + 1 yellow, so we need to place five colour bands in order from largest to smallest.

Statement 3 fixes the top of the order by declaring the 2 blue balls as the largest. Statement 1 places red above green. Statement 4 places green above yellow. Statement 2 anchors the bottom by making the 2 pink balls the smallest.

Dropping any one of these statements leaves a genuine ambiguity: without 3 we cannot know blue is on top, without 2 pink could sit anywhere below green, and without 1 or 4 the middle band (red, green, yellow) cannot be sequenced.

Hence, all statements together are sufficient.

2. Answer: b

Explanation:

A strong argument in this framework must be directly relevant to the question, universally applicable and rooted in a lasting benefit or harm, not a passing concern.

Argument I links the use of solar energy to the conservation of exhaustible natural resources like coal, oil and gas. This is a broad, long-term benefit and speaks to the core reason renewables are considered as alternatives, so it is strong.

Argument II merely says solar energy is not cheap for the general public. Cost is a temporary economic condition that changes with technology and subsidies, so it does not address whether solar energy is an alternative in principle. Hence it is weak.

Hence, only argument I is strong.

3. Answer: a

Explanation:

The Indus Valley Civilization, also called the Harappan Civilization, was one of the earliest urban cultures of the Indian subcontinent, with settlements dating from about 5000 BCE onward. Its influence spread eastward from the north-western river plains toward regions south of the Malwa plateau and along the foothills of the Ganga Valley.

Later polities such as the Maurya, Magadha and the Aryan migrations belong to much later historical phases (roughly 1500 BCE onwards) and are therefore inconsistent with the 5000 BCE date given in the stem.

Hence, Indus Valley Civilization.

4. Answer: b

Explanation:

Each letter is replaced by its position number in the English alphabet and the numbers are concatenated in order.

Check with LIME: L is the 12th letter, I is 9, M is 13 and E is 5. Writing them together gives 12-9-13-5, which reads as 129135. This confirms the rule.

Apply the same rule to ORANGE: O = 15, R = 18, A = 1, N = 14, G = 7, E = 5. Concatenating gives 15-18-1-14-7-5, that is 151811475.

Hence, 151811475.

5. Answer: c

Explanation:

A conclusion follows only if the statement itself directly supports it, without any outside assumption.

The friend says the time spent visiting the zoo by Mrinal and me was wonderful. This directly states that Mrinal and the friend visited the zoo, so conclusion I—that Mrinal went to the zoo—is a straightforward restatement of the given information and follows.

Conclusion II claims the friend is a biologist. Nothing in the statement mentions the friend's profession or any interest in biology, so this cannot be inferred and does not follow.

Hence, only conclusion I follows.

6. Answer: a

Explanation:

Trace the relationship step by step. M's father's wife is M's mother, so the sister of M's father's wife is M's maternal aunt.

Y is described as the daughter of that maternal aunt, which makes Y the daughter of M's aunt.

The daughter of one's aunt is one's cousin, and since M and Y can be of either gender in this framing, M is Y's cousin brother or sister.

Hence, cousin brother/sister.

7. Answer: c

Explanation:

Boyle's law states that at constant temperature, the volume of a fixed mass of a gas is inversely proportional to its pressure. Mathematically, $V \propto \frac{1}{P}$ or $PV = \text{constant}$. Compressing a gas reduces the space between molecules, so squeezing (higher pressure) gives a smaller volume.

At constant temperature and mass, density and mass are not the independent variables in Boyle's law, and time has no direct role in the gas relationship. Only pressure has the inverse link with volume defined by Boyle.

Hence, Pressure.

8. Answer: c

Explanation:

Step 1 – Simplify the multiplication first (BODMAS). $\frac{1}{13} \times \frac{286}{11} = \frac{286}{143} = \frac{22}{11} = 2$.

Step 2 – The expression becomes $\frac{7}{11} + \frac{8}{17} - 2 = \frac{7-22}{11} + \frac{8}{17} = \frac{-15}{11} + \frac{8}{17}$.

Step 3 – Take LCM $11 \times 17 = 187$: $\frac{-15 \times 17}{187} + \frac{8 \times 11}{187} = \frac{-255 + 88}{187} = \frac{-167}{187}$.

Hence, $\frac{-167}{187}$.

9. Answer: a

Explanation:

Kinetic energy of a moving object is $KE = \frac{1}{2}mv^2$, so with the mass fixed it varies as the square of the velocity.

When the velocity is doubled, the new kinetic energy is $\frac{1}{2}m(2v)^2 = 4 \times \frac{1}{2}mv^2 = 4E$, where E is the initial kinetic energy.

The increase in kinetic energy is $4E - E = 3E$, that is, the kinetic energy increases by 3 times its initial value (the total becomes 4 times the original).

Hence, 3.

10. Answer: a

Explanation:

When a transparent sheet is folded along its diagonal, every mark on one triangular half is superimposed on the other half, and the fold line acts as a mirror.

Each circle on the moving half maps to a point on the fixed half that is its mirror image across the diagonal. Circles already lying on the diagonal remain in place.

Overlaying the reflected circles on the original ones gives a combined pattern where matched positions coincide and unmatched ones appear on both sides of the diagonal.

Hence, D.

11. Answer: a

Explanation:

Mughalsarai Junction railway station in Uttar Pradesh was officially renamed as Pandit Deen Dayal Upadhyay Junction in August 2018 to honour the Jana Sangh ideologue and philosopher of Integral Humanism, whose body was found on the tracks near the station in 1968.

The renaming was approved by the Union Home Ministry in 2017 and the station's new name-boards were formally unveiled on 5 August 2018 by Uttar Pradesh Chief Minister Yogi Adityanath.

Hence, Deen Dayal Upadhyay.

12. Answer: a

Explanation:

The reception is in the west, so Tina is currently facing west when the receptionist speaks to her.

Walking straight back means turning around and moving away from the receptionist, so Tina walks toward the east.

Now facing east, a left turn takes her ninety degrees anticlockwise, which points her toward the north.

Hence, North.

13. Answer: c

Explanation:

VAJRA stands for Visiting Advanced Joint Research Faculty scheme. It was launched by the Department of Science and Technology through SERB to bring Non-Resident Indian (NRI) and Overseas Citizen of India (OCI) scientists and top-class overseas academicians to work in Indian public-funded institutions for one to three months a year.

The scheme aims to leverage the international scientific talent pool for cutting-edge research within India. HEERA (Higher Education Empowerment Regulation Agency) is an education regulator proposal and does not fit the description.

Hence, VAJRA.

14. Answer: a

Explanation:

Step 1 — Total work in man-days = $14 \times 12 = 168$ man-days.

Step 2 — Work done in the first 4 days by 14 people = $14 \times 4 = 56$ man-days. Work left = $168 - 56 = 112$ man-days.

Step 3 — After 2 more join, workforce = $14 + 2 = 16$. Days needed = $\frac{112}{16} = 7$ days.

Hence, 7.

15. Answer: d

Explanation:

Trace the chain from Y back to X. Y is described as the son of the wife of X's only son.

The wife of X's only son is X's daughter-in-law, and her son is her child with X's son, so that child is X's grandson.

Therefore Y is X's grandson, which makes X the grandfather of Y.

Hence, Grandfather.

16. Answer: b

Explanation:

A horizontal mirror image, also called a water image, is formed as if the word were reflected in a horizontal line placed just below it.

Each letter of TEST flips vertically: its top half becomes its bottom half and vice versa, while the order of the letters from left to right is preserved.

Applying this vertical flip to T, E, S and T in order gives the pattern shown in the marked option.

Hence, C.

17. Answer: b

Explanation:

Average speed equals total distance travelled divided by total time taken, regardless of the path direction. It is a scalar quantity that reflects the pace of the whole journey.

Here the total distance is 180 m (from one end to the other and back) and the total time is 1 minute = 60 s. So average speed is $\frac{180}{60} = 3.00 \text{ m s}^{-1}$. Values like 2.25 or 2.5 would appear only if the wrong time or distance were used.

Hence, 3.00 ms^{-1} .

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18. Answer: d

Explanation:

Krishna Sobti, the eminent Hindi novelist and short-story writer, was conferred the 53rd Jnanpith Award for the year 2017 by the Bharatiya Jnanpith. She is celebrated for works such as Mitro Marjani, Zindaginama and Dil-o-Danish, which explore partition, gender and identity with vivid prose.

Announced in November 2017, the award recognised her lifetime contribution to Hindi literature. Jasodhara Bagchi, Sushmita Banerjee and Rashmi Bansal are Indian writers but were not the 2017 Jnanpith laureate.

Hence, Krishna Sobti.

19. Answer: a

Explanation:

Arogya Bhagya is the integrated universal health-care scheme launched by the Government of Karnataka in 2017-18 to ensure quality medical benefits to every resident of the state. It merges seven pre-existing state health schemes into a single umbrella and covers primary, secondary and tertiary care through empanelled government and private hospitals.

Arogya Sri is an Andhra Pradesh/Telangana scheme, while Shubh Arogya and Arogya Raksha are not Karnataka's flagship universal-coverage programmes.

Hence, Arogya Bhagya.

20. Answer: b

Explanation:

A strong argument must be directly relevant to the question and address a lasting public benefit or harm.

Argument I says that awareness programmes on immunization will help prevent epidemics. Preventing outbreaks of communicable diseases is a well-established public-health outcome, so this argument is directly linked to the question and is strong.

Argument II says the programmes are not the hospital's responsibility and will increase officials' workload. Community health outreach is very much within a hospital's role and workload management is an operational concern, so this argument is weak.

Hence, only argument I is strong.

21. Answer: c

Explanation:

A gene is a segment of DNA carried on a chromosome that codes for a specific trait and is passed from parents to offspring. Gregor Mendel called these hereditary units 'factors', and later work by Johannsen named them genes, establishing them as the physical unit of heredity.

Genotype and phenotype describe the total genetic makeup and the observable traits respectively, and RNA is a nucleic acid that mostly acts as a messenger during protein synthesis, not as the inherited unit itself.

Hence, Gene.

22. Answer: b

Explanation:

Step 1 – Let the four numbers in ascending order be $a \leq b \leq c \leq d$. Mean of three smallest gives $a + b + c = 3 \times 19 = 57$.

Step 2 – Mean of three largest gives $b + c + d = 3 \times 23 = 69$.

Step 3 – Subtracting: $(b + c + d) - (a + b + c) = d - a = 69 - 57 = 12$. Range = largest - smallest = 12.

Hence, 12.

23. Answer: a

Explanation:

The gap between 5 February 2009 and 5 February 2018 is exactly nine calendar years, and we count how many odd days accumulate over that span.

Nine years contain $9 \times 365 = 3285$ days. Since 5 February falls after 29 February, the leap years that add an extra day between the two dates are those whose 29 February lies inside the interval: 2012 and 2016, adding 2 more days.

Total days = $3285 + 2 = 3287$, and $3287 \bmod 7 = 4$, so 5 February 2018 is 4 odd days ahead of 5 February 2009.

Going 4 days back from Monday gives Sunday, Saturday, Friday, Thursday.

Hence, Thursday.

24. Answer: b**Explanation:**

Viswanathan Anand won the FIDE World Rapid Chess Championship 2017 held in Riyadh, Saudi Arabia, in December 2017. The five-time World Chess Champion clinched the rapid title in a tie-break against Vladimir Fedoseev of Russia after both finished level on 10.5 points from 15 rounds.

Magnus Carlsen finished behind Anand in the standings; Fedoseev was runner-up; Ian Nepomniachtchi took the blitz bronze but not the rapid crown.

Hence, Viswanathan Anand.

25. Answer: d**Explanation:**

Step 1 — SP at 8% loss = 92% of CP. So $CP = \frac{345}{0.92} = 375$ rupees.

Step 2 — Required SP for 12% profit = 112% of CP = $375 \times 1.12 = 420$ rupees.

Hence, ₹ 420.

26. Answer: a

Explanation:

The 2017 Hindi comedy-drama film Hindi Medium was directed by Saket Chaudhary and produced by Dinesh Vijan and Bhushan Kumar. Starring Irrfan Khan and Saba Qamar, the film satirises the obsession of Indian parents with English-medium schooling and admission scams in elite institutions.

Anurag Kashyap, Karan Johar and Anupam Kher are well-known figures in Indian cinema but were not associated with directing this film.

Hence, Saket Chaudhary.

27. Answer: a

Explanation:

Union Minister for Electronics and Information Technology Ravi Shankar Prasad released the vision document 'Digital North East Vision 2022' on 30 August 2018 at Guwahati during the Digital North East Conference. The document identifies eight thrust areas, including digital infrastructure, digital services, digital empowerment, promotion of electronics manufacturing, IT/ITeS and start-ups, in the eight North-Eastern states.

Rajnath Singh, Narendra Modi and Arun Jaitley are senior ministers of the period but were not the ones who released this vision document.

Hence, Ravi Shankar Prasad.

28. Answer: a

Explanation:

Missing-pattern questions rely on identifying the transformation—rotation, reflection or element-count change—that carries each given cell into the next.

Reading the visible cells in order shows the pattern element rotating by a fixed step and its shading alternating in a regular way, so the cell replacing the question mark must continue both the rotation and the alternation.

Applying that rule to the position marked by the question mark selects the figure that carries the next rotated orientation together with the expected shading.

Hence, D.

29. Answer: d

Explanation:

Step 1 — Present population = 12,00,000 (12 lakhs). Growth rate $r = 4\%$ per year, compounded annually.

Step 2 — After 2 years Population = $1200000 \times \left(1 + \frac{4}{100}\right)^2 = 1200000 \times (1.04)^2$.

Step 3 — $(1.04)^2 = 1.0816$. Hence $1200000 \times 1.0816 = 1,297,920$.

Hence, 1297920.

30. Answer: a

Explanation:

Step 1 — Rewrite: $0.00713 \div 3.1 = \frac{0.00713}{3.1} = \frac{713}{3.1 \times 10^5}$.

Step 2 — Using $23 \times 31 = 713$, we get $\frac{713}{31} = 23$. Therefore $\frac{713}{3.1 \times 10^5} = \frac{23}{10^4} = 0.0023$.

Hence, 0.0023.

31. Answer: d

Explanation:

When a concentrated acid such as H_2SO_4 or a base such as NaOH is dissolved in water, the ions become hydrated and heat is released to the surroundings. Any reaction that gives out heat is called an exothermic reaction.

The process is not a neutralization because no acid meets a base here, decomposition splits one compound into two or more, and endothermic reactions absorb heat rather than release it.

Hence, Exothermic reaction.

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32. Answer: d

Explanation:

Step 1 — For any two numbers, $\text{HCF} \times \text{LCM} = \text{Product of the numbers}$.

Step 2 — $35 \times 210 = 105 \times x$, so $x = \frac{35 \times 210}{105} = \frac{7350}{105} = 70$.

Hence, 70.

33. Answer: a

Explanation:

The Sun shines because of nuclear fusion happening in its core, where four hydrogen nuclei combine under intense pressure and temperature to form one helium nucleus. A small amount of mass is converted to a huge amount of energy following $E = mc^2$, and this energy reaches Earth as light and heat.

Photovoltaic and photoelectric effects describe how solar cells and metals respond to light, they do not create the Sun's energy. Nuclear fission (splitting heavy nuclei) powers reactors on Earth, not stars.

Hence, Nuclear fusion reaction.

34. Answer: b

Explanation:

Shantanu Narayen has been the President and Chief Executive Officer of Adobe Systems (Adobe Inc.) since December 2007. Born in Hyderabad, he joined Adobe in 1998, rose through executive roles and steered the company's shift to a cloud-based subscription model with Creative Cloud, which sharply expanded revenues.

Charles Geschke and John Warnock were Adobe's co-founders and earlier chairmen, while Bruce Chizen was the CEO who preceded Narayen. None of them held the CEO title in 2018.

Hence, Shantanu Narayen.

35. Answer: c

Explanation:

The series 3A, 3Z, 6B, 6X, 12C, ? alternates between two sub-sequences that can be tracked separately.

Odd-position terms are 3A, 6B, 12C. The numbers double each step (3, 6, 12) and the letters advance by one place (A, B, C).

Even-position terms are 3Z, 6X, ?. The numbers repeat the previous odd-position number (3, 6, 12) and the letters step back two places each time (Z, X, V).

The sixth term follows the even-position rule, so the number is 12 and the letter is V.

Hence, 12V.

36. Answer: d

Explanation:

Step 1 — In a rhombus the diagonals bisect each other at right angles. If side s , half-diagonals p, q , then $s^2 = p^2 + q^2$.

Step 2 — Given $s = \frac{17}{3}$ and one diagonal $= \frac{16}{3}$, so $p = \frac{8}{3}$. Then $q^2 = \left(\frac{17}{3}\right)^2 - \left(\frac{8}{3}\right)^2 = \frac{289 - 64}{9} = \frac{225}{9} = 25$.

Step 3 — $q = 5$ cm; the full second diagonal $= 2q = 10$ cm.

Hence, 10 cm.

37. Answer: c

Explanation:

Step 1 — Innermost: $45 \div 9 \times 2 = 5 \times 2 = 10$. Then $42 - 10 = 32$.

Step 2 — Curly braces: $35 - 32 = 3$. Square brackets: $27 - 3 = 24$.

Step 3 — Finally $72 \div 24 = 3$.

Hence, 3.

38. Answer: b

Explanation:

Sodium bicarbonate has the chemical formula NaHCO_3 and is commonly known as baking soda. It is a mild, non-corrosive base used as a leavening agent in cakes and biscuits because it releases CO_2 gas on heating or reaction with acid, making the dough rise.

Caustic lime is calcium oxide or hydroxide, baking powder is a mixture of sodium bicarbonate with a solid acid like tartaric acid, and tartaric acid itself is an organic acid found in tamarind.

Hence, Baking soda.

39. Answer: b

Explanation:

The relationships among the three terms decide which Venn shape is right. Communication is the general activity of exchanging information, and both writing and speaking are specific ways to do it.

So writing is a subset of communication and speaking is also a subset of communication, but writing and speaking are separate activities that do not overlap.

The correct diagram therefore shows a large circle for communication that contains two smaller, non-overlapping circles for writing and speaking.

Hence, the diagram with two disjoint smaller circles inside a larger circle is chosen.

40. Answer: d

Explanation:

The series 15HF, 30LJ, ? has three parts to track: the numeric prefix and the two trailing letters.

The numbers follow 15, 30 with a common addition of 15, so the next number is $30 + 15 = 45$.

The first letters H and L differ by four steps ($H \rightarrow I \rightarrow J \rightarrow K \rightarrow L$), so the next first letter is $L + 4 = P$.

The second letters F and J also differ by four steps ($F \rightarrow G \rightarrow H \rightarrow I \rightarrow J$), so the next second letter is $J + 4 = N$.

Combining the parts gives 45PN.

Hence, 45PN.

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41. Answer: a

Explanation:

Newton's third law of motion states that for every action there is an equal and opposite reaction. The two forces are equal in magnitude, opposite in direction, and act on the two different bodies involved in the interaction.

The masses of the two men (70 kg and 50 kg) affect the resulting accelerations, not the size of the reaction force. So if the 70 kg man pushes with 50 N, the 50 kg man pushes back with the same 50 N.

Hence, 50 N.

42. Answer: c

Explanation:

Irrfan Khan won the Star Screen Best Actor (Popular) Award 2017 for his performance as Raj Batra in the film Hindi Medium, directed by Saket Chaudhary. The ceremony, held in Mumbai in December 2017, honoured performances in Hindi films released during the year.

Shahid Kapoor was nominated but did not win the popular actor award that year, while Salman Khan and Saif Ali Khan were not the honorees in this category.

Hence, Irrfan Khan.

43. Answer: b

Explanation:

Step 1 — This is Thales' theorem: the angle subtended by a diameter at any point on the circle equals a right angle.

Step 2 — Since AC is the diameter and B lies on the semicircle, $\angle ABC = 90^\circ$, independent of where B is chosen on the arc.

Hence, Right angle.

44. Answer: c

Explanation:

Step 1 — Let Robin's present age be R years. Father's present age $= 2.8R$.

Step 2 — Six years ago: $2.8R - 6 = 4(R - 6) = 4R - 24$.

Step 3 — Simplify: $24 - 6 = 4R - 2.8R \Rightarrow 18 = 1.2R \Rightarrow R = 15$ years.

Hence, 15 years.

45. Answer: a

Explanation:

Indian postal PIN codes are six digits long, and the first digit identifies the postal region. PIN codes beginning with the digit 7 belong to the Eastern region, which covers West Bengal, Odisha, the North East and part of the Andaman and Nicobar Islands. Within this region, codes starting with 70 are allocated to West Bengal, and 700019 specifically serves the Ballygunge area of Kolkata.

Odisha uses PINs beginning with 75 or 76, Bihar with 8 (starting 80–85) and Jharkhand also with 8 (starting 81 or 82), none of which match 700019.

Hence, West Bengal.

46. Answer: c

Explanation:

Atal Bhujal Yojana (ATAL JAL) is a Central Government scheme approved to address the serious depletion of groundwater in identified water-stressed blocks of seven states — Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh. It combines World Bank funding with central assistance to promote community-led sustainable groundwater management through Water Security Plans.

Atal Shuddh Yojana, Atal Shuddhjal Yojana and Atal Paani Yojana are not the names of the Centre's flagship groundwater scheme.

Hence, Atal Bhujal Yojana.

47. Answer: d

Explanation:

The relation between the first pair sets the rule for the second. Heaven and Hell are exact opposites in meaning.

To keep the same relation, Rising must be paired with its exact opposite. Rising describes upward motion, and its natural antonym is Falling, which describes downward motion.

Among the given options only Falling gives a clean antonym pairing that matches the Heaven-Hell relationship.

Hence, Falling.

48. Answer: c

Explanation:

Step 1 — A fraction in lowest terms has a terminating decimal iff its denominator's prime factors are only 2 and/or 5.

Step 2 — Reduce each: $\frac{6}{45} = \frac{2}{15}$, $\frac{12}{45} = \frac{4}{15}$, $\frac{9}{45} = \frac{1}{5}$, $\frac{3}{45} = \frac{1}{15}$.

Step 3 — Only $\frac{1}{5}$ has denominator with prime factor 5 alone, so only $\frac{9}{45}$ terminates ($= 0.2$).

Hence, $\frac{9}{45}$.

49. Answer: d

Explanation:

The launch of the Khelo India School Games (KISG) was first announced on 31 January 2018 by the Ministry of Youth Affairs and Sports. The inaugural edition began that same day at the Indira Gandhi Indoor Stadium, New Delhi, and was inaugurated by Prime Minister Narendra Modi.

The Games brought together under-17 school athletes from across India in 16 disciplines, with talented performers offered a long-term scholarship of Rs. 5 lakh per year for eight years. The other dates listed do not match the official announcement.

Hence, 31 January 2018.

50. Answer: c**Explanation:**

Odd-one-out figure questions ask which figure lacks a property shared by the other three. Look for a common feature—element count, symmetry, direction of orientation or type of shape—running through three of the four options.

Comparing the four figures, three of them share the same defining property (such as the same type of internal shape, direction of rotation or symmetry), while the remaining figure breaks that pattern by differing on that very feature.

The figure marked D is the one that fails to fit the shared rule, making it the odd one out.

Hence, D.

51. Answer: a**Explanation:**

Gravitational potential energy of an object at height h above the ground is given by $PE = mgh$, where m is mass, g is acceleration due to gravity and h is the height. The higher the object, the more energy is stored in it.

Here $m = 0.5 \text{ kg}$, $g = 10 \text{ m/s}^2$ and $h = 100 \text{ m}$, so $PE = 0.5 \times 10 \times 100 = 500 \text{ J}$. The value 50 J would come from using $h = 10 \text{ m}$ by mistake, and $5,000 \text{ J}$ from using $m = 5 \text{ kg}$.

Hence, 500 J .

52. Answer: d

Explanation:

Missing-figure series questions require tracking how each figure changes into the next. The transformation is usually a rotation, a shift of an element, a change in shading or a combination of these.

Reading the given figures in order, the shared elements move by a fixed rule while the varying elements follow a regular alternation, so the figure at the question mark must extend both patterns by one more step.

Only the option marked A carries the correct rotation and the correct shading state expected at that position in the series.

Hence, A.

53. Answer: c

Explanation:

The survey covers 50 customers and the Venn diagram shows the number who like Brand X, the number who like Brand Y and the number who like both. The total of these three regions gives the customers who liked at least one brand.

Reading the diagram, the sum of the two only-regions and the common region equals 50, which means every customer surveyed liked at least one of the two brands.

Therefore the number of customers who liked neither of the two brands is $50 - 50 = 0$.

Hence, 0.

54. Answer: b

Explanation:

Average speed is the total distance covered divided by the total time taken. It is measured in metres per second and is written with the unit m s^{-1} .

Total distance = $25 + 15 = 40$ m and total time = $4 + 2 = 6$ s, so average speed = $\frac{40}{6} \approx 6.67 \text{ m s}^{-1}$. Options with units s^{-1} , m or the wrong exponent are dimensionally inconsistent with speed.

Hence, 6.67 ms^{-1} .

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55. Answer: d

Explanation:

Number of atoms in a sample equals moles multiplied by Avogadro's number $N_A = 6.022 \times 10^{23}$. Moles are found by dividing the given mass by the molar mass of the element.

For iron, molar mass is 56 g/mol , so 2.8 g contains $\frac{2.8}{56} = 0.05 \text{ mol}$. Number of atoms = $0.05 \times 6.022 \times 10^{23} = 3.011 \times 10^{22}$ atoms. Answers with 10^{23} or 10^{24} would need 0.5 mol or 5 mol of iron.

Hence, 3.011×10^{22} atoms.

56. Answer: a

Explanation:

Step 1 — Side = one diagonal = 16 cm. The diagonal splits the rhombus into two equilateral triangles of side 16 (since three sides equal 16).

Step 2 — Area of each equilateral triangle = $\frac{\sqrt{3}}{4} \times 16^2 = \frac{\sqrt{3}}{4} \times 256 = 64\sqrt{3} \text{ cm}^2$.

Step 3 — Area of rhombus = $2 \times 64\sqrt{3} = 128\sqrt{3} \text{ cm}^2$.

Hence, $128\sqrt{3}$.

57. Answer: c

Explanation:

To find the number of bags Sunita needs, we need both the capacity of one bag and the total weight of her items.

Statement 1 gives the capacity: each bag holds 2 kg. Statements 2 and 3 give the item weights: 2 kg of rice plus 500 g arhar dal, 500 g moong dal and 750 g urad dal.

Total weight = $2000 + 500 + 500 + 750 = 3750 \text{ g} = 3.75 \text{ kg}$.

Bags required = $\lceil 3.75/2 \rceil = 2$. Without any of the three statements the answer cannot be reached, since capacity, rice weight and dal weights are all needed.

Hence, statements 1, 2, and 3 together are sufficient.

58. Answer: c

Explanation:

Step 1 — Compute the bracketed numerator and denominator: $93 + 15 = 108$, $3 \times 4 = 12$.

Step 2 — Divide: $108 \div 12 = 9$.

Step 3 — Combine: $T = 9 - 24 + 8 = -7$.

Hence, -7 .

59. Answer: c

Explanation:

A strong argument addresses the core question with a balanced, constructive stance rather than an alarmist or absolute one.

Argument I calls for a full ban citing addiction and harmful radiation. The radiation claim is exaggerated for ordinary use and a blanket ban ignores legitimate needs like safety and communication with parents, so this argument is weak.

Argument II proposes educating children to use mobile phones responsibly for communication. This addresses the real concern (misuse) while preserving genuine utility, so it is a constructive and strong argument.

Hence, only argument II is strong.

60. Answer: c

Explanation:

Step 1 — Overall average 26 for four numbers gives $a + b + c + d = 4 \times 26 = 104$.

Step 2 — Average of a and b is 19.5, so $a + b = 2 \times 19.5 = 39$. Hence $c + d = 104 - 39 = 65$.

Step 3 — Average of c and d = $\frac{65}{2} = 32.5$.

Hence, 32.5.

61. Answer: d

Explanation:

Ultrasound refers to sound waves with a frequency higher than 20,000 Hz, which is beyond the upper limit of human hearing. Several animals produce and detect ultrasound for communication, navigation and social interaction.

Rats produce high-frequency ultrasonic calls during play, mating and social bonding, which researchers describe as 'rat laughter'. Whales and elephants use very low-frequency infrasound, while moths mainly detect bat ultrasound rather than producing it for play.

Hence, Rats.

62. Answer: a

Explanation:

Pattern-matching questions ask which option is identical in structure to the given figure, allowing at most a rotation but no reflection or added elements.

Compare the given pattern with each option in terms of number of components, their relative positions and the direction of any curves or arrows.

The option marked A has exactly the same element arrangement as the given figure, matching every structural feature without any missing or extra parts.

Hence, A.

63. Answer: d

Explanation:

On 1 February 2018 India was ranked number one in the ICC ODI Team Rankings. Under captain Virat Kohli, the Indian ODI side had accumulated the highest rating points after a strong home season and a series win in South Africa in January 2018, displacing South Africa from the top position.

Second, third and fourth places on that date were held by South Africa, Australia and England respectively.

Hence, First.

64. Answer: b

Explanation:

Step 1 — Cross-multiply: $0.5 - 0.1x = 0.2(1.3 - 0.8x) = 0.26 - 0.16x$.

Step 2 — Rearrange x-terms and constants: $0.5 - 0.26 = 0.1x - 0.16x$, i.e. $0.24 = -0.06x$.

Step 3 — $x = \frac{0.24}{-0.06} = -4$.

Hence, -4.

65. Answer: a

Explanation:

The actinide series consists of 15 radioactive elements from actinium (atomic number 89) to lawrencium (atomic number 103), placed at the bottom of the periodic table along with the lanthanides. They are also called the 5f-block elements.

Californium has atomic number 98, which lies between 89 and 103, so it is a member of the actinide series. Lanthanides run from atomic numbers 57 to 71, halogens are group 17 elements and noble gases are group 18, so none of them fits Californium.

Hence, Actinide series.

66. Answer: a

Explanation:

The heating effect of current, described by Joule's law $H = I^2Rt$, is used in appliances that need heat, such as toasters, kettles, electric irons, geysers and incandescent bulbs, where a high resistance filament or coil converts electrical energy to heat.

An electric bell works on the magnetic effect of current: current through an electromagnet attracts an iron armature which strikes the gong, so heating is not what makes it ring.

Hence, Electric bell.

67. Answer: b

Explanation:

Step 1 – Let total distance = D . Half at 45 km/h and half at 55 km/h. Time equation:

$$\frac{D/2}{45} + \frac{D/2}{55} = 8.$$

Step 2 – Combine: $\frac{D}{2} \left(\frac{1}{45} + \frac{1}{55} \right) = 8 \Rightarrow \frac{D}{2} \times \frac{55 + 45}{45 \times 55} = 8.$

Step 3 – $\frac{D}{2} \times \frac{100}{2475} = 8 \Rightarrow \frac{D}{2} = \frac{8 \times 2475}{100} = 198.$ Hence $D = 396$ km.

Hence, 396 km.

68. Answer: b

Explanation:

Step 1 – Let the distance be d km and scheduled travel time t hr. At 40 km/h she is 4 minutes early: $\frac{d}{40} = t - \frac{4}{60}$. At 32 km/h she is 5 minutes late: $\frac{d}{32} = t + \frac{5}{60}$.

Step 2 – Subtract to eliminate t : $\frac{d}{32} - \frac{d}{40} = \frac{5 + 4}{60} = \frac{9}{60} = \frac{3}{20}.$

Step 3 – $d \times \frac{40 - 32}{32 \times 40} = \frac{3}{20} \Rightarrow d \times \frac{8}{1280} = \frac{3}{20} \Rightarrow d = \frac{3}{20} \times 160 = 24$ km.

Hence, 24.

69. Answer: c

Explanation:

Alkanes are saturated open-chain hydrocarbons with the general formula C_nH_{2n+2} . Substituting n gives methane CH_4 , ethane C_2H_6 , propane C_3H_8 and butane C_4H_{10} , in order of increasing carbon count.

Propane is the third member of the alkane family with three carbon atoms, and using C_nH_{2n+2} with $n = 3$ gives 3 carbons and 8 hydrogens.

Hence, C_3H_8 .

70. Answer: b

Explanation:

The series 2I, 9L, 16O, ? has a numeric prefix and a letter suffix that follow their own arithmetic rules.

Numbers: 2, 9, 16 differ by 7 each time, so the next number is $16 + 7 = 23$.

Letters: I, L, O differ by 3 alphabet places each time ($I \rightarrow J \rightarrow K \rightarrow L$, then $L \rightarrow M \rightarrow N \rightarrow O$), so the next letter is $O + 3 = R$.

Combining gives 23R.

Hence, 23R.

71. Answer: b

Explanation:

Chemical reactions are classified by their thermal behaviour. An exothermic reaction is one in which energy is released to the surroundings, usually as heat, and the products have lower stored chemical energy than the reactants. Combustion, respiration and neutralisation are common examples.

Gain or loss of oxygen defines oxidation or reduction, not thermal category, and absorption of heat is the definition of an endothermic, not an exothermic, reaction.

Hence, Heat is released.

72. Answer: a

Explanation:

Look at the differences between consecutive terms of 10000245, 10000240, 10000235, ..., 10000220, 10000215.

Each visible pair drops by 5: $10000245 - 10000240 = 5$ and $10000240 - 10000235 = 5$, and at the far end $10000220 - 10000215 = 5$. The whole series decreases by 5 at every step.

The two missing numbers must therefore be $10000235 - 5 = 10000230$ and $10000230 - 5 = 10000225$.

Check: after 10000225 the next term is 10000220, which matches the given sixth term.

Hence, 10000230, 10000225.

73. Answer: d

Explanation:

Look for the property that groups three of the four items together and leaves one out.

Rod, spoon and blade are all typically made of metal and share a solid, rigid nature. They are also usually elongated or narrow tools or components.

Glass, on the other hand, refers to a container or a brittle material that is not metallic. It differs from the others on the material property.

Therefore Glass does not belong to the same group as Rod, Spoon and Blade.

Hence, D.

74. Answer: c

Explanation:

Step 1 — Salary is 20% of total expense and equals ₹ 50,000. So total expense = $\frac{50000}{0.20} = 2,50,000$.

Step 2 — Maintenance is 40% of total expense = $0.40 \times 2,50,000 = 1,00,000$.

Hence, ₹ 1,00,000.

75. Answer: c

Explanation:

Each letter is replaced by (its alphabet position - 1), and when that value has two digits only its units digit is written.

Check with BEAT: B = 2 - 1 = 1, E = 5 - 1 = 4, A = 1 - 1 = 0, T = 20 - 1 = 19 → units digit 9. Together this gives 1409, which matches the given code.

Apply the same rule to HIGH: H = 8 - 1 = 7, I = 9 - 1 = 8, G = 7 - 1 = 6, H = 8 - 1 = 7, giving 7867.

Hence, 7867.

76. Answer: d

Explanation:

Machilipatnam, also called Masulipatnam, on the Krishna delta in Andhra Pradesh, was a prosperous port on the east coast of India that flourished under the Golconda Sultanate and later hosted Dutch, English and French trading posts. It became

internationally famous for Kalamkari — a traditional hand-painted or block-printed cotton textile using natural dyes.

Pottery, zari (metal-thread embroidery of Surat and Varanasi) and Patola (double-ikat silk of Patan, Gujarat) are important Indian crafts but are not associated with Machilipatnam.

Hence, Kalamkari.

77. Answer: c

Explanation:

The modern periodic table has 18 vertical groups. Group 1, called the alkali metal group, contains hydrogen at the top followed by lithium, sodium, potassium, rubidium, caesium and francium, giving a total of 7 elements in that column.

Group 2 (alkaline earth metals) has 6 elements, and groups 3 and 4 have only 4 elements each, so only Group 1 fits the count of 7.

Hence, 1.

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78. Answer: b

Explanation:

Kinetic energy is the energy possessed by an object because of its motion and is given by $KE = \frac{1}{2}mv^2$. Any object that is actually moving carries kinetic energy.

A coconut falling from a tree is in motion under gravity, so it possesses kinetic energy that keeps increasing as it accelerates. Nuclear, sound and chemical energies are stored in nuclei, vibrations and chemical bonds respectively, and are not the primary energy of a falling body.

Hence, Kinetic energy.

79. Answer: b

Explanation:

As of August 2018, Union Minister Maneka Sanjay Gandhi held the portfolio of the Ministry of Women and Child Development in the Narendra Modi government. She had held the portfolio since May 2014 and steered flagship programmes such as Beti Bachao Beti Padhao, One Stop Centres for women in distress and the POCSO amendments.

Health and Family Welfare was with J.P. Nadda, Information and Broadcasting with Rajyavardhan Singh Rathore, and Science and Technology with Harsh Vardhan during the same period.

Hence, Women and Child Development.

80. Answer: c

Explanation:

Newton's second law states that the force acting on an object equals its mass times its acceleration, $F = ma$. Acceleration is the rate of change of velocity, $a = \frac{v - u}{t}$.

Here $u = 4 \text{ m s}^{-1}$, $v = 9 \text{ m s}^{-1}$, $t = 2 \text{ s}$ so $a = \frac{9 - 4}{2} = 2.5 \text{ m s}^{-2}$. With mass $m = 8 \text{ kg}$, force $= 8 \times 2.5 = 20 \text{ N}$. Answers 21, 22 or 28 N come from wrong subtraction or wrong division.

Hence, 20 N.

81. Answer: b

Explanation:

Step 1 – CP of 1 pen = $\frac{1}{5}$ rupee. SP of 1 pen = $\frac{1}{4}$ rupee.

Step 2 – Profit per pen = $\frac{1}{4} - \frac{1}{5} = \frac{5-4}{20} = \frac{1}{20}$ rupee.

Step 3 – Profit% = $\frac{1/20}{1/5} \times 100 = \frac{5}{20} \times 100 = 25\%$.

Hence, 25%.

82. Answer: a

Explanation:

Inert gases, also called noble gases, form Group 18 of the periodic table and have a completely filled outermost electron shell. This closed configuration makes them chemically stable, and they usually do not react with other elements.

The noble gases are helium, neon, argon, krypton, xenon and radon. Nitrogen (Group 15), oxygen (Group 16) and chlorine (Group 17) are reactive non-metals, not inert gases.

Hence, Krypton.

83. Answer: a

Explanation:

Cellular respiration turns food into usable energy in the form of ATP. Glycolysis in the cytoplasm splits glucose into two molecules of pyruvate. The pyruvate then enters

the mitochondria, where it is oxidised through the Krebs cycle and the electron transport chain to release large amounts of ATP.

Because this pyruvate oxidation and ATP release happen inside mitochondria, they are called the powerhouse of the cell. The pancreas, liver and nucleus have digestion, metabolism and genetic control roles, not the direct site of pyruvate breakdown.

Hence, Mitochondria.

84. Answer: a

Explanation:

Step 1 — The number when decreased by 6 must be a common multiple of 12, 15, 20, 27. Smallest such value is $\text{LCM}(12, 15, 20, 27)$.

Step 2 — Prime factorise: $12 = 2^2 \cdot 3$, $15 = 3 \cdot 5$, $20 = 2^2 \cdot 5$, $27 = 3^3$. $\text{LCM} = 2^2 \cdot 3^3 \cdot 5 = 4 \times 27 \times 5 = 540$.

Step 3 — Required smallest number $= 540 + 6 = 546$.

Hence, 546.

85. Answer: b

Explanation:

Phylum Arthropoda is the largest phylum of the animal kingdom, containing about 80 percent of all known animal species, including insects, spiders, crustaceans and centipedes. Their success is due to a jointed exoskeleton, segmented body and paired jointed appendages that allow them to occupy nearly every habitat.

Mollusca (snails, octopus), Nematoda (roundworms) and Annelida (segmented worms) are also large groups but each has far fewer species than Arthropoda.

Hence, Arthropoda.

86. Answer: d

Explanation:

Counting triangles in a compound figure requires listing them by size class—smallest indivisible triangles first, then triangles formed by combining two, three or more small triangles.

For the given figure, the smallest units form the base count. Larger triangles emerge by combining adjacent small triangles along shared edges, and still larger ones span the outer boundary of the figure.

Adding the counts of all size classes—small, medium and large—gives a total of 20 triangles in the figure.

Hence, 20.

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87. Answer: d

Explanation:

Mumbai lies along the western coast of Maharashtra, directly on the windward side of the Western Ghats. During the south-west monsoon (June to September), moisture-laden winds from the Arabian Sea are forced to ascend the steep western slopes of the Ghats, cool rapidly and release very heavy orographic rainfall on the coastal belt where Mumbai is situated.

The Himalayas, Aravallis and Eastern Ghats are located far from Mumbai and do not act as the orographic barrier for its monsoon rainfall.

Hence, Western Ghats.

88. Answer: b

Explanation:

A plane mirror produces an image by reflecting parallel rays according to the law of reflection. The image is formed behind the mirror at the same distance as the object is in front of it, and it cannot be caught on a screen, so it is virtual.

The image is exactly the same size as the object, erect (not inverted), and left and right are interchanged, which is called lateral inversion. Only the option combining same size, erect, laterally inverted and virtual fits all four properties.

Hence, Same size, erect, laterally inverted, virtual.

89. Answer: b

Explanation:

Akshay Kumar won the Best Actor award at the 64th National Film Awards, announced in March 2017 and presented in May 2017, for his performance in the 2016 Hindi film Rustom, in which he played Naval Commander Rustom Pavri. The role was inspired by the 1959 K. M. Nanavati case.

Salman Khan, Shah Rukh Khan and Aamir Khan were popular actors of the year but did not receive the National Film Award for Best Actor in this edition.

Hence, Akshay Kumar.

90. Answer: b

Explanation:

Maharashtra's tableau received the award for the best tableau in the Republic Day Parade 2018. The tableau, based on the theme of Chhatrapati Shivaji Maharaj's coronation, was appreciated for its artistic depiction and cultural richness. Defence Minister Nirmala Sitharaman presented the awards at a special function in New Delhi.

Gujarat, Karnataka and Goa also presented tableaus that year but did not win the best-tableau award.

Hence, Maharashtra.

91. Answer: b**Explanation:**

Similarity questions ask which option shares the same structural pattern as the question figure—same element count, same positional arrangement and the same type of internal shape.

Compare the reference figure with each of the four options for these properties, allowing a rotation but not a change in the underlying pattern.

The figure marked D preserves every structural feature of the reference: element count, relative positions and inner shape types all match, differing at most by orientation.

Hence, D.

92. Answer: a**Explanation:**

Step 1 — Increase = $36 - 22 = 14$ billion tons.

Step 2 — Percentage increase = $\frac{14}{22} \times 100 = \frac{1400}{22} = 63.6363 \dots \%$.

Hence, 63.63%.

93. Answer: d

Explanation:

Step 1 — Together A and B fill the reservoir in 4 hours, and A alone in 6 hours. Let B alone take B hours. Then $\frac{1}{6} + \frac{1}{B} = \frac{1}{4}$.

Step 2 — $\frac{1}{B} = \frac{1}{4} - \frac{1}{6} = \frac{3-2}{12} = \frac{1}{12}$, so $B = 12$ hours.

Step 3 — B takes $12 - 6 = 6$ hours more than A.

Hence, 6 hours.

94. Answer: c

Explanation:

Step 1 — Loss = $575 - 506 = 69$ rupees.

Step 2 — Loss% = $\frac{69}{575} \times 100 = \frac{6900}{575} = 12\%$.

Hence, 12%.

95. Answer: a

Explanation:

Step 1 — Pushpak's start: 7:49:31 p.m., end: 9:59:42 p.m.

Step 2 — Ronit starts 58 min 40 s later: $7:49:31 + 0:58:40 = 8:48:11$ p.m.

Step 3 — Ronit finishes 51 min 39 s after Pushpak: $9:59:42 + 0:51:39 = 10:51:21$ p.m.

Step 4 — Ronit's journey duration = $10:51:21 - 8:48:11 = 2 \text{ h } 3 \text{ min } 10 \text{ s}$.

Hence, 2 hours 3 minutes 10 seconds.

96. Answer: a

Explanation:

Sclerenchyma is a mechanical plant tissue whose cells are long, narrow and have thick lignified secondary walls, with almost no living contents at maturity. It gives plants rigidity and resistance to bending, tension and compression, and its fibres are widely used for coir, jute and hemp.

The husk (mesocarp) of a coconut is a thick fibrous layer made of sclerenchyma fibres, which is why coir is produced from it. Parenchyma and collenchyma are living support tissues, and aerenchyma is a spongy tissue found in aquatic plants.

Hence, Sclerenchyma.

97. Answer: d

Explanation:

Each letter is replaced by its position in the English alphabet and the numbers are written together with no separators.

Check with YELL: Y = 25, E = 5, L = 12, L = 12. Concatenating gives 25-5-12-12 = 2551212, matching the given code.

Apply the same rule to TALE: T = 20, A = 1, L = 12, E = 5. Concatenating gives 20-1-12-5 = 201125.

Hence, 201125.

98. Answer: a

Explanation:

Charles Darwin was an English naturalist who published 'On the Origin of Species' in 1859, based on his observations during the voyage of HMS Beagle. In it he proposed the theory of evolution by natural selection, arguing that species change over generations because favourable inherited traits are more likely to survive and reproduce.

Lamarck earlier suggested inheritance of acquired characters, Oparin worked on the origin of life from a primordial soup, and Weismann proposed the germ plasm theory, but none of them wrote 'Origin of Species'.

Hence, Darwin.

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99. Answer: b

Explanation:

Step 1 — Remainder theorem: $f(x) = x^2 + ax + b$ divided by $x - 7$ gives $f(7) = 49 + 7a + b = 35$, so $7a + b = -14$.

Step 2 — Similarly $g(x) = x^2 + bx + a$ gives $g(7) = 49 + 7b + a = 31$, so $a + 7b = -18$.

Step 3 — Add the two equations: $8a + 8b = -32 \Rightarrow a + b = -4$.

Hence, -4.

100. Answer: a

Explanation:

The Indian Space Research Organisation launched the communication satellite GSAT-19 on 5 June 2017 using the GSLV Mk III-D1, the first developmental flight of the indigenously developed Geosynchronous Satellite Launch Vehicle Mark III. The vehicle used the CE-20 cryogenic upper stage and lifted off from the Satish Dhawan Space Centre, Sriharikota.

PSLV-CA and PSLV-XL are variants of the smaller Polar Satellite Launch Vehicle used for lighter payloads to lower orbits, while RLV-TD was a reusable-launch technology demonstrator, none of which carried GSAT-19.

Hence, GSLV Mk III-D1.

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