

Answers

1. Answer: c

Explanation:

An assumption is something taken for granted by the speaker for the statement to hold true.

Assumption I says children like songs and are happy listening to them. If children disliked songs, using songs as a medium of teaching would not be effective, so this belief is taken for granted by the speaker.

Assumption II says songs increase children's memory power. The statement claims songs are the best medium for memorising lessons, which necessarily assumes that songs support memory retention.

Hence, Both assumptions are implicit.

2. Answer: a

Explanation:

The modern periodic table groups elements after lanthanum (atomic number 57) into a special inner-transition series.

Elements with atomic numbers 58 (Cerium) to 71 (Lutetium) form the Lanthanoid series (also called Lanthanides). They belong to the f-block and are placed below the main table for convenience.

Actinoids are the second inner-transition series with atomic numbers 90 to 103. Halogens (Group 17) and noble gases (Group 18) are p-block elements and do not lie in this range.

Hence, elements with atomic numbers 58 to 71 are called Lanthanoids.

3. Answer: c

Explanation:

The Global Diversity Award recognises individuals who have made outstanding contributions to promoting cultural diversity across the world.

In 2017, Bollywood actor Salman Khan was conferred the Global Diversity Award at the British Parliament House in London. He was honoured for his work through the Being Human Foundation and his contribution to Indian cinema reaching global audiences.

Other actors listed as options are eminent film personalities but were not awarded this particular recognition in 2017.

Hence, Salman Khan received the Global Diversity Award 2017.

4. Answer: c

Explanation:

Each letter is replaced by its position in the English alphabet and then the digits are joined without separators.

For FROCK: F = 6, R = 18, O = 15, C = 3, K = 11. Joining them gives $6 \rightarrow 18 \rightarrow 15 \rightarrow 3 \rightarrow 11 = 61815311$, which matches the given code.

For LIKE: L = 12, I = 9, K = 11, E = 5. Joining them gives $12 \rightarrow 9 \rightarrow 11 \rightarrow 5 = 129115$.

Hence, the code for LIKE is 129115.

5. Answer: c

Explanation:

The angle between the hands of a clock can be computed from the hour-hand and minute-hand positions measured from the 12 o'clock mark.

At 10:14 pm, the minute hand is at $14 \times 6 = 84^\circ$ from 12.

The hour hand moves 30° per hour and 0.5° per minute, so it is at $10 \times 30 + 14 \times 0.5 = 300 + 7 = 307^\circ$.

The angle between them is $307 - 84 = 223^\circ$, and the smaller angle is $360 - 223 = 137^\circ$.

Hence, the required angle is 137° .

6. Answer: b

Explanation:

A strong argument must be directly related to the statement and give a weighty reason for the course of action, here holding awareness programmes on air pollution.

Argument I is strong: awareness programmes that inspire people to plant more trees and increase green cover directly help reduce air pollution.

Argument II is strong: vehicle exhaust is a major source of air pollution, and awareness programmes that make people limit the number of vehicles on the road address it directly.

Hence, both arguments I and II are strong.

7. Answer: b

Explanation:

The Ajanta Caves in Maharashtra are rock-cut Buddhist cave monuments dating from the 2nd century BCE to the 6th century CE, celebrated for their murals and sculptures.

The paintings on the walls and ceilings of these caves primarily depict the Jataka tales, which are stories of the previous births of Gautama Buddha, along with scenes from Buddha's life.

Rashtrakuta stories are associated with the Ellora caves, Raasleela with Krishna-themed art, and Mahabharata episodes are found in later temple sculptures, none of which describe the main theme of Ajanta.

Hence, the paintings of Ajanta depict Jataka tales.

8. Answer: c

Explanation:

From the table, the yearly incomes are: 2012 – ₹12.5 lakh, 2013 – ₹13 lakh, 2014 – ₹13 lakh, 2015 – ₹12.5 lakh, 2016 – ₹14 lakh.

Total income over five years = $12.5 + 13 + 13 + 12.5 + 14 = ₹65$ lakh, so the average yearly income = $65 \div 5 = ₹13$ lakh.

Variable cost is 20% of income, so the average variable cost per year = $\frac{20}{100} \times 13 = 2.6$ lakh.

Hence, Shashank spends ₹2.6 lakh per year on average on variable costs.

9. Answer: a

Explanation:

Let Harry's present age be H years; Yahudi is 15 years older, so his present age is $H + 15$.

13 years from now, Yahudi will be $H + 28$ and Harry will be $H + 13$. Yahudi's age then is twice Harry's age then: $H + 28 = 2(H + 13)$.

Simplifying: $H + 28 = 2H + 26$, so $H = 2$. Check: in 13 years Harry is 15 and Yahudi is 30, which is twice 15.

Hence, Harry's present age is 2 years.

10. Answer: a

Explanation:

The group of an element in the modern periodic table is determined by the number of valence electrons in its outermost shell.

An element with 12 protons has atomic number 12, so it has 12 electrons arranged as 2, 8, 2. The two electrons in the outermost shell place it in Group 2 (the alkaline-earth metals).

This element is magnesium (Mg). Groups 4 and 6 belong to transition metals and Group 8 to a mid-transition series, none of which match a 2, 8, 2 configuration.

Hence, the element belongs to Group 2.

Your Personal Exams Guide

11. Answer: d

Explanation:

If $\frac{5}{7}$ of the journey is still left, then the portion already covered is $1 - \frac{5}{7} = \frac{2}{7}$ of the total distance.

The distance covered so far equals 28 km, so $\frac{2}{7} \times \text{Total} = 28$.

Solving, Total distance = $28 \times \frac{7}{2} = 98$ km.

Hence, the total distance of her journey is 98 km.

12. Answer: b

Explanation:

Every hot body emits electromagnetic radiation whose peak wavelength depends on its temperature (Wien's law).

A hot furnace, though very warm to the touch, has temperature well below that required to emit visible or ultraviolet radiation as its main output. Instead, most of its radiation lies in the infrared region of the electromagnetic spectrum, which we perceive as heat.

Ultraviolet radiation comes from very hot bodies like the Sun or arcs. X-rays need atomic transitions or high-energy processes, and microwaves are produced by specific electronic devices, not naturally by a furnace.

Hence, the radiations emitted by a hot furnace are infrared.

13. Answer: c

Explanation:

Factorise each number into its prime factors: $112 = 2^4 \times 7$, $168 = 2^3 \times 3 \times 7$, and $196 = 2^2 \times 7^2$.

The HCF is the product of the lowest powers of the common prime factors. Only 2 and 7 are common to all three numbers.

Lowest power of 2 is 2^2 and lowest power of 7 is 7^1 .

$$\text{HCF} = 2^2 \times 7 = 4 \times 7 = 28.$$

Hence, the HCF of 112, 168 and 196 is 28.

14. Answer: a

Explanation:

To find a percentage of a number, multiply the number by the percentage expressed as a decimal.

$$\text{Passing marks} = 34\% \text{ of } 45 = \frac{34}{100} \times 45.$$

$$\text{Compute: } \frac{34 \times 45}{100} = \frac{1530}{100} = 15.3.$$

Hence, the passing marks out of 45 are 15.3.

15. Answer: d

Explanation:

The given equation $x^2 - 2x + 1 = 0$ factorises as $(x - 1)^2 = 0$, so its roots are $\alpha = \beta = 1$.

The new roots are α^2 and β^2 , both equal to $1^2 = 1$.

An equation with both roots equal to 1 is again $(x - 1)^2 = 0$, which expands to $x^2 - 2x + 1 = 0$.

Hence, the required equation is $x^2 - 2x + 1 = 0$.

16. Answer: b

Explanation:

The question figure is a box (cuboid) lying horizontally with a circle drawn wholly inside its front face.

Figure D shows the same box simply turned upright, and its circle still lies completely inside the front face.

In figures A, B and C the front face is shifted so that the circle overlaps the edge lines of the box, which is not the case in the question figure.

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

17. Answer: a

Explanation:

Combustion of carbon compounds in oxygen depends on how easily the carbon is oxidised to carbon dioxide.

Saturated hydrocarbons burn in sufficient oxygen with a clean blue flame because all the carbon is converted to CO₂ efficiently.

Unsaturated hydrocarbons (with double or triple bonds) have a higher carbon-to-hydrogen ratio. When they burn, unburnt carbon particles are released as thick black smoke and produce a sooty yellow flame.

Red or brown flames are not typical of hydrocarbon combustion, so those options are ruled out.

Hence, unsaturated carbon compounds burn with a lot of black smoke giving a Yellow flame.

18. Answer: c

Explanation:

For a pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, no solution exists when $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ (parallel lines).

Here $a_1 = 6, b_1 = -11, c_1 = 11$ and $a_2 = 15, b_2 = k, c_2 = -9$.

Applying $\frac{6}{15} = \frac{-11}{k}$ gives $k = \frac{-11 \times 15}{6} = -27.5$.

Checking that $\frac{6}{15} \neq \frac{11}{-9}$ confirms the lines are parallel and distinct, so no solution exists.

Hence, the value of k is -27.5 .

19. Answer: b

Explanation:

Employment surveys of the Indian labour market rank sectors by the total number of women they employ.

Agriculture remains the largest employer of women in India, absorbing the bulk of the female workforce mainly in rural areas.

The technology sector, driven by IT services and business process management firms, ranks as the second largest employer of women in India, reflecting the strong participation of women in the IT/ITES industry.

Manufacturing and other services fall behind these two, so ranks like third or fourth do not fit.

Hence, the technology sector is the Second largest employer of women in India.

20. Answer: c

Explanation:

The question figure gives five pieces: a square, a triangle, a shaded rectangle, a right-angled triangle and a small circle.

Figure A uses the square as the frame, places the shaded rectangle along its left side, and draws the right-angled triangle with its slant side running from the top of the shaded strip to the bottom-right corner, with the small circle inside that triangle.

In figure B the shaded strip is on the right and the circle lies outside the triangle; in figure C the circle sits above the slant side; figure D uses an inverted triangle instead of the right-angled one.

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

Hence, figure A.

21. Answer: c

Explanation:

pH paper changes colour only when it comes into contact with a solution containing free H^+ or OH^- ions, since it detects the hydrogen-ion concentration in water.

Sodium bicarbonate is a solid salt. When placed on a strip of dry pH paper, no ionisation takes place because there is no water to dissolve the salt and release ions.

Since no H^+ or OH^- ions are available, the indicator dyes in the paper do not react and the strip's colour stays the same.

If the paper were moist, sodium bicarbonate would dissolve slightly and turn the paper blue, showing its basic nature, but that is not the given condition.

Hence, the colour of the strip does not change.

22. Answer: d

Explanation:

Density is a fundamental physical property that measures how much mass is packed into a given volume of a substance.

By definition, $\text{Density} = \frac{\text{Mass}}{\text{Volume}}$. Its SI unit is kilogram per cubic metre (kg/m^3).

Options involving mass multiplied by volume, mass added to volume, or volume divided by mass do not describe density and are dimensionally inconsistent with kg/m^3 .

Hence, Density is the ratio Mass / Volume.

23. Answer: c

Explanation:

Average speed of an object is the total distance travelled divided by the total time taken, and is a scalar quantity measured in metres per second.

Total distance = $15 \text{ m} + 15 \text{ m} = 30 \text{ m}$.

Total time = $4 \text{ s} + 2 \text{ s} = 6 \text{ s}$.

Average speed = $\frac{30}{6} = 5.0 \text{ m s}^{-1}$.

The option 5.0 s^{-1} has wrong units (frequency, not speed) and 5.0 m is a distance, not a speed, so both are ruled out.

Hence, the average speed of the object is 5.0 ms^{-1} .

24. Answer: b

Explanation:

The series is: CC, then a smiley followed by CC, then RR, then ?.

Going from CC to the next figure, a smiley face is added in front of the pair of circled letters.

The same rule applies from RR to the missing figure: a smiley must be added in front of RR, giving smiley RR.

Figure B shows a smiley followed by RR.

Hence, figure B replaces the '?'.

25. Answer: a

Explanation:

Write the alphabet position of each letter of TAILOR: T = 20, A = 1, I = 9, L = 12, O = 15, R = 18.

The code 019258 keeps only the unit digit of each position: 20 → 0, 1 → 1, 9 → 9, 12 → 2, 15 → 5, 18 → 8.

Apply the same rule to CUT: C = 3 → 3, U = 21 → 1, T = 20 → 0.

Hence, the code for CUT is 310.

26. Answer: d

Explanation:

The purity of gold is measured on a 24-carat scale, where 24-carat represents 100% pure gold.

To find the percentage of pure gold in any lower carat sample, we use the ratio:

$$\text{Purity \%} = \frac{\text{Given carat}}{24} \times 100.$$

For 22-carat gold: $\frac{22}{24} \times 100 = \frac{2200}{24} = \frac{275}{3}\%$, which is approximately 91.67%.

Hence, $\frac{275}{3}$.

27. Answer: c

Explanation:

By Newton's second law, the force on the bullet equals its rate of change of momentum: $F = \frac{m(v - u)}{t}$.

Given: $m = 12 \text{ g} = 0.012 \text{ kg}$, $u = 0$, $v = 600 \text{ m/s}$ and $t = 0.006 \text{ s}$.

Substituting: $F = \frac{0.012 \times 600}{0.006} = \frac{7.2}{0.006} = 1200 \text{ N}$.

Hence, the force exerted by the gun on the bullet is 1200 N.

28. Answer: c

Explanation:

In 2018, the Government of Uttar Pradesh signed a Memorandum of Understanding with the Republic of Korea to promote and boost the tourism industry in the state.

The MoU focused on developing the Buddhist Circuit sites in Uttar Pradesh such as Sarnath, Kushinagar and Shravasti, which draw a large number of Buddhist pilgrims from Korea, Japan and Southeast Asia every year.

The agreement also covered training of tourism professionals, joint promotion campaigns and easier connectivity between Korean pilgrims and heritage sites in the state.

Hence, Uttar Pradesh.

29. Answer: b

Explanation:

Toofan Ghosh took charge as the new Chief Operating Officer (COO) of the National Cricket Academy (NCA), Bengaluru in 2017.

A former first-class cricketer and long-serving BCCI administrator, he was appointed to oversee the day-to-day operations of the NCA, including coaching camps, rehabilitation of injured players and age-group cricket development.

Saba Karim, Dilip Sardesai and Kapil Dev held different roles in Indian cricket administration or coaching but were not appointed COO of NCA in 2017.

Hence, Toofan Ghosh.

30. Answer: d

Explanation:

Parshvanatha was the twenty-third Tirthankara of Jainism and lived roughly in the 8th–9th century BCE, about 250 years before Mahavira.

He was born a Kshatriya prince, the son of King Ashvasena and Queen Vamadevi of Banaras (Varanasi), and renounced worldly life at the age of thirty to attain enlightenment.

His teachings rested on four vows — non-violence, truth, non-stealing and non-possession — to which Mahavira, the twenty-fourth and last Tirthankara, later added the vow of celibacy.

Hence, Twenty-third.

31. Answer: b

Explanation:

Sodium, an alkali metal, reacts violently with cold water at ordinary temperature.

The reaction is: $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2 \uparrow$. The heat released ignites the hydrogen gas evolved, producing a characteristic yellow flame.

Aluminium reacts only with steam after its protective oxide layer is removed; iron reacts slowly with steam at red heat; zinc reacts with steam but not with cold water. None of these show the violent behaviour that sodium does.

Hence, Sodium.

32. Answer: b

Explanation:

Base area $\pi r^2 = 144\pi$, so the base radius is $r = 12$ cm.

With slant height $l = 13$ cm, the height is $h = \sqrt{l^2 - r^2} = \sqrt{169 - 144} = 5$ cm.

Volume of the cone $= \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \times 144 \times 5 = 240\pi$ cm³.

On recasting into a sphere of radius R , volume is conserved: $\frac{4}{3}\pi R^3 = 240\pi$, so $R^3 = 180$.

Hence, the radius of the sphere is $\sqrt[3]{180}$ cm.

33. Answer: a

Explanation:

The Prime Minister of India hoists the national flag every year on Independence Day (15 August) at the Red Fort (Lal Qila) in Delhi.

This tradition began on 15 August 1947, when India's first Prime Minister Pandit Jawaharlal Nehru unfurled the flag from the ramparts of the Red Fort, and it has been followed by every subsequent PM.

India Gate and Raisina Road host other national events, while the flag is unfurled at Rashtrapati Bhavan by the President on Republic Day (26 January) – not on Independence Day, and not by the Prime Minister.

Hence, Red Fort.

34. Answer: d

Explanation:

Mammals are warm-blooded (endothermic) vertebrates that maintain a constant internal body temperature independent of the environment.

Their heart is four-chambered – two atria and two ventricles – which keeps oxygenated blood from the lungs completely separate from the deoxygenated blood returning from the body, enabling efficient oxygen transport.

Fish and amphibians have a two- or three-chambered heart and are cold-blooded; reptiles (except crocodiles) also have a three-chambered heart and are cold-blooded. Only mammals and birds are truly warm-blooded, but among the given options only mammals fit.

Hence, Mammals.

35. Answer: d

Explanation:

Sound propagates through air as a longitudinal wave, made up of alternating regions of compression and rarefaction.

A compression is a region where the air particles are pushed closely together, so the density and the pressure of the air are HIGHER than the surrounding undisturbed medium.

A rarefaction is the opposite — the particles are farther apart, giving a region of lower density and lower pressure. Zero or infinite pressure do not occur in a longitudinal sound wave.

Hence, higher.

36. Answer: a

Explanation:

Justice Abhilasha Kumari became the first woman Chief Justice of the Manipur High Court.

Her appointment came after the Manipur High Court was carved out of the Gauhati High Court in 2013, making her the first woman to hold the top judicial post in the newly formed High Court.

Justice Indu Malhotra was elevated directly to the Supreme Court from the Bar in 2018; Justice Ranjana Prakash Desai served on the Supreme Court and Justice Ruma Pal was also a Supreme Court judge — none of them headed the Manipur High Court.

Hence, Abhilasha Kumari.

37. Answer: c

Explanation:

The launching of a rocket is based on Newton's third law of motion, which states that for every action there is an equal and opposite reaction.

Inside the rocket, hot gases produced by burning fuel are expelled downward at very high speed through the nozzle — this is the action force.

By the third law, the escaping gases exert an equal and opposite force on the rocket in the upward direction, and this reaction force lifts the rocket off the ground.

Hence, Third law of motion.

38. Answer: a

Explanation:

Candy is a kind of sweet food, so every candy belongs to the class Sweet: the Candy circle must lie completely inside the Sweet circle.

Tangy is a different taste from sweet, and the classes Tangy and Sweet are treated as unrelated, so Tangy is drawn as a separate circle that touches neither of the other two.

The correct Venn diagram therefore shows a small Candy circle inside a larger Sweet circle, with a separate Tangy circle outside them.

Hence, the diagram with Candy inside Sweet and Tangy separate is correct.

39. Answer: c

Explanation:

The maximum number of electrons that can be accommodated in any shell is given by the Bohr–Bury formula $2n^2$, where n is the principal quantum number of the shell.

The shells are labelled K, L, M, N, O ... corresponding to $n = 1, 2, 3, 4, 5 \dots$ respectively, so for the M shell $n = 3$.

Substituting: $2 \times 3^2 = 2 \times 9 = 18$ electrons.

Hence, 18.

40. Answer: b

Explanation:

Marble chips are made of calcium carbonate, CaCO_3 , and dilute hydrochloric acid (HCl) is a strong acid.

The reaction is a typical acid-carbonate reaction that produces a salt, water and carbon dioxide gas as effervescence: $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$.

The other options are chemically incorrect: H_2CO_3 is unstable and decomposes into water and CO_2 ; free chlorine and oxygen are not liberated in this mild reaction; and $\text{H}_2 + \text{CO}_3$ as separate species is not a real product set.

Hence, $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$.

41. Answer: d

Explanation:

Among vertebrate classes, only Mammalia and Aves (birds) are warm-blooded (endothermic) — they maintain a constant body temperature regardless of the environment.

Among the given options, Aves (birds) are warm-blooded; they have a four-chambered heart, feathers for insulation and a high metabolic rate that generates internal heat.

Amphibia (frogs, toads), Pisces (fish) and Reptilia (snakes, lizards) are all cold-blooded (ectothermic) – their body temperature varies with the surroundings.

Hence, Aves.

42. Answer: d

Explanation:

Anil Kumble resigned as the head coach of the Indian cricket team in June 2017.

His one-year tenure as head coach ended after the ICC Champions Trophy 2017, and he cited differences with then-captain Virat Kohli over his working style as the reason for stepping down.

Ravi Shastri was appointed head coach in his place shortly afterwards; Rahul Dravid and Kapil Dev held coaching roles in Indian cricket at other times but did not resign from the head coach post in 2017.

Hence, Anil Kumble.

43. Answer: b

Explanation:

Let Meeku's monthly income be x .

According to the problem, 20% of his income is spent on shop rent and electricity bill, which is given as ₹ 13,000. So $0.20x = 13000$, which gives $x = \frac{13000}{0.20} = 65000$.

He spends 80% of his income on purchase: $0.80 \times 65000 = 52000$.

Hence, ₹ 52,000.

Your Personal Exams Guide

44. Answer: c

Explanation:

The reaction is $\text{CuO} + \text{CO} \rightarrow \text{Cu} + \text{CO}_2$.

Here CuO loses oxygen and gets reduced to Cu — so CuO is the oxidising agent. CO, on the other hand, gains that oxygen to become CO_2 — it is oxidised. The substance that gets oxidised is by definition the reducing agent.

Cu and CO_2 are the products of the reaction, not reactants, so they cannot be the reducing agent. CuO is the oxidising agent, not the reducing agent.

Hence, CO.

45. Answer: b

Explanation:

Examine the differences between consecutive terms of the given series: 310, 260, 210, ?

$260 - 310 = -50$, and $210 - 260 = -50$. The common difference is -50 throughout, so the series is an arithmetic progression with common difference -50 .

Therefore, the next term is $210 - 50 = 160$.

Hence, 160.

46. Answer: a

Explanation:

A well-known identity in number theory states that the sum of the first n odd natural numbers equals n^2 .

That is, $1 + 3 + 5 + \dots + (2n - 1) = n^2$.

Here $121 = 11^2$, so we need $n^2 = 121$, giving $n = 11$. Verification: $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 = 121$.

Hence, 11.

47. Answer: a

Explanation:

Momentum is defined as the product of the mass of a body and its velocity: $\vec{p} = m\vec{v}$.

Mass is a scalar quantity, but velocity is a vector — it has both magnitude and direction. When a scalar is multiplied with a vector, the result is a vector with the same direction as that vector.

Therefore momentum is a vector quantity, and possesses both magnitude and direction. Its direction is always the same as the direction of the velocity of the body.

Hence, magnitude and direction.

48. Answer: d

Explanation:

Find the coding rule from the given example MINT $\rightarrow$ 3940.

Write the alphabet position of each letter: M = 13, I = 9, N = 14, T = 20. The code retains only the unit (last) digit of each position: $13 \rightarrow 3$, $9 \rightarrow 9$, $14 \rightarrow 4$, $20 \rightarrow 0$, giving 3940.

Apply the same rule to TALE. T = 20, A = 1, L = 12, E = 5. The unit digits are 0, 1, 2, 5, so TALE is coded as 0125.

Hence, 0125.

49. Answer: d

Explanation:

Examine the given series: 3G3R, 6F6S, 12E12T, ?

The number appearing at the start and end of each term follows the pattern 3, 6, 12, ... each term is twice the previous one, so the next number is 24.

The first letter follows $G \rightarrow F \rightarrow E \rightarrow \dots$, moving one step back in the alphabet, so the next letter is D. The last letter follows $R \rightarrow S \rightarrow T \rightarrow \dots$, moving one step forward, so the next letter is U.

Combining these, the next term is 24D24U.

Hence, 24D24U.

Your Personal Exams Guide

50. Answer: a

Explanation:

Let the three numbers in increasing order be smallest = s , middle = m , largest = L . Mean is 16, so $s + m + L = 48$.

Range = 12 means $L - s = 12$. The problem also says the difference between the largest and middle is three times the difference between the middle and the smallest: $L - m = 3(m - s)$.

Let $m - s = x$. Then $L - m = 3x$ and $L - s = 4x = 12$, so $x = 3$. Therefore $m = s + 3$ and $L = s + 12$.

Substituting into the sum: $s + (s + 3) + (s + 12) = 48 \Rightarrow 3s + 15 = 48 \Rightarrow s = 11$. Then $m = 14$ and $L = 23$.

Hence, 23.

51. Answer: b

Explanation:

In February 2017, Kalimpong was carved out of Darjeeling district and declared the 21st district of West Bengal by the state government led by Chief Minister Mamata Banerjee.

Kalimpong lies in the eastern Himalayan foothills and is well known as a hill station and educational centre. Its creation as a separate district was aimed at improving administration and local development in the sub-Himalayan region.

Howrah, Nadia and Birbhum are older districts of West Bengal and were not the newly declared 21st district. Hence, Kalimpong is the correct answer.

52. Answer: c

Explanation:

Examine the given series: 10, 19, 18, 27, ?

The pattern alternates between two operations: add 9, then subtract 1.

Step 1: $10 + 9 = 19$.

Step 2: $19 - 1 = 18$.

Step 3: $18 + 9 = 27$.

Step 4: $27 - 1 = 26$.

Hence, 26.

53. Answer: a

Explanation:

Bile is a greenish-yellow fluid secreted by the liver and stored in the gall bladder. It is released into the small intestine through the bile duct during digestion.

The chief role of bile is the emulsification of fats. Bile salts break large fat globules into much smaller droplets, greatly increasing the surface area on which the pancreatic enzyme lipase can act.

Bile itself does not digest fat, nor is it responsible for the absorption or excretion of fat. Digestion is carried out by lipase, absorption occurs in the intestinal villi, and excretion of fats is not a body process. Hence, the correct role is emulsification of fat.

54. Answer: b

Explanation:

Side of each corner square = $\sqrt{2.25} = 1.5$ cm.

When these corner squares are removed and the flaps folded up, they form the height of the open cuboid. So height $h = 1.5$ cm.

Length of the base = original side - $2 \times (\text{cut}) = 9 - 2(1.5) = 6$ cm. Breadth is also 6 cm because the plate was square.

Volume of the open cuboid = $l \times b \times h = 6 \times 6 \times 1.5 = 54 \text{ cm}^3$.

Hence, 54.

55. Answer: a

Explanation:

Let the speed of the train be t km/hr. Then the speed of the horse = $t/3$ (train is 3 times faster) and the speed of the steamer = $t/1.5 = 2t/3$.

Time taken by steamer = $120 \div (2t/3) = 180/t$ hr.

Time taken by train = $450 \div t = 450/t$ hr.

Time taken on horse = $60 \div (t/3) = 180/t$ hr.

Total time = $180/t + 450/t + 180/t = 810/t$ hr, and this equals 13 hr 30 min = 13.5 hr.

So $810/t = 13.5$, giving $t = 810 \div 13.5 = 60$.

Hence, 60 km/hr.

56. Answer: c

Explanation:

Look at the four items: Blanket, Pillow, Mosquito and Mattress.

Blanket, Pillow and Mattress are all inanimate objects used for sleeping or resting in bed.

Mosquito, on the other hand, is a living insect and does not belong to the category of bedding articles.

Hence, Mosquito.

57. Answer: c

Explanation:

Since 15 men + 6 women and 9 men + 8 women both complete the same work in 25 days, they have equal daily output.

$15m + 6w = 9m + 8w$, giving $6m = 2w$, so 1 woman = 3 men.

Convert the first group into men-equivalents: $15m + 6w = 15m + 18m = 33$ men. Total work = $33 \times 25 = 825$ man-days.

The same work is now to be finished in 15 days by 19 men and x women. Group in men-equivalents = $19 + 3x$. So $15(19 + 3x) = 825$, i.e. $285 + 45x = 825$.

$45x = 540$, giving $x = 12$.

Hence, 12.

58. Answer: d

Explanation:

For the equation $x^2 - 6x + q = 0$, let the roots be α and β .

Sum of roots $\alpha + \beta = 6$ and product of roots $\alpha\beta = q$.

Difference of squares: $|\alpha^2 - \beta^2| = |\alpha + \beta| \cdot |\alpha - \beta| = 6 \cdot |\alpha - \beta| = 24$, so $|\alpha - \beta| = 4$.

Use $(\alpha - \beta)^2 = (\alpha + \beta)^2 - 4\alpha\beta$: $16 = 36 - 4q$, giving $4q = 20$ and $q = 5$.

Hence, 5.

59. Answer: b

Explanation:

Apply BODMAS starting inside the braces.

Step 1: $(-96) \div (-6) = 16$ (a negative divided by a negative is positive).

Step 2: Inside the braces: $-44 - 16 = -60$.

Step 3: Multiply by $-1/5$: $(-1/5) \times (-60) = 60/5 = 12$.

Hence, 12.

60. Answer: a

Explanation:

The question figure shows a vertical cylinder crossed at its middle by a horizontal ellipse, drawn inside two overlapping squares.

Figure A reproduces all three parts: the vertical cylinder, the horizontal ellipse across it and the two overlapping squares.

Figure B has no horizontal ellipse, figure C has the cylinder lying horizontally, and figure D changes the placement of the cylinder and ring within the squares.

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

61. Answer: c

Explanation:

Let the total weight of the brick be W kg. Then $\frac{3}{5}W = \frac{9}{10}$.

Step 1: $W = \frac{9}{10} \div \frac{3}{5} = \frac{9}{10} \times \frac{5}{3} = \frac{3}{2}$ kg.

Step 2: Weight of $8/15$ part = $\frac{8}{15} \times \frac{3}{2} = \frac{24}{30} = \frac{4}{5}$ kg.

Hence, $4/5$ kg.

62. Answer: b

Explanation:

Kandla, officially known as Deendayal Port, is a major sea port located on the Gulf of Kutch in the state of Gujarat.

It handles a large share of India's cargo traffic on the west coast and is particularly known for petroleum, chemicals and grain trade.

Veraval is a port on the Arabian Sea in Gujarat but not in the Gulf of Kutch. Jafrabad and Dahej are ports located on the Gulf of Khambhat, not the Gulf of Kutch. Hence, the correct answer is Kandla.

63. Answer: d

Explanation:

Energy resources are broadly classified as renewable and non-renewable on the basis of how quickly nature can replenish them.

Non-renewable sources of energy such as coal, petroleum and natural gas were formed over millions of years by geological processes acting on buried organic matter. Once these deposits are exhausted, they cannot be replaced within any human time-scale.

Renewable sources such as solar, wind and hydro energy are continuously replaced by natural cycles, so they do not fit the description. Hence, the correct answer is Non-renewable sources of energy.

64. Answer: c

Explanation:

The World Bank approved a loan of about USD 375 million to assist India in developing its first modern inland waterway on the National Waterway 1 stretch of the Ganga between Varanasi and Haldia.

The funding was extended for the Jal Marg Vikas Project executed by the Inland Waterways Authority of India under the Ministry of Shipping. It supports fairway development, multi-modal terminals and navigational aids to make the river fit for large cargo vessels.

The other loan figures listed do not match the World Bank commitment for this specific project. Hence, USD 375 million is correct.

65. Answer: b

Explanation:

A strong argument must be directly related to the statement and give a weighty reason for or against the course of action.

Argument I is strong: keeping pets helps children learn to share and care, which is a real reason to encourage it.

Argument II is weak: that pets are not feasible for every family does not argue against encouraging children in general; families who can care for a pet still benefit.

Hence, only argument I is strong.

66. Answer: a

Explanation:

Formula: HCF of fractions = HCF of numerators $\div$ LCM of denominators.

Step 1: HCF of numerators 3, 6, 9, 12 = 3.

Step 2: LCM of denominators 4, 7, 14, 25.

Prime factorisation: $4 = 2^2$, $7 = 7$, $14 = 2 \times 7$, $25 = 5^2$. LCM = $2^2 \times 5^2 \times 7 = 4 \times 25 \times 7 = 700$.

Step 3: HCF = $3/700$.

Hence, $3/700$.

67. Answer: c**Explanation:**

Apply BODMAS from inside the bracket outward.

Step 1: $4^2 = 16$.

Step 2: Inside bracket, evaluate left to right: $96 \div 16 = 6$; $6 \times 8 = 48$; $48 \div 16 = 3$.

Step 3: Now the expression is $-30 \div 3 \times 7 - 2 = -10 \times 7 - 2 = -70 - 2 = -72$.

Hence, -72.

68. Answer: c**Explanation:**

The park entrance faces east, so on entering the park both girls walk towards the west.

Leela: facing west, she turns right → north; turns right again → east; turns right once more → south.

Tina: she walks straight (west) and then turns left → south.

Hence, both are walking towards the South.

69. Answer: a

Explanation:

The question figure is a diamond with an arrow-headed arm on each of its four sides, and two small four-pointed stars placed diagonally inside the diamond.

Figure C keeps the diamond, the four arrow arms and the two diagonal stars inside it.

Figures A and B lose the diamond outline in the centre, and figure D has only a single star inside the diamond.

Hence, figure C shows the closest resemblance to the question figure.

Your Personal Exams Guide

70. Answer: b

Explanation:

Sumati says the twins are the daughters of her son's aunt.

Her son's aunt is Sumati's own sister (or sister-in-law, i.e. the sister of Sumati's husband). In either case she is a female relative of Sumati's generation.

The daughters of Sumati's sister (or sister-in-law) are Sumati's nieces.

Cousin sisters would require the aunt to be Sumati's father's or mother's sister, not her son's aunt. Nephews are male, and Friends is unrelated. Hence, the girls are

Sumati's nieces.

71. Answer: b

Explanation:

The 2018 Political and Public Life Awards ceremony was held in the United Kingdom to recognize contributions to public and political life.

Veteran Bollywood actor and politician Shatrughan Sinha was honoured with the Lifetime Achievement Award at this ceremony for his long career in cinema and his service in Parliament.

Shah Rukh Khan, Dilip Kumar and Salman Khan, while celebrated actors, were not chosen for this specific 2018 Lifetime Achievement Award in the UK. Hence, the correct answer is Shatrughan Sinha.

72. Answer: b

Explanation:

Replace + with - and $\times$ with $\div$ in the expression $((75 + 60) \times 5) \times 10$.

After substitution: $((75 - 60) \div 5) \div 10$.

Step 1: Innermost bracket: $75 - 60 = 15$.

Step 2: $15 \div 5 = 3$.

Step 3: $3 \div 10 = 0.3$.

Hence, 0.3.

73. Answer: c

Explanation:

The relationship in the first pair is tool and its primary function: a Knife is used to Cut.

Applying the same logic to the second pair, the primary function of a Key is to Open a lock or a door.

Metal describes what a key is made of, Tool is a general category, and Door is the object opened, not the action performed. Hence, the correct analogy word is Open.

74. Answer: d

Explanation:

The Central Board of the Reserve Bank of India, in its meeting on 8 August 2018, decided to transfer a surplus of Rs 50,000 crore to the Government of India for the accounting year ended 30 June 2018.

This surplus, popularly called RBI's dividend, comes from the RBI's income on foreign and domestic assets after meeting its own expenditure and contingency reserves. It was among the highest transfers made to the central government at that time.

The other figures listed do not match the amount announced by the RBI Board for that financial year. Hence, the correct answer is Rs 50,000 crore.

75. Answer: d

Explanation:

For a spherical mirror, the focal length f is related to the radius of curvature R by the standard mirror formula $f = R/2$, i.e. the focal length is half the radius of curvature.

The centre of curvature is the centre of the sphere of which the mirror forms a part, while the focus lies midway between the pole and the centre of curvature for a mirror of small aperture.

Thrice, twice or equal to the radius of curvature are incorrect statements of this geometrical relation. Hence, the correct answer is half of its radius of curvature.

76. Answer: c

Explanation:

Let pipe A alone fill the tank in x hours; then pipe B takes $x + 2$ hours.

Together they fill it in 2.4 h, so $\frac{1}{x} + \frac{1}{x+2} = \frac{1}{2.4} = \frac{5}{12}$.

Cross-multiplying: $12(2x + 2) = 5x(x + 2)$, which gives $5x^2 - 14x - 24 = 0$, i.e. $(x - 4)(5x + 6) = 0$. So $x = 4$: A fills in 4 h and B in 6 h.

Pipe C empties the tank in 5 h, so A and C together have a net rate of $\frac{1}{4} - \frac{1}{5} = \frac{1}{20}$ tank per hour.

Hence, A and C together fill the tank in 20 hours.

77. Answer: b

Explanation:

Let the amounts with A, B and C be $2k$, $5k$ and $7k$ rupees respectively.

B has ₹ 90 more than A, so $5k - 2k = 90$, which gives $3k = 90$ and $k = 30$.

Therefore, the money with C is $7k = 7 \times 30 = ₹ 210$.

Hence, C has ₹ 210.

78. Answer: c

Explanation:

Ajit does $\frac{1}{7}$ of the work per day and Bhadree does $\frac{1}{8}$ per day.

In 3 days Ajit finishes $\frac{3}{7}$ of the work and Bhadree finishes $\frac{3}{8}$.

Arun's share of the work is $1 - \frac{3}{7} - \frac{3}{8} = 1 - \frac{24 + 21}{56} = \frac{11}{56}$.

Wages are divided in the ratio of work done, so Arun receives $\frac{11}{56} \times 56 = ₹ 11$.

Hence, Arun will receive ₹ 11.

79. Answer: d

Explanation:

Leemay buys vegetables once every 4 days, so each purchase falls exactly 4 days after the previous one.

He bought on Thursday, so the following purchases are Thursday + 4 days = Monday, then Monday + 4 days = Friday, then Friday + 4 days = Tuesday, and so on.

Within the next week the two days on which he buys vegetables are therefore Monday and Friday.

Hence, he will buy vegetables on Monday and Friday.

80. Answer: a

Explanation:

The code replaces each letter with its position in the English alphabet, written without any separator.

Check with LIMP: L = 12, I = 9, M = 13, P = 16, and joining these gives 12-9-13-16 = 1291316, which matches the given code.

Apply the same rule to DINNER: D = 4, I = 9, N = 14, N = 14, E = 5, R = 18.

Joining these values gives 4-9-14-14-5-18 = 491414518.

Hence, the code for DINNER is 491414518.

81. Answer: a

Explanation:

The official mascot of the Tokyo 2020 Summer Olympic Games was Miraitowa, a blue-and-white checkered character whose name combines the Japanese words 'mirai' (future) and 'towa' (eternity).

Miraitowa was designed by Ryo Taniguchi and chosen through a vote by school children across Japan.

Wenlock was the London 2012 Olympic mascot; Vinicius was the Rio 2016 Olympic mascot; Soohorang was the mascot of the PyeongChang 2018 Winter Olympics.

Hence, the mascot for Olympic 2020 is Miraitowa.

82. Answer: a

Explanation:

Apply the BODMAS order: brackets first, then division and multiplication from left to right, and finally addition.

Inside the innermost bracket: $11 \times 24 \div 8 \times 3 = 11 \times 3 \times 3 = 99$, and $99 - 69 = 30$.

Its square is $30^2 = 900$, so $1800 \div 900 = 2$, and $\frac{1}{2} \times 2 = 1$.

For the left part: $240 \div 8 = 30$, then $30 \times 512 = 15360$, and $15360 \div 4 = 3840$.

Adding the two parts: $3840 + 1 = 3841$.

Hence, the value of the expression is 3841.

83. Answer: d

Explanation:

The perpendicular drawn from the centre of a circle to a chord bisects the chord.

The diameter AD = 34 cm, so the radius is $r = 17$ cm.

Half of chord AB is $\frac{30}{2} = 15$ cm, and this half-chord together with the perpendicular distance and the radius forms a right triangle.

By the Pythagoras theorem, the distance $d = \sqrt{r^2 - 15^2} = \sqrt{289 - 225} = \sqrt{64} = 8$ cm.

Hence, the distance of chord AB from the centre is 8 cm.

84. Answer: d

Explanation:

An electric fuse works on the heating effect of electric current, also known as the Joule heating effect.

When a current flows through the fuse wire, heat is produced in proportion to $I^2 R$. If the current exceeds a safe value, the heat generated melts the low-melting-point fuse wire and breaks the circuit.

The magnetic effect of current is used in devices like electric bells and motors; electromagnetic induction is the principle of transformers and generators; there is no separate cooling effect of current used in a fuse.

Hence, an electric fuse is based on the heating effect of current.

85. Answer: d

Explanation:

Kinetic energy is the energy possessed by a body because of its motion, and its standard expression is $KE = \frac{1}{2}mv^2$, where m is the mass and v is the speed of the body.

The formula is derived from the work-energy theorem: the work done to accelerate a body of mass m from rest to speed v equals $\frac{1}{2}mv^2$.

The expression Mgh gives gravitational potential energy; $\frac{1}{2}mv^{-2}$ and $\frac{1}{2}mv$ are dimensionally inconsistent with energy.

Hence, kinetic energy is expressed by $\frac{1}{2}mv^2$.

Your Personal Exams Guide

86. Answer: b

Explanation:

Dipa Karmakar is an Indian artistic gymnast from Agartala, Tripura. She is associated with the sport of gymnastics.

At the 2016 Rio Olympics she became the first Indian female gymnast to qualify for the Olympic Games and finished fourth in the women's vault event, narrowly missing a bronze medal.

She is famous for successfully performing the Produnova vault, one of the most difficult vaults in women's artistic gymnastics, and has been awarded the Padma Shri and the Rajiv Gandhi Khel Ratna.

Hence, Dipa Karmakar is associated with gymnastics.

87. Answer: a

Explanation:

From the table (lakh rupees): Year 1 sales = $20 + 10 + 10 = 40$; Year 5 sales = $20 + 10 + 35 = 65$.

Difference between the two years = $65 - 40 = 25$ lakh.

Percentage difference with respect to Year 1 = $\frac{25}{40} \times 100 = 62.5\%$.

Hence, the difference between the sales of Year 1 and Year 5 is 62.5%.

88. Answer: a

Explanation:

A horizontal mirror is placed above or below the word, so it turns every letter upside down while keeping the left-to-right order of the letters unchanged.

So the image of RISE still reads R, I, S, E from left to right, but each letter appears inverted top to bottom.

Figure C shows RISE with each letter flipped upside down in the same order; figures B and D reverse the letter order (a vertical mirror), and figure A is the word unchanged.

Hence, figure C is the horizontal mirror image of RISE.

89. Answer: a

Explanation:

Simple interest is given by $SI = \frac{P \times R \times T}{100}$.

For the same principal P and rate 7.25% per annum, increasing the time from 4 years to 6 years adds 2 years of interest.

The extra interest is $\frac{P \times 7.25 \times 2}{100} = \frac{14.5 P}{100}$, and this equals ₹ 435.

Therefore $P = \frac{435 \times 100}{14.5} = 3000$.

Hence, the sum invested initially was ₹ 3000.

90. Answer: b

Explanation:

Work in physics is defined as $W = F \times s \times \cos \theta$, where F is the force applied, s is the displacement and θ is the angle between them.

The boy exerts an upward force on the bag to hold it, but he does not move; the displacement s of the bag is zero.

Since $s = 0$, the work done $W = F \times 0 = 0$ joules regardless of the mass of the bag or the time for which it is held.

Hence, the work done by the boy is zero.

91. Answer: c

Explanation:

Take the statement 'Embroidery requires a lot of patience' as true and test each conclusion against it.

Conclusion I says embroidery is a hobby for people with a lot of free time. The statement speaks of patience, not free time, so conclusion I does not follow.

Conclusion II says people who lack patience may find embroidery difficult. If embroidery requires a lot of patience, a person without patience will struggle with it, so conclusion II follows directly.

Hence, only conclusion II logically follows the statement.

92. Answer: a

Explanation:

From the table, the visitors on the seven days are: Monday 30, Tuesday 35, Wednesday 40, Thursday 35, Friday 40, Saturday 55, Sunday 45.

Total visitors in the week = $30 + 35 + 40 + 35 + 40 + 55 + 45 = 280$.

Average number of visitors per day of the week = $\frac{280}{7} = 40$.

Hence, the average number of visitors is 40.

93. Answer: a

Explanation:

Variation refers to the differences in the genetic makeup or observable traits between individuals of the same species.

Variations arise from mutations, recombination during sexual reproduction and environmental influences; a favourable variation can give an individual a better

chance of survival in a changing environment (natural selection), while a neutral variation may simply add to the gene pool.

Pollination and fertilisation are stages of reproduction but do not by themselves confer a survival advantage, and speciation is the outcome of accumulated variations, not the variations themselves.

Hence, the correct answer is variation.

94. Answer: b

Explanation:

The India-ASEAN Commemorative Summit 2018 was held in New Delhi on 25 January 2018 to mark 25 years of the India-ASEAN Dialogue Partnership.

All ten heads of state or government of ASEAN member countries attended the summit and were the chief guests at India's 69th Republic Day parade on 26 January 2018.

The summit adopted the Delhi Declaration, focusing on maritime cooperation, connectivity, counter-terrorism and people-to-people contact.

Mumbai, Colombo and Kathmandu were not the venue of this commemorative summit.

Hence, the summit was held in New Delhi.

95. Answer: a

Explanation:

During pregnancy the developing embryo is connected to the wall of the mother's uterus by a special disc-shaped tissue called the placenta.

The placenta contains villi that project into the uterine lining, providing a large surface area through which oxygen, nutrients and dissolved substances pass from the mother's blood to the embryo, while waste products such as carbon dioxide diffuse in the opposite direction.

The ovary produces eggs, the cervix is the lower narrow opening of the uterus, and the uterus is the muscular organ that houses the embryo; none of these directly transfers nutrition from the mother's blood.

Hence, the correct answer is placenta.

96. Answer: d

Explanation:

The Karlovy Vary International Film Festival is one of the oldest 'A' category film festivals in the world, held annually in the Czech Republic.

At the 1958 Karlovy Vary Film Festival, Nargis received the Best Actress Award for her memorable performance as Radha in the 1957 film 'Mother India', directed by Mehboob Khan.

Deedar (1951) and Chori Chori (1956) also starred Nargis but were not the films for which she received this festival award; Awaara (1951) was another famous Nargis film, but again not the one recognised at Karlovy Vary in 1958.

Hence, Nargis was awarded the Best Actress Award for the film Mother India.

97. Answer: c

Explanation:

Label the figure: the rectangle has a horizontal midline; two points P and Q on the midline are joined to the four corners and to the midpoints of the top and bottom

sides, and four short inner lines are drawn inside the slanted strips.

Without the four short inner lines, the outline, midline and slanted lines form 12 triangles: 4 corner triangles in the upper half, 4 in the lower half, the two side triangles touching the corners on the left and right edges, and the two central triangles above and below PQ.

Each of the four short inner lines runs from a vertex to the opposite side of one of these triangles and splits it into two smaller triangles, adding 2 new triangles each: $4 \times 2 = 8$.

Total = $12 + 8 = 20$.

Hence, there are 20 triangles in the figure.

98. Answer: a

Explanation:

Ankleshwar is a town in the Bharuch district of Gujarat, located on the banks of the Amravati river.

Ankleshwar is famous as the site of one of the largest onshore oilfields in India; commercial production of crude oil began here in 1961 under ONGC and it remains an important centre for petroleum extraction and refining.

Bhopal is a city (the capital of Madhya Pradesh) and not a state; Uttar Pradesh and Bihar are not the states where Ankleshwar is located.

Hence, Ankleshwar is located in the state of Gujarat.

99. Answer: c

Explanation:

The four figures are A: 12L, B: 2B, C: 5E, D: 15P.

In 12L, 2B and 5E the number equals the alphabet position of the letter: L = 12, B = 2, E = 5.

In 15P the letter P is the 16th letter, not the 15th, so this pair breaks the rule.

Hence, D (15P) is the odd one out.

100. Answer: c

Explanation:

The Sanskrit phrase 'Vasudhaiva Kutumbakam' translates to 'The world is one family' and expresses the idea of universal brotherhood.

It appears in Chapter 6, verse 71 of the Maha Upanishad, which forms part of the Sama Veda tradition; the full verse contrasts the narrow-minded view of 'this is mine, that is another's' with the wider view that the whole earth is one family.

The phrase is not found in the Brihadaranyaka Upanishad, the Chandogya Upanishad or the Kena Upanishad.

It is inscribed in the entrance hall of the Parliament of India and was also the motto of India's G20 presidency in 2023.

Hence, the term 'Vasudhaiva Kutumbakam' is mentioned in the Maha Upanishad.