

Answers

1. Answer: c

Explanation:

73.5 km/hr is correct.

Distance stays the same, so $\text{speed} \times \text{time} = \text{constant}$.

Original distance = $105 \times 7 = 735$ km.

New speed = $\frac{735}{10} = 73.5$ km/hr.

2. Answer: a

Explanation:

São Paulo is correct.

São Paulo is the most populous city in Brazil and in the entire southern hemisphere, serving as the country's financial and commercial capital in the south-east region.

Rio de Janeiro ranks second by population; Salvador and Fortaleza are large north-eastern cities but trail São Paulo in both population and economic size.

3. Answer: a

Explanation:

Uttar Pradesh is correct.

Uttar Pradesh leads Indian states in milk production, contributing close to one-sixth of national output thanks to its large cattle and buffalo population and extensive

dairy co-operatives.

Rajasthan and Gujarat follow next, both strong dairy states with buffalo-dominated herds; Andhra Pradesh is lower in the ranking.

4. Answer: c

Explanation:

Calcium hydroxide is correct.

Slaked lime is obtained by adding water to quicklime (calcium oxide); the reaction $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$ gives calcium hydroxide, used in whitewashing and in neutralising acidic soils.

CaO is quicklime, CaCl_2 is calcium chloride, and CaCO_3 is limestone or chalk.

5. Answer: a

Explanation:

Carboxylic acid is correct.

The $-\text{COOH}$ group (a carbonyl joined to a hydroxyl on the same carbon) is the defining functional group of carboxylic acids such as acetic acid (CH_3COOH).

Ketones carry $\text{C}=\text{O}$ between two carbons, aldehydes carry $-\text{CHO}$ at a chain end, and alcohols carry $-\text{OH}$ on an sp^3 carbon.

6. Answer: d

Explanation:

external force, rigidity is correct.

Rigidity is the ability of a body to resist deformation when an external force is applied; a perfectly rigid body keeps its shape and size unchanged.

External volume or external area are not meaningful causes of deformation, and 'shape' is the thing being preserved, not the property itself.

7. Answer: c

Explanation:

Germanium is correct.

Mendeleev had left a gap below silicon in his periodic table and called the missing element eka-silicon, predicting its properties. When Clemens Winkler isolated germanium in 1886 its atomic mass, density and oxide formula matched the prediction closely, filling that gap.

Eka-aluminium was replaced by gallium and eka-boron by scandium; rubidium was never a predicted eka element.

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8. Answer: a

Explanation:

A is correct.

The figures go in pairs in which the inner and outer shapes swap: a triangle holding a circle is followed by a circle holding a triangle.

The third figure is a square holding a pentagon (arrow-house shape), so the next figure must be that pentagon holding a square.

Hence, A.

9. Answer: c

Explanation:

c is correct.

Figures a, b and d contain punctuation marks: a colon (:), a semicolon (;) and a full stop (.).

Figure c contains the division sign ($\div$), which is a mathematical operator, not a punctuation mark.

Hence, c.

10. Answer: a

Explanation:

-3.2 is correct.

Expand both sides: $12(5x - 4) = 60x - 48$ and $16(5x + 1) = 80x + 16$.

Set equal: $60x - 48 = 80x + 16$, giving $-64 = 20x$.

Therefore $x = -\frac{64}{20} = -3.2$.

11. Answer: a

Explanation:

Om Prakash Rawat is correct.

Om Prakash Rawat took charge as the 22nd Chief Election Commissioner of India on 23 January 2018, succeeding Achal Kumar Jyoti, and held the office through mid-2018 until his retirement on 1 December 2018.

12. Answer: d

Explanation:

Salman Khan is correct.

Bollywood actor Salman Khan received the Global Diversity Award 2017 at the British Parliament House in London for his contribution to cinema and humanitarian work through his Being Human Foundation.

13. Answer: a

Explanation:

A is correct.

The mirror MN is placed horizontally below the word MAN, so the image is a reflection from top to bottom.

In such a reflection the order of the letters stays M, A, N from left to right, but each letter is turned upside down.

Figure A shows MAN with every letter inverted top to bottom in the same left-to-right order.

Hence, A.

14. Answer: b

Explanation:

Patna is correct.

The analogy pairs an Indian state with its state capital. Shillong is the capital of Meghalaya; following the same pattern, Patna is the capital of Bihar.

Lucknow is the capital of Uttar Pradesh, Hyderabad of Telangana (and the shared capital of Andhra Pradesh), and Dispur of Assam.

15. Answer: a

Explanation:

9:22:12 a.m. is correct.

The lights change together after an interval equal to the LCM of 48, 72 and 108 seconds.

$48 = 2^4 \cdot 3$, $72 = 2^3 \cdot 3^2$, $108 = 2^2 \cdot 3^3$, so $\text{LCM} = 2^4 \cdot 3^3 = 432 \text{ s} = 7 \text{ min } 12 \text{ s}$.

Adding 7 min 12 s to 9:15:00 a.m. gives 9:22:12 a.m.

16. Answer: c

Explanation:

Literature is correct.

The Sahitya Akademi Award is a literary honour conferred annually by the Sahitya Akademi, India's national academy of letters, on works of outstanding literary merit in each of the 24 languages it recognises.

Innovation falls under awards like the National Innovation Award; music is covered by the Sangeet Natak Akademi Award; sports by the Arjuna, Khel Ratna and similar

awards.

17. Answer: c

Explanation:

The data given in statement II is sufficient is correct.

From statement II, the 16th is the third Friday, so the first Friday falls on the 2nd of the month. Day 13 is 11 days after day 2, which is $11 \bmod 7 = 4$ days after Friday — i.e. Tuesday. Statement II alone fixes the weekday of the 13th.

Statement I only names the day for the last date without pinning down the length of the month (28, 29, 30 or 31 days), so the day of the 13th cannot be uniquely found from it.

18. Answer: b

Explanation:

195 J is correct.

Work done against gravity in lifting a load through height h is $W = mgh$.

Substituting $m = 13 \text{ kg}$, $g = 10 \text{ ms}^{-2}$, $h = 1.5 \text{ m}$ gives $W = 13 \times 10 \times 1.5 = 195 \text{ J}$.

A value expressed in newtons would be a force, not work, so it is dimensionally wrong for this calculation.

19. Answer: c

Explanation:

Dhanak is correct.

Nagesh Kukunoor's film Dhanak won the Best Children's Film at the 64th National Film Awards, honouring films of 2016. The road-trip story of a brother and sister across Rajasthan was praised for its sensitive handling of children's themes.

20. Answer: b

Explanation:

77 is correct.

Consecutive differences are 5, 10, 15, 20, i.e. an arithmetic sequence of jumps increasing by 5 each time.

The next difference is 25, so the next term is $52 + 25 = 77$.

21. Answer: b

Explanation:

6 is correct.

Inside the innermost brackets apply BODMAS: $27 \div 9 \times 2 = 3 \times 2 = 6$, so $32 - 6 = 26$.

Then $45 - 26 = 19$, and $55 - 19 = 36$.

Finally, $216 \div 36 = 6$.

22. Answer: a

Explanation:

Density is correct.

Density is defined as mass per unit volume, $\rho = \frac{m}{V}$, with SI units kg/m^3 . It is an intensive property that distinguishes materials of the same mass but different volumes.

Mass is the total quantity of matter, matter is the general term for anything occupying space, and energy is the capacity to do work — none of them is mass per unit volume.

23. Answer: b

Explanation:

1526 is correct.

The First Battle of Panipat was fought on 21 April 1526 between Babur and Ibrahim Lodi, the Sultan of Delhi. Babur's use of field artillery and tulugma tactics defeated the much larger Lodi army and marked the founding of the Mughal Empire in India.

24. Answer: c

Explanation:

M. B. Shah is correct.

Retired Supreme Court judge Justice M. B. Shah chaired the SIT on black money constituted in 2014. In its 2016 report, the SIT recommended banning cash transactions above ₹3 lakh and placing a limit on cash holdings as part of measures to curb unaccounted wealth.

25. Answer: b

Explanation:

Alkane, alkene, alkyne is correct.

General formulae: alkanes C_nH_{2n+2} , alkenes C_nH_{2n} , alkynes C_nH_{2n-2} .

For the same n , hydrogens count down from alkane to alkene to alkyne. For $n = 2$ this is 6, 4, 2 (ethane, ethene, ethyne), confirming the descending order Alkane > Alkene > Alkyne.

26. Answer: b

Explanation:

D is correct.

In each row one outer layer is removed at every step: star in two circles, then star in one circle, then the star alone; circle in two squares, then circle in one square, then the circle alone.

In the third row the innermost shape inside the triangles is a small square, so the last figure of that row is the small square alone.

Hence, D.

27. Answer: c

Explanation:

₹35,400 is correct.

The two perpendicular 2 m wide roads inside the 72 m × 48 m park overlap in a 2 m × 2 m square at the centre. Area of the paths = $(72 \times 2) + (48 \times 2) - (2 \times 2) = 144 + 96$

- 4 = 236 sq m. Cost = $236 \times 150 = ₹ 35,400$. The other values miss the overlap deduction or use a wrong dimension.

28. Answer: d

Explanation:

Power is correct.

Power is defined as the rate at which work is done, $P = W / t$, measured in watts. Energy is the capacity to do work, force is the push or pull on a body, and pressure is force per unit area - none of these capture the time rate of work.

29. Answer: d

Explanation:

Polonium is correct.

Reading the staircase of metalloids across the p-block of the modern periodic table, the elements are boron, silicon, germanium, arsenic, antimony, tellurium and finally polonium. Polonium (atomic number 84) sits in Group 16, Period 6 and is counted as the last metalloid before the heavy post-transition metals, placing arsenic, tellurium and antimony earlier in the sequence.

30. Answer: c

Explanation:

2 is correct.

Number of moles = $\frac{\text{given mass}}{\text{atomic mass}}$.

For carbon, $n = \frac{24 \text{ g}}{12 \text{ g/mol}} = 2 \text{ mol}$, i.e. $2 \times 6.022 \times 10^{23}$ atoms.

Hence, 2.

31. Answer: c

Explanation:

Clean Ganga Fund is correct.

The Clean Ganga Fund (CGF) was set up in 2014 by the Government of India under the Ministry of Water Resources, River Development and Ganga Rejuvenation to receive voluntary contributions from residents, NRIs, PIOs, corporates and PSUs for Ganga conservation activities under the Namami Gange programme. It is managed by a trust under the Finance Minister.

32. Answer: a

Explanation:

United States is correct.

The Black Rock Desert is a semi-arid alkali flat basin in north-western Nevada, United States, famous as the venue of the annual Burning Man festival and as the site where several land-speed records have been set. It is not found in China, South Africa or Egypt – those countries host the Gobi, Kalahari and Sahara respectively.

33. Answer: c

Explanation:

₹ 337.50 is correct.

Time = 2 years 3 months = 2.25 years = $\frac{9}{4}$ years. Simple Interest = $P \times R \times T / 100 = 2500 \times 6 \times (\frac{9}{4}) / 100 = (2500 \times 54) / 400 = 135000 / 400 = ₹ 337.50$. The other options arise from using a wrong time (such as 2.5 years or 2 years only) or an incorrect rate conversion.

34. Answer: b

Explanation:

The hook figure with the small circle at the right end of its top line is correct.

The figures change in pairs. The second figure is the first figure flipped top to bottom.

In the same way, the fourth figure is the third figure flipped left to right. The third figure has its circle at the left end of the top line, so the missing figure has the circle at the right end of the top line, with the line running left, down the left side and ending in a short stroke to the right.

Hence, the figure with the circle at the right end of the top line completes the series.

35. Answer: b

Explanation:

Maya is correct.

Gautam Buddha, originally Prince Siddhartha of the Shakya clan, was born to Queen Mahamaya (Maya Devi) at Lumbini in 563 BCE. Trishala was the mother of Mahavira, the 24th Jain Tirthankara; Kaushalya was the mother of Lord Rama; and Kanika is not associated with the Buddha's family.

36. Answer: b

Explanation:

D is correct.

Figures A, B and C each show two identical shapes overlapping each other: two circles, two rectangles and two triangles.

Figure D shows two ellipses that do not touch or overlap.

Hence, D.

37. Answer: d

Explanation:

Equal to the weight of the object is correct.

For a body to float in equilibrium, the net vertical force on it must be zero, so the upward buoyant force from the fluid must balance the downward weight of the body. This follows directly from Archimedes' principle - the weight of the displaced liquid equals the weight of the floating body. If the buoyant force were less, the body would sink; if more, it would rise further out of the water.

38. Answer: b

Explanation:

The rectangle with a triangle joined to each side is correct.

The figure group (X) contains exactly three pieces: two small triangles and one small rectangle.

Only one figure uses exactly these pieces: a rectangle in the middle with one triangle attached on its left and an arrow-head triangle attached on its right.

The other figures are single closed outlines with a notch; they need pieces that are not in (X).

Hence, the rectangle flanked by two triangles can be constructed.

39. Answer: d

Explanation:

Dispense is correct.

Talk and Chat are synonyms meaning to converse informally. Applying the same synonym relation to Pour, the matching word is Dispense, which also means to distribute or pour out in measured quantity. Fall, Drown and Drop describe downward motion or submergence rather than the act of pouring something out.

40. Answer: d

Explanation:

Only 1 is logical. is correct.

Argument 1 directly links the proposed subsidy to a measurable outcome – higher electric vehicle sales – which is the policy's own goal, so it is a strong and relevant argument. Argument 2 is a moral appeal and ignores the fact that most buyers respond to the cost barrier that a subsidy is meant to lower; it does not address why the subsidy itself is unnecessary. Hence only Argument 1 holds.

41. Answer: c

Explanation:

Ultrasonic is correct.

Bats emit ultrasonic sound waves (frequencies above 20 kHz, beyond the human hearing range) and listen to the echoes that return after reflecting off obstacles and prey. This echolocation lets them judge distance, size and direction in darkness. Infrasonic refers to frequencies below 20 Hz, supersonic describes speeds greater than that of sound (not a sound-wave category), and 'super-ultrasonic' is not a standard physics term.

42. Answer: a

Explanation:

Potential Difference is correct.

The volt is defined as the potential difference that drives one coulomb of charge through one joule of work, i.e. $1 \text{ V} = 1 \text{ J/C}$. The SI unit of electric charge is the coulomb, of resistance is the ohm, and of electric current is the ampere – none of these is the volt.

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43. Answer: d

Explanation:

Either statement 1 alone or 2 alone is sufficient. is correct.

From Statement 1, if 16 persons stand in front of Mr. X, his position from the front is $16 + 1 = 17$. From Statement 2, if 23 persons stand behind him in a row of 40, his position from the front is $40 - 23 = 17$. Each statement independently fixes the same position, so either one alone is enough.

44. Answer: d

Explanation:

Two separate small circles inside one large circle is correct.

Capsicum is a vegetable and beans are a vegetable, so both lie completely inside the set of Vegetables.

No capsicum is a bean and no bean is a capsicum, so the two small circles do not overlap.

Hence, two separate circles (Capsicum and Beans) enclosed in a larger circle (Vegetables).

45. Answer: d

Explanation:

₹ 13,560 is correct.

Selling price corresponds to $(100 - 47)\% = 53\%$ of the cost price, so cost price = $6360 / 0.53 = ₹ 12,000$. For a 13% profit, required selling price = $12,000 \times 1.13 = ₹ 13,560$. The other values arise from using a wrong loss percentage or forgetting to recover the full cost first.

46. Answer: c

Explanation:

16J is correct.

The numeric part increases by 3 each time: 4, 7, 10, 13, so the next number is 16. The letter part skips one letter backwards each time: R → P → N → L (gap of 2 letters), so the next letter is J. Combining, the next term is 16J. The other options break either the +3 numeric pattern or the -2 letter pattern.

47. Answer: a

Explanation:

10 m/s^2 is correct.

Weight W is related to mass m and acceleration due to gravity g by $W = m \times g$, so $g = W / m = 200 \text{ N} / 20 \text{ kg} = 10 \text{ m/s}^2$. The 9.8 m/s^2 value is the standard average, but with the given data the calculation yields exactly 10. The ' m/s^{-2} ' notation in two options is not the standard unit for acceleration.

48. Answer: a

Explanation:

6 is correct.

The outer boundary is 1 square.

The vertical line and the horizontal line in the right half form 2 squares on the right.

The small inner square is 1 square, and its right half is split by the two lines into 2 smaller squares.

Total = $1 + 2 + 1 + 2 = 6$.

Hence, 6.

49. Answer: d

Explanation:

-1.0ms^{-1} is correct.

By conservation of linear momentum, the total momentum before firing is zero, so $m_{\text{pistol}} \times v_{\text{pistol}} + m_{\text{bullet}} \times v_{\text{bullet}} = 0$. Here $(3\text{ kg}) \times v + (0.020\text{ kg}) \times (150\text{ m/s}) = 0$, giving $v = -3 / 3 = -1.0\text{ m/s}$. The negative sign indicates the pistol recoils in the opposite direction to the bullet. The other values would require a different bullet mass or velocity.

50. Answer: c

Explanation:

Basketball is correct.

Prashanti Singh is an Indian basketball player from Varanasi who has captained the Indian women's basketball team and was awarded the Arjuna Award in 2017 for her contribution to the sport. She is not associated with badminton, cricket or table tennis.

51. Answer: d

Explanation:

The lifespan of human red blood cells (RBCs) is 15–20 days. is correct.

Mature human red blood cells circulate in the bloodstream for roughly 120 days before being broken down by the spleen and liver, so a lifespan of 15–20 days is factually wrong.

The other statements are standard facts about blood and the circulatory system: blood is nicknamed the 'river of life', it flows under pressure in pulses through arteries, and it makes up about 7-8% of body weight in a healthy adult.

52. Answer: a

Explanation:

9 years is correct.

Let Deepika's present age be $3x$ and her mother's be $11x$. After 3 years, $(3x + 3) : (11x + 3) = 1 : 3$, so $3(3x + 3) = 11x + 3$, giving $9x + 9 = 11x + 3$ and $2x = 6$, hence $x = 3$.

Deepika's age = $3x = 9$ years and the mother's age is 33 years. Check: $12 : 36 = 1 : 3$. Values 11, 13 and 15 do not satisfy the second ratio.

53. Answer: d

Explanation:

Plane is correct.

A plane mirror reflects parallel rays as parallel rays and the image formed is virtual (behind the mirror), erect, laterally inverted, and of exactly the same size as the object, at the same distance behind the mirror as the object is in front.

A concave mirror can form a magnified or diminished image depending on object position, and a convex mirror always forms a diminished virtual image. A plano-convex mirror behaves like a converging mirror, not size-preserving.

54. Answer: b

Explanation:

proportional to the product of their masses and inversely proportional to the square of the distance between them is correct.

Newton's universal law of gravitation states $F = G \frac{m_1 m_2}{r^2}$, where G is the universal gravitational constant.

So the force grows with the product $m_1 m_2$ (not the sum), and falls as r^2 grows: doubling the distance makes the force one-fourth.

A force that grows with r^2 or falls with the masses contradicts this law.

Hence, proportional to the product of their masses and inversely proportional to the square of the distance between them.

55. Answer: b**Explanation:**

Only 2 follows. is correct.

From 'Some rabbits are cats' and 'All cats are papayas', the rabbits that are cats are also papayas, so 'Some rabbits are papayas' definitely follows (conclusion 2).

Conclusion 1, 'All papayas are cats', is the illicit converse of 'All cats are papayas' and does not follow — there could be papayas that are not cats. Hence only conclusion 2 is valid.

56. Answer: b**Explanation:**

40 is correct.

All regions inside circle L are counted: only L = 18, L and M only = 7, L and N only = 9, and all three sports = 6.

$$\text{Total} = 18 + 7 + 9 + 6 = 40.$$

Hence, 40 students play sport L.

57. Answer: b

Explanation:

Connective is correct.

Blood is classified as a specialised fluid connective tissue because its cellular components (RBCs, WBCs, platelets) are suspended in a non-living extracellular fluid matrix called plasma, which is the defining feature of connective tissues.

Muscular tissue is contractile, vascular refers to blood vessels (a structure, not a tissue type), and nervous tissue conducts impulses — none describe blood itself.

58. Answer: a

Explanation:

18 is correct.

Total work = men $\times$ days = $69 \times 6 = 414$ person-days. If 23 persons do the same work, the required days = $\frac{414}{23} = 18$ days.

This is the standard inverse proportion between men and time: $M_1D_1 = M_2D_2$. Values 10, 15 or 16 would require fewer person-days than the actual 414, so they fail.

59. Answer: b

Explanation:

29 is correct.

India topped the medal tally at the 22nd Asian Athletics Championships held at the Kalinga Stadium, Bhubaneswar in July 2017. The host nation's final tally stood at 29 medals – 12 gold, 5 silver and 12 bronze – which placed India at the top of the overall standings.

The nearest options (26, 27, 28) correspond to intermediate day-wise counts widely reported during the meet, but the final official medal count was 29.

60. Answer: b

Explanation:

22 is correct.

Prime factorisations: $44 = 2^2 \times 11$, $88 = 2^3 \times 11$, $154 = 2 \times 7 \times 11$. The common prime factors with the lowest powers are 2^1 and 11^1 , so $HCF = 2 \times 11 = 22$.

44 is not a factor of 154, so HCF cannot be 44; 11 is common but misses the factor of 2 that all three share; 8 is not a factor of 154 or 44.

61. Answer: c

Explanation:

Only assumption I is implicit is correct.

The speaker is comparing the current rendition with earlier renditions, which only makes sense if the speaker has previously heard other renditions of this song. Hence assumption I is naturally implicit in the statement.

Assumption II contradicts the statement — the speaker has just heard the song sung so beautifully, which proves it is possible. So II is not implicit.

62. Answer: a

Explanation:

0.774 is correct.

$\sqrt{0.6} = \sqrt{\frac{60}{100}} = \frac{\sqrt{60}}{10}$. Since $\sqrt{60} \approx 7.746$, we get $\sqrt{0.6} \approx 0.7746$, which rounds to 0.774.

Checking: $0.774^2 = 0.599076 \approx 0.6$. The other options square to 0.891, 0.799 and 0.764 respectively, none of which equals 0.6.

63. Answer: d

Explanation:

16% is correct.

Total cost price = purchase + repair = 47000 + 3000 = 50000. Selling price = 58000, so profit = 58000 – 50000 = 8000.

Profit % = $\frac{\text{Profit}}{\text{CP}} \times 100 = \frac{8000}{50000} \times 100 = 16\%$. Ignoring the repair cost would give $11000/47000 \approx 23.4\%$, so repairs must be added to CP.

64. Answer: a

Explanation:

126.5° is correct.

Angle formula: $\theta = |30H - 5.5M|$. At 12:23, $H = 0$ (12 is treated as 0) and $M = 23$, so $\theta = |30 \times 0 - 5.5 \times 23| = |-126.5| = 126.5^\circ$.

Since $126.5^\circ < 180^\circ$, it is already the smaller of the two angles between the hands. Values 126, 127.5 or 138 would need different minute positions.

65. Answer: c

Explanation:

Only conclusion I follows is correct.

Calling this restaurant's soup 'the best' presupposes comparison with soups served at other restaurants, so conclusion I — that other restaurants also serve soup — is implicit and follows.

Conclusion II extends the claim to 'the best in the world', which the statement never asserts. Such a jump is beyond the given information and therefore does not follow.

66. Answer: b

Explanation:

Sunday is correct.

Using the standard odd-days method or a known reference: 1 January 2020 was a Wednesday. From 1 January to 1 November 2020 (a leap year) there are $31 + 29 + 31 + 30 + 31 + 30 + 31 + 31 + 30 + 31 = 306$ days, so 1 November is day 306. $306 \bmod 7 = 5$, which added to Wednesday gives Sunday.

Hence 1 November 2020 was Sunday.

67. Answer: c

Explanation:

Devendra Jhajharia is correct.

Para-javelin thrower Devendra Jhajharia, a two-time Paralympic gold medallist (Athens 2004 and Rio 2016), was conferred the Rajiv Gandhi Khel Ratna in 2017 — becoming the first para-athlete to receive India's highest sporting honour. He shared the award that year with hockey player Sardar Singh.

Deepa Malik and Mariyappan Thangavelu received the Khel Ratna in 2019 and 2020 respectively; Varun Bhati was awarded the Arjuna Award.

68. Answer: c

Explanation:

1500 J is correct.

Gravitational potential energy relative to the ground is $PE = mgh$. Substituting $m = 15 \text{ kg}$, $g = 10 \text{ ms}^{-2}$ and $h = 10 \text{ m}$: $PE = 15 \times 10 \times 10 = 1500 \text{ J}$.

PE gained by lifting an object against gravity is positive, so the two negative options are wrong, and 150 J corresponds to dropping a factor of 10 from the calculation.

69. Answer: b

Explanation:

Rs 36 is correct.

From the pie chart, the shares are: R&D 40%, Infrastructure 30%, Salaries 20%, Loan interest 5% and Tax 5%.

Expenditure on infrastructure = 30% of 120 = $\frac{30}{100} \times 120 = 36$ lakh crore.

Hence, Rs 36 lakh crore.

70. Answer: b

Explanation:

20 J is correct.

By definition, the work done in moving a charge Q across a potential difference V is $W = QV$. Substituting $Q = 2$ C and $V = 10$ V gives $W = 2 \times 10 = 20$ J.

The SI unit of work is the joule, so the other options with Pa (pressure), C (charge) and N (force) are dimensionally wrong even though the numerical value is 20.

71. Answer: a

Explanation:

60° is correct.

The sum of the four interior angles of any quadrilateral is 360°. Let the angles be $3x, 4x, 5x, 6x$. Then $3x + 4x + 5x + 6x = 18x = 360$, so $x = 20$.

The smallest angle corresponds to the ratio 3: $3x = 3 \times 20 = 60^\circ$. Verification: the four angles become 60°, 80°, 100°, 120°, which sum to 360°.

72. Answer: a

Explanation:

$\frac{16}{9}$ is correct.

Numerator: $(1 - \sin A)(1 + \sin A) = 1 - \sin^2 A = \cos^2 A$. Denominator: $(1 - \cos A)(1 + \cos A) = 1 - \cos^2 A = \sin^2 A$. The expression therefore reduces to $\frac{\cos^2 A}{\sin^2 A} = \cot^2 A$.

Given $\tan A = \frac{3}{4}$, $\cot A = \frac{4}{3}$, so $\cot^2 A = \frac{16}{9}$. Direct substitution with $\sin A = \frac{3}{5}$ and $\cos A = \frac{4}{5}$ also gives $\frac{16/25}{9/25} = \frac{16}{9}$.

73. Answer: c

Explanation:

Only conclusion 2 follows. is correct.

'Some black are feathers' is an I-type (particular affirmative) statement, which is convertible: if some black are feathers, then some feathers are black. Hence conclusion 2 follows directly.

Conclusion 1, 'All bats are feathers', would need a universal link between bats and feathers. The two premises only connect bats to black and black to some feathers; the bats could be among the non-feather black things. So 1 does not follow.

74. Answer: b

Explanation:

West is correct.

On a compass, West (270°) turning into South (180°) is a turn of 90° anticlockwise.

The same 90° anticlockwise turn applies to every direction: South becomes East, East becomes North, and North becomes West.

Hence, North will become West.

75. Answer: c

Explanation:

104 is correct.

Estimate by placing 10816 between known squares: $100^2 = 10000$ and $110^2 = 12100$, so $\sqrt{10816}$ lies between 100 and 110. The last digit 6 suggests the root ends in 4 or 6.

Trying 104: $104^2 = 104 \times 104 = 10816$ exactly. Checking the others: $114^2 = 12996$, $106^2 = 11236$, $96^2 = 9216$ — none equal 10816. Hence the answer is 104.

76. Answer: a

Explanation:

Governor of Bihar is correct.

Ram Nath Kovind was serving as the Governor of Bihar when the National Democratic Alliance (NDA) nominated him as its candidate for the office of the President of India in June 2017. He tendered his resignation as Governor of Bihar on 20 June 2017 after being nominated, and later took oath as the 14th President of India on 25 July 2017.

He had been appointed Governor of Bihar in August 2015. He never held the Governor's office in Tamil Nadu, West Bengal or Andhra Pradesh, which is why the other options are incorrect.

77. Answer: b

Explanation:

Halophyta is correct.

Plants are classified by the kind of habitat they tolerate. Halophytes are plants adapted to grow in soil or water with a high salt (sodium chloride) content, such as mangroves, saltmarsh grasses and *Salicornia*. They manage osmotic stress through salt glands, succulence or exclusion of ions.

Hydrophytes grow in freshwater, xerophytes are desert plants adapted to very dry conditions, and macrophytes is a general term for large aquatic plants regardless of salinity, so none of them specifically denotes salt-water plants.

78. Answer: c

Explanation:

James Maxwell is correct.

In the 1860s James Clerk Maxwell formulated the four equations now known as Maxwell's equations, which combined all known laws of electricity and magnetism. From these equations he derived a wave equation for the electromagnetic field whose predicted propagation speed matched the measured speed of light, establishing that light itself is an electromagnetic wave.

Sheldon Glashow and Carlo Rubbia worked on the electroweak unification much later in the 20th century, and Isaac Newton proposed a corpuscular theory of light long before electromagnetism was understood, so none of them belongs to this unification.

79. Answer: d

Explanation:

Redox is correct.

In this reaction, manganese in MnO_2 carries an oxidation state of +4 and is reduced to +2 in MnCl_2 , while chlorine in HCl carries an oxidation state of -1 and is oxidised to 0 in Cl_2 . Simultaneous reduction and oxidation of two different species in the same reaction defines a redox reaction.

It is not a simple combination (two reactants giving one product) or a double displacement (exchange of ions between two salts), and it is not a displacement because no single element is replacing another in a compound.

80. Answer: d

Explanation:

Be upset inside but still say 'no problem' is correct.

The question tests social decision-making. The accident is involuntary, so retaliation (throwing coffee back) or scolding would damage the friendship and the party atmosphere. Pretending the mishap caused no annoyance at all is unrealistic because coffee has stained your clothes.

The mature, socially appropriate response is to acknowledge inwardly that you are upset while outwardly reassuring the friend that it was an accident, so the evening is not spoiled and the relationship is preserved.

81. Answer: c

Explanation:

North-east is correct.

When two people stand face-to-face, the direction one is facing is exactly opposite to the direction the other is facing. On the compass, the direction opposite to south-west is north-east (SW and NE lie on the same straight line through the centre).

Since I faces south-west, J must be facing north-east. South-east is 90 degrees away from south-west, and north-west is also 90 degrees away, so neither is directly opposite; and both facing south-west would mean they are side-by-side, not face-to-face.

82. Answer: d

Explanation:

127 is correct.

If a number N leaves remainder r when it divides A , then N divides $(A - r)$ exactly. So the required number must divide both $1657 - 6 = 1651$ and $2037 - 5 = 2032$ exactly, and the largest such divisor is the HCF of 1651 and 2032.

Factorising: $1651 = 13 \times 127$ and $2032 = 16 \times 127$. The common factor is 127, so $\text{HCF}(1651, 2032) = 127$. Checking: $1657 \div 127 = 13$ remainder 6 and $2037 \div 127 = 16$ remainder 5. 130, 150 and 125 do not divide both 1651 and 2032 exactly.

83. Answer: c

Explanation:

A is correct.

The shape changes every two figures: triangle, triangle, square, square.

Within each pair, the stick with the dot moves from the top vertex to the bottom-left vertex and points down-left.

The third figure has the stick at the top-left corner of the square, so the fourth has it at the bottom-left corner, pointing down-left.

Hence, A.

84. Answer: b

Explanation:

Complex tissue is correct.

Plant tissues are divided into simple and complex tissues. A simple tissue (e.g. parenchyma, collenchyma, sclerenchyma) has only one type of cell, whereas a complex tissue is made up of more than one type of cell—xylem contains tracheids, vessels, xylem parenchyma and fibres, and phloem contains sieve tubes, companion cells, phloem parenchyma and fibres—all working together on a common function (conduction).

Meristematic tissue has a single type of actively dividing cell, epidermal tissue is a protective single-cell-type covering, and nervous tissue is largely composed of neurons and glial cells but is animal tissue; none of them fits the definition of 'different kinds of cells with a similar function' the way complex plant tissues do.

85. Answer: c

Explanation:

128.57° is correct.

The sum of the interior angles of any polygon with n sides is $(n - 2) \times 180^\circ$. In a regular polygon all interior angles are equal, so each angle equals $\frac{(n - 2) \times 180^\circ}{n}$.

For a regular heptagon $n = 7$, giving $\frac{(7 - 2) \times 180^\circ}{7} = \frac{900^\circ}{7} \approx 128.57^\circ$. The other options correspond to incorrect values of n or arithmetic slips and do not satisfy the formula for a seven-sided regular polygon.

86. Answer: a

Explanation:

1099375 is correct.

A fast shortcut: $125 = \frac{1000}{8}$. So $8795 \times 125 = \frac{8795 \times 1000}{8} = \frac{8\,795\,000}{8} = 1\,099\,375$.

Direct multiplication confirms it: $8795 \times 100 = 879500$, $8795 \times 25 = 219875$, and $879500 + 219875 = 1\,099\,375$. The other options differ in the tens or hundreds digit and come from small arithmetic slips.

87. Answer: c

Explanation:

4, 14 is correct.

Let the two numbers be $2x$ and $7x$ (keeping the 2 : 7 ratio). After adding 4 to each, they become $2x + 4$ and $7x + 4$, and this new pair is in the ratio 4 : 9. So $\frac{2x + 4}{7x + 4} = \frac{4}{9}$, which cross-multiplies to $9(2x + 4) = 4(7x + 4)$.

Expanding: $18x + 36 = 28x + 16$, i.e. $10x = 20$, so $x = 2$. The original numbers are $2x = 4$ and $7x = 14$. Verification: $(4 + 4) : (14 + 4) = 8 : 18 = 4 : 9$. The other options either keep the 2 : 7 ratio but fail the second condition or do not even satisfy 2 : 7.

88. Answer: b

Explanation:

96 m is correct.

At any given moment, the sun's angle of elevation is the same for all vertical objects in the same place, so the ratio $\frac{\text{height}}{\text{shadow}}$ is constant. For the building this ratio is $\frac{48}{32} = \frac{3}{2}$.

Let the tower's shadow be s . Then $\frac{144}{s} = \frac{3}{2}$, giving $s = \frac{144 \times 2}{3} = 96$ m. The other options come from inverting the ratio or dividing by the wrong number.

89. Answer: c

Explanation:

34 is correct.

First replace the symbols by their arithmetic meanings: $19 + 8 \times 3 - 81 \div 9$. Now apply BODMAS: division and multiplication before addition and subtraction.

$81 \div 9 = 9$ and $8 \times 3 = 24$, so the expression becomes $19 + 24 - 9 = 43 - 9 = 34$. 38, 35 and 36 come from performing the operations in the written order instead of BODMAS order.

90. Answer: c

Explanation:

Yeshe Dorjee Thongchi is correct.

The Bhupen Hazarika National Award, instituted in memory of the legendary Assamese singer-composer, is given to literary and cultural figures from the North-East. The 2017 edition was conferred on noted Arunachal Pradesh novelist and

Sahitya Akademi Award winner Yeshe Dorjee Thongchi for his lifetime contribution to literature.

Lou Majaw is a Khasi rock musician, Jahnu Barua is an Assamese film-maker, and Gopal Krishnan is unrelated to this literary honour, so none of them received this specific award.

91. Answer: c

Explanation:

-1.21 is correct.

When a value rises by $a\%$ and then falls by $b\%$, the net percentage change is $a - b - \frac{ab}{100}$ (positive = gain, negative = loss). Here $a = b = 11$, so the net change is $11 - 11 - \frac{11 \times 11}{100} = -\frac{121}{100} = -1.21\%$.

Direct check: starting salary 100 becomes $100 \times 1.11 = 111$, then $111 \times 0.89 = 98.79$, a drop of 1.21 from 100. The result is a loss, so positive options are incorrect, and -1.23 does not match the exact arithmetic.

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92. Answer: d

Explanation:

Regeneration is correct.

Regeneration is the ability of an organism to grow a complete new individual from a cut or broken body part.

A cut piece of the flatworm Planaria grows back into a full worm, and a broken piece of the filamentous alga Spirogyra grows into a complete filament.

Fertilisation is the fusion of gametes, reproduction by ovule happens only in seed plants, and budding (an outgrowth that detaches, as in Hydra or yeast) is not how these two organisms multiply.

Hence, Regeneration.

93. Answer: a

Explanation:

Only assumption I is implicit is correct.

The statement claims we are 'victims' of our own thoughts. Calling thoughts the cause of our fate presumes that our subsequent actions, choices and outcomes are determined by our thoughts; otherwise thoughts could not make us victims. Hence assumption I—our actions are based on our thoughts—is a necessary unstated premise.

Assumption II makes a sweeping claim about newspapers as the best information source; the statement merely quotes a newspaper headline and in no way asserts the superiority of newspapers as a medium. It is therefore not implicit.

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94. Answer: b

Explanation:

Urjit Patel is correct.

At the time this question was asked (RRB Group D 2018), Dr Urjit Patel was serving as the 24th Governor of the Reserve Bank of India. He assumed office on 4 September 2016 after Raghuram Rajan completed his term, and he served until his resignation in December 2018.

Raghuram Rajan (the 23rd Governor) demitted office in 2016, D. Subbarao preceded Rajan (2008–13), and Y.V. Reddy served even earlier (2003–08); none of them was the sitting Governor in 2018.

95. Answer: c

Explanation:

320 is correct.

Let the total number of residents be N . Car owners $= \frac{5}{8}N$, and covered-parking buyers $= \frac{3}{4}$ of car owners $= \frac{3}{4} \times \frac{5}{8}N = \frac{15}{32}N$.

Given $\frac{15}{32}N = 150$, we get $N = \frac{150 \times 32}{15} = 10 \times 32 = 320$. Checking: $5/8$ of $320 = 200$ car owners; $3/4$ of $200 = 150$ covered-parking buyers—matches. 336, 352 and 360 do not produce exactly 150 under this calculation.

96. Answer: d

Explanation:

4 cm is correct.

The tangent-secant theorem states that if from an external point D a tangent DE (touching the circle at E) and a secant through A and B are drawn, then $DE^2 = DA \times DB$, where DA and DB are the distances from D to the two points where the secant meets the circle.

Here the secant passes through B first and then A , with $BD = 2$ cm and $AB = 6$ cm, so $DA = DB + BA = 2 + 6 = 8$ cm. Therefore $DE^2 = 8 \times 2 = 16$, giving $DE = 4$ cm. The other options do not satisfy this standard theorem.

97. Answer: b

Explanation:

6 is correct.

Write each number as a product of primes: $30 = 2 \times 3 \times 5$, $42 = 2 \times 3 \times 7$, $96 = 2^5 \times 3$. The HCF is the product of the lowest power of each prime common to all three numbers.

The primes common to all three are 2 and 3, each with lowest power 1. So $HCF = 2 \times 3 = 6$. Checking: $30/6 = 5$, $42/6 = 7$, $96/6 = 16$ —all integers. 4, 2 and 8 either do not divide all three (e.g. 4 does not divide 30 or 42) or divide them but are not the greatest such divisor.

98. Answer: d

Explanation:

Mahabaleshwar Sail is correct.

The Saraswati Samman is an annual literary honour instituted by the K.K. Birla Foundation for outstanding literary works published in any of the 22 scheduled Indian languages during the preceding ten years. The 2016 Saraswati Samman was conferred on Konkani novelist Mahabaleshwar Sail for his novel 'Hawthan', which depicts the lives of traditional potters.

Shamsur Rahman Faruqi, Sugathakumari and Sunita Jain are distinguished writers in Urdu, Malayalam and Hindi respectively, but the specific 2016 Saraswati Samman went to Mahabaleshwar Sail.

99. Answer: d

Explanation:

23 is correct.

A human somatic (body) cell is diploid and contains 46 chromosomes arranged as 23 pairs. Gametes, however, are produced by meiosis, which halves the chromosome number so that fertilisation can restore the diploid count. Thus both the sperm and the egg are haploid, carrying only 23 chromosomes each.

These 23 consist of 22 autosomes and one sex chromosome (X or Y in sperm). 22, 24 and 21 all contradict the fundamental fact that the haploid count in humans is exactly half of 46, which is 23.

100. Answer: b

Explanation:

Grandfather is correct.

The sister of Madhuri's only brother is Madhuri herself or another sister of hers; either way she is a daughter of Madhuri's father.

Rajesh is her son, so Madhuri's father is the father of Rajesh's mother.

The father of one's mother is one's (maternal) grandfather. Son, cousin and uncle are relations of a different generation or branch.

Hence, Grandfather.