RRC Group D Previous Year Paper 51 (Held On: 17 Dec 2018 Shift 2)

RRB Group D • 2018 • 100 questions • 90 minutes • Answer key and solutions

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CBT

Q1. Select the option that is related to the third term in exactly the same way as the second term is related to the first term.

Flowerpot : Mud :: Candle : _____

(a) Light
(b) Stand
(c) Wax
(d) Wick

Q2. With which sport is the Begum Hazrat Mahal Cup associated?

(a) Hockey
(b) Cricket
(c) Kabaddi
(d) Football

Q3. An item is sold for Rs. 649 with a profit of 18%, what will be the loss percentage if that item is sold for Rs. 418?

(a) 24.5
(b) 24
(c) 25
(d) 22.5

Q4. If a force (F) is acting in the direction of displacement (s) on an object, what will be the equation of work (W)?

(a) F - s
(b) F × s
(c) F / s
(d) s /F

Q5. At a function, Mahi meets Vijaya, who is her mother's father's second daughter's daughter. Whom did Mahi meet?

(a) Her paternal aunt
(b) Her maternal aunt
(c) Her cousin
(d) Her sibling

Q6. The two people traveled a similar distance, but at different speeds. During this time Ghanshyam traveled at fixed speed which ran between 35 km/h and 40 km/h, similarly Sutirtha traveled at fixed speed, which was between 40 km/h and 45 km/h. While Ghanshyam took 7 hours to complete this journey, Sutirth took 6 hours.

Which distance can be traveled by each in the distance given below?

(a) 272 km
(b) 242 km
(c) 276 km
(d) 252 km

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Q7. The chemical formula of Ammonium Sulphate is ____

(a) (NH4)3SO4
(b) NH4(SO4)
(c) (NH4)2SO4
(d) NH4(SO2)3

Q8. During rusting of iron, _____ on iron.

(a) Brown blue powder is coated.
(b) Black is coated.
(c) Green is coated.
(d) Red brown powder is coated.

Q9. The sum of 7/11 and 11/7 is _____.

(a) 170/77
(b) 18/77
(c) 18/18
(d) 77/18

Q10. Mahi went to her relative's house to meet the only brother of her husband's father. Whom did Mahi meet ?

(a) Her paternal uncle
(b) Her father-in-law's daughter
(c) Her maternal uncle
(d) Her husband's uncle

Q11. In which of the following games, the terms 'Ace' and 'Advantage' are used?

(a) Volleyball
(b) Hockey
(c) Football
(d) Tennis

Q12. Ananya walks east for a distance of 3 km, then turns to the right and walks for 1 km. Now in which direction is she from her initial position?

(a) South East
(b) North East
(c) South West
(d) North West

Q13. The Ministry of Shipping laid the foundation stone for the formation of the National Center for Technology for Ports, Waterways, and Coasts (NTCPWC) in which city?

(a) Chennai
(b) Ahmedabad
(c) Kanpur
(d) Varanasi

Q14. Select the option that is related to the third term in the same way as the second term is related to the first term.

Hear : Listen :: sense : ?

(a) Understand
(b) Vision
(c) Perceive
(d) Dark

Q15. A question is given followed by two statements. Identify which statement (s) is sufficient to answer the question.

Question:

A, B, P, O and D are standing in a circle. Who stands between O and P?

Statement:

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1. P stands ahead of D.
2. A stands to the right of D.

(a) Statement 1 alone is sufficient.
(b) Statements 1 and 2 together are sufficient.
(c) Statements 1 and 2 together are insufficient.
(d) Statement 2 alone is sufficient.

Q16. Read the given statements and conclusions carefully and decide which of the given conclusions logically follows from the given statements.

Statement:

I. All wings are multicolored.

II. Some bags are multicolored.

Conclusions:

1. Some multicolored are wings.
2. Some bags are wings.

(a) Neither conclusion 1 nor 2 follows.
(b) Both conclusions 1 and 2 follow.
(c) Only conclusion 1 follows.
(d) Only conclusion 2 follows.

Q17. A club house also has a private swimming bridge. The following table shows the number of visitors here, in which both members and non-members are shown.

Based on the given data, on average, how many visitors are members of the swimming pool and how many are non-members?

Days	Swimming Pool Users Members	Swimming Pool Users Non-Members
Monday	10	3
Tuesday	15	3
Wednesday	10	1
Thursday	Closed	Closed
Friday	10	2
Saturday	5	1
Sunday	30	10

(a) Members: 12, Non-Members: 2
(b) Members: 20, Non-Members: 3
(c) Members: 13, Non-Members: 2
(d) Members: 13, Non-Members: 3

Q18. Which of the following statement is NOT Correct?

If an object sinks in water, it means that:

(a) The upper thrust of water on the object is less than the weight of the object.
(b) The density of object is less than the density of the water.
(c) The density of an object is greater than the density of water.
(d) The overhead of water on an object is greater than the weight of the object.

Q19. In which state was the Solar Energy Park, Shakti Sthala inaugurated in March 2018?

(a) Karnataka
(b) Odisha
(c) Assam
(d) Chhattisgarh

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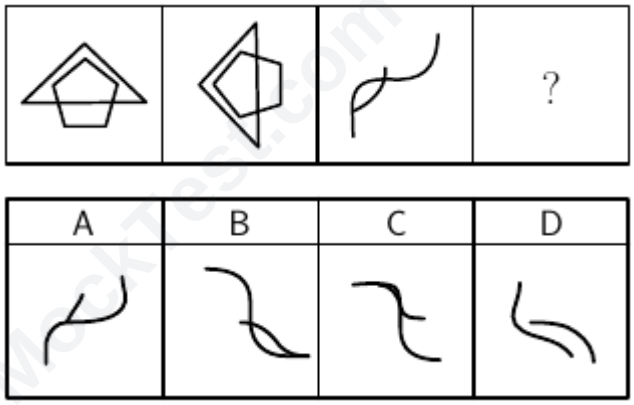
Q20. 56 ÷ 7 × (35 - 45 ÷ 3) ÷ 4 = ?

(a) 1.6
(b) 48
(c) 40
(d) 8

Q21. _____ won the Best Film Friendly State Award at the National Film Awards, 2017.

(a) Andhra Pradesh
(b) Karnataka
(c) Uttar Pradesh
(d) Tamil Nadu

Q22. Find the next figure in the following series.



(a) A
(b) B
(c) C
(d) D

Q23. Which country was visited by Indian President Ram Nath Kovind in March 2018?

(a) Pakistan
(b) Nepal
(c) Mauritius
(d) Iran

Q24. The sum of kinetic energy and potential energy will be:

(a) Geothermal Energy
(b) Thermal Energy
(c) Nuclear Power
(d) Mechanical Energy

Q25. The amount of time that B takes to fill the tank, pipe A fills it in its one fourth time. Pipe C takes 3 times the time taken by pipe A. If all three pipes are opened simultaneously, it takes 33 hours to fill the tank. If pipe C is not switched on, how many hours will it take to fill the tank?

(a) 42.4
(b) 41.5
(c) 42.1
(d) 41.8

Q26. Who is the Minister of Women and Child Welfare (November 2018)?

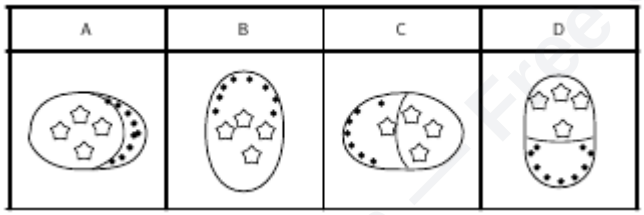
(a) JP Nadda
(b) Piyush Goyal
(c) Nirmala Sitharaman
(d) Maneka Gandhi

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Q27. Who among the following was awarded Bharat Ratna by the Government of India in 2015?

(a) Madan Mohan Malviya
(b) Kailash Satyarthi
(c) Rahul Gandhi
(d) MS Dhoni

Q28. Find the odd figure.



(a) D
(b) C
(c) B
(d) A

Q29. Indira Pradhan Trophy is related to which of the following sports?

(a) Football
(b) Cricket
(c) Volleyball
(d) Hockey

Q30. In which of the following sports, the words 'crawl', 'breaststroke', and 'butterfly' are used?

(a) Swimming
(b) Shooting
(c) Tennis
(d) Badminton

Q31. A concave mirror creates a virtual, straight, and enlarged image when the object is placed _____.

(a) Between F and P
(b) At infinity
(c) Between C and F
(d) Beyond or away from C

Q32. An event was organized by an event management company and the entry fee per person was fixed at Rs 250/-. On average, 2 persons from each family participated in the program and there were 300 families participating in the event. 50% of the total amount received by the company from the entry fee was spent on the arrangement. What was the amount spent on the arrangement?

(a) Rs. 1,50,000
(b) Rs. 1,20,000
(c) Rs. 1,0,5000
(d) Rs. 75,000

Q33. Which of the following languages is NOT a Classical Language of India?

(a) Malayalam
(b) Kannada
(c) Prakrit
(d) Sanskrit

Q34. Which element has three shells which are completely filled with electrons?

(a) Argon
(b) Neon
(c) Krypton

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(d) Aluminum

Q35. If $22x^2 - ax + 2 = ax^2 + 18x - 7$ has only one (repeated) solution, then the positive integral solution of a is

(a) 3
(b) 6
(c) 4
(d) 5

Q36. If the edge of a cube is increased by 4 cm, the surface area will increase by 432 cm^2. Then the original length of each edge of the cube is _____.

(a) 8 cm
(b) 7 cm
(c) 6 cm
(d) 9 cm

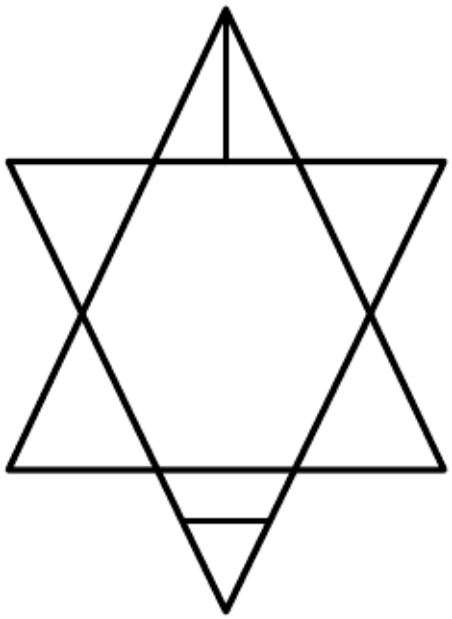
Q37. 703 ÷ 37 = 19 then 7.03 ÷ 0.0037 = ?

(a) 1.9
(b) 1900
(c) 0.19
(d) 190

Q38. Which of the following is not an involuntary action?

(a) Saliva Secretion
(b) Bicycling
(c) Digestion
(d) Respiration

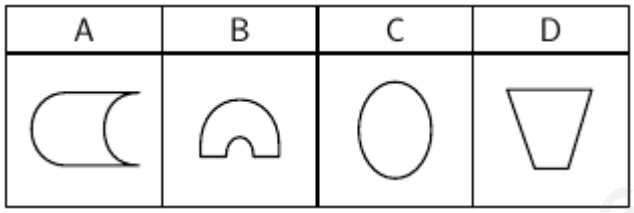
Q39. How many triangles are there in the following figure ?



(a) 15
(b) 20
(c) 10
(d) 18

Q40. Find the odd figure.

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(a) D
(b) B
(c) C
(d) A

Q41. Which Indian city is known as 'The City of Palaces' ?
(a) Kolkata
(b) Hyderabad
(c) Mumbai
(d) Chennai

Q42. When $x^2 + kx - 6$ can be completely divided by $x + 3$, the value of k is _____.
(a) 3
(b) -1
(c) 1
(d) -3

Q43. What is the mode of the given numbers:
4, 5, 5, 6, 4, 3, 2, 2, 5, 1?
(a) 5
(b) 2
(c) 4
(d) 6

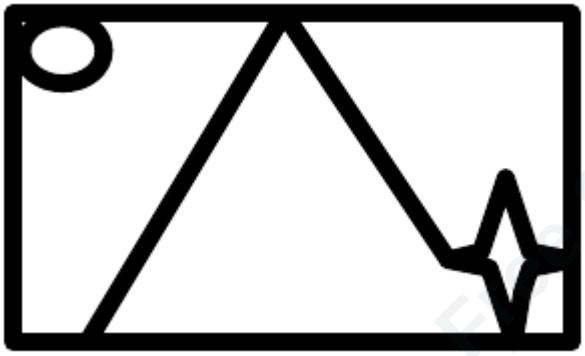
Q44. Which of the following government schemes has been launched by the Indian Prime Minister to combat malnutrition and stunting (dwarfness) among children?
(a) AMRUT Scheme
(b) HRIDAY Mission
(c) POSHAN Abhiyan
(d) Deen Dayal Upadhyay Gram Jyoti Abhiyan

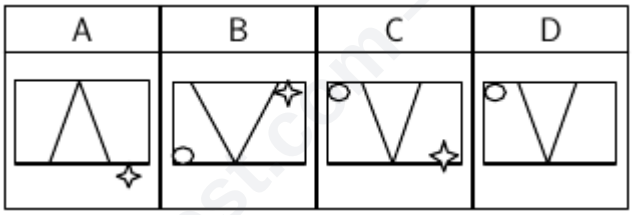
Q45. Who is the Minister of Road Transport and Highways (November 2018) ?
(a) Arun Jaitley
(b) Sushma Swaraj
(c) Nitin Gadkari
(d) JP Nadda

Q46. The length of the arc in front of an angle at the center of a circle of radius 14 cm is 11 cm. What is the measure of that perceived centroid angle? [Use $\pi = 22/7$]
(a) 60°
(b) 45°
(c) 75°
(d) 30°

Q47. Which of the following forms is closest to which of the following?

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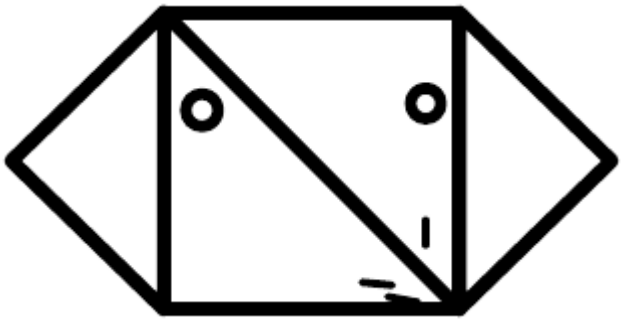


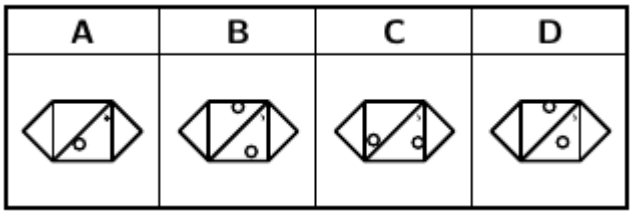
(a) C
(b) B
(c) D
(d) A

Q48. In 2017, the Assamese film 'Dixon Banat Palash' received the Nargis Dutt Award for Best _____ at the 64th National Film Awards.

(a) Feature film
(b) Animated Film
(c) Social issues
(d) Feature film on national integration

Q49. Which of the following forms is closest to which of the following?





(a) B
(b) A
(c) C
(d) D

Q50. If tanα = √15 + 4, then the value of tanα - cotα is _____.

(a) 4 - √15
(b) √15 - 4
(c) 2√15
(d) 8

Q51. Find the next term in the following series.

DG, GJ, JM, ____

(a) MP
(b) MQ
(c) MO
(d) MM

Q52. In a code or code language, ANGEL is written as 1147512. What would be the code for DEVIL in that language?

(a) 4622912
(b) 4523912
(c) 4522912
(d) 4522812

Q53. A question is given followed by two arguments. Decide which arguments are stronger in relation to the question.

Question:

Do people who work late at night have higher levels of toxins than people of normal working hours?

Argument:

1. Yes, our health improves when we respect our natural body time and sleep early.

2. No, nowadays, working till late at night is unavoidable because we work in many time zones.

(a) Only argument 1 is strong.
(b) Only argument 2 is strong.
(c) Neither argument 1 nor 2 is strong.
(d) Both 1 and 2 arguments are strong.

Q54. What is the energy contained in the body of 20 kg mass at a height of 8 m from the ground? (Given that 'g' = 10 ms^(-2))

(a) 16 J
(b) 16000 J
(c) 1600 J
(d) 160 J

Q55. A number is divided in the ratio 2 : 1. The larger of these two is 52, so that number is _____.

(a) 72
(b) 84
(c) 66
(d) 78

Q56. What is the value of x in the following equation?

(16 - 4) × (13 - 6) ÷ x = 12

(a) 4
(b) 12
(c) 7
(d) 1

Q57. Read the given statements and conclusions carefully and decide which of the given conclusions logically follows from the given statements.

Statement:

X tells Y, "Our society's septic tank is full and gutter water is coming out; the Society Association is not taking the

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necessary steps to clean the septic tank."

Conclusions:

1. The septic tank can be full and needs to be cleaned or emptied.

2. The septic tank of the X's Society is not yet connected to the main gutter line of the municipality.

(a) Only conclusion 2 follows.
(b) Both conclusions follow.
(c) No conclusions follow.
(d) Only conclusion 1 follows.

Q58. Which of the following is used as a catalyst in the hydrogenation of vegetable oil?

(a) Palladium
(b) Carbon
(c) Manganese
(d) Nickel

Q59. The lens formula is _____

(a) 1/u - 1/v = 1/f
(b) 1/v - 1/u = 1/f
(c) 1/f - 1/u = 1/v
(d) 1/v + 1/u = 1/f

Q60. A question is given followed by two arguments. Decide which arguments are stronger in relation to the question.

Question:

Do dogs love selflessly?

Arguments:

1. Yes, dogs are very loyal and loving; Having a pet dog at home creates a very friendly atmosphere.

2. No, this is just a human thinking; Rather, dogs need the freedom to live a life without human intervention.

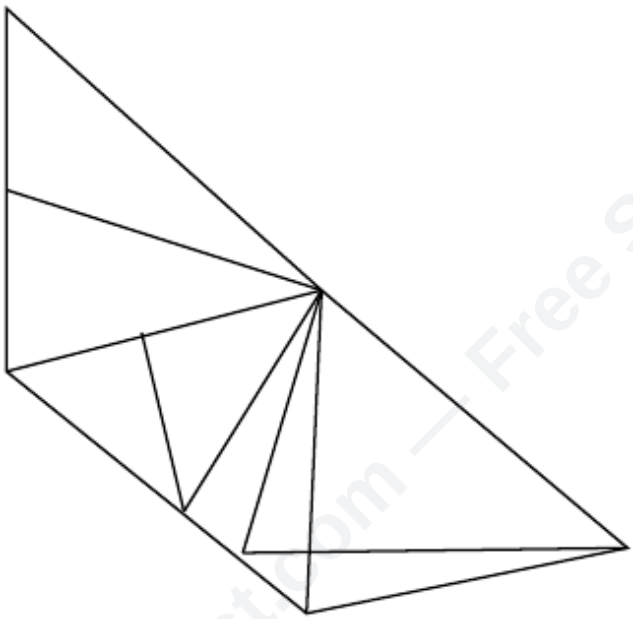
(a) Only argument 1 is strong.
(b) Only argument 2 is strong.
(c) Neither argument 1 nor 2 is strong.
(d) Both 1 and 2 are strong arguments.

Q61. Which of the following sodium compounds is used to normalize hard water?

(a) Sodium Chloride
(b) Sodium Hydroxide
(c) Sodium Carbonate
(d) Sodium Hydrogen Carbonate

Q62. How many triangles are there in the following figure?

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(a) 19
(b) 16
(c) 12
(d) 18

Q63. The molecular mass of H_2SO_4 is ____.
(H = 1, S = 32, O = 16)
(a) 98 u
(b) 49 u
(c) 96 u
(d) 97 u

Q64. Which of the following gases was not present in the atmosphere at the time of origin of life?
(a) O_2
(b) CO
(c) NH_3
(d) CH_4

Q65. Which of the following is not based on Archimedes' theory?
(a) Lactometer
(b) Hygrometer
(c) Hydrometer
(d) Submarine

Q66. What will be the momentum of a body of mass 'm' moving with 'v' velocity?
(a) mv
(b) mv^2
(c) $1/2\ mv^2$
(d) m/v

Q67. Mrinalini and Samyukta can work together to paint half of a wall in 14 days. Working separately, Mrinalini would need four times the time taken by the Samyukta to complete it. In how many days can the Samyukta paint the entire wall alone?
(a) 30
(b) 28
(c) 42
(d) 35

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Q68. Find the next number in the following series.

22, 76, 31, 101, __

(a) 90
(b) 40
(c) 67
(d) 41

Q69. Investing a money for 6 years yields Rs. 5600. If the simple rate of interest was increased by 2% per annum and then the yield became Rs. 6020. The original investment was _____.

(a) Rs. 4000
(b) Rs. 3500
(c) Rs. 3250
(d) Rs. 3750

Q70. Priyam is 9 years younger than Pritam. Five years ago Priyam's four times age was equal to Pritam's three times age. Find the present age of Priyam.

(a) 30 years
(b) 32 years
(c) 28 years
(d) 33 years

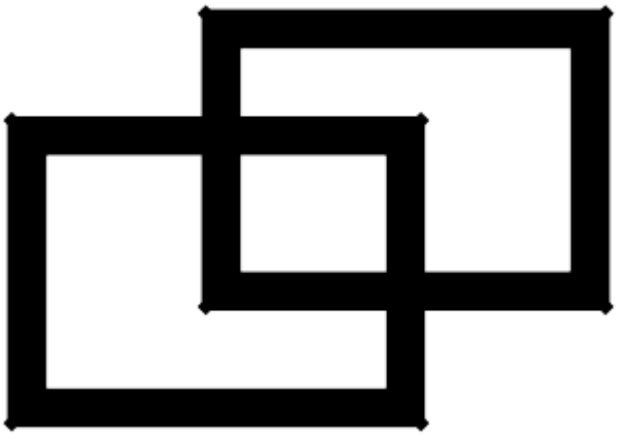
Q71. Sitesh drove 12 hours at a speed of @ 75 km/hr. At present, how long should he drive at a speed of @ 90 km/hr so that the overall average speed will be 81 km/hr?

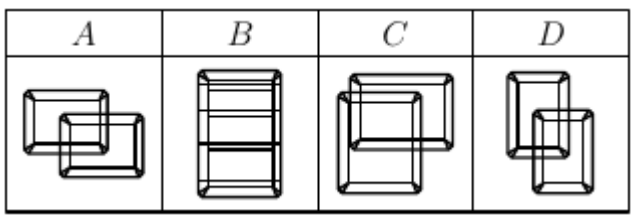
(a) 9
(b) 7.5
(c) 8
(d) 6

Q72. Which is the smallest natural number that divides 2736 and makes the quotient a perfect square?

(a) 171
(b) 18
(c) 19
(d) 9

Q73. Which of the following figure will look like the given figure when it is rotated 90° clockwise?





(a) A
(b) D
(c) C
(d) B

Q74. Oxides of carbon, nitrogen, and sulfur released while burning fossil fuels are _____ oxides.
(a) Amphoteric
(b) Acidic
(c) Alkaline
(d) Neutral

Q75. Find the HCF of 144, 288 and 396.
(a) 18
(b) 72
(c) 36
(d) 48

Q76. Which of the following numbers, when multiplied by 9√64 will give a rational number?
(a) 9√4
(b) 9√16
(c) 9√8
(d) 9√2

Q77. In the context of the tertiary Indian economy sector, which of the following areas comes under it?
(a) Mining
(b) Animal Husbandry
(c) Banking
(d) Agriculture

Q78. Which of the following proteins helps the muscle tissue to contract and relax to cause movement ?
(a) Hemp proteins
(b) Whey proteins
(c) Contractile proteins
(d) Lipoproteins

Q79. Which of the following state assembly elections were held in February 2018?
(a) Assam
(b) Meghalaya
(c) West Bengal
(d) Gujarat

Q80. The perimeter of a rectangle is 24 cm, while its area is 32 cm^2. What is the length and breadth of that rectangle?
(a) 5 cm, 7 cm
(b) 6 cm, 6 cm
(c) 5 cm, 6.4 cm
(d) 4 cm, 8 cm

Q81. Read the given statements and conclusions carefully and decide which of the given conclusions logically follows from the given statements.

Statement:

A asked C, "What time is it now?" Is it half past two? "

Conclusions:

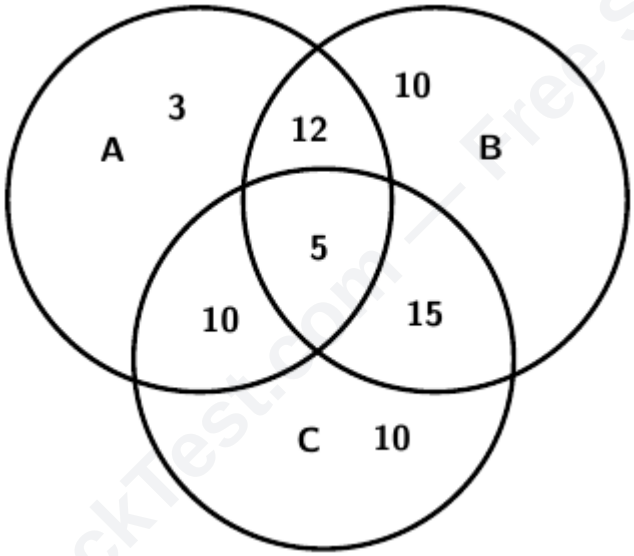
1. A wants to go to lunch.
2. A wants to confirm what the time is because his watch is off.

(a) Both conclusions follow.

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(b) Neither conclusion 1 nor 2 follows.
(c) Only conclusion 1 follows.
(d) Only conclusion 2 follows.

Q82. The following Venn diagram represents the favorite ice cream of some children: A - vanilla, B - chocolate and C - pistachio. Based on the diagram, how many children like more than one flavor of ice cream?



(a) 42
(b) 30
(c) 5
(d) 25

Q83. Which of the following is not an example of a Döbereiner's triad?
(a) K, F, Cl
(b) Ca, Sr, Ba
(c) Cl, Br, I
(d) Li, Na, K

Q84. Identify the odd from the given group.
Hydra, Sea Anemone, Psychon, Jellyfish
(a) Psychon
(b) Sea Anemone
(c) Jellyfish
(d) Hydra

Q85. Identify the incorrect statement.
According to Ohm's law:
(a) I/R = Constant
(b) V is directly proportional to I.
(c) V/I = Constant
(d) V = IR

Q86. A question is given followed by two statements. Identify which statements are sufficient to answer the question.
Question:
A, K, P and X are standing in a row. Who stands second in the row?
Statement:
1. X is on the counter.
2. P is between A and K.
(a) Statements 1 and 2 together are sufficient.

(b) Statement 2 alone is sufficient.
(c) Statement 1 alone is sufficient.
(d) Statements 1 and 2 together are insufficient.

Q87. Arrange the following substance in increasing order of forces of attraction between the particles
(A) Water, (B) Wax, (C) Nitrogen
(a) Nitrogen, Water, Wax
(b) Wax, Water, Nitrogen
(c) Water, Wax, Nitrogen
(d) Nitrogen, Wax, Water

Q88. Firoza was born on 2^(nd) February 2011, while Adesh was born 553 days later. On what date Adesh was born?
(a) 11^(th)August 2012
(b) 8^(th) August 2012
(c) 10^(th) August 2012
(d) 9^(th) August 2012

Q89. Who is the author of the famous book 'New India'?
(a) Mother Teresa
(b) Mahatma Gandhi
(c) Annie Besant
(d) Jawaharlal Nehru

Q90. The film 'Pink' won the Best _____ award at the National Film Awards 2017.
(a) Feature film
(b) Animated Film
(c) Children's film
(d) Film on social issues

Q91. Find the next term in the following series.
I9R18A26, H8S19C24, _____
(a) G7T20E21
(b) G7T20E22
(c) G7T21E21
(d) G7T20E23

Q92. Which of the following metals does not react with cold or hot water?
(a) Potassium
(b) Sodium
(c) Zinc
(d) Magnesium

Q93. Which famous personality's birthday is celebrated in India on 14 April every year?
(a) Dr. Sarvepalli Radhakrishnan
(b) Dr. B.R. Ambedkar
(c) Sardar Vallabh Bhai Patel
(d) Dr. A.P.J. Abdul Kalam

Q94. Which of the following numbers is the square root of 13456?
(a) 116
(b) 114
(c) 124
(d) 126

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Q95. The baby is born as a result of rhythmic contraction of muscles in _____.

(a) Vagina
(b) Fallopian tube
(c) Cervix
(d) Uterus

Q96. To succeed in a test, one must score 38%, then a pass score of 45 marks will be _____.

(a) 17.4
(b) 16.9
(c) 16.6
(d) 17.1

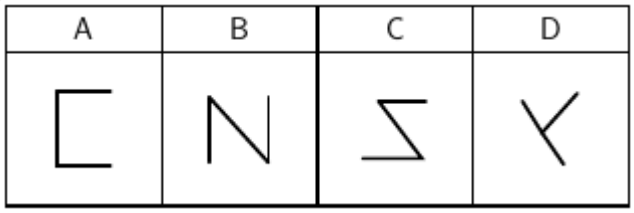
Q97. The density of a substance is defined as _____.

(a) Mass per unit area
(b) Mass per unit volume
(c) Volume per unit mass
(d) Force per unit area

Q98. Which of the following numbers will have an even number of factors ?

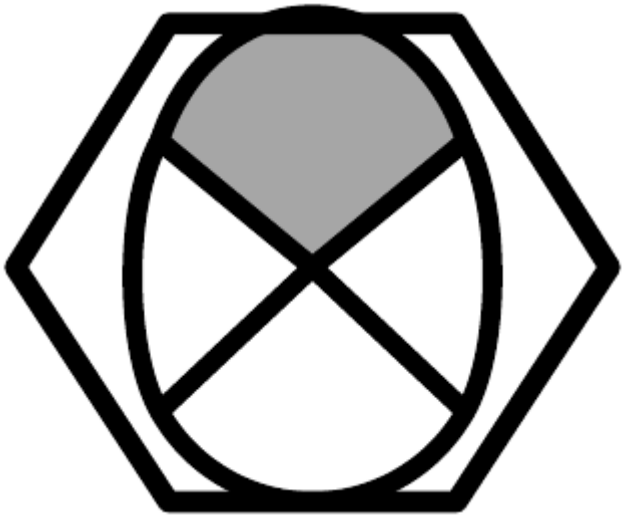
(a) 16900
(b) 36000
(c) 28900
(d) 62500

Q99. Find the odd image.

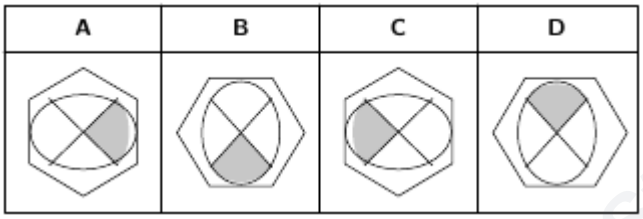


(a) C
(b) D
(c) A
(d) B

Q100. What is the rotation of the following figure in a 270° clockwise direction?



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(a) C
(b) D
(c) B
(d) A

ANSWER KEY

1	c	2	d	3	b	4	b	5	c	6	d	7	c	8	d	9	a	10	d
11	d	12	a	13	a	14	c	15	c	16	c	17	d	18	b	19	a	20	c
21	c	22	b	23	c	24	d	25	d	26	d	27	a	28	b	29	c	30	a
31	a	32	d	33	c	34	a	35	b	36	b	37	b	38	b	39	d	40	a
41	a	42	c	43	a	44	c	45	c	46	b	47	b	48	d	49	c	50	c
51	a	52	c	53	a	54	c	55	d	56	c	57	d	58	d	59	b	60	c
61	c	62	d	63	a	64	a	65	b	66	a	67	d	68	b	69	b	70	b
71	c	72	c	73	b	74	b	75	c	76	c	77	c	78	c	79	b	80	d
81	b	82	a	83	a	84	a	85	a	86	d	87	a	88	b	89	c	90	d
91	b	92	c	93	b	94	a	95	d	96	d	97	b	98	b	99	b	100	a

SOLUTIONS

Q1. Answer: (c) Wax

The logic follows here is:-
As The forms of mud that we use to make flowerpot.
Similarly,
The forms of waxes that we use to make candles are candle waxes.
Hence, the correct answer is "Wax".
Additional Information
• The Mud Flower Pot is a small decorative block. It has a regular variant and a light-producing candle variant.

Q2. Answer: (d) Football

The correct answer is Football.
• Begum Hazrat Mahal Cup is associated with the sport of football.
Key Points
• Begum Hazrat Mahal Cup is associated with football.
• Other cups/trophies related to football:-
• Sanjay Gold Cup, Santosh Trophy, Kalinga cup, Stafford Cup, Subroto Cup, Todd Memo-rial Trophy, Rovers cup, etc.
Additional Information
• Begum Hazrat Mahal was Begum of Awadh.
• Nawab wajid Ali shah second wife was Begum Hazrat Mahal.
• During the first revolt of independence in 1857, she rebelled against the British.
• She died in 1879.
• In Calcutta, the husband of Begum Hazrat Mahal was exiled.
• The charge of the state of Awadh was taken by her.

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• Prince Birjis Qadir was her son.
• He was made the ruler of Awadh by her.
• Muhammadi Khanum was her other name.
• She belonged to the Shia Islam religion.
Important Points
• Other cups/trophies related to:-
• Cricket:
• Deodhar Trophy, Duleep Trophy, Ranji Tro-phy, Vijay Hazare Trophy, etc.
• Hockey:
• Agha Khan Cup, Dhyan Chand Trophy, etc.
• Kabaddi:
• Pro Kabaddi League.

Q3. Answer: (b) 24

Shortcut Trick
Ratio of Selling Price to Cost Price percentage: 118% of CP = Rs. 649.
Unitary method: 1% of CP = 649 ÷ 118 = 5.5.
Therefore, Cost Price (CP) = 100 × 5.5 = Rs. 550.
New Selling Price (SP2) = Rs. 418.
Loss = 550 − 418 = 132.
Loss% = (132 ÷ 550) × 100 = 24%.
Therefore The correct answer is 24.
Alternate Method
Given: SP1 = Rs. 649, Profit% = 18%, SP2 = Rs. 418.
Formulas: CP = [SP × 100] ÷ [100 + Profit%], Loss% = [(CP − SP) ÷ CP] × 100.
=> Cost Price = (649 × 100) ÷ 118 = 55000 ÷ 118 = Rs. 550.
=> If sold at Rs. 418, Loss = 550 − 418 = Rs. 132.
=> Loss Percentage = (132 ÷ 550) × 100.
=> Loss Percentage = 1320 ÷ 55 = 24%.
Therefore The correct answer is 24.
Additional Information
Profit and Loss Basics
Profit occurs when Selling Price (SP) > Cost Price (CP), and Loss occurs when CP > SP.
Cost Price as Base
Unless specified otherwise, both Profit Percentage and Loss Percentage are always calculated on the Cost Price.

Q4. Answer: (b) F × s

The correct answer is F × s.
Key Points
• When a force (F) acts in the direction of displacement (s) on an object,
then it can be expressed by the equation mentioned below-
W = F × s
• In other words, work is said to be done when a force applied to an object moves that object.
• It can be calculated by:-
• Multiplying the force by the movement of the object.
• It is a scalar quantity that has magnitude and no direction.
Additional Information
• Work is defined as the product of force and displacement.

Q5. Answer: (c) Her cousin

Family chart,
Drawing the family tree as per the given information :
Thus, Mahi met her cousin.

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Hence, the correct answer is "Her cousin".

Q6. Answer: (d) 252 km

Shortcut Trick

Find the common intersection range for the distance.

Ghanshyam distance range: (35 × 7) to (40 × 7) → 245 km to 280 km.

Sutirtha distance range: (40 × 6) to (45 × 6) → 240 km to 270 km.

Common range: 245 km to 270 km. Only 252 km fits.

Therefore The correct answer is 252 km.

Alternate Method

Given:

Ghanshyam Speed (Sg): 35 < Sg < 40 km/h | Time (Tg): 7 hours

Sutirtha Speed (Ss): 40 < Ss < 45 km/h | Time (Ts): 6 hours

Calculations:

=> Min Distance (Ghanshyam) = 35 × 7 = 245 km

=> Max Distance (Ghanshyam) = 40 × 7 = 280 km

=> Min Distance (Sutirtha) = 40 × 6 = 240 km

=> Max Distance (Sutirtha) = 45 × 6 = 270 km

=> The distance (D) must satisfy: 245 < D < 270

=> Checking options: 252 km is the only value between 245 and 270.

Therefore The correct answer is 252 km.

Additional Information

Distance Formula

The fundamental relation is Distance = Speed × Time. When speeds are given as a range, the distance also forms a corresponding range.

Inequality Overlap

For a common distance traveled by two individuals with different constraints, the value must lie in the intersection of their individual possible distance ranges.

Q7. Answer: (c) (NH4)2SO4

The correct answer is (NH4)2SO4.

• The chemical formula of ammonium sulphate is (NH4)2SO4.

Key Points

• Ammonium sulphate is used in so many ways:-

• It is used as an inorganic salt.

• It is used as a soil fertiliser.

• 21% and 24% sulphur is contained by it.

• For alkaline soil, it is used as a fertiliser.

• Ammonium sulphate lowers the pH balance of the soil.

• A small amount of acid is formed by it when it is released into the soil.

Additional Information

• The other uses of ammonium sulphate are:-

• herbicides, insecticides and fungicides.

• Iron and calcium cations are bound by it in the soil.

• For protein purification by precipitation, ammonium sulphate precipitation is most commonly used.

Q8. Answer: (d) Red brown powder is coated.

The correct answer is Red-brown powder is coated.

During rusting in iron, Red-brown powder is coated on iron.

Key Points

• Rust is basically iron oxide.

• It is of reddish-brown color.

• During rusting of iron, the red-brown powder is formed.

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• During rusting, iron and oxygen react in the presence of water or air moisture.
• Hydrous iron oxide and iron oxide hydroxide are present in the rust.
• Generally, refined iron goes through corrosion.
• An entire iron can be converted into rust with time.

Additional Information

• Many other metals are corroded but rusting of these metals is not called rust.
• Galvanization is used to prevent the rusting of iron.
• In galvanization:-
• a layer of zinc is coated on iron.
• Special weathering steel alloys can be used, in which rusting takes place slowly.

Q9. Answer: (a) 170/77

Shortcut Trick

For fractions a/b + c/d, use cross-multiplication: (ad + bc) / bd

Sum = (7 × 7 + 11 × 11) / (11 × 7)

Sum = (49 + 121) / 77

Sum = 170 / 77

Therefore The correct answer is 170/77.

Alternate Method

Given:

First fraction = 7/11

Second fraction = 11/7

Formula Used:

Sum of fractions = [(LCM ÷ Denominator1) × Numerator1 + (LCM ÷ Denominator2) × Numerator2] / LCM

Calculations:

=> Denominators are 11 and 7. Since both are prime numbers, their LCM = 11 × 7 = 77.

=> Convert 7/11 to a fraction with denominator 77: (7 × 7) / (11 × 7) = 49/77

=> Convert 11/7 to a fraction with denominator 77: (11 × 11) / (7 × 11) = 121/77

=> Sum = 49/77 + 121/77

=> Sum = (49 + 121) / 77

=> Sum = 170/77

Therefore The correct answer is 170/77.

Additional Information

Addition of Unlike Fractions

To add fractions with different denominators, first find the Least Common Multiple (LCM) of the denominators to make them like fractions.

Reciprocal Property

The sum of a fraction x/y and its reciprocal y/x is always (x2 + y2) / xy.

Proper vs Improper Fractions

7/11 is a proper fraction (numerator < denominator), while 11/7 and 170/77 are improper fractions (numerator > denominator).

Q10. Answer: (d) Her husband's uncle

Family chart,

Drawing the family tree as per the given information :

As Mahi met her husband's uncle.

Hence, the correct answer is "Her husband's uncle".

Q11. Answer: (d) Tennis

The correct answer is Tennis.

• The terms ace and advantage are associated with tennis.

Key Points

• The international tennis federation is the highest governing body for the sport of tennis.
• The game was first played in the 19^(th) century in England.

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• The game could be outdoor or indoor.
• Ball, racket, and net are the equipment that is used in the game.
• It is an Olympic sport.
• The game of tennis can be played as either single (one team) or doubles (doubles).

Additional Information

• In Birmingham England, modern tennis was originated.
• Some famous tennis player are:-
• Rafael Nadal
• Serena Williams
• Roger Federer
• Mahesh Bhupathi
• Novak Djokovic

Q12. Answer: (a) South East

Representing the given information in NE-SW direction:

Thus, Ananya is to the South-East from her initial position.

Hence, the correct answer is "South-East".

Q13. Answer: (a) Chennai

The correct answer is Chennai.

• The national centre for technology for ports, waterways and coast (NTCPWC) will be formed in Chennai.

Key Points

• It was established to boost the development of indigenous technology.
• To expertise in India’s port and maritime sector is the other aim of establishing it.
• It will provide:-
• Autonomous platforms for navigation and water quality monitoring.
• Also, provide night time navigation in inland waterways.
• For small ports, new indigenous technologies will be given.

Additional Information

• The structure that prevents waves from entering the harbour is called breakwaters.
• To consolidate to provide solutions to fulfil the technological requirements of the sector is the major aim of NTCPWC.

Q14. Answer: (c) Perceive

The logic followed here is:- Words are the synonyms of each other.

'Hear' is the synonyms of 'Listen'.

Similarly,

'Sense' is the synonyms of 'Perceive'.

Hence, the correct answer is "Perceive".

• Hearing is simply the act of perceiving sound by the ear. If you are not hearing- impaired, hearing simply happens on its own.
• Listening, however, is something you consciously choose to do. Listening requires concentration so that your brain processes meaning from words and sentences.
• Perceive and sense: perceive is to see, to be aware of, to understand while sense is to use biological senses: to either smell, watch, taste, hear or feel.

Q15. Answer: (c) Statements 1 and 2 together are insufficient.

According to the given information :

A, B, P, O, and D are standing in a circle.

Statement 1: P stands ahead of D.

Case 1:

Case 2:

• Here, we do not know the position of O.

So, it alone is not sufficient to answer the question.

Statement 2: A stands to the right of D.

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Case 1:

Case 2:

• Here, there are 2 different possible positions for O in each of the 2 cases.

So, statement 2 alone is not sufficient.

Combining statements 1 and 2:

Case 1:

Case 2:

• There are still 2 cases left and both show different positions for O.

• Thus, combining statements 1 and 2 are also not sufficient to determine who stands between O and P.

Hence, the correct answer is "Statements 1 and 2 together are
insufficient.".

Q16. Answer: (c) Only conclusion 1 follows.

The least possible Venn diagram from the given statements is:-

Conclusions:

I. Some multicolored are wings → True (as "All wings are multicolored" given so it is definitely true)

II. Some bags are wings → False (There is no direct relation given between wings and bags so it can be possible but not definite)

Hence, the correct answer is "Only conclusion 1 follows".

Q17. Answer: (d) Members: 13, Non-Members: 3

Calculation:

Average number of users who are member in the swimming pool

= (10 + 15 + 10 + 10 + 5 + 30)/6 = 80/6 ≈ 13

Average number of users who are non-member in the swimming pool

= (3 + 3 + 1 + 2 + 1 +10)/6 = 20/6 ≈ 3

Therefore Average Users Members are 13 and Average User non-members are 3 per day.

Q18. Answer: (b) The density of object is less than the density of the water.

The correct answer is The density of the object is less than the density of the water.

The incorrect statement is The density of the object is less than the density of the water.

• If an object sinks in water, it means that the upper thrust of water on the object is greater than the weight of the object.

• Whether an object will float or sink in another substance is decided by the density of an object.

• If an object is less dense than the liquid, then the object will float in that liquid.

Key Points

• The characteristic property of an object is density.

• Density does not depend on the amount of substance.

• Density measures how heavy something is as compared to its size.

• The size, shape, or type of material does not decide that if the substance will flow or sink in the liquid.

• Some trapped air is contained by all objects that float in the liquid.

• Archimedes principle:

• The principle of Archimedes states “When a body is immersed in a liquid, an upward thrust, equal to the weight of the liquid displaced, acts on it.”

Confusion Points

• Do not get confused in this question, as the question is asking an INCORRECT statement.

• If an object sinks in water then it is due to its higher density as compared to water, therefore the density of an object is greater than the density of water is a correct statement.

• And the density of an object is less than the density of water is clearly a false statement.

Q19. Answer: (a) Karnataka

The correct answer is Karnataka.In March 2018, the solar energy park, Shakti Sthala has been inaugurated in Karnataka.

Key Points

• Shakti Sthala is the world’s largest solar park.

• The solar park has a capacity of 2000 MW.

• Rs16500 crore is invested for setting up this park.
• The park is set up at Pavagada, in the Tumaguru district of Karnataka.
• This is a drone-prone region.
• The solar energy park is situated 180 km from Bengaluru.
• Shakti Sthala is the first phase of the rupees 16,500 crore park.
• Around 13000 acres of land are used in setting up the park.
• To decrease the dependence on traditional power sources and use environment-friendly ones to meet the power needs of the people is the aim of setting up this park.

Additional Information

• About Karnataka:
• Formation - 1 November 1956
• Governor - Vajubhai Vala
• Chief Minister - Basavaraj Bommai (BJP)

Q20. Answer: (c) 40

Concept:

Follow BODMAS rule to solve this question, as per the order given below,

Calculations :

Use above given order to solve this

=> 56 ÷ 7 × (35 - 15) ÷ 4 = ?

=> 56 ÷ 7 × 20 ÷ 4 = ?

=> 8 × 5

=> 40

Therefore Option 3 will be the correct choice

Q21. Answer: (c) Uttar Pradesh

The correct answer is Uttar Pradesh.

• In 2017, the National film award, Uttar Pradesh has won the best film-friendly state award.

Key Points

• Special mention of Jharkhand was also made by jury members in the award festival.
• The best feature film award was given to the Marathi film Kasav.
• The best non-feature film category award was given to fireflies.

Additional Information

• The best actor award was given to Akshay Kumar for Rustam.
• It was Akshay Kumar’s first national award.
• The national award for best Hindi feature film was given to Neerja.
• For the 64^(th) national award, 344 films from 26 languages have been viewed.
• The best-supporting actress award was given to Zaira Waseem for Dangal.

Q22. Answer: (b) B

The pattern follows here is:

The figure is rotating by 90 degrees anti-clockwise.

Hence, the correct answer is "Option 2".

Q23. Answer: (c) Mauritius

The correct answer is Mauritius.

• In March 2018, President Ram Nath Kovind had visited Mauritius.
• Key Points
• He visited during his visit of 6 days visit to the island nation of Madagascar and Mauritius.
• This region is vital for India’s strategic interest.
• Our president was the chief guest at the 50^(th) year of independence at Mauritius.
• It was the first visit of India’s VVIP to an Island nation.

Additional Information

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• In the Indian Ocean, these African country lies.
• Chinese naval presence is growing in these regions.
• World Hindi Secretariat in Mauritius was also inaugurated by the President of India.
• President had also interacted with the business communities in Madagascar.
• Madagascar is located in the Indian ocean.

Q24. Answer: (d) Mechanical Energy

Concept:
• Mechanical energy is a combination of Kinetic energy and Potential energy.
• Mechanical energy is defined as the sum total of kinetic energy and potential energy in an object that is utilized to do work.
• Mechanical energy is a form of energy that is related to the position and motion of an object.
Explanation:
• The sum of potential energy and kinetic energy gives the mechanical energy which is the total energy that is associated with the position and motion of the object.
i.e., M.E = K.E + P.E
• The energy of an object due to its motion is called kinetic energy.
• The energy of an object due to its position is the potential energy.
Additional Information
The following fig shows different forms of energy

Q25. Answer: (d) 41.8

Shortcut Trick
Ratio of Time taken by A : B : C = 1 : 4 : 3.
Ratio of Efficiency (Inverse of Time) = 1/1 : 1/4 : 1/3 = 12 : 3 : 4.
Total Efficiency = 12 + 3 + 4 = 19. Total Work = 19 × 33 hours.
Time taken by A and B together = (19 × 33) ÷ (12 + 3) = 627 ÷ 15 = 41.8 hours.
Therefore The correct answer is 41.8 hours.
Alternate Method
Given: Pipe A takes 1/4th the time of B. Pipe C takes 3 times the time of A. Total time (A+B+C) = 33 hours.
Formula Used: Efficiency × Time = Total Work.
=> Let the time taken by Pipe A be 1x hours.
=> Time taken by Pipe B = 4x hours (since A takes 1/4th time of B).
=> Time taken by Pipe C = 3x hours.
=> Efficiency of A : B : C = (1/x) : (1/4x) : (1/3x) = 12 : 3 : 4.
=> Combined efficiency of A, B, and C = 12 + 3 + 4 = 19 units/hr.
=> Total capacity of tank = 19 × 33 = 627 units.
=> If Pipe C is not switched on, combined efficiency of A and B = 12 + 3 = 15 units/hr.
=> Time taken = 627 ÷ 15 = 41.8 hours.
Therefore The correct answer is 41.8 hours.
Additional Information
Efficiency and Time Relationship
Efficiency is inversely proportional to the time taken to complete a task. If time ratio is a:b, efficiency ratio is b:a.
Combined Work Formula
If pipes fill a tank in x, y, and z hours respectively, the time taken together is 1 ÷ (1/x + 1/y + 1/z).
Negative Work (Inlet vs Outlet)
Inlet pipes have positive efficiency, while outlet (leakage) pipes have negative efficiency when calculating total work.

Q26. Answer: (d) Maneka Gandhi

The correct answer is Maneka Gandhi.
• Maneka Gandhi was the minister of women and child welfare in November 2018.
Key Points
• At present, Smt. Smriti Zubin Irani is the minister of women and child welfare. (As of Feb 2021)
• The formulation and administration of the rules and regulations and laws relating to women and child development in India is the

responsibility of the ministry of women and child development.

• The headquarter of the Ministry is located in Shastri Bhawan, New Delhi.

• The ministry is mandated for the holistic development of women and children.

Important Points

• All the plans, policies and programmes for the development of women and children are formulated and coordinated by the ministry.

• A certain innovative programme for women and children are also formulated by the ministry.

• Welfare and support service, training for employment and income generation and gender sensitisation are some programmes that are covered by the ministry.

• The ministry work towards the empowerment of women.

• The Integrated Child Development Service (ICDS) plan is implemented by this ministry.

Q27. Answer: (a) Madan Mohan Malviya

The correct answer is Madan Mohan Malviya.

• Madan Mohan Malviya was awarded Bharat Ratna by the government of India in 2015.

Key Points

• He was an Indian scholar, educational reformer, and politician.

• He played a very crucial role in the Indian independence movement.

• He was president of the Indian National Congress three times.

• Akhil Bhartiya Hindu Mahasabha was founded by him.

• Mahamana was the title given to him.

Additional Information

• His wife's name was Kumari Kundan Devi.

• He was awarded Bharat Ratna posthumously in 2015.

• Modern education was promoted by Madan Mohan Malviya.

• He cofounded Banaras Hindu University at Banaras.

• In the Indian indenture system, he played a very important role.

• He was the founder of scouting in India.

Q28. Answer: (b) C

The pattern followed here is:

• Figures A, B, and, D contain dots and 4 stars with 5 vertices each.

• Figures A, B, and, D can be obtained from each other by anti-clockwise rotation.

• However, figure C is different because it contains 3 stars with 5 vertices and 1 star with 4 vertices.

Hence, the correct answer is "Option 2".

Q29. Answer: (c) Volleyball

The correct answer is Volleyball.

• Indira Pradhan's trophy is related to volleyball.

Key Points

• The trophies related to a volleyball game are the Indira Pradhan trophy, Centennial Cup, and Shivanthi Gold Cup.

• In this game, two teams of six players are separated by a net.

• FIVB is the highest governing body of volleyball.

• The player begins the rally by serving the ball.

• The ball must not let to be grounded within the court by the receiving team.

• With hands or arms, the ball is usually played.

• Many consistent techniques have evolved in volleyball.

• The official ball which was used in the first volleyball was disputed.

• The rules for this game was evolved in this game in 1915 in the Philippines.

Additional Information

Sports	Cups or trophies

Football	Rovers Cup, Bandodkar Trophy, Merdeka Cup, Confederation Cup, DCM Trophy, Durand Cup, B.C. Raj Trophy(National Championship), FIFA World cup, Jules Rimet Trophy, Indian Super League, Kalinga Cup, Santosh Trophy, IFA Shield, Scissor Cup, Subroto Cup, Sir Ashutosh Mukherjee Trophy, Todd Memorial Trophy, Vittal Trophy, UEFA Champions League.
Cricket	Ashes Cup, Asia Cup, C.K Naidu Trophy, Cooch Behar Trophy, Deodhar Trophy, Duleep Trophy, Gavaskar Border Trophy, G.D Birla Trophy, Gillette Cup, ICC World Cup, IPL, Irani Trophy, Jawaharlal Nehru Cup, Rani Jhansi Trophy, Ranji Trophy, Rohinton Baria Trophy, Rothmans Cup, Sahara Cup, Sharjah Cup, Singer Cup, Titan Cup, Vijay Hazare Trophy, Vijay Marchent Trophy, Wisden Trophy, and Wills Trophy.
Badminton	Amrit Diwan Cup, Asia Cup, Chaddha Cup, European Cup, Harilela Cup, Ibrahim Rahimatullah cup, Challenger Cup, Konica Cup, Sophia Cup, Kitiakara Cup, Malaysian Open, Thomas Cup (Men), and Uber Cup(Women)
Hockey	Agha Khan Cup, Maharaja Rajit, Singh Gold Cup, Dhyanchand Trophy, Sultan Azlan Shah Cup, Wales Trophy, Stanley Cup, Sindhia Gold Cup, Wellington Cup.

Q30. Answer: (a) Swimming

The correct answer is Swimming.

• The words crawl, breaststroke, and butterfly are associated with the game of swimming.

Key Points

• In this game, the entire body of the person is moved through the water.

• In pools or open water, the sports take place.

• The events butterfly, breaststroke, freestyle, and individual medley are associated with swimming.

• A set of specific techniques is required by swimming.

• There are distinct regulations in competition.

Additional Information

• In prehistoric times, evidence of recreational swimming was found.

• The earliest evidence of painting was found in the stone age.

• In 1830 in England:-

• Swimming emerged as a competitive recreational activity.

• In the 19th century:-

• Competitive swimming became popular.

• Tapering is the practice of reducing exercise in the days just before an important competition.

Q31. Answer: (a) Between F and P

The correct answer is Between F and P.

• A concave mirror creates a virtual, straight, and enlarged image when the object is placed between F and P.

Key Points

• When the object is positioned between the pole of the mirror and the focus, then the image formed by a concave mirror appears to be virtual, erect, and larger than the object.

• A concave mirror forms different images which depend on the distance between the object and the mirror.

Additional Information

• A concave mirror is a type of spherical mirror in which, the reflecting surface is the inner curved surface of the sphere.

• The incident light is reflected inwards because of its shape. Thus, such mirrors are also called converging mirrors.

Q32. Answer: (d) Rs. 75,000

Shortcut Trick

Total persons = 300 families × 2 persons/family = 600 persons

Total collection = 600 × Rs 250 = Rs 1,50,000

Arrangement cost = 50% of Total collection = 1,50,000 ÷ 2 = Rs 75,000

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Therefore The correct answer is Rs. 75,000.

Alternate Method

Given:

Entry fee per person = Rs 250

Number of families = 300

Average persons per family = 2

Percentage spent on arrangement = 50%

Calculations:

=> Total number of participants = 300 × 2 = 600

=> Total amount received = 600 × 250 = Rs 1,50,000

=> Amount spent on arrangement = 50% of 1,50,000

=> Amount spent = (50 ÷ 100) × 1,50,000

=> Amount spent = 0.5 × 1,50,000 = Rs 75,000

Therefore The correct answer is Rs. 75,000.

Additional Information

Percentage Calculation

To find x% of a value V, use the formula: (x ÷ 100) × V.

Average Concept

Total Value = Average × Number of entities. Here, Total persons = 2 (avg) × 300 (families).

Unitary Method

Total Cost = Number of units × Price per unit. Used to find the total entry fee collection.

Q33. Answer: (c) Prakrit

The correct answer is Prakrit.

Key Points

• Prakrit has not been designated as a classical language by the Government of India.

• Hindi is given the status of the official language of the nation by using article 343 of the constitution.

• An independent literary tradition and a large and ancient body of written literature are the features of classical language.

• Typically dead languages are classified as classical language.

• In India, there are 6 languages that are classified as classical language.

Additional Information

• Tamil was the first language to be declared as a classical language in India in 2004.

• Malayalam was declared as a classical language in India in 2013.

• Kannada was declared as a classical language in India in 2008.

• Sanskrit was declared as a classical language in India in 2005.

• The guidelines regarding classical languages are provided by the ministry of culture.

Q34. Answer: (a) Argon

The correct answer is Argon.

• Argon has three shells that are completely filled with electrons.

Key Points

• Argon has three electron shells.

• The third shell is filled with eight electrons.

• It is the third of the noble gases or inert gases.

• It is very non-reactive.

Important Points

• Helium, neon, and argon are those elements that completely filled the outermost shell. Helium-He(2) ,Neon-Ne (2,8),Argon-Ar (2,8,8).

• They are noble gases.

Additional Information

• About Argon:-

• Atomic number:18.

• Third-most abundant gas in the Earth's atmosphere.

• It is produced industrially by the fractional distillation of liquid air.

• It is commonly used to fill incandescent light bulbs.

• It is used in tungsten filament.

• All Helium, Neon, and Argon have completely filled outermost shells. But it is asked which element have all three shells filled. So, Argon-Ar (2,8,8) has all three shells filled completely filled with electrons.

Q35. Answer: (b) 6

Shortcut Trick

Rearrange the equation to the standard form: $(22 - a)x^2 - (a + 18)x + 9 = 0$.

For a repeated solution, the Discriminant (D) must be zero ($B^2 = 4AC$).

$(a + 18)^2 = 4 \times (22 - a) \times 9 \Rightarrow a^2 + 36a + 324 = 792 - 36a$.

$a^2 + 72a - 468 = 0 \Rightarrow (a + 78)(a - 6) = 0$.

Since the question asks for a positive integral solution, we take $a = 6$.

Therefore The correct answer is 6.

Alternate Method

Given Equation: $22x^2 - ax + 2 = ax^2 + 18x - 7$

Rearranging into standard form $Ax^2 + Bx + C = 0$:

$\Rightarrow 22x^2 - ax^2 - ax - 18x + 2 + 7 = 0$

$\Rightarrow (22 - a)x^2 - (a + 18)x + 9 = 0$

Comparing with the standard quadratic equation, we have:

$A = (22 - a)$, $B = -(a + 18)$, and $C = 9$.

Condition for a repeated solution (Discriminant D = 0):

$\Rightarrow B^2 - 4AC = 0$

$\Rightarrow [-(a + 18)]^2 - 4 \times (22 - a) \times 9 = 0$

$\Rightarrow (a + 18)^2 - 36(22 - a) = 0$

$\Rightarrow a^2 + 36a + 324 - 792 + 36a = 0$

$\Rightarrow a^2 + 72a - 468 = 0$

Solving the quadratic equation for a:

$\Rightarrow a^2 + 78a - 6a - 468 = 0$

$\Rightarrow a(a + 78) - 6(a + 78) = 0$

$\Rightarrow (a - 6)(a + 78) = 0$

$\Rightarrow a = 6$ or $a = -78$

Since a is a positive integral solution, we select $a = 6$.

Therefore The correct answer is 6.

Additional Information

Nature of Roots

For a quadratic equation $Ax^2 + Bx + C = 0$, the discriminant $D = B^2 - 4AC$ determines the nature: $D > 0$ (real and distinct), $D = 0$ (real and equal/repeated), $D < 0$ (imaginary/complex).

Quadratic Formula

The roots of a quadratic equation are given by $x = [-B \pm \sqrt{(B^2 - 4AC)}] \div 2A$.

Repeated Root Condition

A quadratic expression is a perfect square if and only if its discriminant is zero.

Q36. Answer: (b) 7 cm

Shortcut Trick

Let the original edge be 'a'. Change in Surface Area = $6 \times [(a + 4)^2 - a^2] = 432$.

Dividing by 6: $(a + 4)^2 - a^2 = 72$.

Using $x^2 - y^2 = (x + y)(x - y)$: $(2a + 4)(4) = 72$.

$2a + 4 = 18 \Rightarrow 2a = 14 \Rightarrow a = 7$ cm.

Therefore The correct answer is 7 cm.

Alternate Method

Given:

Increase in edge of the cube = 4 cm
Increase in total surface area = 432 cm²
Formula Used:
Total Surface Area (TSA) of a cube = 6 × (edge)²
Calculations:
=> Let the original edge of the cube be 'a' cm.
=> Original surface area = 6a²
=> New edge = (a + 4) cm
=> New surface area = 6(a + 4)²
=> According to the question: 6(a + 4)² − 6a² = 432
=> 6 × [(a + 4)² − a²] = 432
=> (a + 4)² − a² = 432 ÷ 6
=> a² + 16 + 8a − a² = 72
=> 8a + 16 = 72
=> 8a = 72 − 16
=> 8a = 56
=> a = 7 cm
Therefore The correct answer is 7 cm.
Additional Information
Volume of a Cube
The volume of a cube is given by the formula V = a³, where 'a' is the length of the edge.
Lateral Surface Area (LSA)
The lateral surface area (area of 4 side faces) of a cube is 4a².
Diagonal of a Cube
The length of the space diagonal connecting opposite corners of a cube is a√3.

Q37. Answer: (b) 1900

Given :
703 ÷ 37 = 19
Calculations :
7.03 ÷ 0.0037 = 7030000 ÷ 3700
=> (703 ÷ 37) × 100
=> 19 × 100
=> 1900
Therefore The value of 7.03 ÷ 0.0037 will be 1900

Q38. Answer: (b) Bicycling

The correct answer is Bicycling.
• Bicycling is not an involuntary action.
Key Points
• Involuntary action:-
• Unintended action is called involuntary action.
• The action is done without will.
• Involuntary actions are automatic.
• The speed of these actions is usually fast.
• Heartbeat, saliva secretion, digestion, and respiration all are involuntary actions.

Q39. Answer: (d) 18

The logic follows here is:
The total number of triangles here are 18 as given below.
Triangle (NDC, NDE, NCE, BHC, AIC, PIM, KLO, EFG, FGK, EFK, QRS, AFS, BJF, PHJ, JGO, JFL, NPO, SML).
Hence, the correct answer is "18".
Note:

• For this question, a discrepancy was found in the question/answer in the official paper. So, this question was dismissed for all candidates.

• The official paper had 17 as the fourth option. However, because there were 18 triangles in all as explained in the solution, we had to change the fourth option.

Q40. Answer: (a) D

The logic follows here is:

All the figure A, B, and C have an arc in it.

while the figure D is made of straight lines and doesn't have an arc.

Thus figure D is not similar to the other figures.

Hence, the correct answer is "Option 1".

Additional Information

In general, an arc is any smooth curve joining two points. The length of an arc is known as its arc length.

In a graph, a graph arc is an ordered pair of adjacent vertices.

In particular, an arc is any portion (other than the entire curve) of the circumference of a circle. An arc corresponding to the central angle angle AOC is denoted arcAC.

Q41. Answer: (a) Kolkata

The correct answer is Kolkata.

• Kolkata is known as the city of palaces.

Key Points

• Kolkata has a nickname, the "City of Palaces".

• It is famous for its Rajbaris.

• During the British colonial era from 1700-1912, when Kolkata was the capital of British India, Kolkata witnessed a spate of frenzied construction activity of buildings largely influenced by the conscious intermingling of Gothic, Baroque, Roman, Oriental, and Islamic schools of design.

• Unlike many north Indian cities, whose construction stresses minimalism, the layout in architectural variety in Kolkata owed its origins to the Occident.

• The buildings were designed and inspired by the tastes of the English gentleman around and the aspiring Bengali Baboo.

• The numerous palatial mansions built all over the core city led to the city being called the City of Palaces.

Additional Information

• The East India Company founded its trading post in Kolkata.

• Till 1911, it was the capital of India.

• In 1911, the capital of India was shifted to Delhi by the British.

• The grand colonial architecture, art galleries, and cultural festivals can be found in the city.

• Kolkata is one of the largest cities in India.

• It is also the major port.

• The city is located at the bank of the Hoogly River.

• The city is the educational, commercial, and cultural center of India.

• The capital of the state of West Bengal is Kolkata.

Q42. Answer: (c) 1

Shortcut Trick

By the Remainder Theorem, if a polynomial f(x) is divisible by (x + a), then f(−a) = 0.

Substitute x = −3 into $x^2 + kx - 6 = 0$.

$(-3)^2 + k(-3) - 6 = 0$

$9 - 3k - 6 = 0$

$3 - 3k = 0 \Rightarrow 3k = 3 \Rightarrow k = 1$.

Therefore The correct answer is 1.

Alternate Method

Given: Polynomial $P(x) = x^2 + kx - 6$ and divisor (x + 3).

Formula Used: If (x − a) is a factor of P(x), then P(a) = 0.

=> Here, the divisor is (x + 3), so we set x + 3 = 0, which gives x = −3.

=> $P(-3) = (-3)^2 + k(-3) - 6$

=> Since it is completely divisible, the remainder must be 0.

=> 0 = 9 − 3k − 6

=> 0 = 3 − 3k

=> 3k = 3

=> k = 3 ÷ 3

=> k = 1

Therefore The correct answer is 1.

Additional Information

Factor Theorem

A polynomial f(x) has a factor (x − a) if and only if f(a) = 0. This is a special case of the remainder theorem where the remainder is zero.

Remainder Theorem

When a polynomial f(x) is divided by a linear divisor (ax + b), the remainder is f(−b/a).

Quadratic Roots Relation

If one factor of $x^2 + kx - 6$ is (x + 3), the other factor must be (x − 2) because the product of the constant terms (3 × −2) must equal −6.

Q43. Answer: (a) 5

Shortcut Trick

Mode is the value that appears most frequently in a data set.

Count the occurrences: 1 (1 time), 2 (2 times), 3 (1 time), 4 (2 times), 5 (3 times), 6 (1 time).

The number 5 appears 3 times, which is the highest frequency.

Therefore The correct answer is 5.

Alternate Method

Given: Data set = {4, 5, 5, 6, 4, 3, 2, 2, 5, 1}

Formula: Mode = Value with the maximum frequency.

Numbers

Frequency

1

2

3

1

2

3

4

5

6

Q44. Answer: (c) POSHAN Abhiyan

The correct answer is POSHAN Abhiyan.

• Poshan Abhiyan has been launched by the Indian prime minister to combat malnutrition and stunting among children.

Key Points

• On March 8, 2018, the Abhiyan was launched by the government.

• To bring down the stunting among children in the age group of 0-6 years is the main aim of the scheme.

• Ensuring service delivery and interventions by use of technology is the aim of the Poshan Abhiyan.

• The Swasth Bharat Preraks will be deployed in each district under the Abhiyan.

• For tracking the implementation of Abhiyan, the Swasth Bharat prerak will act as a catalyst.

Additional Information

• The national council on nutrition (NCN) has been set up under the Poshan Abhiyaan.

• NCN is national-level coordination and convergence body on nutrition.

• The vice-chairman of NITI Aayog heads the NCN.

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Q45. Answer: (c) Nitin Gadkari

The correct answer is Nitin Gadkari.

• Nitin Gadkari is the Minister of Road Transport and Highways.

Key Points

• The Ministry of Road Transport and Highways is a ministry of the Government of India.

• It is the apex body for the formulation and management of the rules, regulations, and laws related to road transport.

• This ministry aims to increase the mobility and efficiency of the road transport system in India.

Important Points

• Nitin Jairam Gadkari is an Indian politician and businessman from Maharashtra.

• He is the current Minister for Road Transport & Highways and the Minister of Micro, Small and Medium Enterprises in the Indian government.

• His current constituency in the Lok Sabha is Nagpur.

• He previously served as the President of the Bharatiya Janata Party (BJP) from 2009 to 2013.

Q46. Answer: (b) 45°

Shortcut Trick

Angle θ = (Arc Length ÷ Circumference) × 360°

Circumference = 2 × (22/7) × 14 = 88 cm

θ = (11 ÷ 88) × 360° = (1/8) × 360°

θ = 45°

Therefore The correct answer is 45°.

Alternate Method

Given:

Radius (r) = 14 cm

Arc Length (l) = 11 cm

Formula Used:

Arc Length (l) = (2 × π × r × θ) ÷ 360°

Calculations:

=> 11 = (2 × 22/7 × 14 × θ) ÷ 360

=> 11 = (44 × 2 × θ) ÷ 360

=> 11 = (88 × θ) ÷ 360

=> θ = (11 × 360) ÷ 88

=> θ = 360 ÷ 8

=> θ = 45°

Therefore The correct answer is 45°.

Additional Information

Area of Sector

The area of a sector with radius r and angle θ is given by A = (θ/360) × πr².

Relation between Arc and Area

Area of sector can also be calculated using arc length (l) as Area = (1/2) × l × r.

Radian Measure

Angle in radians (θ) = Arc length (l) ÷ Radius (r). To convert radians to degrees, multiply by 180/π.

Q47. Answer: (b) B

The logic follows here is:

The water image of the given figure is:

Thus figure B forms closest to the given figures.

Hence, the correct answer is "Option 2".

Q48. Answer: (d) Feature film on national integration

The correct answer is a Feature film on national integration.

• In 2017, the Assamese film 'Dixon Banat Palash' received the Nargis Dutt Award for Best Feature Film on National Integration.

Key Points

• The Nargis Dutt Award for Best Feature Film on National Integration is a National Film Award presented annually by the Directorate of Film Festivals which comes under the Ministry of Information and Broadcasting, India.

• The award was instituted in 1965.

• This award is presented for feature films and awarded with Rajat Kamal (Silver Lotus).

Important Points

• Dikchow Banat Palaax, an Assamese feature film received the Nargis Dutt Award for Best Feature Film on National Integration at the 64^(th) National Film Awards.

• This film was written and directed by National Award-winning filmmaker Sanjib Sabhapandit.

Q49. Answer: (c) C

The logic follows here is:

The water image of the given figure is:

Thus figure B forms closest to the given figures.

Hence, the correct answer is "Option 3".

Q50. Answer: (c) 2√15

Shortcut Trick

If $\tan\alpha = x + \sqrt{y}$ where $x^2 - y = 1$, then $\cot\alpha = \sqrt{y} - x$ (or $x - \sqrt{y}$ depending on sign).

Given: $\tan\alpha = 4 + \sqrt{15}$. Since $4^2 - (\sqrt{15})^2 = 16 - 15 = 1$, then $\cot\alpha = 1 / (4 + \sqrt{15}) = 4 - \sqrt{15}$.

Value = $\tan\alpha - \cot\alpha = (4 + \sqrt{15}) - (4 - \sqrt{15}) = 4 + \sqrt{15} - 4 + \sqrt{15} = 2\sqrt{15}$.

Therefore The correct answer is $2\sqrt{15}$.

Alternate Method

Given: $\tan\alpha = 4 + \sqrt{15}$

Formula Used: $\cot\alpha = 1 / \tan\alpha$

$\Rightarrow \cot\alpha = 1 / (4 + \sqrt{15})$

Rationalizing the denominator:

$\Rightarrow \cot\alpha = [1 \times (4 - \sqrt{15})] / [(4 + \sqrt{15}) \times (4 - \sqrt{15})]$

$\Rightarrow \cot\alpha = (4 - \sqrt{15}) / (4^2 - (\sqrt{15})^2)$

$\Rightarrow \cot\alpha = (4 - \sqrt{15}) / (16 - 15) = 4 - \sqrt{15}$

Calculation:

$\Rightarrow \tan\alpha - \cot\alpha = (4 + \sqrt{15}) - (4 - \sqrt{15})$

$\Rightarrow \tan\alpha - \cot\alpha = 4 + \sqrt{15} - 4 + \sqrt{15}$

$\Rightarrow \tan\alpha - \cot\alpha = 2\sqrt{15}$

Therefore The correct answer is $2\sqrt{15}$.

Additional Information

Reciprocal Identities

The function $\cot\alpha$ is the reciprocal of $\tan\alpha$, such that $\tan\alpha \times \cot\alpha = 1$.

Rationalization Rule

To rationalize $1/(a + \sqrt{b})$, multiply numerator and denominator by the conjugate $(a - \sqrt{b})$.

Algebraic Identity

Use $(a + b)(a - b) = a^2 - b^2$ to simplify expressions involving square roots in the denominator.

Q51. Answer: (a) MP

The pattern followed here is:

Hence, the correct answer is "MP".

Q52. Answer: (c) 4522912

The logic follows here is :

Each alphabet is representing its corresponding place value.

Similarly,

Hence, the correct answer is "4522912".

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Q53. Answer: (a) Only argument 1 is strong.

Arguments :

1. Yes, our health improves when we respect our natural body time and sleep early → Implicit (This argument is scientifically proven that following the biological clock improves health).

2. No, nowadays, working till late at night is unavoidable because we work in many time zones → Explicit (Working till late at night is unavoidable doesn't mean that it wouldn't affect our health).

Thus, argument 1 holds a strong position.

Hence, the correct answer is "Only argument 1 is strong".

Additional Information

1. The argument which is the reconstruing part of the statement is a strong agreement.
2. The argument should not be imagined.
3. The relationship of the argument should be direct from the statement.
4. The argument should be simple and clear.
5. The argument should be based on scientific facts.
6. The statement in the argument should receive a logical answer.

Q54. Answer: (c) 1600 J

The correct answer is 1600 J.

Key Points

• Ep = mgh
• Here,
• Ep= Potential energy
• m= mass
• g= Gravitational field strength
• h= Vertical height
• Given-
• Mass of the body= 20kg
• Vertical height= 8m
• 'g' = 10 ms^(-2)
• Putting these values in the formula mentioned above, we get-
• Ep= 20×10×8 = 1600
• The SI unit of energy is joules (J).
• So, it will be expressed as 1600J.

Q55. Answer: (d) 78

Shortcut Trick

Ratio of division = 2 : 1

Larger part (2 units) = 52

=> 1 unit = 52 ÷ 2 = 26

Total number = (2 + 1) units = 3 units = 3 × 26 = 78

Therefore The correct answer is 78.

Alternate Method

Larger Part (2x)

Small (x)

52

Original Number (3x)

Given: Ratio = 2 : 1, Larger part = 52

Formula Used: Total = Part1 + Part2

=> Let the parts be 2x and 1x.

=> Larger part = 2x = 52

=> x = 52 ÷ 2 = 26

=> Smaller part = 1x = 26

=> Original number = 52 + 26 = 78

Therefore The correct answer is 78.

Additional Information

Ratio and Proportion

A ratio compares two quantities. If a number N is divided in ratio a:b, the parts are [a/(a+b)]×N and [b/(a+b)]×N.

Inverse Ratio

The inverse ratio of a : b is b : a. This is often used in speed and time calculations.

Compound Ratio

For two ratios a : b and c : d, the compound ratio is (a×c) : (b×d).

Q56. Answer: (c) 7

Given:

(16 - 4) × (13 - 6) ÷ x = 12

Concept used:

Calculation:

12 × 7 ÷ x = 12

=> 12 × 7/x = 12

=> x = 7

Therefore The value of x is 7.

Q57. Answer: (d) Only conclusion 1 follows.

Conclusions :

1. The septic tank can be full and needs to be cleaned or emptied → Follows (It is clearly given in the statement itself that the septic tank is full).

2. The septic tank of the X's Society is not yet connected to the main gutter line of the municipality → Not follow (We can not assume anything that is not mentioned in the statement).

Hence, the correct answer is "Only conclusion 1 follows".

Additional Information

1. The argument which is the reconstruing part of the statement is a strong agreement.

2. The argument should not be imagined.

3. The relationship of the argument should be direct from the statement.

4. The argument should be simple and clear.

5. The argument should be based on scientific facts.

6. The statement in the argument should receive a logical answer.

Q58. Answer: (d) Nickel

The correct answer is Nickel.

• Nickel is used as a catalyst in the hydrogenation of vegetable oil.

Key Points

• Hydrogenation of vegetable oil was introduced to convert some of the unsaturated fatty acids present in vegetable oils, as well as marine or animal fats to make them more stable to oxidation.

• This process is used to improve the oxidative stability of vegetable oils for improved shelf life and to modify the solid's content and melting characteristics of the oil.

• In this process, the unsaturated double bonds in the fatty acids of the oil molecules react with hydrogen atoms in the presence of a catalyst.

• Nickel as a catalyst is used in the commercial hydrogenation of edible oils.

Q59. Answer: (b) 1/v - 1/u = 1/f

The correct answer is 1/v - 1/u = 1/f

Key Points

There are two types of lenses -

• Convex Lens: This type of lens is also known as a Converging lens as when light passes through it converges at one point.

• Concave Lens: This type of lens is also known as Diverging lens as all the rays diverged when light passes through it.

• Lens formula

1/f = 1/v - 1/u

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Where f is the focal length of the lens, v is the distance of the image on the principal axis from the optical centre. u is the distance of the object on the principle axis from the optical centre.

Sign convention: In the convex lens

• The distance measured from the optical centre (o) to the left side is taken as negative.

• The distance measured from the optical centre (o) to the right side is taken as positive.

• The distance measured from the principal axis (o) to downward be taken as negative.

• The distance measured from the principal axis (o) to upward be taken as positive.

Explanation:

The lens formula can be given by the following relation.

1/f = 1/v - 1/u or

1/v - 1/u = 1/f

Additional Information

Lens Maker's Formula:

• If R1 and R2 are the radii of curvature of first and second refracting surfaces of a thin lens of focal length f and refractive index μ (w.r.t. surrounding medium) then the relation between f, μ, R1 and R2 are known as lens maker's formula.

1/f = (μ - 1)(1/R1 - 1/R2)

Q60. Answer: (c) Neither argument 1 nor 2 is strong.

Arguments :

1. Yes, dogs are very loyal and loving; Having a pet dog at home creates a very friendly atmosphere → Explicit (This argument is neither scientifically proven nor mentioned in the statement).

2.No, this is just a human thinking; Rather, dogs need the freedom to live a life without human intervention → Explicit (This argument is neither scientifically proven nor mentioned in the statement).

Hence, the correct answer is "Neither argument 1 nor 2 is strong".

Additional Information

1. The argument which is the reconstruing part of the statement is a strong agreement.

2. The argument should not be imagined.

3. The relationship of the argument should be direct from the statement.

4. The argument should be simple and clear.

5. The argument should be based on scientific facts.

6. The statement in the argument should receive a logical answer.

Q61. Answer: (c) Sodium Carbonate

The correct answer is Sodium Carbonate.

Key Points

• Sodium carbonate is used to normalize hard water.

Additional Information

• Washing soda also known as sodium carbonate is a chemical compound with the formula Na2CO3.

• It can remove temporary and permanent hardness from water.

• The hardness of Water-

• The Hardness of water is because of the presence of soluble bicarbonates, chlorides, and sulfates of calcium and magnesium. Hard water has high mineral content.

• It is formed when water drains through the deposits of chalk and limestone which are made up of magnesium and calcium carbonates.

• It does not form lather with soap.

• The hardness of water can be classified into two types:

• Temporary Hardness-

• It occurs due to the presence of magnesium and calcium carbonates in the water.

• Permanent Hardness-

• It occurs when soluble salts of magnesium and calcium are present in the form of chlorides and sulfides in water.

Q62. Answer: (d) 18

Naming the points and counting triangles :

ΔABH, ΔAEH, ΔBEH = 3

ΔBHC, ΔBHF, ΔBHG, ΔBIF = 4

ΔHCD, ΔHGD, ΔHIF, ΔHFG, ΔHGC, ΔHGJ, ΔHFC, ΔHJD = 8

ΔGJC, ΔGCD = 2

ΔCDJ = 1.

Total triangles = 3 + 4 + 8 + 2 + 1 = 18.

Hence, the correct answer is "18".

Note:

• The official answer key was 17. However, because there were 18 triangles in all as explained in the solution, we had to change the fourth option.

Q63. Answer: (a) 98 u

Concept:

• The molecular formula of a compound that shows its constituent atoms and their number per molecule denoted by subscripts.

• Molecular formula if known can be used to calculate:

• Molecular mass or molar mass.

• Percentage of elements in the compound.

• The molecular mass of any compound is calculated by adding the masses of all the constituent atoms. It is the mass of one molecule of a substance.

• Molar mass is defined as the mass of one mole of a substance, i.e., 6.022 × 1023 number of particles of that substance.

• The mass of one unit is expressed in the atomic mass unit, a.m.u, or simply 'u'.

• If the percentage composition and molar mass is known, then it can be used to calculate the empirical formula which represents the formula in the simplest whole-number ratio.

Calculation:

Given:

• The compound is: H_2SO_4

• Molecular mass of H = 1, S = 32 and O = 16

• The molecular mass of H_2SO_4 is calculated by adding the masses of all the constituent atoms Hydrogen, Sulphur and Oxygen.

So, the molecular mass of H_2SO_4 is:

2 × 1 + 32 + 4 × 16 = 98 u.

Hence, the molecular mass of H_2SO_4 is 98 u.

Important Points

• The molar mass is the mass of one mole of a substance and is expressed in grams 'g'.

• It is the same as molecular mass only expressed in grams.

• The molar mass of H_2SO_4 is 98 g.

Q64. Answer: (a) O2

The correct answer is O2.

• O2 was not present in the atmosphere at the time of origin of life.

Key Points

• The atmosphere of the earth was not initially favorable for the development of life.

• Origin of life is a kind of chemical reaction, which first generated complex organic molecules and assembled them.

• The last phase in the evolution of the earth is associated with the origin and evolution of life.

• The original atmosphere at the time of origin of life was rich in methane, ammonia, water vapor, and the noble gas neon, but it lacked free oxygen.

• Thus, there was no free oxygen available in the primitive atmosphere.

Q65. Answer: (b) Hygrometer

The correct answer is Hygrometer.

• Hygrometer does not work on Archimedes' principle.

Key Points

• Archimedes' principle:-

• It states that a body immersed in a liquid is subjected to an upwards force which is equal to the weight of the displaced fluid.

• It experiences a buoyant force that is equal in magnitude to the force of gravity on the displaced fluid.

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Additional Information

• Lactometer-

• Lactometer is an instrument that is used to test the purity of the milk.

• It works on Archimede's Principle.

• Hydrometer-

• A hydrometer is an instrument that is used to determine specific gravity.

• It works on Archimedes' principle.

• Submarine-

• A submarine is a watercraft that is capable of independent operation below the surface of the water.

• It operates using Archimedes' principle by manipulating the buoyancy.

• Hygrometer-

• A hygrometer is an instrument that measures the humidity or amount of water vapor in the air or in soil.

• It works on the phenomenon of evaporative cooling.

Q66. Answer: (a) mv

The correct answer is mv.

• Momentum is defined as the product of the mass and velocity of a particle.

Key Points

• It is a vector quantity i.e., it has both magnitudes as well as direction.

• In form of an equation, the momentum of an object is equal to the mass of the object multiplied by the velocity of the object.

• It is expressed as:

Momentum = mass× velocity

• Thus, the momentum of a body of mass 'm' moving with 'v' velocity will be-

p = m×v

• Here, the symbol for the momentum is the lower-case p, m is the mass and v is the velocity.

• This formula also illustrates that momentum is directly proportional to an object's mass and directly proportional to the object's velocity.

Q67. Answer: (d) 35

Shortcut Trick

Time ratio of Mrinalini to Samyukta = 4 : 1

Efficiency ratio (inverse of time) = 1 : 4

Combined efficiency = 1 + 4 = 5 units/day

Full wall time together = 14 × 2 = 28 days

Total Work = 28 × 5 = 140 units

Samyukta alone = 140 ÷ 4 = 35 days

Therefore The correct answer is 35 days.

Alternate Method

Given:

Time for half wall (M + S) = 14 days

Time for full wall (M + S) = 14 × 2 = 28 days

Time taken by Mrinalini = 4 × Time taken by Samyukta

Formula Used:

Efficiency prop. to 1 / Time

Total Work = Combined Efficiency × Time Taken Together

Person	Efficiency Ratio	Total Work	Days for Full Wall
Mrinalini (M)	1	5 × 28 = 140	140
Samyukta (S)	4	140 ÷ 4 = 35	

Calculations:

=> Let Samyukta efficiency be 4 units/day, then Mrinalini efficiency is 1 unit/day.

=> Combined Efficiency = 1 + 4 = 5 units/day

=> Total Work for full wall = 28 days × 5 units/day = 140 units
=> Days for Samyukta to paint entire wall = 140 / 4
=> Result = 35 days
Therefore The correct answer is 35 days.
Additional Information
Efficiency and Time Relationship
Efficiency is inversely proportional to time. If A is n times as fast as B, then A takes 1/n of the time taken by B.
Work Done Fraction
If half work is done in T days, the full work is completed in 2T days, assuming a constant rate of work.

Q68. Answer: (b) 40

Concept used:
The series follows following pattern
Calculation:
$22 + 3^2 = 31$
$76 + 5^2 = 101$
$31 + 3^2 = 40$
$101 + 5^2 = 126$
Therefore The next number in the series will be 40

Q69. Answer: (b) Rs. 3500

Shortcut Trick
Total difference in Yield = Rs. 6020 − Rs. 5600 = Rs. 420.
Effective increase in Rate for 6 years = 6 years × 2% per annum = 12%.
This 12% of the Original Investment equals the yield difference of Rs. 420.
Principal (P) = (420 ÷ 12) × 100 = 35 × 100 = Rs. 3500.
Therefore The correct answer is Rs. 3500.
Alternate Method
Given: Time (T) = 6 years, Initial Amount (A1) = Rs. 5600, Final Amount (A2) = Rs. 6020, Rate increase (ΔR) = 2%.
Formula Used: Change in Simple Interest (ΔSI) = (P × ΔR × T) ÷ 100
=> Difference in yield = A2 − A1 = 6020 − 5600 = Rs. 420
=> 420 = (P × 2 × 6) ÷ 100
=> 420 = (P × 12) ÷ 100
=> P = (420 × 100) ÷ 12
=> P = 35 × 100
=> P = Rs. 3500
Therefore The correct answer is Rs. 3500.
Additional Information
Simple Interest (SI)
Interest calculated on the Principal portion of a loan or investment: SI = (P × R × T) ÷ 100.
Total Amount (Yield)
The total sum of Principal and Interest: A = P + SI = P[1 + (R × T)/100].
Linearity of Simple Interest
Since SI is directly proportional to Rate (R), any change ΔR results in a change ΔSI = P × ΔR × T / 100.

Q70. Answer: (b) 32 years

Given :
Priyam is 9 years younger than Pritam
Five years ago Priyam's four times age was equal to Pritam's three times age
Calculations :
Let the age of Pritam be 'P'
So the age of Priyam will be 'P - 9'
Pritam's age 5 years ago 'P - 5'

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Priyam's age 5 years ago 'P- 14' years

According to the question

4 × (P - 14) = 3 × (P - 5)

=> P = 41 years

Age of Priyam = P - 9

=> 41 - 9 = 32

Therefore The present age of the Priyam is 32 years

Q71. Answer: (c) 8

Shortcut Trick

Use Alligation on speed to find the ratio of time.

Speed 1 (75) vs Speed 2 (90) with Average (81).

Ratio of Time1 : Time2 = (90 − 81) : (81 − 75) = 9 : 6 = 3 : 2.

Given Time1 = 12 hours => 3 units = 12 hours => 1 unit = 4 hours.

Time2 = 2 units = 2 × 4 = 8 hours.

Therefore The correct answer is 8 hours.

Alternate Method

Given: Time1 = 12 hours, Speed1 = 75 km/hr, Speed2 = 90 km/hr, Average Speed = 81 km/hr.

Formula: Average Speed = Total Distance ÷ Total Time

=> 81 = (75 × 12 + 90 × t) ÷ (12 + t)

=> 81 × (12 + t) = 900 + 90t

=> 972 + 81t = 900 + 90t

=> 972 − 900 = 90t − 81t

=> 72 = 9t

=> t = 72 ÷ 9 = 8

Therefore The correct answer is 8 hours.

Additional Information

Average Speed (Equal Distances)

If distances traveled at two speeds 'a' and 'b' are equal, Average Speed = (2 × a × b) ÷ (a + b).

Alligation Rule for Speed

Applying alligation on speed always gives the ratio of the time taken at those respective speeds.

Relative Speed

For two objects moving in the same direction, Relative Speed = S1 − S2. In opposite directions, Relative Speed = S1 + S2.

Q72. Answer: (c) 19

Shortcut Trick

Perform Prime Factorization of 2736.

2736 = 2^4 × 3^2 × 19^1.

To make it a perfect square, all powers must be even.

The only term with an odd power is 19^1, so we must divide by 19.

Therefore The correct answer is 19.

Alternate Method

Given: Number = 2736

Formula Used: Prime factorization of N = a^p × b^q × c^r. For N to be a perfect square, p, q, r must be even.

=> 2736 ÷ 2 = 1368

=> 1368 ÷ 2 = 684

=> 684 ÷ 2 = 342

=> 342 ÷ 2 = 171

=> 171 ÷ 3 = 57

=> 57 ÷ 3 = 19

=> 19 ÷ 19 = 1

=> 2736 = 2 × 2 × 2 × 2 × 3 × 3 × 19 = $(2^2)^2$ × 3^2 × 19

=> To make the quotient a perfect square, we divide by the factor that does not have an even power.

=> Smallest number = 19

Therefore The correct answer is 19.

Additional Information

Perfect Square Condition

A number is a perfect square if and only if all the exponents in its prime factorization are even integers.

Division and Multiplication Rule

The smallest number to multiply or divide a value to make it a perfect square is the product of all prime factors that have odd powers.

Number of Factors

If N = p^a × q^b, the total number of factors is (a + 1)(b + 1). For perfect squares, the total number of factors is always odd.

Q73. Answer: (b) D

• On rotating the question figure 90° clockwise we get:

Hence, the correct answer is "Option (2)".

Mistake Points

• This is not a mirror image problem. Therefore, option A will be incorrect.

Q74. Answer: (b) Acidic

The correct answer is Acidic.

• Oxides of carbon, nitrogen, and sulfur released while burning fossil fuels are Acidic oxides.

Key Points

• Acidic oxides-

• Acidic oxides are oxides that react with water to form an acid and with a base to form a salt.

• They are oxides of either metals or non-metals in high oxidation states.

• They are also called acid anhydrides.

• Oxides of carbon, nitrogen, and sulfur are released while burning fossil fuels are acidic oxides.

Additional Information

• Alkaline oxides-

• Basic oxides are also called base anhydrides.

• They are usually formed by the reaction of oxygen with metals, especially alkali and alkaline earth metals.

• These compounds are generally ionic in nature.

• Amphoteric oxides-

• Amphoteric oxides are oxides that behave as both acidic and basic oxides.

• They have features of acidic as well as basic oxides.

• These oxides dissolve in water to form alkaline solutions.

• Neutral oxides-

• Neutral oxides are oxides that are neither acidic nor basic in nature.

• Thus, the oxides which neither react with acids or with bases are called neutral oxides.

Q75. Answer: (c) 36

Shortcut Trick

Difference method: Find the difference between the closest numbers.

288 − 144 = 144

396 − 288 = 108

HCF must be a factor of the minimum difference 108. Factors of 108 are 108, 54, 36, 27...

Checking the options, 36 is the largest factor of 108 that divides 144, 288, and 396.

Therefore The correct answer is 36.

Alternate Method

Given: Numbers are 144, 288, and 396.

Method: Prime Factorization

=> 144 = 12 × 12 = (2² × 3) × (2² × 3) = 2^4 × 3²

=> 288 = 144 × 2 = 2^5 × 3²

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=> 396 = 4 × 9 × 11 = $2^2 \times 3^2 \times 11$

=> HCF = Product of the lowest powers of common prime factors.

=> HCF = $2^2 \times 3^2$

=> HCF = 4 × 9 = 36

Therefore The correct answer is 36.

Additional Information

Highest Common Factor (HCF)

The HCF of two or more numbers is the greatest number that divides each of them exactly. It is also known as GCD (Greatest Common Divisor).

Relation between HCF and LCM

For two numbers a and b, Product of numbers = HCF × LCM. Note that HCF is always a factor of the LCM.

HCF of Fractions

HCF of Fractions = (HCF of Numerators) ÷ (LCM of Denominators).

Q76. Answer: (c) 9√8

Shortcut Trick

To make ^9√64 a rational number, we need to multiply it by a value that completes the power of 9.

Given: ^9√64 = ^9√2^6.

Required: ^9√2^x such that 6 + x = 9 (or a multiple of 9).

=> x = 3.

=> Required number = ^9√2^3 = ^9√8.

Therefore The correct answer is ^9√8.

Alternate Method

Given: The number is 9√64.

Formula: $\sqrt[n]{a} \times \sqrt[n]{b} = \sqrt[n]{(a \times b)}$. A number is rational if it can be expressed as p/q.

=> Express 64 as a power of 2: 64 = 2^6.

=> The given number is 2^(6/9) = 2^(2/3).

=> To make the exponent an integer, we test the options:

=> Option (3): ^9√8 = ^9√2^3 = 2^(3/9) = 2^(1/3).

=> Product = 2^(2/3) × 2^(1/3) = 2^((2/3 + 1/3)) = 2^(3/3) = 2^1 = 2.

=> Since 2 is a rational number, the multiplier is ^9√8.

Therefore The correct answer is ^9√8.

Additional Information

Rationalizing Factor

If the product of two surds is a rational number, then each surd is called the rationalizing factor of the other.

Laws of Radicals

For any positive real number a, $\sqrt[n]{a^n} = a$. To rationalize $\sqrt[n]{a^m}$, multiply by $\sqrt[n]{a^{n-m}}$.

Rational Numbers

Numbers that can be written as p/q where p, q are integers and q ≠ 0. Their decimal expansions are either terminating or recurring.

Q77. Answer: (c) Banking

The correct answer is Banking.

Key Points

• The three main sectors of the economy are primary, secondary and tertiary sectors.
• Tertiary sector
• This sector consists of the production of services instead of end products.
• Goods are not produced in this sector but they are helpful to the production process.
• It helps in the development of primary and secondary sectors.
• It is also called the service sector.
• This sector jobs are called white-collar jobs.
• Goods transported by trucks or trains, banking, insurance, finance etc. come under this sector.
• Borrow money from banks (banking) to help production and trade is a. Hence, Banking comes under the tertiary Indian economy

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sector.

• The banking system plays a significant role in the modern economic world.

• Banks collect the savings of the individuals and give them to the business people and manufacturers.

• Banks play an important role in the creation of new capital in a country and thus help to enhance the growth in the country.

Additional Information

• Primary Sector:

• In the Primary sector of the economy, activities are undertaken by directly using natural resources.

• Agriculture, Animal Husbandry, Mining, Fishing, Forestry, Dairy, etc. are some examples of this sector.

• It is called so because it forms the base for all other products. Since most of the natural products we get are from agriculture, dairy, forestry, fishing, it is also called Agriculture and allied sector.

• People engaged in primary activities are called red-collar workers due to the outdoor nature of their work.

• Secondary Sector:

• It includes the industries where finished products are made from natural materials produced in the primary sector.

• Industrial production, cotton fabric, sugar cane production, etc. activities come under this sector.

• Hence its the part of a country's economy that manufactures goods, rather than producing raw materials.

• Since this sector is associated with different kinds of industries, it is also called an industrial sector.

Q78. Answer: (c) Contractile proteins

The correct answer is Contractile proteins.

• Contractile proteins help the muscle tissue to contract and relax to cause movement.

Key Points

• Contractile proteins-

• Contractile proteins are proteins that facilitate the sliding of contractile fibers of a cell’s cytoskeleton as well as of cardiac and skeletal muscle.

• Contraction of the muscles depends on the presence of contractile proteins such as actin and myosin in the myofilaments.

• They help the muscle tissue to contract and relax to cause movement.

Additional Information

• Hemp proteins-

• Hemp protein is the protein content of hemp seeds.

• The most important benefit of hemp protein is that it can help to lower the risk of cardiovascular disease, cancer, high cholesterol, and high blood pressure.

• Whey proteins-

• Whey protein is derived from milk.

• It is a source of protein and essential amino acids, which are the building blocks of protein and occur naturally within the body.

• Lipoproteins-

• Lipoproteins are formed from lipid and protein molecule complexes.

• The prime function of lipoproteins is the transportation and delivery of fatty acids, triacylglycerol, and cholesterol from the target cells to different organs in the human body.

Q79. Answer: (b) Meghalaya

The correct answer is Meghalaya.

• Meghalaya state assembly elections were held in February 2018.

Key Points

• The Meghalaya Legislative Assembly election was conducted on 27 February 2018 to elect 59 of 60 members to the Meghalaya Legislative Assembly and the results were declared on 3 March 2018.

• In the Meghalaya assembly elections with 60-members, a party needed 31 seats to get a clear majority.

• There were four prominent parties who participated in the Elections which are Indian National Congress (INC), Bharatiya Janata Party (BJP), National People's Party (NPP), and United Democratic Party (UDP).

• The Election was won by the Indian National Congress government led by Chief Minister Mukul Sangma.

Q80. Answer: (d) 4 cm, 8 cm

Shortcut Trick

Use options to check Perimeter (2 × (L + B)) and Area (L × B).

From option (4): Length = 8 cm, Breadth = 4 cm.

Perimeter = 2 × (8 + 4) = 2 × 12 = 24 cm.

Area = 8 × 4 = 32 cm².

Both conditions are satisfied.

Therefore The correct answer is 4 cm, 8 cm.

Alternate Method

Given: Perimeter = 24 cm, Area = 32 cm².

Formula Used: Perimeter = 2(L + B) and Area = L × B.

=> 2(L + B) = 24

=> L + B = 12

=> L × B = 32

=> We need two numbers whose sum is 12 and product is 32.

=> Quadratic equation: $x^2 - (Sum)x + (Product) = 0$

=> $x^2 - 12x + 32 = 0$

=> $(x - 8)(x - 4) = 0$

=> x = 8 or x = 4

Therefore The correct answer is 4 cm, 8 cm.

Additional Information

Properties of a Rectangle

Opposite sides are equal and parallel, and each interior angle is 90°.

Diagonal of a Rectangle

The length of the diagonal is given by $\sqrt{(L^2 + B^2)}$.

Square as a Rectangle

A square is a special type of rectangle where all four sides are equal (L = B).

Q81. Answer: (b) Neither conclusion 1 nor 2 follows.

Conclusions:

1. A wants to go to lunch. → False (Asking time doesn't mean A wants to have lunch.)

2. A wants to confirm what the time is because his watch is off. → False (Asking time doesn't mean his watch is off. It can also mean he didn't have a watch.)

Hence, the correct answer is "Neither conclusion 1 nor 2 follow".

Q82. Answer: (a) 42

Given:

A - vanilla, B - chocolate and C - pistachio

Calculation:

From the Venn diagram,

the number of children who like more than one flavour of ice cream

= 10 + 12 + 15 + 5 = 42

Q83. Answer: (a) K, F, Cl

The correct answer is K, F, Cl.

Key Points

• Dobereiner’s triads were basically the groups of elements with similar properties.

• These triads are mentioned below-

• Triad 1- lithium, sodium, and potassium

• Triad 2- calcium, barium, and strontium

• Triad 3- chlorine, bromine, and iodine

• Triad 4- sulfur, selenium, and tellurium

• Triad 5- iron, cobalt, and nickel

• Thus, K, F, Cl is not an example of a Döbereiner's triad.

Additional Information

• These elements were identified by the German chemist Johann Wolfgang Dobereiner.

• He observed that the groups of three elements could be formed which share similar physical and chemical properties.

• The first of Dobereiner's triads was identified in 1817 and three more triads were identified by the year 1829.

Q84. Answer: (a) Psychon

The correct answer is Psychon.

• Psychon is odd from the group.

• Phylum Cnidaria includes the animals which show radial or biradial symmetry and are diploblastic.

Key Points

• Nearly 99 percent of cnidarians are marine species.

• This phylum includes diverse animals like jellyfish, sea anemones, corals, and Hydra.

• Their general characteristics are as follows-

• Cnidarians have two distinct morphological body plans known as polyp and medusa.

• They are diploblastic and exhibit tissue grade of organization.

• The body wall is composed of an outer layer called as the epidermis, an inner layer called the gastrodermis and a gelatinous mesoglea is between the outer and inner epidermis.

• They have an incomplete digestive system with only one opening.

• Cnidarians are commonly unisexual but some are bisexual. Fertilization is external.

• Asexual reproduction takes place by budding, fission, and fragmentation and they have a remarkable power of regeneration.

Q85. Answer: (a) I/R = Constant

The correct answer is I/R = Constant.

Confusion Points Note- The question is asking you to identify the wrong statement.

Key Points

• Ohm's law states that the current flowing through a conductor is directly proportional to the voltage.

• It is used to calculate the relationship between voltage, current, and resistance in an electrical circuit.

• It was experimentally verified by Georg Simon Ohm, a German physicist. It is expressed as-

I = V/R

• This current-voltage relationship can also be written as V= IR

• Here, I is the current that flows through the conductor in amperes, V is the voltage measured across the conductor in volts, and R is the resistance of the conductor in ohms.

Q86. Answer: (d) Statements 1 and 2 together are insufficient.

Statement 1: X is on the counter.

Only the first position is known. The second position is not known.

So, it alone is not sufficient to answer the question.

Statement 2: P is between A and K.

The order can be:

Case I	Case II
A	K
P	P
K	A

The position of X is not known.

So, statement 2 alone is not sufficient.

Combining statements 1 and 2:

The order can be:

Case I	Case II
X	X
A	K
P	P
K	A

The second position can be A or K.

So, the two statements together are also not sufficient.

Hence, the correct answer is "Statements 1 and 2 together are insufficient".

Q87. Answer: (a) Nitrogen, Water, Wax

The correct answer is Nitrogen, Water, Wax.

• The increasing order of forces of attraction between the particles is Nitrogen, Water, Wax.

Key Points

• In liquids, particles have adequate kinetic energy to partly overcome the force of attraction between them.

• In solids, particles don’t have sufficient kinetic energy to overcome the force of attraction between them.

• They are closely packed with each other due to which solids have a fixed volume and shape.

• They can slide over one another but are not dragged completely apart. As a result, liquids can change shape but have a fixed volume.

• In gases, particles have maximum kinetic energy.

• They can completely overcome the force of attraction between them and move apart from each other due to which they have neither a fixed shape nor a fixed volume.

• The forces of attraction between the molecules are the strongest in solids, followed by liquids, and the weakest in gases.

• So, the correct increasing order of forces of attraction is Nitrogen, Water, Wax.

Q88. Answer: (b) 8^(th) August 2012

Given

1. Firoza was born on 2nd February 2011

2. Adesh was born 553 days later

The number of days:

553 = 365 + 188

2012 is a leap year, so February has 29 days.

188 days from 2nd Feb

Here, February has 29 Days, as 2012 is a leap year

So, we count 27 remaining days of February.

= 27 (Feb) + 31 (Mar) + 30 (Apr) + 31 (May) + 30 (June) + 31 (July) + 8 (Aug)

So, Adesh was born on 8th Aug 2012.

Hence, the correct answer is "8th August 2012".

2012 is a leap year.

If it is missed, the number of days in February would be considered 28 days.

188 = 26 (Feb) + 31 (Mar) + 30 (Apr) + 31 (May) + 30 (June) + 31 (July) + 9 (Aug)

The answer would come 9th August 2012, which is wrong.

Q89. Answer: (c) Annie Besant

The correct answer is Annie Besant.

• Annie Besant is the author of the famous book 'New India'

Key Points

• Annie Besant was a British socialist, women's rights activist, and writer.

• She is regarded as a champion of human freedom and was an ardent supporter of both Irish and Indian self-rule.

• She was a creative author with over three hundred books and pamphlets.

• She is also one of the founders of the Banaras Hindu University.

• This book was authored by her to highlight issues related to the Indian freedom struggle.

Q90. Answer: (d) Film on social issues

The correct answer is Film on social issues.

• The film 'Pink' won the Best Film on social issues award at the National Film Awards 2017.

Key Points

• The 64th National Film Awards was an award ceremony that was presented by the Directorate of Film Festivals to honor the best films of 2016 in the Indian cinema.

• The awards were declared on 7 April 2017, and the ceremony was held on 3 May 2017.

• Actor Taapsee Pannu, who delivered a creditable performance in Pink co-starred with Amitabh Bachchan won the Best Film on Social Issues at the 64th National Film Awards 2017.

• This movie was directed by Aniruddha Roy Chowdhury.

Q91. Answer: (b) G7T20E22

• The pattern followed here is:

• Hence, the correct answer is "G7T20E22".

Alternate Method

• Observe the first term of the series: I9R18A26

• I9R18A26 can be written as I9 - R18 - A26

• Here, the positional value of I = 9, the positional value of R = 18, and the positional value of the opposite letter of A which is Z = 26.

• Among all the given options, the three letters are G, T, and, E in that order.

• The letter opposite to E is V and hence the last number of the term should be 22.

• Therefore, we can eliminate options 1, 3, and 4 directly.

• Hence, the correct answer is "G7T20E22".

Q92. Answer: (c) Zinc

The correct answer is Zinc.

• Zinc does not react with cold or hot water.

Key Points

• Metals reacting with water, produce a metal oxide and hydrogen gas.

• Metal oxides that are soluble in water dissolve in it and form metal hydroxide.

• But all metals do not react with water.

• Metals such as potassium and sodium react violently with cold water.

• The reaction of calcium with water is less violent.

• Magnesium does not react with cold water. It reacts with hot water and forms magnesium hydroxide and hydrogen.

• Metals like aluminum, iron, and zinc do not react either with cold or hot water. But on reacting with steam they form metal oxide and hydrogen.

Q93. Answer: (b) Dr. B.R. Ambedkar

The correct answer is Dr. B.R. Ambedkar.

• Ambedkar Jayanti is also known as Bhim Jayanti is an annual festival observed on 14 April in memory of B. R. Ambedkar.

Key Points

• He was the chairman of the constituent draft assembly and civil rights activist.

• This day marks the birth anniversary of Babasaheb Ambedkar who was born on 14 April 1891.

• It has been observed as an official public holiday throughout India since 2015.

• This day is also celebrated all over the world.

• He struggled for equality throughout his life, so his birthday is also observed as 'Equality Day' in India.

Q94. Answer: (a) 116

Shortcut Trick

Check the unit digit of 13456, which is 6. The square root must end in 4 or 6.

Estimate the range: $110^2 = 12100$ and $120^2 = 14400$.

Since $12100 < 13456 < 14400$, the answer is between 110 and 120.

Possible values are 114 or 116. Since 13456 is closer to 14400 than 12100, the higher value is likely.

Therefore The correct answer is 116.

Alternate Method

Given: Number = 13456

Method: Long Division Method for Square Root

=> Group the digits in pairs from right to left: 1, 34, 56.

=> Step 1: $1 \times 1 = 1$. Remainder = 0. Bring down 34.

=> Step 2: Double the quotient ($1 \times 2 = 2$). Find 'x' such that $2x \times x \leq 34$. Let $x = 1$.

=> $21 \times 1 = 21$. Remainder $(34 - 21) = 13$. Bring down 56.

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=> Step 3: Double the current quotient (11 × 2 = 22). Find 'y' such that 22y × y = 1356.

=> 226 × 6 = 1356. Remainder = 0.

=> Quotient = 116.

Therefore The correct answer is 116.

Additional Information

Unit Digit Rule

If a perfect square ends in 6, its square root must end in either 4 or 6 because 42=16 and 62=36.

Perfect Square Property

A perfect square never ends with the digits 2, 3, 7, or 8. The digital sum of a perfect square is always 1, 4, 7, or 9.

Estimation Method

To find the square root of N, find two consecutive multiples of 10 whose squares bracket N to narrow down the options.

Q95. Answer: (d) Uterus

The correct answer is Uterus.

• The baby is born as a result of the rhythmic contraction of muscles in the Uterus.

Key Points

• The uterus is an inverted pear-shaped muscular part of the female reproductive system.

• It is positioned between the bladder and the rectum.

• Its function is to nourish and encloses a fertilized egg until the offspring, is ready to be delivered.

• It is within the uterus that the offspring develops during gestation. Once the egg has left the ovary it undergoes fertilization and implants itself in the lining of the uterus.

• The key function of the uterus is to provide nourishment to the developing fetus prior to birth.

• Thus, the baby is born as a result of rhythmic contraction of muscles in uterus.

Q96. Answer: (d) 17.1

Shortcut Trick

Passing score → 38% of the Total Marks.

Since the Total Marks are 45, calculation is 45 × 0.38.

45 × 38 ÷ 100 => 1710 ÷ 100 = 17.1.

Therefore The correct answer is 17.1.

Alternate Method

Given:

Pass Percentage = 38%

Total Marks = 45

Formula Used:

Pass Marks = (Pass Percentage ÷ 100) × Total Marks

Calculations:

=> Pass Marks = (38 ÷ 100) × 45

=> Pass Marks = 0.38 × 45

=> Pass Marks = 17.1

Therefore The correct answer is 17.1.

Additional Information

Percentage to Value

To find the value of a percentage, multiply the Total Value by the Percentage and divide by 100.

Passing Marks Concept

In exam-based problems, Pass Marks is the minimum required score. If a student scores less, they fail by the difference.

Fraction Equivalent

38% can be written as the fraction 38/100 or 19/50 for easier manual multiplication in some cases.

Q97. Answer: (b) Mass per unit volume

The correct answer is Mass per unit volume.

• The density of a substance is defined as mass per unit volume.

Key Points

• The formula for density is-
d = M/V
• In the above formulae, d is the density, M is mass, and V is volume
• The density of a material varies with variation in temperature and pressure.
• This variation is small for solids and liquids but much greater for gases.
• Increasing the pressure on an object decreases the volume of the object and thus increases its density.
• Different materials usually have different densities and are expressed in units of grams per cubic centimeter.

Q98. Answer: (b) 36000

The solution is in Hindi. Read it online.

Q99. Answer: (b) D

The pattern followed here is:

Figure	Minimum no. of lines required
A	3
B	3
C	3
D	2

So, D is different from other images.
Hence, the correct answer is "D"

Q100. Answer: (a) C

When the given figure is rotated 270° clockwise:
Hence, the correct answer is "C".
Important Points
270° clockwise is equivalent to 90° anticlockwise.
Clockwise + Anti-Clockwise = 360°

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