RRC Group D Previous Year Paper 1 (Held On: 17 Sep 2018 Shift 1)

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

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CBT

Q1. Rs. 720 was divided among A, B, C, D, E. The sum received by them was in ascending order and in arithmetic progression. E received Rs. 40 more than A. How much did B receive?

(a) Rs. 134
(b) Rs. 154
(c) Rs. 144
(d) Rs. 124

Q2. Who portrayed the character of Allauddin Khilji in the controversial movie ‘Padmavat’?

(a) Shahid Kapoor
(b) Ranveer Singh
(c) Ranbir Kapoor
(d) Rana Daggubati

Q3. How many medals did India win in the US Open Karate Championship held in Las Vegas in April 2017?

(a) 17
(b) 16
(c) 12
(d) 15

Q4. Dayanand Saraswati was the founder of which of the following missions?

(a) Brahmo Samaj
(b) Chinmaya Mission
(c) Arya Samaj
(d) Prarthana Samaj

Q5. The mass of the Earth is _____.

(a) 6 × 10^(-23) kg
(b) 6×10^{23} kg
(c) 6 × 10^(-24) kg
(d) 6 × 10^(24) kg

Q6. Find the next term in the following series.

5I, 7J, 11L, 17O, ?

(a) 25S
(b) 25Y
(c) 20P
(d) 18C

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Q7. Which of the given assumptions are implied from the below statement?

Statement:

"I need your notes to study," said student 1 to student 2.

Assumptions:

1. Student 2 has prepared notes.
2. Student 1 wants to verify his understanding.

(a) Only I is implicit
(b) Both I and II are implicit
(c) Neither I nor II is implicit
(d) Only II is implicit

Q8. Two trains, one 152.5 m long and the other 157.5 m long, coming from opposite directions crossed each other in 9.3 seconds. The combined speed of the two trains every hour would then be:

(a) 130 km/hr
(b) 125 km/hr
(c) 115 km/hr
(d) 120 km/hr

Q9. In the modern periodic table, which group elements have a complete outer shell?

(a) 15^(th)
(b) 18^(th)
(c) 16^(th)
(d) 17^(th)

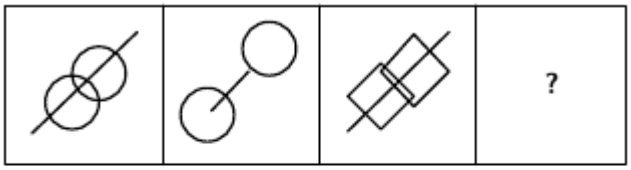
Q10. What is the next term in this series?

B25Y, D23W, F21U, _____.

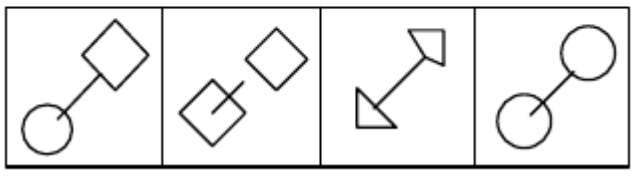
(a) I19V
(b) H19S
(c) I20T
(d) H20V

Q11. Which answer figure will come next in the given problem figure series?

Problem Figure:



Answer Figures:



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

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Q12. The ratio of the mass of hydrogen to the mass of oxygen in water is always _____.

(a) 2 : 1
(b) 1 : 8
(c) 8 : 1
(d) 1 : 2

Q13. Which of the following is a warm-blooded?

(a) Pigeon
(b) Crocodile
(c) Toad
(d) Fish

Q14. Which of the following country hosts the Academy (Oscar) Awards for excellence in the cinema every year?

(a) France
(b) UK
(c) Canada
(d) USA

Q15. Find which of the following are twin Primes.

(a) (37, 41)
(b) (3, 7)
(c) (43, 47)
(d) (71, 73)

Q16. How many water molecules are present in one molecule of washing soda?

(a) 8
(b) 5
(c) 7
(d) 10

Q17. Which of the following sports is Satyawart Kadiyan related to?

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

Q18. Which of the following metals reacts with steam to form a metal oxide and hydrogen?

(a) Copper
(b) Silver
(c) Lead
(d) Aluminium

Q19. The area of the triangle whose vertices are given by the coordinates (1, 2), (-4, -3) and (4, 1) is:

(a) 7 sq. units
(b) 20 sq. units
(c) 10 sq. units
(d) 14 sq. units

Q20. Direction: Given is a statement followed by two assumptions numbered I and II. Consider the statement and the following assumptions and decide which of the assumptions is/are implicit in the statement.

Statement: Making homes energy efficient is important for sustainable development.

Assumptions:

I. Replacement of incandescent light bulbs with energy-efficient compact fluorescent lamps (CFLs) at home is advisable.

II. Plant shade trees and shrubs around your house. Good landscaping (particularly deciduous trees) is auspicious,

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especially if planted on the house's west side.

(a) Neither assumption I nor II is implicit
(b) Only assumption II is implicit
(c) Only assumption I is implicit
(d) Both assumptions I and II are implicit.

Q21. President Ram Nath Kovind has felicitated _____ exceptional women achievers at Rashtrapati Bhawan in New Delhi. These 'FIRST LADIES' are those who are first to set a milestone of achievement in their respective fields.

(a) 111
(b) 112
(c) 114
(d) 113

Q22. The HCF of two co-prime numbers is:

(a) 2
(b) 0
(c) The product of the co-primes
(d) 1

Q23. The resistance of a conductor does NOT depend on which of the following factors?

(a) Length
(b) Area of cross section
(c) Pressure
(d) Material

Q24. $(\cos^2\text{Ø} + 1/\text{cosec}^2\text{Ø}) + 17 = x$. What is the value of x^2?

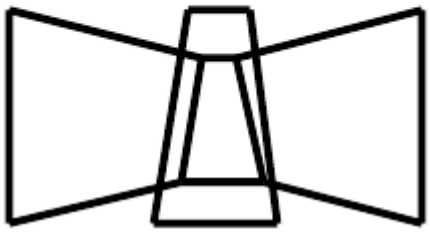
(a) 18
(b) 324
(c) 256
(d) 16

Q25. The force of gravity acting on an object is also known as _____.

(a) Impulse
(b) Mass
(c) Acceleration
(d) Weight

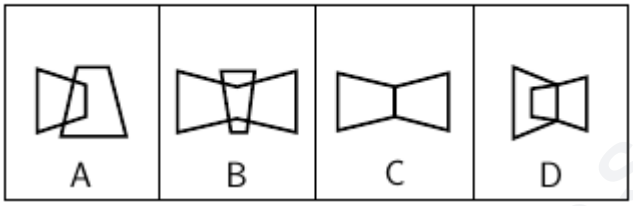
Q26. Which of the option figures bears the closest resemblance to the question figure?

Problem figure-



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Answer figure:

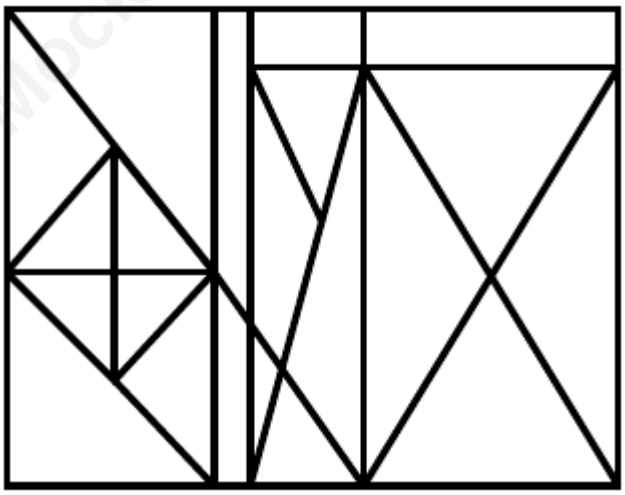


(a) B
(b) D
(c) C
(d) A

Q27. What was the theme of the 2016 Indian Film Festival of Melbourne (IFFM) at which Sonam Kapoor won the Best Actress Award for her performance in Neerja Bhanot's biopic 'Neerja'?

(a) Enrichment of Women Status
(b) Female Empowerment
(c) Beti Bachao
(d) Celebration of Life

Q28. How many triangles are there in the following figure?



(a) 25
(b) 23
(c) 24
(d) 27

Q29. Name the badminton player who won his maiden Super Series title in Singapore in April 2017?

(a) Sai Praneeth
(b) Srikanth Kidambi
(c) Prannoy Kumar
(d) Parupalli Kashyap

Q30. You are given a question and two statements. Identify which of the statements is/are necessary/sufficient to answer the question.

What is the total weight of 20 boxes of Vegetables? Each of them weighs equal.

Statements:

1. Of the first 10 boxes, one-third of each box weighs 10 kg

2. The total weight of 6 boxes is 40 kg more than the total weight of 4 boxes

(a) Both Statements 1 and 2 alone are sufficient
(b) Statement 2 alone is sufficient

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(c) Statement 1 alone is sufficient
(d) Statement 1 and 2 are not sufficient

Q31. In which of the following processes is oxygen released into the air?
(a) Photosynthesis
(b) Respiration
(c) Transpiration
(d) Excretion

Q32. In which of the following media does sound travel the fastest?
(a) Gases
(b) Vacuum
(c) Liquids
(d) Solids

Q33. Which of the following is true?
(a) 9/16 < 13/24
(b) 9/16 = 13/24
(c) 9/16 > 13/24
(d) 9/16 ≤ 13/24

Q34. In physics work done is defined as
1. A force has acted on an object without causing any displacement of it.
2. Only when an object is displaced.
3. Only when force has acted on the object.
4. Any of the above

(a) B and C are correct
(b) A and B are correct
(c) A and C are correct
(d) None of the Above

Q35. Which of the following illustrates Newton's third law of motion?
(a) When a bus starts suddenly, the passengers receive a backward jerk.
(b) While catching a fast-moving cricket ball, the fielder gradually pulls his hand backwards with the moving ball.
(c) The launching of a rocket.
(d) When we stop pedalling, the bicycle slows down.

Q36. A committee under the chairmanship of Uday Kotak was constituted in 2017 to improve efficiency in _____.
(a) Customer satisfaction
(b) Labour management relations
(c) Government policies
(d) Corporate governance

Q37. The fertilised egg, the zygote, gets implanted in the _____.
(a) cervix
(b) ovary
(c) vagina
(d) uterus

Q38. When a body moves on a circular path, the force that acts on the revolving body towards the centre is called _____.
(a) simple force
(b) gravitational force
(c) centripetal force
(d) angular force

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Q39. 56 ÷ [1/3{15 + 12 - (9 + 6 - 5 + 7)}]= ?

(a) 12
(b) 4032
(c) 7
(d) 448

Q40. Name the first city in India to use a robot to control traffic.

(a) Kochi
(b) Indore
(c) Varanasi
(d) Jaipur

Q41. Read the given statement (s) and conclusions carefully and select which of the conclusions logically follow(s) from the statement(s).

Statement:

• All petals are flowers.
• Some petals are yellow.
• All yellows are flowers.

Conclusions:

1. All flowers are yellow.
2. All yellows are petals.

(a) None of the conclusions follows
(b) Only conclusion 2 follows
(c) Only conclusion 1 follows
(d) Both the conclusions follow

Q42. Which is the second company to hit $900 billion market capitalization after Apple?

(a) Google
(b) Walmart
(c) Amazon
(d) Facebook

Q43. Which union minister has launched PowerTax India scheme to boost power loom sector?

(a) Smriti Irani
(b) Maneka Gandhi
(c) Nitin Gadkari
(d) Ravi Shankar Prasad

Q44. Which of the following state governments launched the ‘Quit India 2-from Swaraaj to Suraaj’ initiative at the historic August Kranti Maidan in August 2016?

(a) Haryana
(b) Maharashtra
(c) Madhya Pradesh
(d) West Bengal

Q45. Who has been chosen for the RedInk Award for Lifetime Achievement in Journalism for 2018?

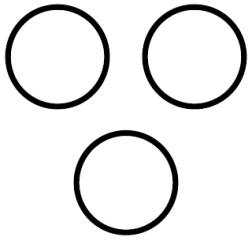
(a) Mark Tully
(b) Arun Shourie
(c) Barkha Dutt
(d) N. Ram

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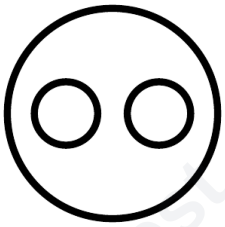
Q46. Choose the most suitable Venn diagram for the following words.

Horse, Monkey, Tiger

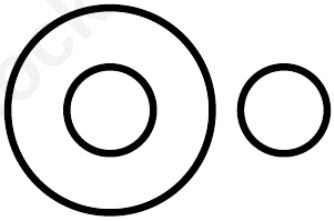
(a)



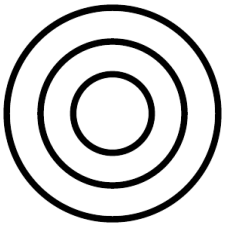
(b)



(c)



(d)



Q47. Rohan and Rohit together can do a certain job in 10 days while Rohan alone can do the same job in 15 days. How many days Rohit alone will do the same job?

(a) 25 days
(b) 32 days
(c) 35 days
(d) 30 days

Q48. The compound interest on Rs. 1,60,000 for 2 years at 10% per annum when compounded semi-annually is:

(a) Rs. 34,400
(b) Rs. 34,481
(c) Rs. 30,000
(d) Rs. 34,480

Q49. Direction: Consider the statement given to be true even if it seems to be at variance with the commonly known facts and decide which of the given conclusions logically follow (s) from the statement.

Statement: All that glitters is not gold.

Conclusions:

I. Things that appear good from outside are not probably good from inside.

II. We cannot imagine the inner truth behind the glossy outlook of anything or any person from far.

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

Q50. A force increases the speed of a 1.0 kg object from 4 m/s to 8 m/s. The work done by the force will be _____.
(a) 8 J
(b) 32 J
(c) 24 J
(d) 16 J

Q51. As long as an unbalanced force is applied to a body, there is a continuous change in its:
(a) Weight
(b) mass
(c) speed
(d) shape

Q52. Which of the following options is an example of salt gives an aqueous solution of pH less than 7?
(a) Sodium carbonate
(b) Sodium chloride
(c) Ammonium chloride
(d) Sodium bicarbonate

Q53. _____ is the amount of work done in carrying a charge of 4C across two points having a potential different of 18 V.
(a) 24 J
(b) 72 J
(c) 7.2 J
(d) 4.5 J

Q54. Which of the following is known as 'the Princess of Hill Stations'?
(a) Dehradun
(b) Kodaikanal
(c) Darjeeling
(d) Ooty

Q55. Identify the award which recognises workers for their distinguished performance, innovative ability, and outstanding contribution in the field of productivity and exhibition of exceptional courage and presence of mind.
(a) Krishi Award
(b) Shram Award
(c) Padma Award
(d) Dronacharya Award

Q56. A TV set is being sold for Rs. X in Delhi. A dealer went to Chandigarh and bought the TV at 20% discount (from the price of Delhi). He spends Rs. 600 on transport. Thus, he sold the set in Delhi for Rs. X making (100/7) % profit what is the value of X?
(a) Rs. 7200
(b) Rs. 8000
(c) Rs. 8800
(d) Rs. 9600

Q57. If sec^4θ – sec²θ = 3 then the value of tan^4θ + tan²θ is:
(a) 8
(b) 4
(c) 6

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(d) 3

Q58. Read the statement and conclusions below

Statements:

• No cows are cats

• All cats have mustache

Conclusions:

1. Some cows are cats

2. Some cows have mustache

Which conclusions(s) follow(s) the given statement?

(a) Only conclusion 2 follows

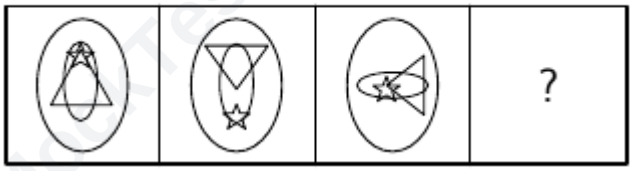
(b) No conclusion follows

(c) All the conclusions follow

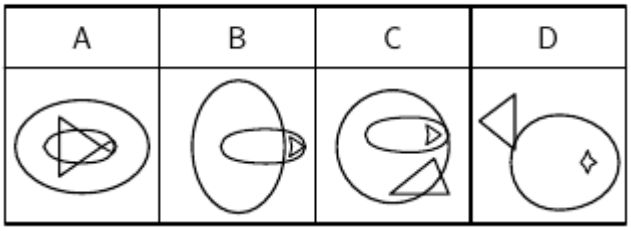
(d) Only conclusion 1 follow

Q59. Select the option that can replace the question mark (?) in the following series.

Problem Figure :



Answer Figures :



(a) A

(b) B

(c) D

(d) C

Q60. Which of the following is known as the Upper house of the Indian Parliament?

(a) Supreme Court

(b) PMO

(c) Rajya Sabha

(d) Lok Sabha

Q61. Choose the most suitable Venn diagram for the following words.

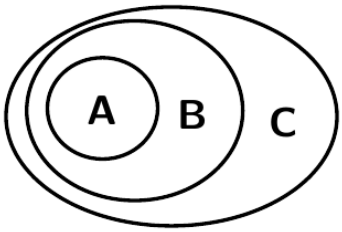
A. Whales

B. Ships

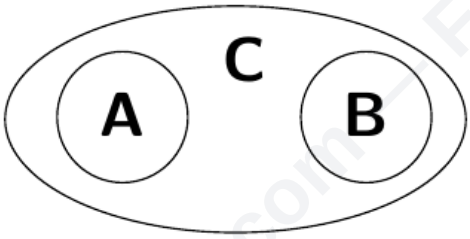
C. Oceans

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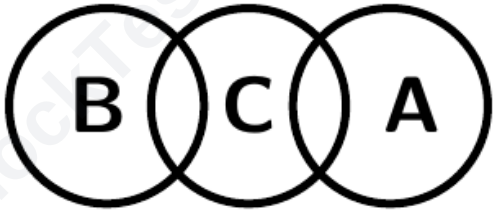
(a)



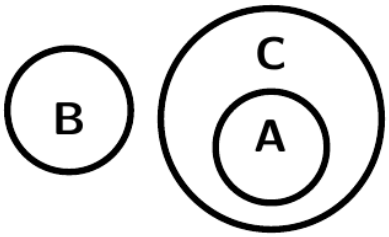
(b)



(c)



(d)



Q62. Consider the given statement to be true even if they seem to be at variance with the commonly known facts and decide which of the given conclusions logically follow(s) from the statements.

Statements:

1. Some metals are iron.
2. Some iron are heavy.

Conclusion:

1. All iron are metals.
2. All heavy are metals.

(a) Only conclusion 2 follows
(b) No conclusions follow
(c) All the conclusions follow
(d) Only conclusion 1 follows

Q63. What is “Hausala 2017’, which was celebrated from 16^(th) November to 20^(th) November 2017?

(a) Celebration of transgender rights
(b) Celebration of women’s rights
(c) Celebration of children’s rights
(d) Celebration of senior citizen’s rights

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Q64. A cake is shared among 5 friends. Four friends take 1/8, 1/6, 5/12, 1/12 part of the cake, respectively. How much part of the cake does the fifth friend get?

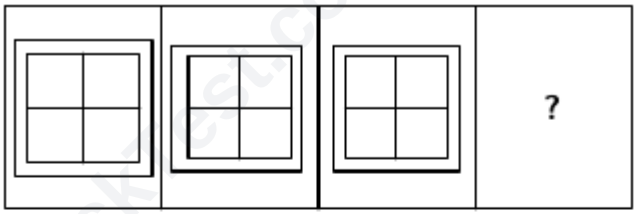
(a) 5/24
(b) 3/8
(c) 1/6
(d) 1/4

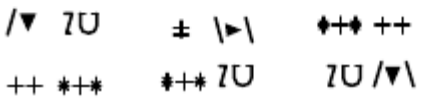
Q65. Which of the following can exist in solid, liquid and gaseous forms?

(a) Metalloids
(b) Inert elements
(c) Non-metals
(d) Metals

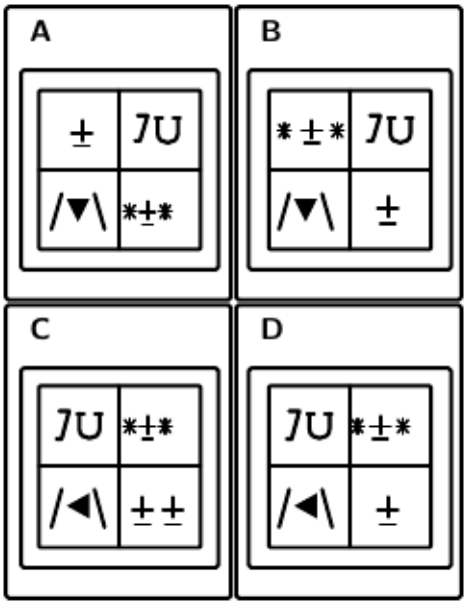
Q66. Which of the option figures comes next?

Problem Figure:





Answer Figures:



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

Q67. Read the given statement(s) and conclusions carefully and select which of the conclusion logically follow(s) from the statement(s).

Statement:

All cars are Jeeps

All Jeeps are four-wheelers.

Conclusions:

I. All four-wheelers are cars.

II. Some four-wheelers are Jeeps.

(a) Neither conclusion follows
(b) All the conclusion follows
(c) Only conclusion I follows
(d) Only conclusion II follows

Q68. A clock is fixed on a horizontal table. At 3 pm its minute hand is pointing towards North. At 3.40 pm, the minute hand will point towards?

(a) 60° south of west
(b) South-east
(c) 60° west of south
(d) South-west

Q69. A, B and C are three pipes connected to a tank. A and B together fill the tank in 6 hrs. B and C together fill the tank in 10 hrs. A and C together fill the tank in 7.5 hours. In how much time will A alone fill the tank?

(a) 11 hours
(b) 10 hours
(c) 13 hours
(d) 12 hours

Q70. Consider the given statement and decide which of the following assumptions is/are implicit in the statement

Statement:

“Every city must house an ecological park”, says the Mayor to his secretary.

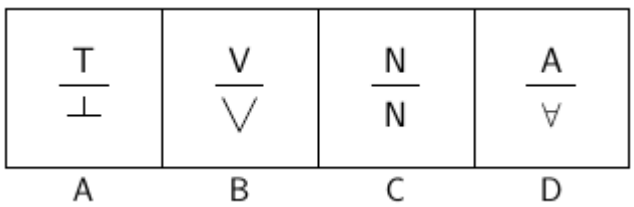
Assumptions:

I. Ecological parks improve green cover.

II. Ecological parks help reduce air pollution.

(a) Neither I nor II is implicit
(b) Only II is implicit
(c) Both I and II are implicit
(d) Only I is implicit

Q71. Find the odd one out.



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

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Q72. (sin A + sin B)/(cos A - cos B) + (cos A + cos B)/(sin A - sin B) = ?

(a) sin A cos B
(b) tan A tan B
(c) 0
(d) cos A cos B

Q73. The chemical symbol of which of the following elements is derived from Latin?

(a) Chlorine
(b) Carbon
(c) Iron
(d) Aluminium

Q74. What is the value of the expression?

$((a - b)^3 + (b - c)^3 + (c - a)^3)/(3 (a - b)(b - c)(c - a)) = ?$

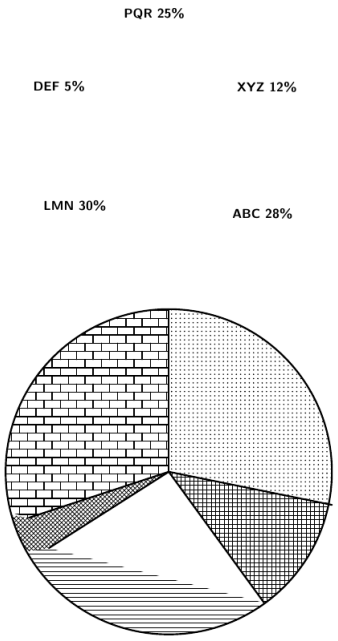
(a) 4
(b) 1
(c) 2
(d) 0

Q75. If a driver drives a car at 15 m/s then how much distance is covered by him in 3 hours 20 mins?

(a) 200 km
(b) 165 km
(c) 150 km
(d) 180 km

Directions

Directions: The given pie chart shows information about the mobile phone manufacturing companies in India. The total number of mobile phone units manufactured is 12,40,000.



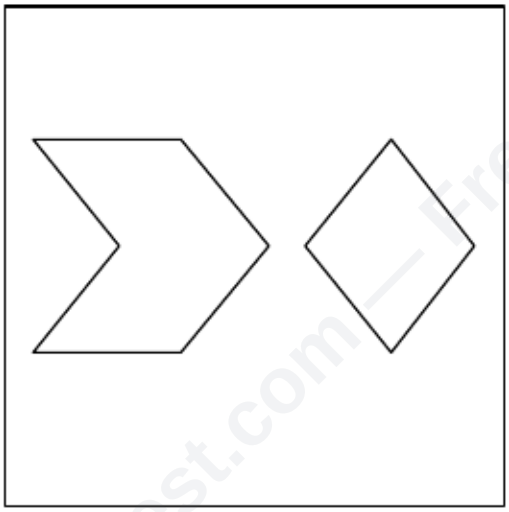
Q76. How many units of mobile phones were manufactured by company ‘LMN’?

(a) 3,72,000
(b) 6,20,000
(c) 12,40,000
(d) 6,12,000

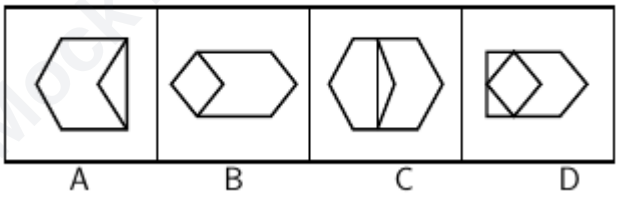
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Q77. Which of the following figures is formed from the two shapes gives the problem figure?

Problem Figure



Answer Figures



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

Q78. It was Monday on 1^(st) January 2018. What was the day of the week on 1^(st) January 2010?

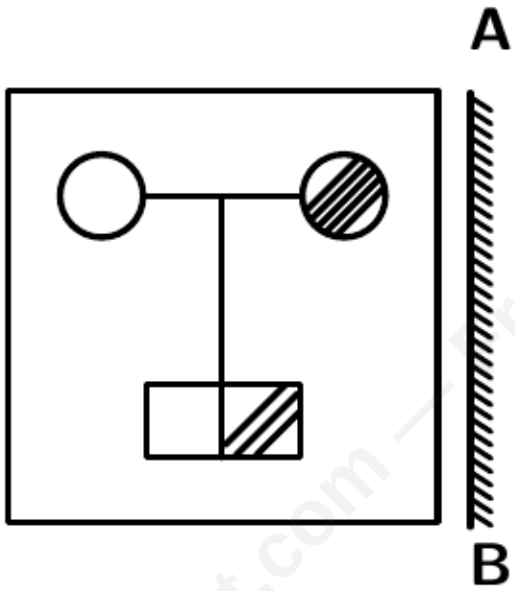
(a) Tuesday
(b) Thursday
(c) Friday
(d) Monday

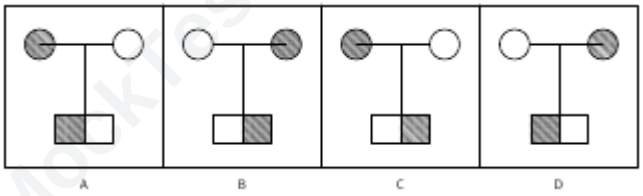
Q79. A person opens a tea shop with an initial investment of Rs. 25,000. He spends 30% of his money in furnishing his shop and 20% in bringing other necessary things. How much money is he left with for purchasing inventory for his business?

(a) Rs. 12,500
(b) Rs. 20,000
(c) Rs. 12,000
(d) Rs. 5,000

Q80. Choose the mirror image for the following figure when the mirror is kept at the AB line.

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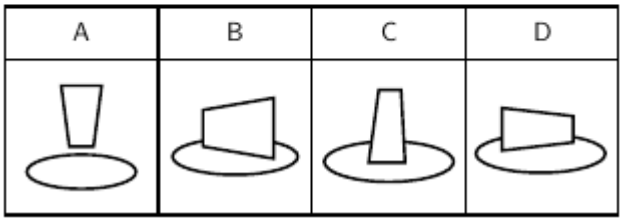
(a) A
(b) D
(c) B
(d) C

Q81. Which pattern resembles closer to?

Problem Figure:



Answer Figures:



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

Q82. If the number x4461 is divisible by 11, what is the face value of x?

(a) 5
(b) 2
(c) 3
(d) 4

Q83. Read the given question and decide which of the following information is sufficient to answer the question.

What is the value of angle ACB?

Informations

1	[figure]
2	angle D = 60°

(a) Only 2 is sufficient
(b) Both 1 and 2 are sufficient
(c) Only 1 is sufficient
(d) Either 1 or 2 is sufficient.

Q84. Which of the following animals can produce ultrasound?

(a) Moths
(b) Porpoises
(c) Shark
(d) Elephant

Q85. Anurag loses one-seventh of the cost by selling a pen for Rs. 144. If the pen is sold for Rs. 189, what is the gain percent?

(a) 11%
(b) 12.5%
(c) 11.5%
(d) 14%

Q86. The HCF of 2/3, 8/9, 10/27, 32/81 is:

(a) 160/81
(b) 160/3
(c) 2/3
(d) 2/81

Q87. Choose the person who does NOT belong to the group.

(a) Alexander Graham Bell
(b) Albert Einstein
(c) Thomas A Edison
(d) Virat Kohli

Q88. Which of the following countries has the longest coastline in the world?

(a) Australia
(b) Norway
(c) Canada
(d) Indonesia

Q89. If South becomes South-West, then what will North become?

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

Q90. On what dates of March 2005 did Friday fall?

(a) 5, 12, 19 and 26
(b) 3, 10, 17 and 24
(c) 4, 11, 18 and 25
(d) 6, 13, 20 and 27

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Q91. The Hundred Year's war was fought between which two countries?

(a) England and France
(b) England and Italy
(c) England and Germany
(d) Germany and France

Q92. The flexibility in plants is due to _____ tissue.

(a) Xylem
(b) Phloem
(c) Sclerenchyma
(d) Collenchyma

Q93. Which of the following is a perfect cube?

(a) 8261
(b) 9000
(c) 8000
(d) 9999

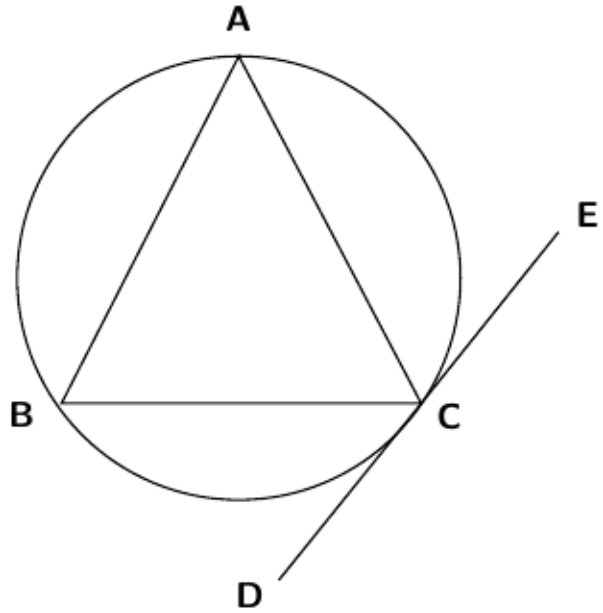
Q94. Generally, the valency of electropositive elements is _____.

(a) 2, 1, 0
(b) 4, 3, 2
(c) 1, 2, 3
(d) 0, 1, 2

Q95. If PIPE is written as 169165, then what is the last digit of SWAN?

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

Q96. Refer to the given figure and answer the question that follows.



If AB is parallel to EC and angle BCD = 72°, then, what is the value of angle BAC?

(a) 75°
(b) 73°
(c) 72°
(d) 67°

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Q97. A type of reproduction in which a part of a plant body develops into a new individual is called _____.

(a) fission
(b) regeneration
(c) vegetative propagation
(d) sexual propagation

Q98. Find the next letter in the following series.

C, D, F, I

(a) M
(b) G
(c) N
(d) P

Q99. Two inlet pipes, A and B, can fill an empty cistern in 22 and 33 hours, respectively. They were opened at the same time, but pipe A had to be closed 3 hours before the cistern was full. How many hours in total did it take the two pipes to fill the cistern?

(a) 15
(b) 16.2
(c) 14.2
(d) 16

Q100. What will be the direction of the magnetic field at a point directly below a horizontal power line with the current flowing from east to west when viewed from the west end?

(a) Anticlockwise
(b) Clockwise
(c) Parallel to the flow of the current
(d) Perpendicular to the flow of the current

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) Rs. 134

Shortcut Trick

In an Arithmetic Progression with 5 terms, the Average is always the middle term (C).

Average = 720 ÷ 5 = Rs. 144. So, C = Rs. 144.

Given E − A = 4d = 40, so common difference d = 10.

B = C − d = 144 − 10 = Rs. 134.

Therefore The correct answer is Rs. 134.

Alternate Method

Given: Total sum = Rs. 720, Number of people = 5 (A, B, C, D, E), Difference E − A = Rs. 40.

Formula Used: Sum of AP = (n/2) × [2a + (n−1)d]

=> Let the amounts be a, a+d, a+2d, a+3d, a+4d.

=> E − A = 40 → (a + 4d) − a = 40 => 4d = 40 => d = 10.

=> Sum = 5a + 10d = 720.

=> 5a + 10(10) = 720 => 5a + 100 = 720.

=> 5a = 620 => a = 124.

=> B = a + d = 124 + 10 = 134.

Therefore The correct answer is Rs. 134.

Additional Information

Arithmetic Progression Properties

For an odd number of terms in AP, the middle term is equal to the Average of the series (Sum ÷ n).

General Term of AP

The n^(th) term is given by T_n = a + (n − 1)d, where 'a' is the first term and 'd' is the common difference.

Sum of n terms

S_n = (n/2) × [first term + last term]. In this case, 720 = (5/2) × [A + E].

Q2. Answer: (b) Ranveer Singh

• Ranveer Singh portrayed the character of Allauddin Khilji in the controversial movie ‘Padmavat’.

• Ranveer Singh got the Filmfare Critics Award for the Best Actor in the year 2019 for portray of his role as Allauddin Khilji.

Q3. Answer: (b) 16

• India won 16 medals in US Open Karate Championship held in Las Vegas held April in the year 2017.

• India won three golds, two sliver and 11 bronze medals in the championship.

Q4. Answer: (c) Arya Samaj

The correct answer is Arya Samaj.

Key Points

• Dayanand Saraswati founded the Arya Samaj in 1875 in Bombay.

• Arya Samaj was a reform movement within Hinduism.

• It aimed to promote values based on the Vedas and sought to rid Hinduism of practices like idol worship, caste discrimination, and ritualism.

• The motto of Arya Samaj was "Krinvanto Vishwam Aryam," meaning "Make the World Noble."

• Arya Samaj also emphasized education, social reform, and the empowerment of women.

Additional Information

• Brahmo Samaj: Brahmo Samaj was founded by Raja Ram Mohan Roy in 1828. It was a reform movement within Hinduism that focused on the worship of one God and opposed idol worship, caste discrimination, and superstitions. It played a significant role in modernizing Indian society.

• Chinmaya Mission: Chinmaya Mission was founded by Swami Chinmayananda in 1953. It focuses on spreading the teachings of Vedanta as expressed in the Bhagavad Gita and the Upanishads. The mission emphasizes spiritual growth and self-realization through education and service.

• Prarthana Samaj: Prarthana Samaj was founded in 1867 in Bombay by Atmaram Pandurang. It emphasized monotheism and opposed rituals, idol worship, and caste discrimination. It sought to reform Hinduism and promote social equality and justice.

Q5. Answer: (d) 6 × 10^(24) kg

• Let the mass of the earth be M.

• Mass of the other object on earth is m.

• We know the value of Gravitational Constant (G) = 6.67259 × 10^(-11) Nm^2/kg^2.

• We know the formula for the force between two objects (F) = G m^1 m^2/r^2.

• Now the radius of the earth (r) = 6.3781 × 10^6 m.

• We know that F = mg

• Now by substituting the values, we get mg = G M m/r^2.

M = g r^2/G

M = (9.81) $(6.3781 \times 10^6)^2/6.67259 \times 10^{-11}$

M = 6 × 10^(24) kg.

The mass of the earth (M) is 6 × 10^(24) kg.

Q6. Answer: (a) 25S

The pattern followed here is as follows:

Hence, “25S” is the correct answer.

Q7. Answer: (a) Only I is implicit

• In the statement student 1 is asking for notes prepared by student 2 for studying, thus we can assume that student 2 “has prepared the notes”.

• The statement clearly mentions that student 1 wants the notes “to study”, hence we cannot assume that he “wants to verify his understanding”.

• Therefore, only assumption I is implicit.

Q8. Answer: (d) 120 km/hr

Shortcut Trick

Relative speed (opposite direction) = Sum of individual speeds = Total distance ÷ Time taken.

Total Distance = 152.5 + 157.5 = 310 m

Combined Speed = 310 ÷ 9.3 = 100 ÷ 3 m/s

Convert to km/hr = (100 ÷ 3) × (18 ÷ 5) = 120 km/hr

Therefore The correct answer is 120 km/hr.

Alternate Method

Train 1: 152.5 m

V1

Train 2: 157.5 m

V2

Total Distance = 152.5 + 157.5 = 310 m

Time taken to cross = 9.3 s

Given:

Length of the first train (L1) = 152.5 m

Length of the second train (L2) = 157.5 m

Time taken to cross each other (T) = 9.3 seconds

Formula Used:

When two objects move in opposite directions, their relative speed is the sum of their individual speeds.

Relative Speed = Total Distance ÷ Time

Total Distance = L1 + L2

Speed in km/hr = Speed in m/s × (18 ÷ 5)

Calculation:

=> Total Distance = 152.5 + 157.5

=> Total Distance = 310 m

=> Combined Speed (m/s) = 310 ÷ 9.3

=> Combined Speed (m/s) = 3100 ÷ 93 = 100 ÷ 3 m/s

=> Combined Speed in km/hr = (100 ÷ 3) × (18 ÷ 5)

=> Combined Speed in km/hr = 20 × 6 = 120 km/hr

Therefore The correct answer is 120 km/hr.

Additional Information

Relative Speed in Opposite Directions

When two bodies travel in opposite directions, their relative speed is the sum of their individual speeds: S_(relative) = S1 + S2.

Relative Speed in Same Direction

When two bodies travel in the same direction, their relative speed is the difference of their individual speeds: S_(relative) = |S1 − S2|.

Speed Unit Conversion

To convert speed from km/hr to m/s, multiply by (5 ÷ 18). To convert speed from m/s to km/hr, multiply by (18 ÷ 5).

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Trains Crossing a Stationary Object

When a train crosses a point-sized object (like a pole or man), the distance covered equals the length of the train. If it crosses a platform or bridge, the distance is the length of the train plus the length of the object.

Q9. Answer: (b) 18^(th)

Key Points

• The elements in 18 group of the periodic table have a complete Outer Shell.

• In the 18^(th) group of the modern periodic table, the noble gases placed.

There are 7 noble gases in the periodic table.

They are Helium (He) with atomic number 2,

• Neon (Ne) with atomic number 10,

• Argon (Ar) with atomic number 18,

• Krypton (Kr) with atomic number 36,

• Xenon (Xe) with atomic number 54,

• Radon (Rn) with atomic number 86,

• Ununoctium (Sun)/Oganesson (Og) with atomic number 118.

Group number	Common name	Number of electrons for bonding
1	Alkali metals	1
2	Alkaline earth metals	2
14	Crystallogens	4
15	Pnictogens	5
16	Chalcogens	6
17	Halogens	7
18	Noble gases	8

Q10. Answer: (b) H19S

The pattern followed here is as follows,

Hence, “H19S” is the correct answer.

Q11. Answer: (b) B

As per the given pattern figure B is the most possible correct answer.

From 1st figure to 2nd figure:

Similarly,

From 3rd figure to 4th figure:

Hence, “B” is the correct answer.

Q12. Answer: (b) 1 : 8

Key Points

• Atomic Mass of the Hydrogen = 1

• Atomic Mass of the oxygen = 16

Explanation:

1 mole of hydrogen = 1gm

1 mole of oxygen = 16gm

Water (H2O) = 2 Hydrogen atoms + 1 Oxygen atom

2 mole of hydrogen = 2gm

1 mole of oxygen = 16 gm

The ratio of the mass of Hydrogen: Ratio of mass of Oxygen = 2/16 = 1/8

The ratio of the mass of Hydrogen to the mass of Oxygen in water is always 1:8.

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Q13. Answer: (a) Pigeon

Animals from class Aves are warm-blooded.

• Aves class represents birds and their characteristic features are feathers, a beak, and the forelimbs are modified into wings.

• They are warm-blooded animals i.e. they will be able to maintain constant body temperature.

Pisces	**These are the gill-bearing vertebrates which lack limbs with digits. They are the aquatic craniate animals generally called fishes.**
Reptilia	These are the tetrapod vertebrates which may either have four-limbs or they are descended from four-limb ancestors like snakes.
Amphibia	Amphibians can live in aquatic as well as in terrestrial habitats and most of them have two pairs of limbs.

Q14. Answer: (d) USA

• The United States of America (USA) host the Academy (Oscars) Awards for excellence in the cinema every year.

• The 91^(st) Academy Awards were presented at the Dolby Theatre in Los Angeles, California.

• Best Picture – Green Book.

• Best Actor in a Leading Role – Rami Malek for Bohemian Rhapsody.

• Best Actress in a Leading Role – Olivia Colman for The Favourite.

• Best Directing – Alfonso Cuarón for Roma.

• Best Supporting Actor – Mahershala Ali for Green Book.

Q15. Answer: (d) (71, 73)

Shortcut Trick

Twin Primes are pairs of prime numbers that differ by exactly 2.

Check the difference between given pairs:

(37, 41) → diff = 4 | (3, 7) → diff = 4 | (43, 47) → diff = 4 | (71, 73) → diff = 2.

Since 71 and 73 are both prime numbers and their difference is 2, they are twin primes.

Therefore The correct answer is (71, 73).

Alternate Method

Given: Four pairs of numbers to identify Twin Primes.

Condition for Twin Primes:

1. Both numbers in the pair must be Prime (divisible only by 1 and itself).

2. The absolute difference between the numbers must be 2.

Evaluating the options:

=> Option 1: (37, 41) → Both are prime, but 41 − 37 = 4 (≠ 2).

=> Option 2: (3, 7) → Both are prime, but 7 − 3 = 4 (≠ 2).

=> Option 3: (43, 47) → Both are prime, but 47 − 43 = 4 (≠ 2).

=> Option 4: (71, 73) → 71 is prime, 73 is prime, and 73 − 71 = 2.

Therefore The correct answer is (71, 73).

Additional Information

Prime Numbers

A Prime Number is a natural number greater than 1 that has no positive divisors other than 1 and itself.

Co-prime Numbers

Two numbers are Co-prime if their Highest Common Factor (HCF) is 1. Example: (8, 9).

Prime Triplet

A Prime Triplet is a set of three prime numbers of the form (p, p+2, p+6) or (p, p+4, p+6). The only triplet with difference 2 is (3, 5, 7).

Q16. Answer: (d) 10

• The number of water molecules present is washing soda is 10.

• We know the molecular formula for Washing Soda is Na2CO3.10H2O.

• Recrystallisation of Sodium Carbonate (Na2CO3) gives washing soda.

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• In a Washing soda, water is present in the form of crystals.

Q17. Answer: (c) Wrestling

• Satyawart Kadiyan is related to Wrestling sport.

• He was given Arjuna Award in 2017.

• He was married to Olympic bronze medallist Sakshi Malik in 2017.

Q18. Answer: (d) Aluminium

• Aluminium (Al) metal reacts with steam to form a metal oxide and hydrogen.

• This reaction can be given as

$2Al + 3H_2O (g) \rightarrow Al_2O_3 + 3H_2 (g)$

• Other metals of this type are Iron (Fe) and Zinc (Zn).

• But these metals do not react with either hot or cold water.

Silver, Lead and Copper do not react with water whether the water is in the form of liquid or gas.

Q19. Answer: (c) 10 sq. units

"

Shortcut Trick

Shift one vertex to the origin (0, 0) by subtracting its coordinates from all vertices.

Subtract (1, 2) from all: (1−1, 2−2) → (0, 0) | (−4−1, −3−2) → (−5, −5) | (4−1, 1−2) → (3, −1).

Area = 1/2 |x1y2 − x2y1| = 1/2 |(−5 × −1) − (−5 × 3)|.

Area = 1/2 |5 − (−15)| = 1/2 |20| = 10 sq. units.

Therefore The correct answer is 10 sq. units.

Alternate Method

Given: Vertices of the triangle are A(1, 2), B(−4, −3), and C(4, 1).

Formula Used: Area of triangle = 1/2 |x1(y2 − y3) + x2(y3 − y1) + x3(y1 − y2)|

=> Area = 1/2 |1(−3 − 1) + (−4)(1 − 2) + 4(2 − (−3))|

=> Area = 1/2 |1(−4) + (−4)(−1) + 4(2 + 3)|

=> Area = 1/2 |−4 + 4 + 4(5)|

=> Area = 1/2 |0 + 20|

=> Area = 1/2 × 20 = 10 sq. units.

Therefore The correct answer is 10 sq. units.

Additional Information

Shoelace Formula

Q20. Answer: (c) Only assumption I is implicit

Here, the objective is to make homes energy efficient for sustainable development.

• Replacing incandescent light bulbs with energy-efficient compact fluorescent lamps (CFLs) is suggested considering the statement says that making homes energy-efficient is important for sustainable development.

Therefore, assumption I is implicit in the statement.

• One cannot relate the auspiciousness of good landscaping around one's house on the west side with efficient energy consumption at home using the information from the statement.

Therefore, assumption II is not implicit

Hence, only assumption I is implicit.

Q21. Answer: (b) 112

• The honourable President of India, Ram Nath Kovind felicitated 112 exceptional woman achievers and titled them as "First Ladies" of the country.

• Those included Miss World 1994 Aishwarya Rai Bachchan and Miss Earth 2010 Nicole Faria.

• The award ceremony was hosted by Minister of Women and Child Development, Shri Maneka Sanjay Gandhi, who felicitated and congratulated the women achievers.

Q22. Answer: (d) 1

Shortcut Trick

Co-prime numbers are defined as numbers having no common factor other than 1.

By definition, the Highest Common Factor (HCF) of any two co-prime numbers is always 1.
Example: 8 and 15 are co-prime; Factors of 8 (1, 2, 4, 8) and 15 (1, 3, 5, 15) share only 1.
Therefore The correct answer is 1.
Alternate Method
Given: Two numbers are co-prime.
Concept: Two numbers are said to be co-prime if their greatest common divisor is 1.
=> Let the numbers be x and y.
=> If x and y are co-prime, factors of x ∩ factors of y = {1}.
=> Highest Common Factor (HCF) = 1.
Therefore The correct answer is 1.
Additional Information
LCM of Co-prime Numbers
The Least Common Multiple (LCM) of two co-prime numbers is always equal to their product (x × y).
Consecutive Numbers
Any two consecutive natural numbers (e.g., 14 and 15) are always co-prime to each other.
Prime Numbers Property
Any two distinct prime numbers are always co-prime, as they only have 1 as a common factor.

Q23. Answer: (c) Pressure

• The resistance of a conductor does not depend upon pressure.
• The type of material defines an element as either Conductor or Insulator or semiconductor.
• We know the formula Resistance (R) = pL/A.
• Where p is resistivity, L is the length and A is Area of Cross section.

Q24. Answer: (b) 324

Shortcut Trick
Using Trigonometric Identity: $\sin^2Ø + \cos^2Ø = 1$.
Given expression: $(\cos^2Ø + \sin^2Ø) + 17 = x$.
=> $1 + 17 = x$ => $x = 18$.
=> $x^2 = 18^2 = 324$.
Therefore The correct answer is 324.
Alternate Method
Given: $(\cos^2Ø + 1/\text{cosec}^2Ø) + 17 = x$
Formula Used: $\sin Ø = 1/\text{cosec}Ø$ and $\sin^2Ø + \cos^2Ø = 1$
=> $x = (\cos^2Ø + \sin^2Ø) + 17$
=> $x = 1 + 17$
=> $x = 18$
=> $x^2 = (18)^2$
=> $x^2 = 324$
Therefore The correct answer is 324.
Additional Information
Reciprocal Identities
Basic reciprocal relations: $\sin Ø = 1/\text{cosec}Ø$, $\cos Ø = 1/\sec Ø$, and $\tan Ø = 1/\cot Ø$.
Pythagorean Identities
Standard identities: $\sin^2Ø + \cos^2Ø = 1$, $1 + \tan^2Ø = \sec^2Ø$, and $1 + \cot^2Ø = \text{cosec}^2Ø$.
Squares of Numbers
It is helpful to memorize squares up to 30: $17^2 = 289$, $18^2 = 324$, $19^2 = 361$.

Q25. Answer: (d) Weight

• Weight is a measure of the force of gravity acting on an object.
Concept:

Unit	Definition

Weight	It is a product of mass and acceleration due to gravity
Acceleration	Acceleration is defined as the rate of change of velocity
Momentum	Momentum is defined as the product of mass and velocity
Impulse	The product of force and time is defined as the impulse.

Explanation:

From the above explanation, we can see that

The gravitational pull by the earth is equal to the weight of the object.

The weight of any object on the planet is given by:

Weight (W) = m g = Force due to gravity

Where

m is mass

g is acceleration due acceleration of the planet.

Q26. Answer: (a) B

• The Figure A, C, and D have the 2 Trapezium but Problem Figure has 3 Trapezums.

In Problem Figure:

In Figure B:

Here, figure B has the closest resemblance to the question figure.

Hence, “B” is the correct answer.

Q27. Answer: (b) Female Empowerment

• The theme of the 2016 Indian Film Festival of Melbourne (IFFM) was ‘Female Empowerment’.

• Along with Sonam Kapoor, Nawazuddin Siddiqui won the Best Actor (Male) award.

• IFFM is presented by the State Government of Victoria to foster close ties between India and Australia film industries.

Q28. Answer: (d) 27

We can count triangles in the given figure as follows,

Clearly, we can say that there are “27” triangles in the given figure.

Q29. Answer: (a) Sai Praneeth

• Sai Praneeth was the badminton player that won his maiden Super Series title in Singapore in April 2017.

• Sai Praneeth beat fellow Indian Kidami Srikanth to win his first maiden Super Series title.

Q30. Answer: (a) Both Statements 1 and 2 alone are sufficient

Let the weight of each box be x.

Statement 1:

=> (1/3) × x = 10

=> x = 30 kg

As, each box weighs the same, total weight of 20 boxes can be calculated

Therefore Statement 1 alone is sufficient

Statement 2:

=> Weight of 6 boxes = weight of 4 boxes + 40

=> 6x = 4x + 40

=> 2x = 40

=> x = 20

As, each box weighs the same, total weight of 20 boxes can be calculated

Therefore Statement 2 alone is also sufficient

Q31. Answer: (a) Photosynthesis

• Oxygen is liberated during Photosynthesis.

• Photosynthesis is the process through which green plants manufacture food by converting solar energy into chemical energy.

• In this process, water and carbon dioxide react in the presence of sunlight to give off oxygen and form glucose molecules.

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• Photolysis of water is the source of oxygen liberated in photosynthesis.

Type	Process
Respiration	Intake of air
Transpiration	Evaporation of water through stomata of leaves
Excretion	Process of removal of waste from the organism.

Q32. Answer: (d) Solids

CONCEPT:

• Sound: A local disturbance whose propagation is facilitated by the collisions between particles this disturbance propagates in a longitudinal wave, imagine one molecule hitting the next molecule, and then that molecule hitting the next, and so forth.

• It is a mechanical wave that needs a medium to travel.

• The speed of sound is maximum in solid then it is in liquid and slowest in gases.

• Speed of sound: The distance traveled per unit time by sound waves as it propagates through an elastic medium.

The velocity of sound in a gaseous medium is given by:

=> $v=\sqrt{((\gamma P)/\rho)}$

Where P = pressure, ρ = density, and γ = ratio of two principal specific heats of the gas

• The speed of sound remains almost the same for all frequencies in a given medium under the same physical conditions.

• A state of matter is one of the distinct forms in which matter can exist.

• The four fundamental states of matters are - solids, liquids, gases, and plasma.

EXPLANATION:

• Solid-state is one of the four fundamental states of matter, in which the constituent particles (ions, atoms, etc) are closely packed together.

• The speed of sound is maximum in solids and least in gases. So option 4 is correct.

EXTRA POINTS

Speed of sound in different media at 25 ºC		
State	Medium	Speed of sound (m/s)
Solid	Solids Aluminium	6420
Nickel	6040	
Steel	5960	
Iron	5950	
Brass	4700	
Glass (Flint)	3980	
liquid	Liquids Water (Sea)	1531
Water (distilled)	1498	
Ethanol 1207	1207	
Methanol	1103	
gas	Gases Hydrogen	1284
Helium	965	
Air	346	
Oxygen	316	
Sulfur dioxide	213	

https://ncert.nic.in/ncerts/l/iesc112.pdf

Q33. Answer: (c) 9/16 > 13/24

Concept Used:

a/b and c/d are two numbers,

then (a × d) and (b × c) are need to be compared.

Calculation:

We have, 9/16 and 13/24

=> 9 × 24 = 216

=> 13 × 16 = 208

=> 216 > 208

=> 9/16 > 13/24.

Therefore Option 3 is correct.

Q34. Answer: (d) None of the Above

Concept:

Work done:

Work is said to be done when a force applied on the body displaces the body through a certain distance in the direction of a force.

• Work done (W) = vec F · vec scos θ = Fs cosθ

• Where F = force, s = distance, and cos θ = angle between F and s.

• The SI unit of work done is N-m or Joule (J).

Key Points Work is done whenever the given condition is satisfied:

(i) A force should act on an object

(ii) There is a displacement of the body caused by the applied force along the direction of the applied force.

Explanation:

Here,

1. A force has acted on an object without causing any displacement of it. - Doesn't satisfy the condition.

2. Only when an object is displaced. - Doesn't satisfy the condition.

3. Only when force has acted on the object. - Doesn't satisfy the condition.

4. Any of the above - Doesn't satisfy the condition.

So the correct option is None of the above.

It will only be true when force is applied and displacement is in the direction of the force.

(The original question has been asked in Railways Group D but due to discrepancy, the question has been rejected. we have updated the question to make it correct)

Q35. Answer: (c) The launching of a rocket.

• The launching of a rocket illustrates Newton’s third law of motion.

• Newton's Third Law of Motion states that 'To every action, there is an equal and opposite reaction'.

• When the rocket is ignited, it releases gases from its thrusters thereby creating a force that will push rocket upwards.

• A fielder pulling his hand back while catching a ball is an application of Newton's second law of motion.

• Newton's Second Law of motion states that the rate of change of momentum of an object is proportional to the applied force in the direction of the force. i.e. F=ma. Where F is the force applied, m is the mass of the body, and a is the acceleration produced.

• When a bus starts suddenly, the passengers receive a backward jerk an application of Newton's first law of motion.

• Newton First law states that Every object remains in uniform motion in a straight line unless compelled to change its state by the action of an external force.

• When we stop pedalling, the bicycle slows down due to the frictional force acting on the bicycle.

Q36. Answer: (d) Corporate governance

• A committee under the chairmanship of Uday Kotak was constituted in 2017 to improve efficiency in Corporate Governance.

• SEBI has set up a committee under the chairmanship of Uday Kotak, executive vice chairman and managing director of Kotak Mahindra Bank Ltd, to advise it on issues relating to corporate governance in Indian firms.

• The 21-member panel includes representatives from other companies, stock exchanges, professional bodies, investor groups, law firms, academicians, research professionals and SEBI officials.

Important Points

• About SEBI: As of May 2022

• Chairman- Madhabi Puri Buch

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• Founded- 1992
• Headquarters - Mumbai Maharashtra

Q37. Answer: (d) uterus

The correct answer is the uterus.

Key Points

• The fertilised egg, the zygote, gets implanted in the uterus.
• The egg is fertilized up in the fallopian tube then travels to the uterus and it implants in the tissue lining the uterus.
• When the fertilized egg pushes itself into the tissue on the wall of the uterus, it is called implantation

Additional Information

Organ	Function
Cervix	It is a narrow tube that connects the vagina to Uterus.
Ovary	They are primary female sex organs and they produce female gamete (Ovum) and ovarian hormones.
Vagina	Vagina, also known as 'birth canal', is a canal that joins the lower part of the uterus called cervix to the outside.

Q38. Answer: (c) centripetal force

• When a body moves on a circular path, the force that acts on the revolving body towards the centre is called centripetal force.
• The Centripetal force is required to maintain a body in Uniform Circular Motion.
• Centripetal Force acts when a body moves around in a circular path, the force that causes this acceleration and keeps the body moving along a circular path is acting towards the centre

Force	Definition
Simple Force	It defined as a pull or push on an object which tends to displace an object form its position.
Gravitational Force	It is defined as the force of attraction between two objects is directly proportional to the product of masses of the objects and inversely proportional to the square of the distance between them.

Q39. Answer: (c) 7

Concept used:

Calculation:

56 ÷ [1/3{15 + 12 - (9 + 6 - 5 + 7)}]
=> 56 ÷ [(1/3){15 + 12 - (9 + 6 - 12)}]
=> 56 ÷ [(1/3){15 + 12 - (15 - 12)}]
=> 56 ÷ [(1/3){15 + 12 - 3}]
=> 56 ÷ [(1/3){27 - 3}]
=> 56 ÷ [(1/3)(24)]
=> 56 ÷ 8
=> 7

Therefore ? = 7

Important Points

If in any simplification problem there is () bar sign above any operation then we should perform the operation at the beginning, whatever the operation is. Then we will follow the chart given above.

Q40. Answer: (b) Indore

• Indore was the first city in India to use a robot for traffic control.
• It is a 14-foot-tall robot that has an inbuilt public address system and has cameras.
• It can also issue challans to traffic offenders.

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Q41. Answer: (a) None of the conclusions follows

Venn diagram:

Conclusions:

I. All flowers are yellow → False (it is possible but not definite)

II. All yellows are petals → False (it is possible but not definite)

Hence, none of the conclusion follows.

Q42. Answer: (c) Amazon

- Amazon became the second to hit $900 billion market capitalisation after Apple.
- Amazon is an e-Commerce company based in Seattle in the United State of America.
- Its founder Jeff Bezos is the richest person on the earth.

Q43. Answer: (a) Smriti Irani

- The Union Textiles Minister Smriti Irani has launched PowerTax India Scheme to boost power loom sector.
- It was launched by her in Bhiwandi, Thane district, Maharastra.
- It also launched simultaneously across 43 location across in India.
- The comprehensive scheme has the following components
- In-situ Upgradation of Plain Powerlooms.
- Group Workshed Scheme (GWS).
- Yarn Bank Scheme.
- Common Facility Centre (CFC).
- Pradhan Mantri Credit Scheme for Powerloom Weavers.
- Solar Energy Scheme for Powerlooms.
- Facilitation, IT, Awareness, Market Development and Publicity for Powerloom Schemes.
- Tex Venture Capital Fund.
- Grant-in-Aid and Modernisation & Upgradation of Powerloom Service Centres (PSCs).

Q44. Answer: (b) Maharashtra

- The State Government of Maharashtra launched the ‘Quit India movement 2 from Swaraaj to Suraaj initiative at the historic August Kranti Maidan in August 2016.
- It was launched to against various social evils to commemorate the Platinum Jubilee Anniversary of the Quit India movement launched in August Kranti Maidan in 1942.

Q45. Answer: (a) Mark Tully

- British journalist and former BBC India correspondent Sir William Mark Tully had been awarded for 2018 RedInk award for lifetime achievement in journalism.
- Tully worked with the BBC for 30 years before resigning in July 1994. He held the position of Chief of Bureau, BBC, Delhi, for 20 years.
- The RedInk awards for excellence in journalism are given by the Mumbai Press Club.

Q46. Answer: (a) [figure]

Here, horse, monkey and tiger all are animals but there is no connection between them.

Therefore, “option 1” is the best suitable venn diagram.

Q47. Answer: (d) 30 days

Shortcut Trick

Use the direct formula for two people where one person's time is to be found: (A × B) ÷ (B − A).

Here, Rohan + Rohit = 10 days and Rohan = 15 days.

=> Rohit = (15 × 10) ÷ (15 − 10)

=> Rohit = 150 ÷ 5 = 30 days.

Therefore The correct answer is 30 days.

Alternate Method

Given:

Time taken by Rohan and Rohit together = 10 days

Time taken by Rohan alone = 15 days

Formula Used:

Total Work = LCM of individual days

Efficiency = Total Work ÷ Time

Person	Days	Total Work	Efficiency
Rohan + Rohit	10	30	30 ÷ 10 = 3
Rohan	15	30 ÷ 15 = 2	

Calculations:

=> Efficiency of Rohit = Efficiency of (Rohan + Rohit) − Efficiency of Rohan

=> Efficiency of Rohit = 3 − 2 = 1 unit/day

=> Time taken by Rohit alone = Total Work ÷ Efficiency of Rohit

=> Time taken by Rohit = 30 ÷ 1 = 30 days

Therefore The correct answer is 30 days.

Additional Information

Work and Efficiency Relationship

Efficiency is inversely proportional to the time taken to complete a work. If a person finishes work in n days, their 1-day work is 1/n.

Combined Work Formula

If A takes x days and B takes y days, together they take (xy) ÷ (x + y) days to complete the same work.

LCM Method for Total Work

Taking the LCM of the given number of days as Total Work simplifies calculations by using whole number efficiencies instead of fractions.

Q48. Answer: (b) Rs. 34,481

Shortcut Trick

For semi-annual compounding, rate r = 10% ÷ 2 = 5% and periods n = 2 × 2 = 4.

Use the Ratio Method for 4 periods → 4 : 6 : 4 : 1

1st part: 5% of 1,60,000 = 8,000 | 2nd: 5% of 8,000 = 400 | 3rd: 5% of 400 = 20 | 4th: 5% of 20 = 1

CI = (8,000 × 4) + (400 × 6) + (20 × 4) + (1 × 1) = 32,000 + 2,400 + 80 + 1 = Rs. 34,481.

Therefore The correct answer is Rs. 34,481.

Alternate Method

Given: Principal (P) = Rs. 1,60,000, Rate (R) = 10% p.a., Time (T) = 2 years.

For semi-annual compounding, the rate is halved and time is doubled:

=> Effective Rate (r) = 10% ÷ 2 = 5% per half-year.

=> Number of periods (n) = 2 × 2 = 4 half-years.

Formula: Amount (A) = $P \times (1 + r/100)^n$

=> A = 1,60,000 × (1 + 5/100)^4

=> A = 1,60,000 × (21/20)^4

=> A = 1,60,000 × (194481 ÷ 160000)

=> A = Rs. 1,94,481

=> Compound Interest (CI) = A − P

=> CI = 1,94,481 − 1,60,000 = Rs. 34,481

Therefore The correct answer is Rs. 34,481.

Additional Information

Compounding Periods

If interest is compounded quarterly, the rate becomes R/4 and time becomes 4T. For monthly, it is R/12 and 12T.

Effective Rate of Interest

When compounded semi-annually, the effective annual rate is $(1 + r/200)^2 - 1$. Here, 5% twice gives 10.25% annually.

CI vs SI for 2 Years

The difference between CI and SI for 2 years is given by the formula: Difference = $P \times (R/100)^2$.

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Q49. Answer: (b) Both conclusions I and II follow.

The given statement is a proverb which means that everything which looks attractive need not be valuable or the appearance of a person need not be a good indicator of his/her nature.

Clearly, both the given conclusions have comprehended the meaning properly.

Hence, both conclusions I and II follow.

Q50. Answer: (c) 24 J

CONCEPT:

• Work-energy theorem: It states that the sum of work done by all the forces acting on a body is equal to the change in the kinetic energy of the body i.e.,

Work done by all the forces = Kf - Ki

$W = 1/2mv^2 - 1/2mu^2 = \Delta K$

Where v = final velocity, u = initial velocity and m = mass of the body

EXPLANATION:

Given that:

• Mass of the Object (m) = 1 kg

• Initial velocity of the object (u) = 4m/s

• Final velocity of the object (v) = 8m/s

• Total net work is done $W_{(net)}$ = Kinetic energy (During final velocity) – Kinetic Energy (During Initial Velocity).

• Now by substituting the values in the above equation, we get

$W_{(net)} = ½ mv^2 – ½ mu^2$

$= ½ (1)\times(8)^2 – ½ (1)\times(4)^2$

= 32 - 8 Joule

= 24 Joules.

• Therefore, the total work done by the force is 24 J.

Q51. Answer: (c) speed

Explanation:

• As long as an unbalanced force is applied to a body, there is a continuous change in its speed.

• Newton's Second Law of motion states that the rate of change of momentum of an object is proportional to the applied force in the direction of the force. i.e. F=ma. Where F is the force applied, m is the mass of the body, and a is the acceleration produced.

• As the rate of change of speed is acceleration and hence, when an unbalanced force acts on an object it speeds changes accordingly.

Q52. Answer: (c) Ammonium chloride

• Ammonium Chloride is an example of a salt gives an aqueous solution of pH less than 7.

• We know the reaction between Ammonium Chloride (NH_4Cl)

• $NH_4Cl + H_2O \rightarrow NH_4OH + HCl$

All the other salts when mixed with water give basic solution.

Q53. Answer: (b) 72 J

• The amount of charge (q) = 4 C

• Potential difference between two points (v) = 18 v

• Now work done (w) = q v

• Now by substituting the value, we get

w = (4) (18)

= 72 Joules

• The total amount of work done is 72 J.

Q54. Answer: (b) Kodaikanal

The correct answer is Kodaikanal

Key Points

• Kodaikanal is known as the Princess of the Hill Stations with an elevation of 2100 mt.

• It is in the state of Tamil Nadu and located in Palani Hills (Part of Western Ghats).

Additional Information

Hill Station	Place sobriquets
Dehradun	Capital of Uttarakhand.
Darjeeling	Famous for its UNESCO World Heritage site, the Darjeeling Himalayan Railway.

Q55. Answer: (b) Shram Award

• Shram Award is given to recognises workers for their distinguished performance, innovative ability, and outstanding contribution in the field of productivity and exhibition of exceptional courage and presence of mind.

• Prime Minister Shram Awards were instituted in 1985 to recognize the contributions made by workers as defined in the Industrial Disputes Act, 1947.

Q56. Answer: (b) Rs. 8000

Shortcut Trick

Let Delhi price (X) be 100 units. Chandigarh CP = 80 units.

Total CP = 80 units + Rs. 600. SP = 100 units.

Profit% = 100/7% = 1/7 in fraction. Therefore SP = CP × 8/7.

100 units = (80 units + 600) × 8/7 => 700 units = 640 units + 4800.

60 units = 4800 => 1 unit = 80. Therefore X (100 units) = 80 × 100 = 8000.

Therefore The correct answer is Rs. 8000.

Alternate Method

Given: Delhi Price = Rs. X, Discount = 20%, Transport = Rs. 600, Profit = 100/7 %.

Formulas: CP = MP × (100 − D%)/100 | Profit% = (SP − CP)/CP × 100 | SP = CP × (1 + P/100).

=> Cost Price in Chandigarh = X − 20% of X = 0.8X.

=> Total Cost Price including transport = 0.8X + 600.

=> Selling Price in Delhi = X.

=> Profit% = 100/7% => SP = CP × (1 + 1/7) = CP × 8/7.

=> X = (0.8X + 600) × 8/7.

=> 7X = 6.4X + 4800.

=> 0.6X = 4800 => X = 4800 ÷ 0.6 = 8000.

Therefore The correct answer is Rs. 8000.

Additional Information

Total Cost Price

When overhead expenses like transportation, repairs, or labor are involved, they are always added to the Purchase Price to calculate the effective Cost Price.

Profit Percentage to Fraction

To simplify calculations, convert percentages to fractions: 100/7 % = (100/7) ÷ 100 = 1/7. A profit of 1/7 means SP is 1 + 1/7 = 8/7 of CP.

Q57. Answer: (d) 3

Shortcut Trick

Given $\sec^4\theta - \sec^2\theta = 3$.

Factorize: $\sec^2\theta(\sec^2\theta - 1) = 3$.

Using $1 + \tan^2\theta = \sec^2\theta$, we know $\sec^2\theta - 1 = \tan^2\theta$.

Substitute: $(1 + \tan^2\theta)(\tan^2\theta) = 3 \rightarrow \tan^2\theta + \tan^4\theta = 3$.

Therefore The correct answer is 3.

Alternate Method

Given: $\sec^4\theta - \sec^2\theta = 3$

Formula Used: $\sec^2\theta = 1 + \tan^2\theta$

=> $\sec^4\theta - \sec^2\theta = 3$

=> $\sec^2\theta(\sec^2\theta - 1) = 3$

=> $(1 + \tan^2\theta)(\tan^2\theta) = 3$

=> $\tan^2\theta + \tan^{\wedge}4\theta = 3$

Therefore The correct answer is 3.

Additional Information

Fundamental Trigonometric Identities

1. $\sin^2\theta + \cos^2\theta = 1$ | 2. $1 + \tan^2\theta = \sec^2\theta$ | 3. $1 + \cot^2\theta = \text{cosec}^2\theta$.

Reciprocal Relations

$\sec\theta = 1/\cos\theta$ and $\tan\theta = \sin\theta/\cos\theta$.

Important Substitution

Whenever powers of sec and tan are given together, look for the factor ($\sec^2\theta - \tan^2\theta = 1$).

Q58. Answer: (b) No conclusion follows

The minimum possible Venn diagram of the given statements,

Conclusions:

I. Some cows are cats → False

II. Some cows have mustache → False (it is possible but not definite)

Hence, no conclusion follows.

Q59. Answer: (a) A

Figure 1 to Figure 2:

• Figure 3 to Figure 4:

• Hence, “A” is the correct answer.

Q60. Answer: (c) Rajya Sabha

• Rajya Sabha is known as the Upper house of the Indian Parliament.

• Article 80 of the Indian Constitution lays down the maximum strength of Rajya Sabha as 250, out of which 12 members are nominated by the President and 238 are representatives of the States and of the two Union Territories.

• Vice President of India will act as Ex-Officio chairman of Rajya Sabha.

	Lok Sabha	Rajya Sabha
Total Members	543	245(at present)
Elected	543	233
Nominated	0	12

Q61. Answer: (b) [figure]

• We know that ships travel on the oceans

• Similarly, whales live in the ocean. But we can not relate ships and whales.

Hence, the most suitable venn diagram is “option 2”.

Q62. Answer: (b) No conclusions follow

The minimum possible Venn diagram of the given statements,

Conclusions:

1. All iron are metals → False (it is possible but not definite)

2. All heavy are metals → False (it is possible but not definite)

Hence, no conclusion follows.

Q63. Answer: (c) Celebration of children’s rights

• ‘Hausala 2017’ is the celebration of Children’s rights.

• It was held from 16^(th) November to 20^(th) November 2017 by the Ministry of Women and Child Development and celebrated as child Rights Week.

Q64. Answer: (a) 5/24

=> Part of cake left with 5^(th) friend = 1 – {(1/8) + (1/6) + (5/12) + (1/12)} = 1 – {(3 + 4 + 10 + 2)/24} = 1 – (19/24) = 5/24

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Q65. Answer: (c) Non-metals

• Non-Metals can exist in solid, liquid and gaseous forms.

• Physical Properties of non-metals:

• Density: Non-metals have low densities.

• Lustre: Non-metals do not have lustre, except diamond and iodine crystals.

• Brittleness: Solid non-metals are brittle, and some non-metals are soft. Diamond (an allotrope of carbon) is an exception, which is the hardest natural substance.

• Ductility & Malleability: Non-metals are neither ductile nor malleable.

• Conduction of Heat & Electricity: Non-metals are bad conductors of heat and electricity except graphite.

• Physical State: At ordinary temperature non-metals occur as solids, liquids, and gases.

For example, Solids: Carbon, Sulphur, Phosphorus, Liquids: Bromine

Gases: Hydrogen, Nitrogen.

Q66. Answer: (c) D

The logic followed here is:-

• All the symbols are moving clockwise one behind the other.

• Triangle (

) rotates 900 anticlockwise directions in each step.

• Both symbols

rotate one place in the clockwise direction in each step.

• Symbols (

) rotate in the clockwise direction in each step and symbol

changes to symbol ± in alternate steps.

• The symbol

rotates in the clockwise direction in each step.

So, the next image of the given series is figure D.

Hence, “Option 3” is the correct answer.

Q67. Answer: (d) Only conclusion II follows

The minimum possible Venn diagram of the given statements,

Conclusions:

1. All four-wheelers are cars → False (Because all jeeps are four-wheelers so some four-wheelers can be jeeps but all four-wheelers is definitely false)

2. Some four-wheelers are Jeeps → True (Because all jeeps are four-wheelers so some four-wheelers can be jeeps, it is definitely true)

Hence, Only conclusion 2 follows.

Q68. Answer: (c) 60° west of south

Given, at 3 pm

Now at 3.40 pm

In every 5 minutes movement minute hand will make an angle of 30°, thus between 3.30 pm and 3.40 pm it will make an angle of 60° (5 min. + 5 min. = 30° + 30°)

Therefore minute hand is pointing 60° west (9) of the south (6).

Hence, “60° west of south” is the correct answer.

Q69. Answer: (b) 10 hours

Shortcut Trick

Combined efficiency 2(A + B + C) = (Total Work ÷ (A+B)) + (Total Work ÷ (B+C)) + (Total Work ÷ (A+C))

LCM of (6, 10, 7.5) = 30 units (Total Work)

Efficiency: (A+B) = 5, (B+C) = 3, (A+C) = 4

Efficiency of A = [(A+B) + (A+C) − (B+C)] ÷ 2 = (5 + 4 − 3) ÷ 2 = 3

Time for A = 30 ÷ 3 = 10 hrs

Therefore The correct answer is 10 hr.

Alternate Method

Given: Time (A+B) = 6 hr, (B+C) = 10 hr, (A+C) = 7.5 hr.

Person/Pipe	Days/Time	Total Work	Efficiency
A + B	6 hr	30 units	30 ÷ 6 = 5
B + C	10 hr	30 ÷ 10 = 3	
A + C	7.5 hr	30 ÷ 7.5 = 4	

=> Adding efficiencies: 2(A + B + C) = 5 + 3 + 4 = 12

=> A + B + C = 12 ÷ 2 = 6

=> Efficiency of A = (A + B + C) − (B + C) = 6 − 3 = 3

=> Time taken by A alone = Total Work ÷ Efficiency of A

=> Time = 30 ÷ 3 = 10 hr

Therefore The correct answer is 10 hr.

Additional Information

Total Work and Efficiency

Efficiency is inversely proportional to time. Total Work = Efficiency × Time.

Combined Work Formula

If A and B work together, their combined efficiency is the sum of their individual efficiencies (E_(total) = E_A + E_B).

Pipes and Cisterns

Inlet pipes have positive efficiency, while outlet (leak) pipes have negative efficiency in work calculations.

Q70. Answer: (c) Both I and II are implicit

The Mayor is promoting to keep his city clean, pollution-free, beautiful, and green. As we know that ecological park has trees and diverse ecological systems, we can say “ecological parks improve green cover”.

And since we know that trees absorb Carbon dioxide, it can be safely assumed that having an ecological park in the city will “reduce air pollution”.

Thus, both the assumption can be implicit from the given statement.

Q71. Answer: (a) C

The pattern followed here is:

1.

• T and its water image

2.

• V and its water image

3.

• not the water image of N.

• Water image of N will be as follows:

4.

• A and its water image

Hence, “C” is the correct answer.

Q72. Answer: (c) 0

Shortcut Trick

Apply Cross-Multiplication to the given expression.

Numerator = (sin A + sin B)(sin A − sin B) + (cos A + cos B)(cos A − cos B)

=> (sin² A − sin² B) + (cos² A − cos² B)

=> (sin² A + cos² A) − (sin² B + cos² B) = 1 − 1 = 0

Therefore The correct answer is 0.

Alternate Method

Given: [(sin A + sin B) / (cos A − cos B)] + [(cos A + cos B) / (sin A − sin B)]

Formula Used: (a + b)(a − b) = a² − b² and sin² θ + cos² θ = 1

Calculations:

=> Take LCM: (cos A − cos B)(sin A − sin B)

=> Numerator: (sin A + sin B)(sin A − sin B) + (cos A + cos B)(cos A − cos B)

=> Using (a+b)(a-b): (sin² A − sin² B) + (cos² A − cos² B)

=> Rearranging: (sin² A + cos² A) − (sin² B + cos² B)

=> Substituting 1: 1 − 1 = 0

=> Expression: 0 / [(cos A − cos B)(sin A − sin B)] = 0

Therefore The correct answer is 0.

Additional Information

Trigonometric Identities

Fundamental identities include $\sin^2\theta + \cos^2\theta = 1$, $1 + \tan^2\theta = \sec^2\theta$, and $1 + \cot^2\theta = \operatorname{cosec}^2\theta$.

CD Formulas

Alternative solution involves sin C + sin D and cos C − cos D transformations to simplify ratios into tan or cot functions.

Q73. Answer: (c) Iron

• The element Iron (26) has the chemical symbol that is derived from Latin.

• It's chemical symbol is Fe which is derived from Iron's Latin name Ferrous.

Element	Atomic Number
Chlorine (Cl)	17
Carbon (C)	6
Aluminium (Al)	13

Q74. Answer: (b) 1

Shortcut Trick

Identify the algebraic identity: If the sum of three terms is zero (x + y + z = 0), then the sum of their cubes is equal to three times their product ($x^3 + y^3 + z^3 = 3xyz$).

Let x = a − b, y = b − c, and z = c − a. Summing them: (a − b) + (b − c) + (c − a) = 0.

Thus, the numerator becomes 3(a − b)(b − c)(c − a).

The expression simplifies to: 3(a − b)(b − c)(c − a) ÷ 3(a − b)(b − c)(c − a) = 1.

Therefore The correct answer is 1.

Alternate Method

Given:

Expression: $[(a-b)^3 + (b-c)^3 + (c-a)^3] \div [3(a-b)(b-c)(c-a)]$

Formula Used:

If x + y + z = 0, then $x^3 + y^3 + z^3 = 3xyz$

Calculations:

Let us assume:

x = a − b

y = b − c

z = c − a

=> x + y + z = (a − b) + (b − c) + (c − a)

=> x + y + z = a − a + b − b + c − c = 0

=> According to the identity, $x^3 + y^3 + z^3 = 3xyz$

=> $(a-b)^3 + (b-c)^3 + (c-a)^3 = 3(a-b)(b-c)(c-a)$

Now, substitute the value of the numerator back into the original expression:

=> Value = [3(a − b)(b − c)(c − a)] ÷ [3(a − b)(b − c)(c − a)]

=> Value = 1

Therefore The correct answer is 1.

Additional Information

Standard Algebraic Identity

The general identity is $a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$. If a + b + c = 0, the entire right side becomes zero.

Special Case: a = b = c

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If a = b = c, then $a^2 + b^2 + c^2 - ab - bc - ca = 0$, which also results in $a^3 + b^3 + c^3 = 3abc$.

Application in Fractions

This identity is frequently used to simplify complex cyclic fractions where variables cancel out to leave a constant value, often 1 or 3.

Q75. Answer: (d) 180 km

Shortcut Trick

Convert speed to kmph: 15 × (18/5) = 54 kmph.

Convert time to hours: 3 hours 20 mins = 3 + (1/3) = 10/3 hours.

Distance = 54 × (10/3) = 18 × 10 = 180 km.

Therefore The correct answer is 180 km.

Alternate Method

Given: Speed = 15 m/s, Time = 3 hours 20 minutes.

Formula Used: Distance = Speed × Time

=> Speed in kmph = 15 × (18/5) = 54 kmph

=> Time in hours = 3 + (20/60) = 3 + 1/3 = 10/3 hours

=> Distance = 54 × (10/3)

=> Distance = 18 × 10 = 180 km

Therefore The correct answer is 180 km.

Additional Information

Unit Conversion

To convert m/s to km/h, multiply by 18/5. To convert km/h to m/s, multiply by 5/18.

Average Speed

When a distance is covered at speed x and the same distance at speed y, Average Speed = (2 × x × y) ÷ (x + y).

Relative Speed

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

Q76. Answer: (a) 3,72,000

=> Mobile phone manufactured by LMN = 30% of total mobile = 30% of 1240000 = 372000

Q77. Answer: (d) B

Given,

By combining in best possible way.

Hence, image “B” is formed from the two shapes gives the problem figure.

Q78. Answer: (c) Friday

Total no. of years difference between 2010 – 2018 = 8

Number of leap years till 2018 = 2 (2012 and 2016)

Number of ordinary years till 2018 = 6

Number of odd days till 2018 = 6 + (2 × 2) = 6 + 4 = 10 odd days

Total number of odd days till 1^(st) January 2018 = 10 odd days = 3 odd days

So, we have move 3 days backward from Monday i.e., Friday.

Hence, “Friday” is the correct answer.

Q79. Answer: (a) Rs. 12,500

Shortcut Trick

Total Investment = 100%

Total Expenditure = 30% (Furnishing) + 20% (Necessary things) = 50%

Remaining percentage for inventory = 100% − 50% = 50%

Leftover money = 50% of Rs. 25,000 = Rs. 12,500

Therefore The correct answer is Rs. 12,500.

Alternate Method

Given:

Initial Investment = Rs. 25,000

Furnishing Expense = 30%

Other Necessary Things = 20%

Calculations:

=> Total spending percentage = 30% + 20% = 50%

=> Remaining percentage = 100% − 50% = 50%

=> Leftover amount = (50 ÷ 100) × 25,000

=> Leftover amount = 0.5 × 25,000 = 12,500

Therefore The correct answer is Rs. 12,500.

Additional Information

Percentage Expenditure

When expenditures are given as a percentage of the initial total, they are simply added together: Total % = P1 + P2 + ... + P_n.

Remaining Balance Method

If the question says percentage of remaining amount, use the successive method: Final = Initial × (100−P1)/100 × (100−P2)/100.

Fractional Conversion

Converting percentages to fractions (e.g., 50% = 1/2) often simplifies multiplication during exams.

Q80. Answer: (a) A

Clearly, figure “A” is the correct answer.

Q81. Answer: (d) A

The pattern followed here is:

A)

• The orientation of trapezium and oval is resembles closet to the question figure.

B)

• The orientation of trapezium is not correct as per the given question figure.

C)

• The orientation of trapezium is not correct as per the given question figure.

D)

• The orientation of trapezium is not correct as per the given question figure.

Hence, the correct answer is "Option 4".

Q82. Answer: (a) 5

Shortcut Trick

For a number to be divisible by 11, the difference between the sum of digits at odd places and the sum of digits at even places must be 0 or a multiple of 11.

Sum at odd places (x, 4, 1) = x + 4 + 1 = x + 5

Sum at even places (4, 6) = 4 + 6 = 10

Difference: (x + 5) − 10 = 0 => x − 5 = 0 => x = 5

Therefore The correct answer is 5.

Alternate Method

Given: The number is x4461 and it is divisible by 11.

Formula Used: Divisibility rule of 11: |Sum_(odd) − Sum_(even)| = 0, 11, 22, ...

=> Sum of digits at odd places = x + 4 + 1 = x + 5

=> Sum of digits at even places = 4 + 6 = 10

=> According to rule: (x + 5) − 10 = 0 (since x is a single digit)

=> x − 5 = 0

=> x = 5

Therefore The correct answer is 5.

Additional Information

Face Value and Place Value

The face value of a digit is the digit itself, regardless of its position in the number.

Divisibility by 3 and 9

A number is divisible by 3 or 9 if the sum of its digits is divisible by 3 or 9 respectively.

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Divisibility by 11 Rule

Difference = |∑Digits_(odd) − ∑Digits_(even)|. If Difference ÷ 11 has remainder 0, the number is divisible by 11.

Q83. Answer: (b) Both 1 and 2 are sufficient

Shortcut Trick

Property: Angles subtended by the same arc (or chord) at the circumference of a circle are always equal.

From Information 1: Chord AB subtends angle ACB and angle ADB at the circumference. Therefore angle ACB = angle ADB.

From Information 2: angle D (or angle ADB) = 60°.

Combining both: angle ACB = 60°.

Therefore The correct answer is Both 1 and 2 are sufficient.

Alternate Method

Given:

Information 1: A circle with points A, B, C, D on its circumference and chord AB.

Information 2: The measure of angle angle D = 60°.

Formula Used:

Angles in the same segment of a circle are equal.

Calculations:

=> In Information 1, points A, B, C, D are concyclic (lie on the same circle).

=> Chord AB subtends angle ACB and angle ADB in the major segment.

=> According to the geometric theorem: angle ACB = angle ADB.

=> From Information 2: angle ADB = 60°.

=> Therefore angle ACB = 60°.

=> Since we used both the geometric setup from Info 1 and the numerical value from Info 2, both are required.

Therefore The correct answer is Both 1 and 2 are sufficient.

Additional Information

Angle at the Centre

The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle (Angle at centre = 2 × Angle at circumference).

Angle in a Semi-circle

The angle subtended by a diameter at the circumference is always a right angle (90°).

Cyclic Quadrilateral

In a cyclic quadrilateral, the sum of opposite angles is always 180° (angle A + angle C = 180° and angle B + angle D = 180°).

Q84. Answer: (b) Porpoises

• Porpoises can produce ultrasound.

• Sound waves with a frequency greater than 20 kHz are called ultrasound

• Bats, mice, dolphins, etc, can also produce ultrasound.

The various applications of ultrasonic sound waves are:

• For cleaning aeroplanes and machinery parts of clocks.

• For measurement of the depth of the sea.

• It is used in ultrasonography.

Q85. Answer: (b) 12.5%

Shortcut Trick

Loss = 1/7 of CP => Ratio of Loss : CP = 1 : 7.

SP1 = CP − Loss = 7 − 1 = 6 units.

6 units = Rs. 144 => 1 unit = Rs. 24 => CP = 7 × 24 = Rs. 168.

New SP2 = Rs. 189 => Profit = 189 − 168 = Rs. 21.

Profit% = (21 ÷ 168) × 100 = 1/8 × 100 = 12.5%.

Therefore The correct answer is 12.5%.

Alternate Method

Given: SP1 = Rs. 144, Loss = 1/7 of CP, SP2 = Rs. 189.

Formulas: SP = CP − Loss | Profit = SP − CP | Profit% = (Profit ÷ CP) × 100.

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=> Let Cost Price (CP) be x.
=> Loss = x/7.
=> Selling Price (SP1) = CP − Loss = x − x/7 = 6x/7.
=> 144 = 6x/7 => x = (144 × 7) ÷ 6 = 24 × 7 = 168.
=> For SP2 = 189, Gain = 189 − 168 = 21.
=> Gain% = (21 ÷ 168) × 100 = 12.5%.
Therefore The correct answer is 12.5%.
Additional Information
Cost Price & Selling Price Relation
Profit or Loss is always calculated on the Cost Price unless specified otherwise. Formula: CP = [100 ÷ (100 ± Gain/Loss%)] × SP.
Fraction to Percentage Conversion
Standard fractions like 1/8 equal 12.5% and 1/7 approximately 14.28%. Using fractions simplifies multi-step calculations.

Q86. Answer: (d) 2/81

Shortcut Trick
HCF of fractions = HCF of Numerators ÷ LCM of Denominators.
Numerators: 2, 8, 10, 32 → HCF = 2 (highest common divisor).
Denominators: 3, 9, 27, 81 → LCM = 81 (all are powers of 3, take the highest power).
Resulting HCF = 2/81.
Therefore The correct answer is 2/81.
Alternate Method
Given Fractions: 2/3, 8/9, 10/27, 32/81
Formula Used: HCF of (a/b, c/d, e/f) = HCF(a, c, e) / LCM(b, d, f)
Step 1: Calculate HCF of Numerators (2, 8, 10, 32).
=> 2 = 2^1
=> 8 = 2^3
=> 10 = 2 × 5
=> 32 = 2^5
=> HCF (Numerators) = 2
Step 2: Calculate LCM of Denominators (3, 9, 27, 81).
=> 3 = 3^1
=> 9 = 3^2
=> 27 = 3^3
=> 81 = 3^4
=> LCM (Denominators) = 3^4 = 81
Step 3: Apply Fraction HCF formula.
=> HCF of Fractions = 2 / 81
Therefore The correct answer is 2/81.
Additional Information
LCM of Fractions
To find the LCM of fractions, use the formula: LCM = (LCM of Numerators) ÷ (HCF of Denominators).
HCF and LCM Relation
For two numbers A and B: Product of numbers (A × B) = HCF(A,B) × LCM(A,B).
Co-prime Numbers
The HCF of two co-prime numbers is always 1, and their LCM is the product of the numbers.

Q87. Answer: (d) Virat Kohli

Here, Virat kohli is a cricketer (a sports person) and all the others are inventers.
Hence, “Virat kohli” is the correct answer.

Q88. Answer: (c) Canada

The correct answer is Canada.
Key Points

• Canada has the longest coastline (202, 080 km) in the world.
• The currency of Canada is Canadian dollar and it's Prime Minister is Justin Trudeau.
• Canada is the second largest country in the world after Russia.
• Indonesia is the largest archipelago in the world.
• Australia is the Sixth largest country in the world.
• Norway ranked as number 6th in 'World Happiness Report' in the Year 2023.

Q89. Answer: (c) North-East

We can draw diagram from the given information as follows,

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

Q90. Answer: (c) 4, 11, 18 and 25

The logic followed here is:

No. of Odd days	Simple Year	Leap Year
365 ÷ 7 = 52 weeks + 1 odd day	366 ÷ 7 = 52 weeks + 2 odd day	

Years	No. of odd days
100 years	5
200 years	3
300 years	1
400 years	0

Code for weekdays:

No. of odd days	Day
0	Sunday
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday

Note: Multiple of 400 years i.e. 800, 1200, 1600, 2000 have 0 odd days.

Calculating leap year: For Finding the number of leap year (1 - 99) years, divide the number of years by 4 and the quotient will be the number of leap years.

We will find the day on 1st March 2005 = (2000 years + Period from 1.1.2005 to 1.3.2005)

As mentioned above:

• Odd days in 1600 years = 0
• Odd days in 400 years = 0
• Number of leap years till 2004 = 1 (in 2004) = 2 odd days
• Number of ordinary years till 2004 = 3 (2001, 2002, 2003) = 3 odd days
• Now number of odd days in:
• Jan, Feb, and March = 31 + 28 + 1 = 60 days = 4 odd days
• Total number of odd days = (0 + 0 + 2 + 3 + 4) = 9 days = 2 odd days

Since 2 is the code for Tuesday

• So on 1st March, 2005 it was Tuesday.

Therefore, Friday = 1st March + 3 days = 4th March.

• Friday will repeat after 7 days.
• => 4th March + 7 = 11th March.

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• Thus, in March, 2005 Friday falls on 4th, 11th, 18th and 25th.

Hence, the correct answer is "Option 3".

Other method:

We solve these sum by odd day method, like if we want to find day of 60th day we will just divide it by 7 we get(60/7=7*8 + 4) here we get 4 as remainder. so 1st day Monday, 2nd day Tuesday, 3rd day Wednesday, 4th day Thursday which our ans. .. so on 60th day there will be Thursday. FIND Friday fall on which dasy of March 2005 = ? For 2000 years there will be 0 odd days For 2001-2004 there is 5 odd days. ..(1) because 2001= 1 odd day, for 2002= 1 odd day for 2003 = 1 odd day, for 2oo4 = 2 odd days (leap year) so january,2005 = 31 days, feb 2005 = 28 days.....(2) so from (1) & (2) we get odd days 2001-2004, + jan2005 + feb2005= 5 +31+28=64 Now 64/7=7*9 + 1 remainder = 1 so there will be Monday on 28th feb 2005 1st March = Tuesday 2nd March = wednesday 3rd March = Thursday 4th March = Friday with gap of 7 days other friday fall on 11,18 & 25

Q91. Answer: (a) England and France

• The struggle between France and England called the Hundred Years' War was the longest war in recorded history.

• It lasted, with some interruptions, through the reigns of five English kings (Edward III to Henry V) and five French kings (Philip VI to Charles VII).

Q92. Answer: (d) Collenchyma

• Collenchyma consists of living cells and is characterised by the presence of cellulose.

• Collenchyma is a mechanical tissue in young dicotyledonous stems and provides mechanical support and elasticity.

• It provides great tensile strength with flexibility to those organs in which it is found. It allows easy bending in various parts of a plant mainly young growing stem without breaking them.

Type of cell	Function
Xylem	Xylem is the tissue which carries water from roots to the leaves in a plant.
Phloem	Phloem is a transport tissue found in vascular plants which are responsible for transporting food in plants.
Sclerenchyma	Sclerenchyma is usually dead cells and they provide structural support to plant.

Q93. Answer: (c) 8000

Shortcut Trick

Check the unit digit and the number of trailing zeros.

A perfect cube ending in 0 must have a number of zeros that is a multiple of 3 (3, 6, 9...).

Only 8000 and 9000 have three zeros. Since 8 is a perfect cube (2^3) and 9 is not, 8000 is the answer.

Therefore The correct answer is 8000.

Alternate Method

Given: Numbers 8261, 9000, 8000, 9999.

Formula: A number n is a perfect cube if there exists an integer a such that $n = a^3$.

=> Option 1: 8261 is not a cube of any integer ($20^3 = 8000$, $21^3 = 9261$).

=> Option 2: $9000 = 9 \times 10^3$. Since 9 is not a perfect cube, 9000 is not a perfect cube.

=> Option 3: $8000 = 8 \times 1000 = 2^3 \times 10^3 = (2 \times 10)^3 = 20^3$.

=> Option 4: 9999 is not a perfect cube ($21^3 = 9261$, $22^3 = 10648$).

Therefore The correct answer is 8000.

Additional Information

Properties of Perfect Cubes

Perfect cubes of even numbers are always even, and perfect cubes of odd numbers are always odd.

Trailing Zeros Rule

If a number ends in n zeros, its cube ends in 3n zeros. Therefore, a perfect cube must end in a multiple of 3 zeros.

Common Cubes for Exams

$1^3=1$, $2^3=8$, $3^3=27$, $4^3=64$, $5^3=125$, $10^3=1000$, $20^3=8000$.

Q94. Answer: (c) 1, 2, 3

• The general valency of electropositive elements is 1, 2, 3.

• Atoms which tend to donate electrons and converts into a positive ion (M+) are called Electropositive atoms.

• The atoms which have 1, 2, or 3 electrons in their valence shells will lose their electrons to attain a stable electronic configuration.

• Some examples are Sodium, Magnesium, and Aluminium. These 3 elements will lose electrons to attain the configuration of the noble gas Neon.

Q95. Answer: (c) 4

We know that,

The pattern followed here is as follows,

Similarly,

Thus SWAN is written as 1923114.

Hence, “4” is the last digit of SWAN.

Q96. Answer: (c) 72°

Shortcut Trick

According to the Alternate Segment Theorem, the angle between a tangent and a chord through the point of contact is equal to the angle subtended by the chord in the alternate segment.

In the given figure, EC is the tangent at point C and BC is a chord.

=> angle BAC = angle BCD

Given angle BCD = 72°

=> angle BAC = 72°

Therefore The correct answer is 72°.

Alternate Method

Given:

Line AB is parallel to line EC (AB || EC).

Angle angle BCD = 72°.

Point C is the point of tangency on the circle.

Formula Used:

1. Alternate Segment Theorem: The angle between a tangent and a chord is equal to the angle in the alternate segment.

2. Parallel Lines Property: Alternate interior angles are equal.

Calculations:

=> Since AB || EC, the alternate interior angles must be equal.

=> angle ABC = angle BCE (Alternate interior angles)

=> By the Alternate Segment Theorem, the angle between tangent EC and chord BC is equal to the angle in the alternate segment angle BAC.

=> angle BCE = angle BAC

=> Similarly, if CD is the extension of the tangent, angle BCD is also an angle between the tangent and chord BC.

=> angle BAC = angle BCD

=> Given angle BCD = 72°

=> angle BAC = 72°

Therefore The correct answer is 72°.

Additional Information

Alternate Segment Theorem

The angle between a tangent and a chord through the point of contact is equal to the angle in the alternate segment. For a tangent XY at point P and chord PQ, angle QPX = angle PRQ where R is any point on the major arc.

Parallel Chords and Tangents

If a chord is parallel to a tangent at a point on a circle, the triangle formed by the chord and the point of tangency is always an isosceles triangle.

Angles in the Same Segment

Angles subtended by the same arc or chord at any point on the remaining part of the circle are equal.

Q97. Answer: (c) vegetative propagation

• Vegetative reproduction is the type of reproduction in which a part of a plant body develops into a new individual.

• Vegetative propagation is a type of asexual reproduction in which new plants are produced from roots, stems, leaves and buds.

• As new offspring comes from the vegetative part of the plant, hence the name Vegetative propagation.

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Type	Definition
Fission	It is a type of asexual reproduction in which a single cell divides into two or more cells
Regeneration	It is a type of asexual reproduction. It is the ability of a simple organism to re-grow its lost parts.
Sexual Propagation	Genes of two different parent cell come together to form a new individual.

Q98. Answer: (a) M

The pattern followed here is as follows,

Hence, “M” is the correct answer.

Q99. Answer: (a) 15

Shortcut Trick

Let the total work be 66 units (LCM of 22 and 33).

Efficiency of A = 3, Efficiency of B = 2.

Since A was closed 3 hours before completion, add the work A would have done: 3 × 3 = 9 units.

Total adjusted work = 66 + 9 = 75 units.

Total time = Total adjusted work ÷ Total efficiency = 75 ÷ (3 + 2) = 15 hours.

Therefore The correct answer is 15 hours.

Alternate Method

Person	Days	Total Work	Efficiency
Pipe A	22	66	3
Pipe B	33	2	

Let the total time taken to fill the cistern be T hours.

Pipe A worked for (T − 3) hours and Pipe B worked for T hours.

=> Work by A + Work by B = Total Work

=> 3 × (T − 3) + 2 × T = 66

=> 3T − 9 + 2T = 66

=> 5T = 66 + 9

=> 5T = 75

=> T = 75 ÷ 5 = 15 hours

Therefore The correct answer is 15 hours.

Additional Information

Work & Efficiency Relationship

Total Work = Efficiency × Time. Efficiency is inversely proportional to the time taken to complete the work.

Pipes & Cisterns - Leaving Mid-way

When a pipe is closed 'n' hours before completion, adding its work for those 'n' hours to the total work simplifies the calculation for the total duration.

Combined Efficiency

For two inlet pipes filling a cistern, the combined rate is the sum of their individual efficiencies.

Q100. Answer: (a) Anticlockwise

• Anticlockwise will be the direction of the magnetic field at a point directly below a horizontal power line with the current flowing from east to west when viewed from the west end.

• According to ampere’s right-hand thumb rule when a current carrying conductor is placed in the right hand with thumb showing the direction of current and all other fingers are enclosed around the conductor will show the direction of the magnetic field.

• When we place our hand on a conductor that is flowing with the current in the east to the west direction the enclosed fingers show the anti-clockwise direction of current when viewed from the west.

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