RRC Group D Previous Year Paper 62 (Held On: 9 Oct 2018 Shift 1)

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

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CBT

Q1. Which of the following sport is related to Bembem Devi?

(a) Athletics
(b) Football
(c) Archery
(d) Table Tennis

Q2. If sin θ + cosecθ = 2, then find the value of sin ^(2018)θ + cosec^(2018)θ.

(a) 2018
(b) 2
(c) 1
(d) 0

Q3. 48 men can complete a work in 30 days. After working for 6 days, 12 men left the work. Remaining work was completed by remaining workers in how many days?

(a) 28
(b) 32
(c) 30
(d) 34

Q4. Read given statement and conclusions carefully and choose which of the conclusions logically follows from the given statements.

Statement:

No paper is a book. All books are bag.

Conclusion:

I. No bag is a paper.

II. Some bags are paper.

(a) Both I and II follows.
(b) Either I or II follows.
(c) Neither I nor II follows.
(d) Only I follows.

Q5. A number x is written as 15.84 correct to two decimal places. Which of the given statement is true?

(a) 15.835 < x ≤ 15.845
(b) 15.835 < x < 15.845
(c) 15.835 ≤ x ≤ 15.845
(d) 15.835 ≤ x < 15.845

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Q6. Which of the following characteristics is recessive in a pea plant?

(a) Green bean
(b) Wrinkled seed
(c) Round seed
(d) Yellow seed

Q7. All the four angles of a quadrilateral are same. Find there measure.

(a) 110°
(b) 80°
(c) 75°
(d) 90°

Q8. Name the activist fighting hunger and malnutrition, who won the Queen's Young Leader Award for 2017 at a ceremony held at Buckingham Palace?

(a) Palbinder Kaur Shergill
(b) Srinivas Gokulnath
(c) Ankit Kawatra
(d) Tanmanjit Singh Dhesi

Q9. The universal law of gravitation applies to _____.

(a) Sun and Planets
(b) Earth and Sun
(c) Earth and Moon
(d) Any pair of objects

Q10. The rise of Jainism and Buddhism saw religious unrest in India in the _____ century BC.

(a) 5th
(b) 4th
(c) 6th
(d) 7th

Q11. There are two taps in a tank. One tap fills the tank in 8 hours and another tap empties it in 10 hours. If both the taps are opened simultaneously, then in how much time will the tank be filled?

(a) 40
(b) 20
(c) 30
(d) 50

Q12. A bullet of 40 gm is fired horizontally with a velocity of 160 ms^(–1) from a pistol weighing 2 kg. What is the rebound velocity of the pistol?

(a) –1.5 ms^(–1)
(b) –3.2 ms^(–1)
(c) –1.25 ms^(–1)
(d) –2.0 ms^(–1)

Q13. The chemical formula of unextinguished lime is _____.

(a) CaCO3
(b) CaCl2
(c) CaSO4
(d) CaO

Q14. Square of 1 3/11 is:

(a) 16/111
(b) 225/112
(c) 196/121

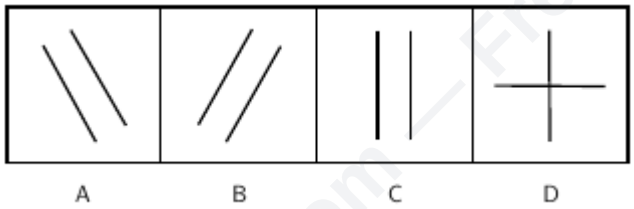
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(d) 9/121

Q15. Who among the following was honoured with the 2018 Padma Bhushan award in the field of art-music?

(a) Sharda Sinha
(b) Kaifi Azmi
(c) Gulzar
(d) Javed Akhtar

Q16. Select the odd one:



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

Q17. If A : B = 5 : 8 and B : C = 18 : 25, then find A : C.

(a) 8 : 5
(b) 9 : 20
(c) 5 : 8
(d) 20 : 9

Q18. What is the position of Indian Railways among the world's largest railways?

(a) 4
(b) 5
(c) 3
(d) 1

Q19. Which party has won majority of seats in Gujarat Assembly Election 2017?

(a) Indian National Congress
(b) Aam Aadmi Party
(c) Rashtriya Janata Party
(d) Bhartiya Janata Party

Q20. The sides of a triangle are 16 m, 12 m and 20 m respectively. Find the altitude to its longest side.

(a) 9.2 m
(b) 9.6 m
(c) 9.4 m
(d) 9.8 m

Q21. $(-4)[20 \div \{(-2) \times (-8)\}] = ?$

(a) 40
(b) -5
(c) -40
(d) 20

Q22. Which of the following materials has the highest resistivity?

(a) Ebonite
(b) Copper
(c) Nichrome
(d) Glass

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Q23. What is the square root of 519841?

(a) 721
(b) 629
(c) 631
(d) 731

Q24. To maintain the current in a given electrical circuit, the cell has to expend _____ energy stored in it.

(a) Electrical
(b) Kinetic
(c) Chemical
(d) Potential

Q25. By selling an article for Rs. 420, the seller gains 5%. How much profit or loss will he make by selling that article for Rs. 380?

(a) P = 10%
(b) P = 5%
(c) L = 10%
(d) L = 5%

Q26. Read given statement and conclusions carefully and choose which of the conclusions logically follows from the given statements.

Statement

The local municipality issued a notice to vendors in the newspaper saying, "Sealed tenders are invited from local contractors for the construction of the bridge in Mohalla 3."

Conclusion:

I. The municipality is planning to build a bridge.

II. They want to know, how many contractors would be interested.

(a) Only conclusion I follows.
(b) Both the conclusions follow.
(c) No conclusion follows.
(d) Only conclusion II follows

Q27. Alternating current was invented by _____.

(a) Isaac Newton
(b) Thomas Edison
(c) Nikola Tesla
(d) Albert Einstein

Q28. Select the option that is related to third word in the same way as second letter is related to first word.

Eat : Ate :: Buy : ?

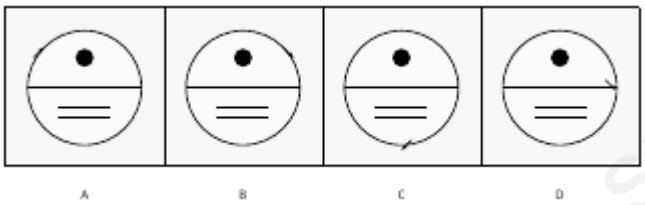
(a) Bought
(b) Brings
(c) Buys
(d) Bring

Q29. The clock is showing 9:00 am. If the minute hand points toward north, then in which direction does the hour hand point?

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

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Q30. Find the odd one out.



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

Q31. On the basis of the following statement, which of the two conclusion(s) given below follows?

Statement:

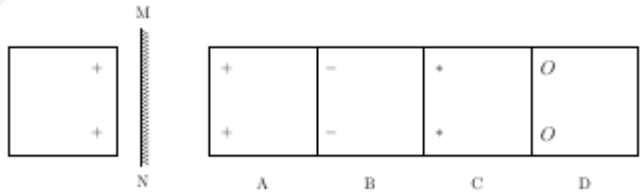
Some lions are tigers. Some tigers are donkeys.

Conclusion:

1. Some lions are donkeys.
2. All tigers are donkeys.

(a) Either 1 or 2 follows.
(b) Only 1 follows.
(c) Neither 1 nor 2 follows.
(d) Only 2 follows.

Q32. Select mirror image of following figure.



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

Q33. Find mode of the following data:

25, 45, 58, 87, 45, 54, 65, 12, 25, 59, 42, 60

(a) 25
(b) 45
(c) 45, 54
(d) 45, 25

Q34. In which of the following processes, the cell is involved in the generation of an exact copy of another living part or a complete organism?

(a) Cloning
(b) In vitro fertilization (IVF)
(c) Fructification
(d) Regeneration

Q35. Sum of three fractions is 6. If one of them is 1 1/4, while the ratio of other two is 9 : 10. Then largest fraction among the three fractions is:

(a) 2 1/4
(b) 2 3/4
(c) 2 1/8

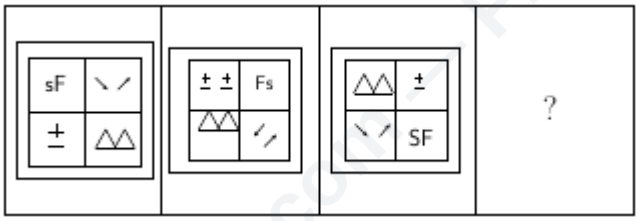
(d) 2 1/2

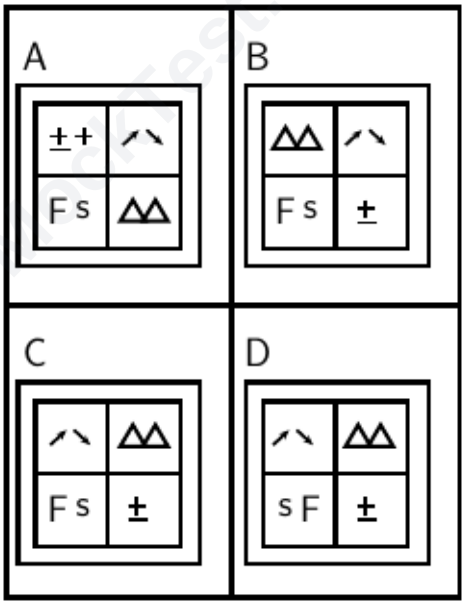
Q36. Select the option which is related to the third word in same way as second word is related to the first word.

Smell : Rose : : Wisdom : ?

(a) Reading
(b) Information
(c) Experience
(d) Money

Q37. Select the option that comes next in the following series.



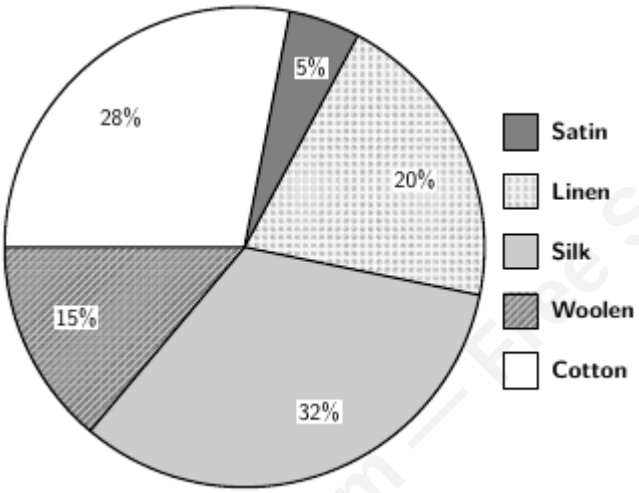


(a) C
(b) A
(c) B
(d) D

Q38. _____ is probably the largest group of creatures.

(a) Arthropoda
(b) Echinodermata
(c) Annelida
(d) Mollusca

Q39. The following pie chart shows the production of different types of garments in Company XYZ in 2014.



If a total of 150,000 tonnes of textiles were produced in 2014, then what was the production of woolen garments (in tonnes) in 2014?

(a) 22500
(b) 60000
(c) 15000
(d) 7500

Q40. The least common multiple of 112, 24 and 48 will be :

(a) 240
(b) 336
(c) 8
(d) 224

Q41. Whose portrait/statue was unveiled by Maharashtra Chief Minister Devendra Fadnavis at the headquarters of the Greater Mumbai Municipal Corporation?

(a) Bal Thackeray
(b) Ajay Mehta
(c) Uddhav Thackeray
(d) Prabodhankar Thackeray

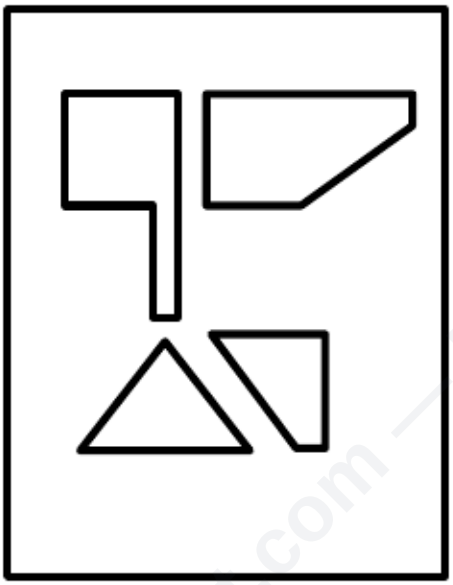
Q42. In 2018, the population of a colony became 54000, which is increasing at the rate of 5 percent per annum. Find the population of the colony 2 years ago.

(a) 45980
(b) 48980
(c) 49500
(d) 50000

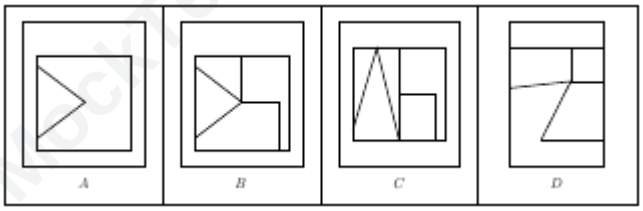
Q43. Which answer figure is formed from the shapes given in the question figure?

Question figure:

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Answer figures:



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

Q44. A force of 125 N is acting on an object. The object moves 5 m in the direction of the force. The work done by the force will be _____.

(a) 625 W
(b) 625 Pa
(c) 625 N
(d) 625 J

Q45. In _____, each carbon atom is bonded to three other carbon atoms in the same plane giving a hexagonal array.

(a) Propene
(b) Graphite
(c) Diamonds
(d) Benzene

Q46. A car falls from the edge of the road to the ground in 0.5 s. Let g = 10ms^(–2). How high is the edge of the road above the ground?

(a) 1.5 m
(b) 2 m
(c) 1.25 m
(d) 1 m

Q47. Sudha is twice as old as Radha. If 6 years is subtracted from Radha's age and Sudha's age is increased by 4 years, then Sudha's age will be four times that of Radha. What will be the ages of Sudha and Radha, 2 years ago from today?

(a) 30 years and 14 years
(b) 26 years and 12 years

(c) 34 years and 20 years
(d) 30 years and 16 years

Q48. In 4 1/2 hours, Jack can cover a distance of 6 km more than the distance covered by Jill in 3 hours. In 6 hours, Jack can cover 5 km less than the distance covered by Jill in 5 hours. What is the average speed of Jack in km/hr?
(a) 10
(b) 9
(c) 11
(d) 12

Q49. Lime Ca(OH)2 reacts slowly with _____ in air to form a thin layer of CaCO3 on the walls.
(a) O2
(b) CO
(c) CO2
(d) SO2

Q50. Which letter will come in place of question mark in the following series?
V, S, P, M,?,G
(a) T
(b) P
(c) L
(d) J

Q51. Radioactive elements are placed in _____.
(a) Actinide
(b) Lanthanide
(c) Period 6
(d) Period 7

Q52. Which of the following cannot travel in vacuum?
(a) Heat
(b) Sound
(c) Light
(d) UV rays

Q53. _____ atoms are present in sodium carbonate molecule.
(a) 6
(b) 8
(c) 5
(d) 7

Q54. The maximum number of bonds a covalent bond can have between two atoms is _____.
(a) 1
(b) 3
(c) 2
(d) 4

Q55. Where is Cape of Good Hope located?
(a) Russia
(b) South Africa
(c) Argentina
(d) Germany

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Q56. If the equations 8x + 5y + 11 = 0 and 20x – ky – 9 = 0 have no solution, then what is the value of k?

(a) –12.5
(b) 12.5
(c) –18
(d) 18

Q57. Sheikh Hasina is the Prime Minister of which of the following countries?

(a) Malaysia
(b) Bangladesh
(c) Saudi Arabia
(d) Pakistan

Q58. Consider the following question and the statements that follow and decide which of the statements are sufficient to answer the question?

Question:

E, F, G, H and I are standing in a row. On the basis of the information given in the statements, if we arrange in the order from smallest to largest, then find out who stands second.

Statements:

1. G is the longest.
2. E is taller than F.
3. H is the smallest.
4. F is taller than I.

(a) Statements 1, 2, 3 all together are sufficient.
(b) Statements 1 and 2 are sufficient.
(c) Statements 1, 2, 3 and 4 all together are sufficient.
(d) Every statement is sufficient

Q59. What is the name of the person who has been awarded the 'Yeraringan Award'?

(a) S. M. Swaminathan
(b) M. S. Swaminathan
(c) S. V. Swaminathan
(d) V. S. Swaminathan

Q60. Read the given statement and conclusions carefully and choose which of the conclusions logically follows from the statement.

Statements:

I. No gates are sticks.

II. Some sticks are windows.

Conclusion:

1. All doors are windows.
2. Some sticks are gates.

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

Q61. _____ was established in 1982 to support the outstanding sportspersons of the past year, sportspersons living in poverty conditions who brought glory to the country in sports.

(a) National Welfare Fund for Sportspersons
(b) National Promotion Scheme for Sportspersons
(c) National Pension Scheme for Sportspersons
(d) National Welfare Club for Sports

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Q62. If in a code language BOOK is written as DQQM, then PEN should be written as?

(a) MNP
(b) RGP
(c) PLN
(d) PAN

Q63. If the side of an equilateral triangle is 19 cm, then what is its area?

(a) 167.76 cm²
(b) 177.87 cm²
(c) 134.87 cm²
(d) 156.31 cm²

Q64. Which is the largest lake in South America?

(a) Lake Poopo
(b) Lake Titicaca
(c) Lake Valencia
(d) Lake Janin

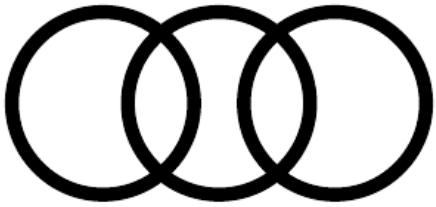
Q65. Mammalian animals have _____.

(a) Single chambered heart
(b) Four chambered heart
(c) Two chambered heart
(d) Three chambered heart

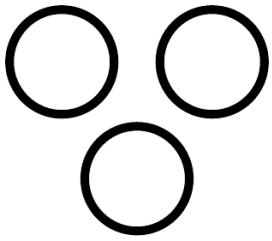
Q66. Select the most appropriate Venn diagram for the following words.

"Wool, Sweater, Hat"

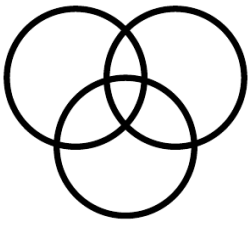
(a)



(b)

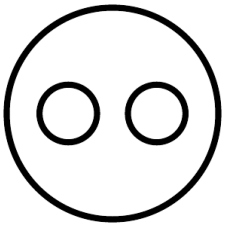


(c)



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(d)



Q67. Name the world champion who won five-time gold medals in the Asian Women's Boxing Championship in the light flyweight (48kg) category?

(a) Ritu Phogat
(b) Geeta Phogat
(c) Karnam Malleswari
(d) Mary Kom

Q68. If the potential difference and current through a circuit are doubled, then the resistance of the circuit:

(a) Increases
(b) Goes to zero
(c) Remains the same
(d) Decreases

Q69. Which of the following statement(s) is/are true?

A: Compressibility: The property of matter due to which its shape does not change after applying external force. Solids show this property.

B: Fluidity: It is a property of matter to flow easily and change shape under external force. This property is exhibited by both liquid and gas.

(a) Only A is true.
(b) Both A and B are true.
(c) Only B is true.
(d) Both A and B are false.

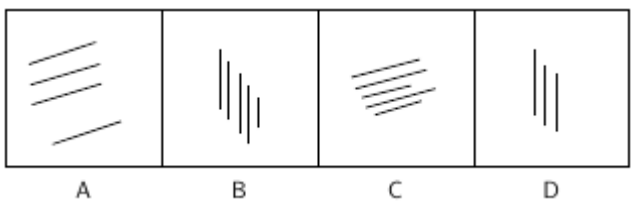
Q70. The atomic number of lanthanide is in the _____ range.

(a) 90-103
(b) 89-102
(c) 57-71
(d) 57-70

Q71. Which of the following steel plants in India won the Prime Minister's Trophy for Best Performing Integrated Steel Plant for the assessment years 2014-15 and 2015-16, on 8 December 2017.

(a) Durgapur Steel Plant
(b) Bhilai Steel Plant
(c) Jindal Steel Plant
(d) Tata Steel Ltd

Q72. Choose the odd one.



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

(d) C

Q73. On which date did India organize the cultural festival in Egypt to commemorate the 156th birth anniversary of Rabindranath Tagore?

(a) 6 - 10 May, 2017
(b) 8 - 12 June, 2017
(c) 6 - 10 June, 2017
(d) 8 - 12 May, 2017

Q74. The hands of a clock are _____ perpendicular to each other in a day.

(a) 22 times
(b) 88 times
(c) 11 times
(d) 44 times

Q75. A question and two statements are given below. Select the statement which is necessary/sufficient to answer the question.

Question:

X is taller than Y and Z is shorter than W, who is the shortest?

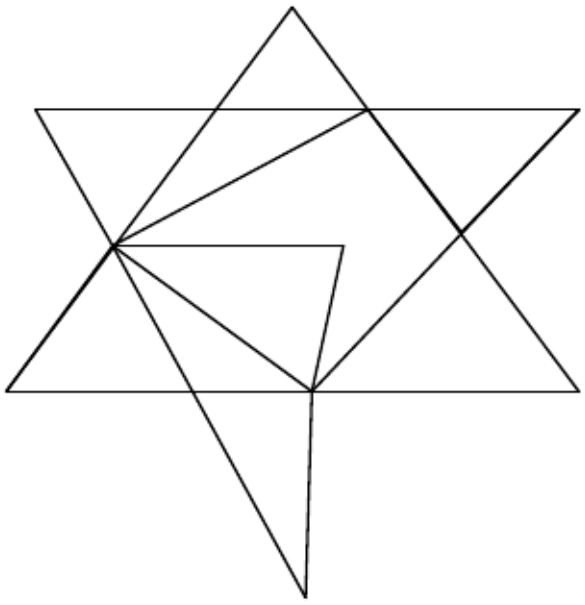
Statements:

1. Z is shorter than X.

2. W is shorter than Y.

(a) Only 2 is sufficient while only 1 is not sufficient.
(b) Only 1 is sufficient, while only 2 is not sufficient.
(c) Either 1 or only 2 is sufficient.
(d) 1 and 2 together are sufficient.

Q76. How many triangles are there in the following figure?



(a) 21
(b) 17
(c) 19
(d) 20

Q77. What is the birth name of Yogi Adityanath, the current Chief Minister of Uttar Pradesh?

(a) Arjun Singh Visht
(b) Ajay singh Bisht
(c) Abhay Singh Visht

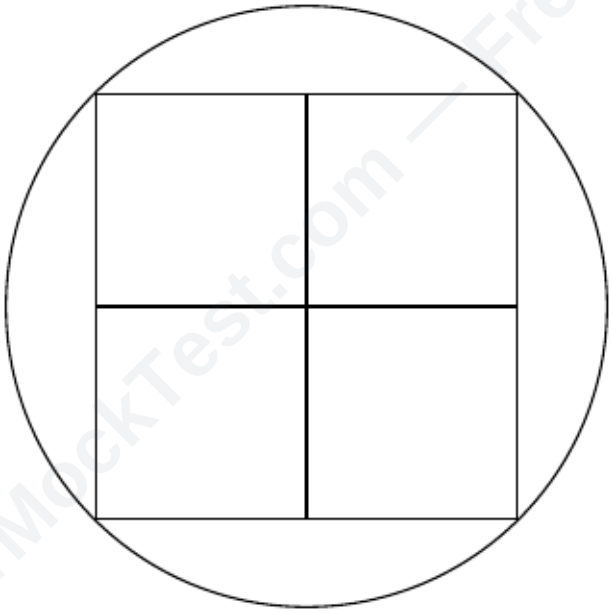
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(d) Arjun Singh Biku

Q78. Who among the following is one of the Trinity of Carnatic Music?

(a) Meera Bai
(b) Annamayya
(c) Tyagaraja
(d) Kalidas

Q79. How many squares are there in the following figure?



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

Q80. The number of books sold by the seller is given in the following table. In which month has he sold the least number of books?

Month	No. of books sold
January	2,000
February	1,500
March	2,500
April	3,000
May	2,000
June	1,000
July	1,500
August	2,000
September	5,000
October	2,000
November	150
December	6,000

(a) May
(b) June

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(c) February
(d) November

Q81. An estate where a cash crop is grown for sale is known as _____.
(a) Kitchen garden
(b) Horticulture Farming
(c) Slash and burn farming
(d) Subsistence farming

Q82. The year _____ had the same calendar year as 2011.
(a) 2004
(b) 2008
(c) 2005
(d) 2009

Q83. If compound interest is compounded annually at about 12% per annum in the interest. After 2 years what will be the amount of Rs. 3,000,?
(a) Rs. 3,763
(b) Rs.3,773
(c) Rs.3,873
(d) Rs. 3,766

Q84. Find the value of the equation:
$((496 + 54)^2 - (496 - 54)^2)/(2(496 \times 54))$
(a) –2
(b) 2
(c) 1
(d) –1

Q85. The Opium War was fought between two countries. One of those countries was China. Which is the second country?
(a) Britain
(b) United States
(c) India
(d) France

Q86. Who is the present CEO of ICICI Bank?
(a) Chanda Kochhar
(b) Shikha Sharma
(c) Naina Lal Kidwai
(d) Arundhati Bhattacharya

Q87. An object of mass 15 kg is moving with a single velocity of 6 ms^(-1). How much kinetic energy has that object held?
(a) 187.5J
(b) 270 J
(c) 187.5 ms
(d) 270 ms

Q88. Consider the given statement and decide which of the given assumptions is implicit in the statement
Statement:
Eat fruits and vegetables for a healthy life.
Assumption:
I. Fruits and vegetables provide essential nutrients for a healthy life.
II. Soybeans are beneficial for health.
(a) Both I and II are implicit.
(b) Only assumption I is implicit.

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(c) Neither I nor II is implicit.
(d) Only II is implicit.

Q89. A group of children are playing a word game. In the game, they were given a word 'CORPORATION' which needs to be rearranged, so that the vowels are always together. Find out in what ways the word can be rearranged.
(a) 1540
(b) 2086
(c) 50400
(d) 8905

Q90. If means +, # means –, @ means (×) and * means (÷) then what will be the value of 24 3@8#45*5?
(a) 39
(b) 37
(c) 43
(d) 40

Q91. If × means +, + means ÷, – means × and ÷ means –, then what is the value of 6 × 5 – 4 + 80 ÷ 2?
(a) 101
(b) 108
(c) 100
(d) 4.25

Q92. The basic unit of classification of living organisms is _____.
(a) World
(b) Species
(c) Genus
(d) Family

Q93. If the angle between force and displacement is _____, then the work done is negative.
(a) 45°
(b) 0
(c) 90°
(d) 180°

Q94. The statement given below is followed by Assumptions I and II given below. You have to consider the statement followed by the assumptions and decide which of the assumptions are implicit in the statement.
Statement:
The government has decided to increase the public transport charges.
Assumption:
I. People are able to pay the increased rent.
II. Many people use public transport as an alternative.
(a) Only Assumption II is implicit.
(b) Neither I nor II is implicit.
(c) Both I and II are implicit.
(d) Only Assumption I is implicit.

Q95. Average speed and average velocity represent the speed of the object:
(a) At a particular point in time
(b) In long distance
(c) In short distance
(d) During the given interval

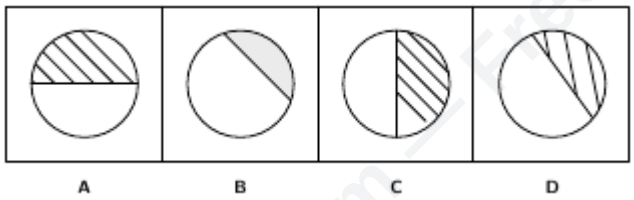
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Q96. Select the most appropriate option to fill in the blanks.

395 – 39.5 – 3.95 – 0.395 = _____

(a) 351.055
(b) 351.145
(c) 351.155
(d) 351.045

Q97. Choose the odd one.

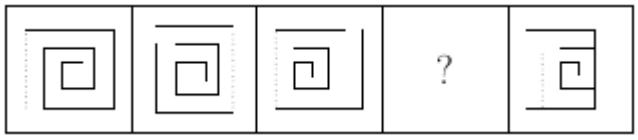


(a) C
(b) A
(c) B
(d) D

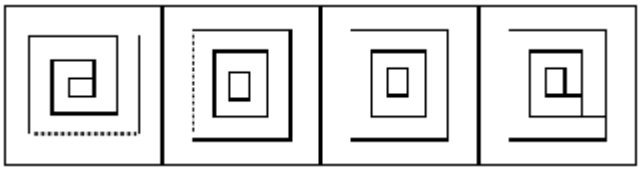
Q98. The distance between the two stations is 340 km. Both trains start simultaneously from these stations on parallel tracks to cross each other. The speed of one of them is 5 km/h more than the other. If the distance between the two trains after 2 hours from their start is 30 km then find the speed of each train.

(a) 75 km/h, 80 km/h
(b) 70 km/h, 75 km/h
(c) 75 km/h, 60 km/h
(d) 85 km/h, 80 km/h

Q99.



Find the missing figure in the above sequence.



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

Q100. Read the given statement(s) and the subsequent course of action carefully and choose which of the following logically follows from the statement(s) for implementation.

Statements:

The African government had decided to declare Ebola as pandemic disease. People are liable to be punished if they do not report Ebola occurring in the family or neighbourhood to the authority.

Course of action:

1. The government should plan to effectively enact laws to control Ebola.

2. Mass media should be used to spread the message about punishment. So that people know about the proceedings.

(a) Only 1 follows.

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

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (b) Football

The correct answer is Football.

• Bembem Devi is associated with the sport of Football.

Key Points

• Oinam Bembem Devi:
• She is a football player.
• She plays as the Midfielder in the Women's Football Team of India.
• She is also called the Durga of Indian Football.
• She was awarded the Arjuna Award in the year 2017.
• She was given the Padma Shri award in 2020.
• =

Additional Information

• Football:
• The first football club in the world ‘Sheffield Football Club’ was founded in the year 1857 in England.
• The first Football club in India was ‘Dalhousie Club’.
• The apex institution of football is the ‘Federation of International Football Association’ (FIFA) was formed on May 21, 1904.
• The headquarters of FIFA is in Zürich, Switzerland.
• Football was included as a competitive game in Olympic Games officially in 1908.
• India took part in the World Olympic Football Competition in 1948 in London.
• The first World Cup was organised in Uruguay in 1930.
• In India, Indian Football Association (IFA) organises National Football Championship.
• The trophy awarded in their competition is called Santosh Trophy.

Q2. Answer: (b) 2

Shortcut Trick

For any expression of the form x + 1/x = 2, the only possible real value is x = 1.

Since $\text{cosec}\theta = 1/\sin\theta$, the given equation is $\sin\theta + 1/\sin\theta = 2$, which implies $\sin\theta = 1$.

Therefore, $\sin^n\theta + \text{cosec}^n\theta = 1^n + 1^n = 1 + 1 = 2$ for any power n.

Here n = 2018, so the value remains 2.

Therefore The correct answer is 2.

Alternate Method

Given: sinθ + cosecθ = 2

Formula Used: cosecθ = 1/sinθ

=> sinθ + 1/sinθ = 2

=> (sin²θ + 1) / sinθ = 2

=> sin²θ − 2sinθ + 1 = 0

=> (sinθ − 1)² = 0

=> sinθ = 1

=> cosecθ = 1/1 = 1

=> sin^(2018)θ + cosec^(2018)θ = (1)^(2018) + (1)^(2018)

=> 1 + 1 = 2

Therefore The correct answer is 2.

Additional Information

Reciprocal Trigonometric Relations

Standard pairs like (sinθ, cosecθ), (cosθ, secθ), and (tanθ, cotθ) follow the property that if their sum is 2, then each individual ratio must be 1.

General Power Rule

If x + 1/x = 2, then $x^n + 1/x^n = 2$ for all natural numbers n. This is frequently used in Algebra and Trigonometry.

Minimum Value Property

For positive real numbers, the sum of a number and its reciprocal (x + 1/x) is always ≥ 2 (Arithmetic Mean ≥ Geometric Mean).

Q3. Answer: (b) 32

Shortcut Trick

Work left after 6 days = Work of 48 men for (30 − 6) = 24 days.

Remaining men = 48 − 12 = 36 men.

Using M1D1 = M2D2: 48 × 24 = 36 × Days.

Days = (48 × 24) ÷ 36 = 4 × 8 = 32 days.

Therefore The correct answer is 32 days.

Alternate Method

Total Work = Men × Days

=> Total Work = 48 × 30 = 1440 units

=> Work done in 6 days = 48 × 6 = 288 units

=> Remaining Work = 1440 − 288 = 1152 units

=> Remaining Men = 48 − 12 = 36 men

=> Time taken = Remaining Work ÷ Remaining Men

=> Time taken = 1152 ÷ 36 = 32 days

Therefore The correct answer is 32 days.

Additional Information

Chain Rule Formula

The fundamental relation is M1D1H1/W1 = M2D2H2/W2, where M is men, D is days, H is hours, and W is work.

Inverse Variation

For a constant amount of work, the number of men is inversely proportional to the time taken (M prop. to 1/D).

Work & Wages

Wages are always distributed in the ratio of the actual work done by each individual or their efficiencies.

Q4. Answer: (b) Either I or II follows.

Given,

Statements:

• No paper is a book.

• All books are bag.

Conclusions:

I. No bag is a paper.

II. Some bags are paper.

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The least possible Venn diagram for the given statements is as follows:

Conclusions:

I. No bag is a paper. → False (It is possible but not definite)

II. Some bags are paper. → False (It is possible but not definite)

• Here, conclusions I and II form a complementary pair.

• Therefore, either I or II follows.

Hence, the correct answer is "Either I or II follows."

Note: The official answer key is "Neither I nor II follows." However, this is incorrect. Because this is an either-or case. So, we have changed the answer accordingly.

Q5. Answer: (d) 15.835 ≤ x < 15.845

Shortcut Trick

To find the range of a number rounded to n decimal places, the lower bound is value − 0.5 × 10−n and the upper bound is value + 0.5 × 10−n.

For 15.84 (2 decimal places), the error interval is ± 0.005.

Lower Limit = 15.84 − 0.005 = 15.835 (inclusive).

Upper Limit = 15.84 + 0.005 = 15.845 (exclusive).

Therefore The correct answer is 15.835 ≤ x < 15.845.

Alternate Method

Given: Number x = 15.84 (rounded to 2 decimal places).

Formula Used: For a value rounded to the nearest unit of precision (d), the error interval is x − d/2 ≤ x < x + d/2.

=> Precision (d) = 0.01 (since it is 2 decimal places).

=> Lower Bound = 15.84 − (0.01 ÷ 2) = 15.84 − 0.005 = 15.835.

=> Upper Bound = 15.84 + (0.01 ÷ 2) = 15.84 + 0.005 = 15.845.

=> According to rounding rules, any value from 15.835 up to but not including 15.845 rounds to 15.84.

Therefore The correct answer is 15.835 ≤ x < 15.845.

Additional Information

Degree of Accuracy

The degree of accuracy is half the unit to which the number is rounded. For rounding to 1 decimal place, accuracy is ±0.05.

Error Intervals

An error interval is written as Lower Bound ≤ x < Upper Bound. The upper bound is excluded because 15.845 would normally round up to 15.85.

Significant Figures

Similar rules apply to significant figures. If 16 is correct to 2 sig figs, the range is 15.5 ≤ x < 16.5.

Q6. Answer: (b) Wrinkled seed

The correct answer is Wrinkled seed.

• Wrinkled seed is a recessive characteristic in a pea plant.

Key Points

• Mendel experiments of inheritance:

• Pea plant was used by Mendel for this experiment.

• It was chosen because this plant has many contrasting characters like a dwarf and tall or wrinkled or round seeds.

• Gregor Mendel, through his experiments on pea plants, discovered the fundamental laws of inheritance.

• His breeding experiments in pea plants revealed that hereditary characteristics are determined by discrete factors (genes) that are transmitted to the next generation.

• He deduced three laws from his experiments and these laws are applicable when parents are pure breeding.

• The three laws of inheritance proposed by Mendel include:

• Law of Dominance

• Law of Segregation

• Law of Independent Assortment

• Mendel coined terms 'dominant' and 'recessive' in terms of the characters studied by him.

• A dominant trait is one that expresses itself in the presence of other contrasting trait and dominates it. eg: tallness.

• A recessive trait is one that is not expressed when present along with the contrasting trait in the hybrid. eg: dwarfness.

-

Q7. Answer: (d) 90°

Shortcut Trick

The sum of all interior angles of any quadrilateral is always 360°.

Since all four angles are equal, let each angle be x.

=> 4 × x = 360°

=> x = 360° ÷ 4 = 90°

Therefore The correct answer is 90°.

Alternate Method

Given:

A quadrilateral where all four angles are equal.

Formula Used:

Sum of interior angles of a polygon = (n − 2) × 180°, where n is the number of sides.

Calculations:

For a quadrilateral, n = 4.

=> Sum of angles = (4 − 2) × 180°

=> Sum of angles = 2 × 180° = 360°

Q8. Answer: (c) Ankit Kawatra

The correct answer is Ankit Kawatra.

• Ankit Kawatra won the Queen's Young Leader Award for 2017 at a ceremony held at Buckingham Palace.

Key Points

• Ankit Kawatra:

• He is an activist, fighting hunger and malnutrition.

• He is the founder of Feeding India.

• He received the award from Queen Elizabeth II for doing exceptional work solving hunger and malnutrition in India.

Additional Information

• Palbinder Kaur Shergill is the first turbaned Sikh woman to be appointed Canada SC judge.

• Srinivas Gokulnath is the first solo Indian to complete Race Around Austria.

• Tanmanjeet Singh Dhesi is a Member of the Parliament of the United Kingdom.

Q9. Answer: (d) Any pair of objects

The correct answer is Any pair of objects.

• The universal law of gravitation applies to any pair of objects.

Key Points

• Gravitational Force:

• Mathematically, it is represented as:

• $F = GMm/(r^2)$

• Where,

• F is the gravitational force

• G is gravitational constant

• M is the mass of the first particle

• m is the mass of the second particle

• r is the distance between them

• This is called Newton’s universal law of gravitation.

• The value of G is 6.67 × 10^(-11) $N\ m^2/kg^2$.

Additional Information

• Gravity:

• The acceleration due to gravity is the rate of increase of velocity of a body falling freely towards the earth.

• It is represented by $g = GM_e/(R_e^2)$

• Where M_e is the mass of the earth and R_e is the radius of the earth.

• The value of g at the surface of the earth is 9.8 m/s^2.

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• Variation in g:
• The value of g decreases with height or depth from the earth's surface.
• g is maximum at poles. Hence, it will be maximum at the Camp in Antarctica.
• g is minimum at the equator.
• g decreases due to the rotation of the earth.
• g decreases if the angular speed of the earth increases and increases if the angular speed of the earth decreases.

Q10. Answer: (c) 6th

The correct answer is 6th.

Key Points

• The rise of Jainism and Buddhism saw religious unrest in India in the 6th century BC.
• Jainism:
• It was founded by Rishabhnath.
• According to Jain tradition, there were 24 Tirthankaras, the first being Rishabhadeva/Adinatha and the last being Mahavira.
• The Vishnu Purana and the Bhagavat Purana describes Rishabh as an incarnation of Narayana.
• The name of two Jain Tirthankaras– Rishabha and Arishtanemi is found in Rigveda.
• Parshvnath: His four main teachings (Chaturthi) were:
• Ahimsa (non-injury);
• Satya (non-lying);
• Asteya (non-stealing);
• Aparigraha (non-possession).
• Mahavira adopted all these four teachings and added one more, i.e., Brahmacharya (chastity) to it.
• Buddhism:
• Gautama Buddha was the founder of Buddhism, was born in 563 BC.
• He renounced home at the age of 29, this was his Mahabhiniskramana.
• At the age of 35, under a peepal tree at Uruvell (Bodh Gaya) on the bank of river Niranjana, he attained Nirvana (enlightenment) after 49 days of continuous meditation.
• Buddha delivered his first sermon at Sarnath to his five disciples.
• It is known as Dharmachaka Pravartana (turning of the wheel of law).
• He died at the age of 80 in 483 BC at Kushinagar.
• This is known as Mahaparinirvana (final blowing out).

Q11. Answer: (a) 40

Shortcut Trick

Net filling rate = (A × B) ÷ (B − A) where A is filling time and B is emptying time.

Time taken = (8 × 10) ÷ (10 − 8)

Time taken = 80 ÷ 2 = 40 hours.

Therefore The correct answer is 40 hours.

Alternate Method

Given: Filling Tap (A) = 8 hours, Emptying Tap (B) = 10 hours.

Formula Used: Total Work = LCM of time durations; Efficiency = Total Work ÷ Time.

Tap

Time (hr)

Total Capacity (LCM)

Efficiency

Tap A (Fill)

8

40 units

+5

Tap B (Empty)

10

−4

=> Net efficiency of (A + B) = 5 − 4 = 1 unit/hour.
=> Total time required = Total Capacity ÷ Net Efficiency
=> Total time = 40 ÷ 1 = 40 hours.
Therefore The correct answer is 40 hours.
Additional Information
Pipes and Cisterns Convention
An inlet pipe (filling) is always considered to have positive efficiency, while an outlet pipe (emptying) has negative efficiency.
Net Work Formula
If pipe A fills in 'x' hours and pipe B empties in 'y' hours (where y > x), net work per hour = (1/x − 1/y).
Total Capacity
The Least Common Multiple (LCM) of individual times is taken as the total volume or capacity of the tank for easier calculation.

Q12. Answer: (b) –3.2 ms^(–1)

The correct answer is –3.2 ms–1.
Key Points
• Given,
• Mass of bullet, m1 = 40g (= 0.04 kg)
• Mass of pistol, m2 = 2 kg
• The initial velocity of the bullet (u1) and pistol (u2) = 0
• Final velocity of the bullet, v1 = +160m s^(-1)
• Let, v2 be the recoil velocity of the pistol.
• The total momentum of the pistol and bullet is zero before the fire because both are at rest.
• The total momentum of the pistol and bullet after it is fired is
= (0.0 kg 4x 160 m s^(-1)) + (2 kg x v2 m s^(-1))
= (6.4 + 2v2) kg m s^(-1)
• Total momentum after the fire = Total momentum before the fire
• 6.4 + 2v2 = 0
• →v2 = 3.2 m/s
• Thus, the recoil velocity of the pistol is 3.2 m/s.

Q13. Answer: (d) CaO

The correct answer is CaO.
• The chemical formula of unextinguished lime is CaO.
Key Points
• Lime:
• It is also known as unextinguished lime, quick lime or burnt lime.
• It is chemically calcium oxide.
• It is a white, caustic, alkaline, crystalline solid at room temperature.
• It is used in the manufacture of glass, cement, etc. and for drying ammonia and alcohol.
Additional Information
• CaCO3 is the chemical formula of calcium carbonate.
• CaSO4 is the chemical formula of calcium sulfate.
• CaCl2 is the chemical formula of Calcium chloride.

Q14. Answer: (c) 196/121

Shortcut Trick
Convert mixed fraction 1(3/11) to improper fraction → (11×1 + 3)/11 = 14/11.
Square the fraction → $(14/11)^2 = 14^2 / 11^2$.
Result → 196 / 121.
Therefore The correct answer is 196/121.
Alternate Method
Given: Mixed fraction = 1(3/11)
Formula: $(a/b)^2 = a^2 / b^2$

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=> 1(3/11) = (11 × 1 + 3) / 11

=> 14 / 11

=> $(14 / 11)^2 = (14 \times 14) / (11 \times 11)$

=> 196 / 121

Therefore The correct answer is 196/121.

Additional Information

Fraction Squaring Rule

To square any fraction, square the numerator and the denominator separately: $(x/y)^n = x^n / y^n$.

Mixed to Improper Conversion

For a mixed fraction A(b/c), the improper form is (A × c + b) / c.

Square Table Reference

Knowing squares up to 25 is vital: $11^2 = 121$, $12^2 = 144$, $13^2 = 169$, $14^2 = 196$, $15^2 = 225$.

Q15. Answer: (a) Sharda Sinha

The correct answer is Sharda Sinha.

• Sharda Sinha was honoured with the 2018 Padma Bhushan award in the field of art-music.

Key Points

• Sharda Sinha:

• She is a Maithili-language folk-singer.

• She sings in Bhojpuri and Magahi languages too.

• She was honoured with the Padma Bhushan award in the year 2018 in the field of art-music.

• She was honoured with the Padma Shri in the year 1991.

• Padma Bhushan:

• The award is given for distinguished service of a high order in any field, including service rendered by government servants.

• It is the third-highest civilian honour in India.

• It was first awarded in 1954.

Additional Information

• Kaifi Azmi was an urdu poet.

• Gulzar was a lyricist, poet, author, screenwriter, and film director.

• His real name was Sampooran Singh Kalra.

• He was awarded the Padma Bhushan award in the year 2004.

• Javed Akhtar is a poet, lyricist, screenwriter and political activist.

• He was awarded the Padma Bhushan award in the year 2007.

Q16. Answer: (a) D

The logic followed here is as follows:

• The option figure D is the odd one out as it represents two perpendicular lines.

• Option figure A, option figure B and option figure C represents two parallel lines.

Hence, option figure D is the correct answer.

Q17. Answer: (b) 9 : 20

Shortcut Trick

To find the ratio A : C, directly multiply the given ratios (A/B) and (B/C).

A/C = (A/B) × (B/C)

A/C = (5/8) × (18/25)

A/C = (1 × 9) / (4 × 5) = 9/20

Therefore The correct answer is 9 : 20.

Alternate Method

Given: A : B = 5 : 8 and B : C = 18 : 25

To combine the ratios, make the value of B common by taking the LCM of 8 and 18.

=> LCM(8, 18) = 72

=> A : B = (5 × 9) : (8 × 9) = 45 : 72

=> B : C = (18 × 4) : (25 × 4) = 72 : 100

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=> A : B : C = 45 : 72 : 100

=> A : C = 45 : 100

=> A : C = 9 : 20 (Dividing by 5)

Therefore The correct answer is 9 : 20.

Additional Information

Compound Ratio

The compound ratio of two ratios a:b and c:d is (ac) : (bd).

Duplicate and Triplicate Ratios

Duplicate ratio of a:b is $a^2:b^2$ and Triplicate ratio is $a^3:b^3$.

Invertendo and Alternendo

If a:b = c:d, then Invertendo is b:a = d:c and Alternendo is a:c = b:d.

Q18. Answer: (a) 4

The correct answer is 4.

• The Indian Railways is ranked 4th among the world's largest railways.

Key Points

• Indian Railways:

• Indian Railway Board was established in March 1905.

• Indian Railway was nationalised in 1951.

• Railways have been divided into 18th zones.

• Southern Coast Railway was the 18th zone.

• The first Indian railway line in India was operated for public traffic in 1853 between Mumbai and Thane over a distance of 34 km.

• Ashwini Vaishnaw is the current Minister of Railways. (As per Jan 2022)

• The first electric train ran in India with the inauguration of services between Bombay VT and Kurla Harbour on 3rd Feb 1925 on ex-GIP Railway system.

• It is ranked 4th among the world's largest railways.

Q19. Answer: (d) Bhartiya Janata Party

The correct answer is Bhartiya Janata Party.

• Bhartiya Janata Party has won a majority of seats in the Gujarat Assembly Election 2017.

Key Points

• Gujarat Assembly Election 2017:

• It has a total of 182 seats in the assembly.

• Out of these 182, BJP won 99 seats.

• Congress won 77 seats.

• 1 seat was won by NCP.

• Bhartiya Tribal Party and Independent won 2 and 3 seats respectively.

Additional Information

• Gujarat:

• Capital: Gandhinagar

• Governor: Acharya Devvrat

• Chief minister: Bhupendrabhai Patel

• Gujarat shares its borders with Madhya Pradesh, Maharashtra and Rajasthan.

• It shares its international border with Pakistan.

Q20. Answer: (b) 9.6 m

Shortcut Trick

Check if the sides 12, 16, and 20 form a Pythagorean triplet:

$12^2 + 16^2 = 144 + 256 = 400 = 20^2$

Since the condition is satisfied, it is a right-angled triangle where the longest side (20 m) is the hypotenuse.

Altitude to hypotenuse = (Product of legs) ÷ Hypotenuse

Altitude = (12 × 16) ÷ 20 = 192 ÷ 20 = 9.6 m.

Therefore The correct answer is 9.6 m.

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Alternate Method

Given: Sides of the triangle are a = 16 m, b = 12 m, and c = 20 m.

Formula Used: Area of triangle = (1/2) × Base × Height

=> Area of triangle = (1/2) × 16 × 12

=> Area = 96 m²

Q21. Answer: (b) -5

Given:

(–4)[20 ÷ {(–2) × (–8)}]

Concept used:

Calculation:

(-4)[20 ÷ {(–2) × (-8)}]

=> (-4)[20 ÷ 16]

=> - 4 × 20/16

=> 20/- 4

=> - 5

Therefore Required answer is - 5

Q22. Answer: (a) Ebonite

The correct answer is Ebonite.

Concept:

• Resistivity (ρ): The property of a conductor that opposes the flow of electric current through them and is independent of the shape and size of the materials but depends on the nature and temperature of the materials is called resistivity.

• The unit for resistivity is the ohm-meter (Ω-m).

• The resistivity of a material depends on its nature and the temperature of the conductor.

• The resistivity of a material doesn't depend on its shape and size (length and area).

• Materials that conduct electrical current easily are called conductors and have a low resistivity.

• Materials that do not conduct electricity easily are called insulators and these materials have a high resistivity.

• Resistivity is inversely proportional to the number of free electrons per unit volume of the conductor and to the average relaxation time of the free electrons in the conductor.

Resistivity is numerically equal to the resistance of a substance having a unit area of cross-section and unit length.

• The formula of resistivity is ρ = fracmne²τ

• Where, m = mass of an electron, n = number of electrons per unit volume of the conductor, τ = relaxation time.

Explanation:

Material	Resistivity (Ω m)	
Conductors	Silver	1.60 × 10^(−8)
Copper	1.62 × 10−8	
Aluminium	2.63 × 10−8	
Tungsten	5.20 × 10−8	
Nickel	6.84 × 10−8	
Iron	10.0 × 10−8	
Chromium	12.9 × 10−8	
Mercury	94.0 × 10−8	
Manganese	1.84 × 10^(−6)	
Constantan (alloy of Cu and Ni)	49 × 10^(−6)	
Alloys	Manganin (alloy of Cu, Mn and Ni)	44 × 10^(−6)
Nichrome (alloy of Ni, Cr, Mn and Fe)	100 × 10^(−6)	
Glass	10^(10) − 10^(14)	

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Insulators	Hard rubber	10^{13} – 10^(16)
Ebonite	10^(15) – 10^(17)	
Diamond	10^{12} – 10^{13}	
Paper (dry)	10^{12}	

Hence the correct answer is Ebonite.

Q23. Answer: (a) 721

Shortcut Trick

To find the square root of 519841, look at the last digit: 1. The square root must end in 1 or 9.

Ignore the last two digits (41) and find the largest square less than 5198.

Since $70^2 = 4900$ and $80^2 = 6400$, the first two digits are 72 (as $72^2 = 5184$).

Check 721^2: 518400 + 1440 + 1 = 519841.

Therefore The correct answer is 721.

Alternate Method

Given: Number = 519841

Method: Long Division Method for finding square root.

=> Grouping the digits in pairs from right to left: 51, 98, 41.

=> Step 1: Find the largest square less than or equal to 51. 7 × 7 = 49. Remainder = 2.

=> Step 2: Bring down 98. New dividend = 298. Double the divisor (7 × 2 = 14).

=> Step 3: Find digit 'x' such that 14x × x ≤ 298. 142 × 2 = 284. Remainder = 14.

=> Step 4: Bring down 41. New dividend = 1441. Double the quotient (72 × 2 = 144).

=> Step 5: Find digit 'y' such that 144y × y = 1441. 1441 × 1 = 1441. Remainder = 0.

=> The quotient is 721.

Therefore The correct answer is 721.

Additional Information

Unit Digit Property

A perfect square ending in 1 must have a square root ending in either 1 or 9.

Range Estimation

Always identify the nearest base (like $700^2 = 490{,}000$) to quickly narrow down options in competitive exams.

Q24. Answer: (c) Chemical

The correct answer is chemical.

• To maintain the current in a given electrical circuit, the cell has to expend chemical energy stored in it.

Key Points

• When the cell is connected to a circuit, the potential difference sets the charges in motion and produces an electric current.

• In order to maintain the current in a given electric circuit, the cell has to expend the chemical energy stored in it.

• By this, the cell helps maintain a potential difference across the ends of a circuit and current starts to flow across the circuit from higher potential end to lower.

• Electrochemical Cell

• An electrochemical cell is a device that converts chemical energy into electrical energy.

• Primary Cell:

• In a primary cell, electrical energy is obtained from the irreversible chemical reaction taking place inside the cell.

• Examples: Voltaic Cell, Leclanche Cell, Daniel Cell, Dry Cell, etc.

Q25. Answer: (d) L = 5%

Shortcut Trick

Ratio of SP1 to SP2 in percentage terms: 105% → Rs. 420.

Using unitary method: 1% → 420 ÷ 105 = Rs. 4.

For SP2 = Rs. 380, the percentage value = 380 ÷ 4 = 95%.

Net result = 95% − 100% = −5% (Loss).

Therefore The correct answer is L = 5%.

Alternate Method

Given: SP1 = Rs. 420, Profit1% = 5%, SP2 = Rs. 380.

Formulas: CP = SP × 100 ÷ (100 + P%), Loss% = (CP − SP) ÷ CP × 100.

=> Cost Price (CP) = 420 × 100 ÷ (100 + 5) = 420 × 100 ÷ 105 = Rs. 400.

=> For New Selling Price (SP2) = Rs. 380.

=> Since CP > SP2, there is a Loss.

=> Loss Amount = 400 − 380 = Rs. 20.

=> Loss % = (20 ÷ 400) × 100 = 5%.

Therefore The correct answer is L = 5%.

Additional Information

Cost Price & Selling Price Relationship

When SP > CP, it is a Profit. When SP < CP, it is a Loss. Both Profit% and Loss% are always calculated on the Cost Price unless stated otherwise.

Percentage Change

A 5% gain means the Selling Price is 105% of the Cost Price. A 5% loss means the Selling Price is 95% of the Cost Price.

Q26. Answer: (a) Only conclusion I follows.

The notice in the newspaper is inviting tenders from contractors for the building of the said bridge.

• Thus, it is clear that the municipality is planning to build a bridge. So, conclusion I follows.

• The invitation for tenders implies that the municipality is looking for a contractor who would be interested in building the bridge, it does not mean that the municipality wants to know how many people are interested. Thus, conclusion II does not follow.

Hence the correct answer is option 1.

Q27. Answer: (c) Nikola Tesla

The correct answer is Nikola Tesla.

• Alternating current was invented by Nikola Tesla.

Key Points

• Alternating current:

• It is an electric current that periodically reverses direction and changes its magnitude continuously with time in contrast to direct current (DC) which flows only in one direction.

• It was invented by Nikola Tesla.

Additional Information

• A rectifier is a device that converts alternating voltage (current) into direct voltage (current).

• An inverter is a device that converts direct voltage (current) into alternating voltage (current).

Q28. Answer: (a) Bought

The logic followed here is:

• Ate is the past tense of Eat.

Similarly,

• Bought is the past tense of Buy.

Hence, "Bought" is the correct answer.

Q29. Answer: (d) West

At 9 am a general clock looks as follows:

The minute hand faces towards the north and the hour hand faces towards the west.

Hence, "west" is the correct answer.

Q30. Answer: (d) B

The logic followed here is:

• The arrows in option figure A, option figure C and option figure D are moving in the clockwise direction

• The arrow in option figure B is moving in the anticlockwise direction.

Hence, "option figure B" is the correct answer.

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Q31. Answer: (c) Neither 1 nor 2 follows.

Given,

Statements:

• Some lions are tigers.

• Some tigers are donkeys.

Conclusions:

1. Some lions are donkeys.

2. All tigers are donkeys.

The least possible Venn diagram for the given statements is as follows:

Conclusions:

I. Some lions are donkeys. → False (It is possible but not definite)

II. All tigers are donkeys. → False (It is possible but not definite)

Hence, the correct answer is "Neither I nor II follows."

Q32. Answer: (b) A

In mirror images,

• The left side becomes the right side and vice versa.

So, the mirror image of the question figure will appear as follows:

Hence, "option figure A" is the correct answer.

Q33. Answer: (d) 45, 25

Shortcut Trick

Identify the frequency of each number in the given data set.

The number 25 appears 2 times.

The number 45 appears 2 times.

All other numbers appear only once.

Since 25 and 45 have the highest frequency, both are modes.

Therefore The correct answer is 45, 25.

Alternate Method

Given: 25, 45, 58, 87, 45, 54, 65, 12, 25, 59, 42, 60

=> Arrange the data in ascending order: 12, 25, 25, 42, 45, 45, 54, 58, 59, 60, 65, 87

=> Frequency of 25 = 2

=> Frequency of 45 = 2

=> Frequency of all other numbers = 1

=> Mode is defined as the value that occurs with the highest frequency.

=> Since both 25 and 45 occur twice, the data is bimodal.

Therefore The correct answer is 45, 25.

Q34. Answer: (a) Cloning

The correct answer is Cloning.

• In the process of cloning, the cell is involved in the generation of an exact copy of another living part of a complete organism.

Key Points

• Cloning:

• The process of generating a genetically identical copy of a cell or an organism.

• The cell is involved in the generation of an exact copy of another living part of a complete organism.

• Cloning happens often in nature—for example when a cell replicates itself asexually without any genetic alteration or recombination.

Additional Information

• IVF

• In vitro fertilization (IVF) is a type of assistive reproductive technology (ART).

• It involves recovering eggs from a woman's ovaries and fertilizing them with sperm.

• This fertilized egg is known as an embryo.

• Fructification is a process of fructifying.

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• Regeneration is the process of restoring damaged or missing cells, tissues, organs sometimes even entire body parts to full function in plants and animals.

Q35. Answer: (d) 2 1/2

Shortcut Trick

Sum of remaining two fractions = 6 − 1¼ = 4.75

Ratio of these two fractions = 9 : 10 (Total parts = 19)

Value of 1 part = 4.75 ÷ 19 = 0.25

Largest fraction = 10 parts = 10 × 0.25 = 2.5

Therefore The correct answer is 2½.

Alternate Method

Given: Sum = 6, Fraction1 = 1¼ = 5/4, Ratio of others = 9 : 10

Formula: Sum of fractions = F1 + F2 + F3

=> Let the other two fractions be 9x and 10x.

=> 5/4 + 9x + 10x = 6

=> 1.25 + 19x = 6

=> 19x = 6 − 1.25 = 4.75

=> x = 4.75 / 19 = 0.25 = 1/4

=> Fraction2 = 9 × 1/4 = 2.25

=> Fraction3 = 10 × 1/4 = 2.5 = 2½

=> Comparing 1.25, 2.25, and 2.5; the largest is 2.5.

Therefore The correct answer is 2½.

Additional Information

Mixed Fractions to Improper

To convert a mixed fraction a b/c to improper, use the formula: (a × c + b) / c.

Ratio Distribution

If a sum S is divided in ratio a:b, then parts are [a/(a+b)]×S and [b/(a+b)]×S.

Q36. Answer: (c) Experience

The logic followed here is:

• Smell(fragrance) comes from Rose.

Similarly,

• Wisdom comes from experience.

Hence, "Experience" is the correct answer.

Q37. Answer: (a) C

The logic followed here is:

All the elements are moving in a clockwise direction.

• The arrows are changing their direction alternately.

• The letters sF and Fs are changing their positions alternately.

• The signs ± + and ± are also changing their positions alternately.

Hence, option figure C is the correct answer.

Q38. Answer: (a) Arthropoda

The correct answer is Arthropoda.

• Arthropoda is probably the largest group of creatures.

Key Points

• Main features of Arthropoda:

• The body is divided into three parts– Head, Thorax and Abdomen.

• The body is covered with a thick chitinous exoskeleton.

• Jointed leg.

• The circulatory system is of open type.

• Its body cavities are called haemocoels.

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• The trachea, book lungs, body surface are respiratory parts.
• These are mainly unisexual and fertilization takes place inside the body.
• Example: Cockroach and Prawn.

Q39. Answer: (a) 22500

Total production of the year is 150000 tonnes
Woolen garments = 15%
So, 150000 × 15/100
=> 22500
Therefore The production of woolen garments (in tonnes) in 2014 is 22500

Q40. Answer: (b) 336

Shortcut Trick
To find the LCM of 112, 24, and 48, observe that 48 is a multiple of 24, so we only need the LCM of 112 and 48.
Ratio of 112 : 48 → 7 : 3 (dividing by 16).
LCM = 112 × 3 = 336.
Therefore The correct answer is 336.
Alternate Method
Given: Numbers are 112, 24, and 48.
Formula Used: Prime Factorization Method.
=> Prime factorization of 112 = 2 × 2 × 2 × 2 × 7 = $2^4 \times 7^1$
=> Prime factorization of 24 = 2 × 2 × 2 × 3 = $2^3 \times 3^1$
=> Prime factorization of 48 = 2 × 2 × 2 × 2 × 3 = $2^4 \times 3^1$
=> LCM = Product of highest powers of all prime factors involved.
=> LCM = $2^4 \times 3^1 \times 7^1$
=> LCM = 16 × 3 × 7
=> LCM = 48 × 7 = 336.
Therefore The correct answer is 336.
Additional Information
LCM Definition
The Least Common Multiple (LCM) is the smallest positive integer that is divisible by each of the given numbers.
LCM and HCF Relationship
For two numbers 'a' and 'b', the product of the numbers is equal to the product of their LCM and HCF: a × b = LCM × HCF.
Division Method
LCM can also be found by dividing the numbers by common prime factors until all quotients become 1.

Q41. Answer: (d) Prabodhankar Thackeray

The correct answer is Prabodhankar Thackeray.
• The statue of Prabodhankar Thackeray was unveiled by Maharashtra Chief Minister Devendra Fadnavis at the headquarters of the Greater Mumbai Municipal Corporation.
Key Points
• Keshav Sitaram Thackeray:
• Prabodhankar Thackeray was his pen name.
• He rosed his voice against superstitions, untouchability, child marriage and dowry.
• He was the leader of Samyukta Maharashtra Samiti.
• He was the father of Bal Thackeray, the founder of Shiv Sena.
• His statue was unveiled by Maharashtra Chief Minister Devendra Fadnavis at the headquarters of the Greater Mumbai Municipal Corporation.
Additional Information
• Maharashtra:
• Chief Minister - Eknath Shinde
• Governor - Bhagat Singh Koshyari.
• Number of Districts - 36.

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• Lok Sabha seats - 48.
• Rajya Sabha seats - 19.
• Founded: 1 May 1960

Q42. Answer: (b) 48980

Shortcut Trick
Rate of 5% is equivalent to the fraction 1/20.
Since the population increases, the growth factor per year is (1 + 1/20) = 21/20.
To find the population 2 years ago, we multiply the current population by the reciprocal factor twice: $(20/21)^2$.
Population = 54000 × (20/21) × (20/21) ≈ 54000 × 0.907 ≈ 48979.59.
Rounding to the nearest whole number, we get 48980.
Therefore The correct answer is 48980.
Alternate Method
Given:
Population in 2018 (A) = 54000
Annual growth rate (R) = 5%
Time period (n) = 2 years
Formula Used:
Future Population = Past Population × $(1 + R/100)^n$
=> Past Population (P) = A ÷ $(1 + R/100)^n$
Calculations:
=> P = 54000 ÷ $(1 + 5/100)^2$
=> P = 54000 ÷ $(1 + 1/20)^2$
=> P = 54000 ÷ $(21/20)^2$
=> P = 54000 × (20/21) × (20/21)
=> P = 54000 × (400 / 441)
=> P = 21600000 ÷ 441
=> P ≈ 48979.59
=> P ≈ 48980 (approx.)
Therefore The correct answer is 48980.
Additional Information
Compound Growth Formula
When a quantity increases at a constant rate, the value after n years is $A = P(1 + R/100)^n$, where P is the initial value.
Effective Percentage Change
For two successive percentage changes of a% and b%, the net change is [a + b + (ab/100)]%.
Depreciation Rule
If a value decreases (like machinery or population decline), the formula becomes $A = P(1 − R/100)^n$.

Q43. Answer: (d) B

The parts given in the question figure can together make the options figure B as follows:
• Option figures A, C, and D have either additional parts or fewer parts as given in the question figure.
Hence, option figure B is the correct answer.
Note: This question was ignored in the official exam due to a discrepancy. We have modified the question to make it logical.

Q44. Answer: (d) 625 J

The correct answer is 625 J.
Key Points
• Given,
• Force, F = 125 N
• Displacement, S = 5m
• Work done = Force x Displacement
• = 125 x 5
• = 625 J.

Q45. Answer: (b) Graphite

The correct answer is graphite.

• In graphite, each carbon atom is bonded to three other carbon atoms in the same plane giving a hexagonal array.

Key Points

• Graphite:

• It is also known as plumbago or black lead.

• It is soft, greasy, dark greyish coloured crystalline solid.

• It is a good conductor of heat and electricity.

• It is chemically more reactive than diamond.

• Its layer structure is headed by weak van der Waal's forces.

• Each carbon atom is bonded to three other carbon atoms in the same plane giving a hexagonal array.

• Additional Information

• In the structure of a diamond, each carbon atom joins four other carbon atoms in regular tetrahedrons.

• In the structure of propene, each carbon atom joins four other carbon atoms.

• In the structure of Benzene, each carbon atom joins four other carbon atoms.

Q46. Answer: (c) 1.25 m

The correct answer is 1.25 m.

• Given,

• t = 0.5 sec

• g=a = 10m/s².

• u = 0 m/s

• Using first law of motion

• v = u+at

• v = 0+10x0.5

• v = 5 m/s

• By the second law of motion to compute distance travelled:

• s =ut+ 1/2 (at²)

• s = 0+ 0.5x10x0.5²

• s = 1.25 m

Q47. Answer: (b) 26 years and 12 years

Shortcut Trick

Let Radha's current age be 1 unit, then Sudha's is 2 units.

According to the condition: (2x + 4) = 4 × (x − 6).

Solving this: 2x + 4 = 4x − 24 => 2x = 28 => x = 14 years.

Current ages: Sudha = 28 years, Radha = 14 years.

Ages 2 years ago: 26 years and 12 years.

Therefore The correct answer is 26 years and 12 years.

Alternate Method

Given: Sudha (S) = 2 × Radha (R).

Calculation:

=> Let current age of Radha = x

=> Current age of Sudha = 2x

=> (2x + 4) = 4(x − 6)

=> 2x + 4 = 4x − 24

=> 4x − 2x = 24 + 4

=> 2x = 28

=> x = 14 (Radha's current age)

=> 2x = 28 (Sudha's current age)

=> Ages 2 years ago: Sudha = 28 − 2 = 26 years; Radha = 14 − 2 = 12 years.

Therefore The correct answer is 26 years and 12 years.

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Additional Information

Ratio of Ages

When the age of two persons is given in a ratio, the difference between their ages remains constant throughout time.

Linear Equations in Ages

Always define variables based on the current age to simplify calculations for past or future conditions.

Verification Method

Back-substitution of options into the original conditions is often the fastest way to solve age-based multiple-choice questions.

Q48. Answer: (a) 10

Shortcut Trick

Let the speed of Jack be S1 and Jill be S2.

From given conditions: 4.5S1 − 3S2 = 6 and 5S2 − 6S1 = 5.

Multiply the first equation by 5 and the second by 3 to eliminate S2: 22.5S1 − 15S2 = 30 and 15S2 − 18S1 = 15.

Adding these gives: 4.5S1 = 45 => S1 = 10 km/hr.

Therefore The correct answer is 10 km/hr.

Alternate Method

Given: Time for Jack = 4.5 hrs, Time for Jill = 3 hrs, Diff = 6 km. Time for Jack = 6 hrs, Time for Jill = 5 hrs, Diff = −5 km.

Formula Used: Distance = Speed × Time

=> Let Jack speed = x and Jill speed = y.

=> 4.5x = 3y + 6 --- (Eq 1)

=> 6x = 5y − 5 --- (Eq 2)

=> From Eq 1: 3y = 4.5x − 6 => y = 1.5x − 2

=> Substitute y in Eq 2: 6x = 5(1.5x − 2) − 5

=> 6x = 7.5x − 10 − 5

=> 1.5x = 15

=> x = 10 km/hr

Therefore The correct answer is 10 km/hr.

Additional Information

Average Speed

Total distance divided by total time. For two equal distances with speeds a and b, Average Speed = 2ab/(a+b).

Relative Speed

Speeds add up when moving in opposite directions (a+b) and subtract when moving in the same direction (a−b).

Unit Conversion

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

Q49. Answer: (c) CO2

The correct answer is CO2.

Key Points

• Calcium hydroxide (Ca(OH)2) reacts slowly with the carbon dioxide (CO2) in the air to form a thin layer of calcium carbonate (CaCO3).

• The layer is formed after two to three days of whitewashing and gives a shiny finish to the walls.

• Calcium carbonate is the chemical name of limestone.

Q50. Answer: (d) J

The logic followed here is as follows:

Hence, "J" is the correct answer.

Q51. Answer: (a) Actinide

The correct answer is Actinide.

• Radioactive elements are placed in actinides.

Key Points

• Actinides:

• It is a series of 15 consecutive chemical elements in the periodic table from actinium (Ac) to lawrencium (Lr).

• From atomic numbers 89–103.
• All the elements are radioactive.
• Radioactivity
• Radioactivity was discovered by Henry Becquerel, Madame Curie and Pierre Curie for which they jointly won Nobel Prize.
• γ-rays are emitted after the emission of α and β rays.
• Alpha rays are positively charged helium nuclei (1/2 He), beta rays are negatively charged electrons and gamma rays are chargeless photons.
• The end product of all-natural radioactive elements after the emission of radioactive rays is lead.

Additional Information

• Lanthanides are a series of 15 naturally occurring metallic chemical elements.
• Their atomic numbers fall between 57 (Lanthanum) and 71 (Lutetium).

Q52. Answer: (b) Sound

The correct answer is Sound.

• Sound cannot travel in a vacuum.

Key Points

• Sound Wave:
• It is a longitudinal mechanical wave.
• The longitudinal mechanical waves which lie in the range of 20 Hz to 20,000 Hz are called audible or sound waves.
• It cannot travel in a vacuum.
• The longitudinal mechanical waves having frequencies less than 20 Hz are called infrasonic. These are produced by earthquakes, volcanic, eruptions, Ocean waves, elephants, and whales.
• The longitudinal mechanical waves having frequencies greater than 20,000 Hz are called ultrasonic waves.

Additional Information

• Heat, Light and UV rays can travel in a vacuum.

Q53. Answer: (a) 6

The correct answer is 6.

• 6 atoms are present in the sodium carbonate molecule.

Key Points

• The formula of sodium-carbonate is Na_2CO_3.
• It contains 2 sodium atoms, 3 oxygen atoms and one carbon atom.
• Hence, the total number of atoms is 6.

Additional Information

• Uses of sodium carbonate:
• It is used in the production of detergents and soaps.
• It is used in the manufacturing of glass.
• It is used in the production of rayon polymers.
• It is used in water softening.
• It is used as a raising agent, food additive as an anticaking agent, stabilizer etc.

Q54. Answer: (b) 3

The correct answer is 3.

• The maximum number of bonds a covalent bond can have between two atoms is 3.

Key Points

• Covalent bond:
• A bond formed between two same or different atoms by mutual contribution and sharing of electrons is called a covalent bond.
• Co-ordinate bond (or Dative bond): Coordinate bond is a special type of covalent bond in which one atom donates electrons to other atoms.
• The bonding between donor to acceptor atom is called co-ordinate bond.
• The maximum number of bonds a covalent bond can have between two atoms is 3.

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Q55. Answer: (b) South Africa

The correct answer is South Africa.

Key Points

• The Cape of Good Hope is located in South Africa.

• It is a rocky point on the Atlantic coast of the Cape Peninsula in South Africa.

• The Cape of Good Hope is a section of the Table Mountain National Park.

• It was earlier known as Cape Colony established by the Dutch in 1652.

• Additional Information

• South Africa:

• Capitals: Cape Town, Pretoria, Bloemfontein

• President: Cyril Ramaphosa

• Currency: South African rand

Q56. Answer: (a) –12.5

Shortcut Trick

For a system of linear equations to have no solution, the lines must be parallel.

Condition: a1/a2 = b1/b2 ≠ c1/c2

From the equations: 8/20 = 5/(−k)

=> 2/5 = 5/(−k) => −2k = 25 => k = −12.5

Therefore The correct answer is −12.5.

Alternate Method

Given Equations:

1) 8x + 5y + 11 = 0

2) 20x − ky − 9 = 0

Formula Used:

For a pair of linear equations a1x + b1y + c1 = 0 and a2x + b2y + c2 = 0, the condition for No Solution (Inconsistent System) is:

a1/a2 = b1/b2 ≠ c1/c2

Calculations:

Identify coefficients from the given equations:

a1 = 8, b1 = 5, c1 = 11

a2 = 20, b2 = −k, c2 = −9

Applying the condition a1/a2 = b1/b2:

=> 8/20 = 5/(−k)

Simplify the fraction 8/20 by dividing both by 4:

=> 2/5 = 5/(−k)

Cross-multiplying the terms:

=> 2 × (−k) = 5 × 5

=> −2k = 25

=> k = 25/(−2)

=> k = −12.5

Verify c1/c2 condition:

=> c1/c2 = 11/(−9) ≈ −1.22

=> Since 0.4 ≠ −1.22, the condition for no solution is strictly satisfied.

Therefore The correct answer is −12.5.

Additional Information

Unique Solution (Intersecting Lines)

The system has a unique solution if the ratios of coefficients of x and y are not equal: a1/a2 ≠ b1/b2.

Infinite Solutions (Coincident Lines)

The system has infinitely many solutions if all ratios are equal: a1/a2 = b1/b2 = c1/c2.

Consistency of Equations

A system is Consistent if it has at least one solution (Unique or Infinite) and Inconsistent if it has no solution.

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Q57. Answer: (b) Bangladesh

The correct answer is Bangladesh.

• Sheikh Hasina is the Prime Minister of Bangladesh.

Key Points

• Bangladesh:

• Capital: Dhaka.

• President: Abdul Hamid

• Prime Minister: Sheikh Hasina

• The Indian states of Assam, Mizoram, Tripura, Meghalaya, and West Bengal share their borders with Bangladesh.

Additional Information

• Ismail Sabri Yaakob is the Prime Minister of Malaysia.

• Salman bin Abdulaziz Al Saud is the King of Saudi Arabia.

Q58. Answer: (c) Statements 1, 2, 3 and 4 all together are sufficient.

To arrange the people from smallest to largest, we need all the four statements as follows:

Statement 1: G is the longest.

_ < _ < _ < _ < G

Statement 2. E is taller than F.

F < E

• Statements 1 and 2 when combined together are not sufficient to answer the question because there is no information about H and I.

Statement 3: H is the smallest.

H < _ < _ < _ < _

• Statements 1, 2, and 3 are not sufficient when taken together because there is no information about the size of I

Statement 4. F is taller than I.

I < F

• On combining statements 1, 2, 3, and 4, we get:

• H < I < F < E < G

Hence, "Statements 1, 2, 3 and 4 all together are sufficient" is the correct answer.

Confusion Points

• The fourth option "Every statement is sufficient" implies that we can determine the answer from any of the statements 1, 2, 3, and 4. Therefore, the fourth option is incorrect.

Q59. Answer: (b) M. S. Swaminathan

The correct answer is M. S. Swaminathan.

• M. S. Swaminathan has been awarded the 'Yeraringan Award'.

Key Points

• Green Revolution:

• It was launched in the year 1966 and was the brainchild of Norman Borlaug, though, in India, it was made successful by Dr M.S. Swaminathan.

• The term ‘Green Revolution’ was coined by Dr William Gide.

• The achievements of the Green Revolution were the rise in cereal production especially wheat.

• Dr M.S. Swaminathan was awarded the 'Yeraringan Award' by the Vice President of India.

• Prof. M.S. Swaminathan was the first recipient of the Prize which was started by Norman Borlaug.

Q60. Answer: (c) Neither 1 nor 2 follows.

Given,

Statements:

I. No gates are sticks.

II. Some sticks are windows.

Conclusions:

1. All doors are windows.

2. Some sticks are gates.

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The least possible Venn diagram for the given statements is as follows:

Conclusions:

I. All doors are windows. → False (It is not possible as the information about doors is not given)

II. Some sticks are gates. → False (It is not possible as no gates are sticks)

Hence, the correct answer is "Neither I nor II follows."

Q61. Answer: (a) National Welfare Fund for Sportspersons

The correct answer is National Welfare Fund for Sportspersons.

• National Welfare Fund for Sportspersons was established in 1982 to support the outstanding sportspersons of the past year, sportspersons living in poverty conditions who brought glory to the country in sports.

Key Points

• National Welfare Fund for Sportspersons:

• It is also known as Pandit Deendayal Upadhyay National Welfare Fund For Sportspersons (PDUNWFS).

• It was set up in the year 1982.

• The motive of the scheme was to assist outstanding Sportspersons of past years, living in poverty circumstances who had brought glory to the country in sports.

• The scheme was revised in May 2016.

• The revised provisions contained to provide for lump sum ex-gratia assistance to outstanding Sportspersons of yesteryears.

• The scheme provides assistance for:

• injuries sustained during training for and participation in sports competitions.

• Assistance to Families of deceased Outstanding Sportspersons.

• Medical Treatment

• Assistance to coaches, support personnel, umpires, referees and match officials.

Q62. Answer: (b) RGP

The logic used here is as follows:

Similarly,

Hence, "RGP" is the correct answer.

Q63. Answer: (d) 156.31 cm²

Shortcut Trick

Area of an equilateral triangle = 0.433 × (side)²

Given side = 19 cm

=> Area = 0.433 × 19²

=> Area = 0.433 × 361

=> Area = 156.313 cm²

Therefore The correct answer is 156.31 cm².

Alternate Method

Given:

Side of the equilateral triangle (a) = 19 cm

Formula Used:

Area of equilateral triangle = (√3 / 4) × a²

Calculations:

=> Area = (√3 / 4) × (19)²

=> Area = (1.732 / 4) × 361

=> Area = 0.433 × 361

=> Area = 156.313 cm²

Therefore The correct answer is 156.31 cm².

Additional Information

Height of Equilateral Triangle

The altitude or height (h) is given by the formula h = (√

Q64. Answer: (b) Lake Titicaca

The correct answer is Lake Titicaca.

• Lake Titicaca is the largest lake in South America.

Key Points

• Lake Titicaca:

• It is the largest lake in South America.

• It is also the world's highest lake navigable to large vessels.

• The lake is situated 3,810 m above sea level.

• It is situated between Peru to the west and Bolivia to the east.

• Additional Information

• Lake Poopo is a large saline water lake situated in Bolivia.

• Lake Valencia is the third largest lake in Venezuela

• Lake Janin is a lake in Quebec, Canada.

Q65. Answer: (b) Four chambered heart

The correct answer is Four chambered hearts.

• Mammalian animals have four-chambered hearts.

Key Points

• Mammalia:

• Main features

• These are warm-blooded animals.

• There is no nucleus in their red blood cells (except in camel and lama).

• Mammalia is divided into three subclasses:

• Prototheria: It lays eggs, e.g., Echidna.

• Metatheria: It bears the immature child, e.g., Kangaroo.

• Eutheria: It bears the well-developed child, e.g., humans.

• They have a four-chambered heart.

Additional Information

• A fish has only a two-chambered heart.

• In amphibians, the heart is three-chambered.

• Crocodiles and birds' heart is also divided into four chambers.

Q66. Answer: (a) [figure]

The most appropriate Venn diagram for the word "Wool, Sweater, Hat"

is as follows:

• Some sweaters and some hats are made up of wool.

Hence, option figure A is the correct answer.

Additional Information

• Sweaters were traditionally made from wool but can now be made of cotton, synthetic fibers, or any combination of these.

Q67. Answer: (d) Mary Kom

The correct answer is Mary Kom.

• Mary Kom won five-time gold medals in the Asian Women's Boxing Championship in the light flyweight (48kg) category.

Key Points

• MC Mary Kom:

• Her full name is Mangte Chungneijang Mary Kom.

• She is the only woman in the world to win the World Amateur Boxing Championship six times.

• She also won five-time gold medals in the Asian Women's Boxing Championship in the light flyweight (48kg) category.

• She is nicknamed Magnificent Mary.

• She is also a Member of Parliament, Rajya Sabha.

Important Points

• Karnam Malleswari is the first Indian woman to win a medal in an Olympic event.

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Q68. Answer: (c) Remains the same

The correct answer is Remains the same.

• If the potential difference and current through a circuit are doubled, then the resistance of the circuit remains the same.

Key Points

• Potential Difference:

• Work done in bringing a unit positive charge from one point to another point is the potential difference between the two points.

• Its SI unit is volt.

• It is a scalar quantity.

• Ohm's Law

• The electric current flowing through a conductor is directly proportional to the potential difference across its ends.

• It is given by the formula:

• V=IR

• Given,

• V1= 2V

• I1= 2I

• hence, R1 = V1/I1

• R1 = 2V/21

• Hence, the remains unchanged.

Q69. Answer: (c) Only B is true.

The correct answer is Only B is true.

Key Points

• Compressibility:

• It is the property by which a substance or matter can be reduced to a smaller space by pressure. Hence, statement A is false.

• Fluidity:

• It is a property of matter to flow easily and change shape under external force.

• This property is exhibited by both liquid and gas. Hence, statement B is true.

Q70. Answer: (c) 57-71

The correct answer is 57-71.

• The atomic number of lanthanide is in the 5-71 range.

Key Points

• Lanthanide:

• It is also called lanthanoid.

• It is any of the series of 14 consecutive chemical elements in the periodic table from lanthanum to lutetium i.e. atomic numbers 57–71 with 57 (Lanthanum) and 71 (Lutetium).

• Scandium and yttrium are rare-earth metals.

Additional Information

• Modern Periodic Table:

• It is a graphical representation of the Aufbau principle.

• It is based on the electronic configuration of elements and contains 118 elements.

• There are 7 periods and 18 groups.

• Modern periodic table is classified as:

i. s-block;

ii. p-block;

iii. d-block;

iv. f-block.

Q71. Answer: (d) Tata Steel Ltd

The correct answer is Tata Steel Ltd.

• Tata Steel Ltd won the Prime Minister's Trophy for Best Performing Integrated Steel Plant for the assessment years 2014-15 and 2015-16, on 8 December 2017.

Key Points

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• Tata Steel Ltd.:
• It was earlier known as the Tata Iron and Steel Company Limited (TISCO).
• It was founded in the year 1907.
• Jamsetji Tata was the founder.
• Its headquarters are located in Mumbai, Maharashtra.

Q72. Answer: (b) A

The logic used here is as follows:
• In option figures B, C, and D, the lines are equidistant.
• But in option A one of the lines is placed far from the remaining 3 lines.
Hence, option figure A is the correct answer.

Q73. Answer: (d) 8 - 12 May, 2017

The correct answer is 8 - 12 May 2017.
Key Points
• From 8th - 12th May 2017, India organized the Cultural Festival in Egypt to mark the 156th birth anniversary of Rabindranath Tagore.
• The event was organised by the cultural wing Indian Embassy in Egypt.
Important Points
• Rabindranath Tagore:
• His first poem was published in the Amrita Bazar Patrika and then he wrote ‘Banaphul’ and ‘Bhanusinher Padavali’.
• He founded Shantiniketan near Bolpore in December 1901.
• He wrote Gitanjali, for which he was awarded the Nobel Prize in 1913.
• He also founded the Vishwa Bharati University.
• In 1919, he renounced the knighthood granted by the British crown after the Jallianwala Bagh Massacre.
• His composed National Anthem of two nations
• India–Jana Gana Mana
• Bangladesh–Amar Sonar Bangla

Q74. Answer: (d) 44 times

The correct answer is 44 times.
Key Points
• The hands of a clock are 44 times perpendicular to each other in a day.
• After 1 hour, hour hands travels a space of 5 minutes or 30^o.
• On the clock, hands are 11 times opposite to each other in 12 hours and 22 times opposite in a day.
• The hands in the clock are perpendicular 22 times in 12 hours and 44 times in one day.

Q75. Answer: (a) Only 2 is sufficient while only 1 is not sufficient.

Given that,
X is taller than Y and Z is shorter than W.
=> X > Y and W > Z
We need to determine who is the shortest one.
Statement 1: Z is shorter than X.
=> X > Y and W > Z
=> X > Y, Z
• This statement alone is not sufficient as the shortest person can be Z or Y.
Statement 2: W is shorter than Y.
=> X > Y > W > Z
• Therefore, Z is the shortest person.
• Thus, statement 2 is sufficient to determine the shortest person.
Hence, "Only 2 is sufficient while only 1 is not sufficient" is the correct answer.

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Q76. Answer: (c) 19

The triangles in the figure given below are as follows:

Hence, "19" is the correct answer.

Q77. Answer: (b) Ajay singh Bisht

The correct answer is Ajay Singh Bisht.

Key Points

• The birth name of Yogi Adityanath is Ajay Bisht.

• He is also the mahant of the Gorakhnath Math, Gorakhpur.

• He is the founder of Hindu Yuva Vahini.

• Uttar Pradesh:

• Capital: Lucknow

• Governor: Anandiben Patel

• Chief Minister: Yogi Adityanath.

• It shares its borders with the states of Rajasthan, Haryana, Delhi, Madhya Pradesh, Chattisgarh, Bihar, Jharkhand, Uttarakhand, Himachal Pradesh.

• It shares its international border with Nepal.

Q78. Answer: (c) Tyagaraja

The correct answer is Tyagaraja.

• Tyagaraja is one of the Trinity of Carnatic Music.

Key Points

• Carnatic Music

• The Tamil classic of the 2nd century AD. titled ‘Silappadhikaram’ contains a vivid description of the music of that period.

• The Tolkappiyam, Kalladam and the contributions of the Saivite and Vaishnavite saints of the 7th and 8th centuries AD.

• It also serves as resource material for studying musical history.

• Trinity of Carnatic music:

• It is a trio of composer-musicians of Carnatic music in the 18th century.

• The trio consisted of Tyagaraja, Muthuswami Dikshitar and Shyama Sastri.

• Tyagaraja was a Telugu composer.

• He is known for Pancharatna Kritis.

• Muthuswami Dikshitar was a Sanskrit and Manipravalam composer.

• Shyama Sastri was a Telugu, Sanskrit composer.

-

Q79. Answer: (b) 5

In the figure above, the squares are as follows:

• ABED, BCFE, DEHG, EFIH, and ACIG

Hence, "5" is the correct answer.

Q80. Answer: (d) November

According to the table,

In the month of November the least number of books were sold

Therefore Required answer is November

Q81. Answer: (b) Horticulture Farming

The correct answer is Horticulture Farming.

• An estate where a cash crop is grown for sale is known as Horticulture Farming.

Key Points

• Horticulture farming is cultivating plants in an estate to produce food and medicinal ingredients as a cash crop.

• The horticulture includes a wide range of cash crops namely fruits, vegetables, flowers medicinal and aromatic plants mushrooms, plantation crops and spices.

Additional Information

• A kitchen garden is a small farming garden growing fruits and vegetables in the backyard of the house by using kitchen

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wastewater.

• Slash and burn farming is a farming method that involves the cutting and burning of plants in a forest or woodland.

• Subsistence farming is the practice of growing crops and raising livestock adequate only for one's own use, without any excess for trade.

Q82. Answer: (c) 2005

To find a year with the same calendar, we add 6 to the given year if the given year is a leap year + 1.

• 2004 is a leap year.

• 2005 = leap year + 1

• So we add 6.

• 2005 + 6 = 2011

Hence, "2005" is the correct answer.

Q83. Answer: (a) Rs. 3,763

Shortcut Trick

Effective rate for 2 years at 12% = 12 + 12 + (12 × 12) ÷ 100 = 24 + 1.44 = 25.44%

Total Amount = Principal × (100% + 25.44%) = 3,000 × 125.44%

Amount = 3,000 × 1.2544 = 3763.2

Therefore The correct answer is Rs. 3,763.

Alternate Method

Given:

Principal (P) = Rs. 3,000

Rate (R) = 12% per annum

Time (T) = 2 years

Formula Used:

Amount (A) = P(1 + R/100)^T

Calculations:

=> A = 3000(1 + 12/100)²

=> A = 3000(1 + 3/25)²

=> A = 3000(28/25)²

=> A = 3000 × (784 ÷ 625)

=> A = 4.8 × 784

=> A = Rs. 3,763.2

Rounding off to the nearest integer, we get Rs. 3,763.

Therefore The correct answer is Rs. 3,763.

Additional Information

Effective Rate for Compound Interest

For a 2-year period, the effective Compound Interest rate can be calculated using the successive percentage formula: R_(eff) = x + y + (xy/100).

Difference between CI and SI

The difference between Compound Interest and Simple Interest for 2 years is given by the formula: D = P(R/100)².

Amount with Different Compounding Frequencies

If interest is compounded half-yearly, the rate is taken as R/2 and time as 2n. Formula: A = P(1 + R/200)^{2n}.

Q84. Answer: (b) 2

Shortcut Trick

Identify the algebraic form: ((a + b)² − (a − b)²) ÷ (2 × a × b).

Using the identity: (a + b)² − (a − b)² = 4ab.

Substituting the identity into the expression gives: 4ab ÷ 2ab.

The variables a and b cancel out completely: 4 ÷ 2 = 2.

The result is a constant regardless of the values 496 and 54.

Therefore The correct answer is 2.

Alternate Method

Given:
Expression = ((496 + 54)² − (496 − 54)²) ÷ (2(496 × 54))
Formula Used:
(a + b)² − (a − b)² = 4ab
Calculations:
=> Let a = 496 and b = 54.
=> Numerator = (a + b)² − (a − b)²
=> Numerator = 4 × a × b = 4 × 496 × 54
=> Denominator = 2 × (496 × 54) = 2 × a × b
=> Expression = (4 × 496 × 54) ÷ (2 × 496 × 54)
=> Expression = 4 ÷ 2
=> Value = 2
Therefore The correct answer is 2.
Additional Information
Sum of Squared Binomials
The identity (a + b)² + (a − b)² = 2(a² + b²) is used when the two squared terms are added.
Difference of Squares
The identity a² − b² = (a − b)(a + b) helps in factoring and simplifying quadratic differences.
Basic Expansion Rules
Expansion of (a + b)² = a² + 2ab + b² and (a − b)² = a² − 2ab + b² are the building blocks of algebraic simplification.

Q85. Answer: (a) Britain

The correct answer is Britain.
• The Opium War was fought between China and Britain
Key Points
• Opium Wars:
• Opium War was fought from 1839 to 1842.
• It was fought between China and Britain.
• China was represented by the Qing dynasty.
• The First Opium War was fought between 1839–42.
• It was fought between China and Britain.
• The Second Opium War was fought between 1856–60.
• It is also known as the Arrow War or the Anglo-French War.
• It was fought by Britain and France against China.

Q86. Answer: (a) Chanda Kochhar

The correct answer is Chanda Kochhar.
Key Points
• ICICI Bank:
• Its full form is Industrial Credit and Investment Corporation of India (ICICI).
• It was founded in the year 1995.
• Its headquarter is located in Vadodara, Gujarat.
• Sir Arcot Ramasamy Mudaliar was the first Chairman of ICICI bank.
• Chanda Kochhar was then CEO of ICICI bank. (As of 2018).
Important Points
• Girish Chandra Chaturvedi is the current chairperson of ICICI bank.
• Sandeep Bakshi is the current CEO of ICICI bank. (As of 2022).
Additional Information
• Shikha Sharma was the CEO of Axis Bank.
• Naina Lal Kidwai was the Group General Manager and the Country Head of HSBC India.
• Arundhati Bhattacharya was the chairperson of the State Bank of India.

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Q87. Answer: (b) 270 J

The correct answer is 270 J.

• Given.

• mass, m= 15 kg.

• Velocity, v= 6 ms^(-1).

• Kinetic~ energy= 1/2mv²

= 0.5 × 15 × 6²

= 270 J

Kinetic Energy

• If a body of mass m is moving with velocity v, then kinetic energy KE:

• Kinetic~ energy= 1/2mv²=(P²)/2m

• where p is the linear momentum.

• When momentum is doubled, kinetic energy becomes four times.

• If a body is moving in a horizontal circle then its kinetic energy is the same at all points, but if it is moving in a vertical circle, then the kinetic energy is different at a different point

Q88. Answer: (b) Only assumption I is implicit.

• From the given statement, healthy life is possible only if there is proper nourishment. As eating fruits and vegetables lead to a healthy life, the assumption that they provide the essential nutrients is implicit. So, assumption I is implicit.

• Only based on the given statement, it cannot be decided whether soybeans are beneficial for health, firstly because soybeans are beans or grains and secondly because the statement does not specify about soybeans or pulses or grains. Thus, assumption II is not implicit.

Hence the correct answer is option 2.

Q89. Answer: (c) 50400

Shortcut Trick

Word: CORPORATION. Vowels: O, O, A, I, O (5). Consonants: C, R, P, R, T, N (6).

Treat all 5 vowels as 1 unit. Total units = 6 consonants + 1 unit = 7 units.

Ways to arrange 7 units (with R repeating twice) = 7! ÷ 2! = 2520.

Ways to arrange 5 vowels (with O repeating thrice) = 5! ÷ 3! = 20.

Total ways = 2520 × 20 = 50400.

Therefore The correct answer is 50400.

Alternate Method

Given: Word = CORPORATION. Condition: Vowels always together.

=> Total letters = 11. Vowels = {O, O, A, I, O}. Consonants = {C, R, P, R, T, N}.

=> Number of ways to arrange (Consonants + 1 Vowel Unit) = 7! ÷ (2! for R)

=> External arrangement = 5040 ÷ 2 = 2520.

=> Number of ways to arrange Vowels internally = 5! ÷ (3! for O)

=> Internal arrangement = 120 ÷ 6 = 20.

=> Total arrangements = 2520 × 20 = 50400.

Therefore The correct answer is 50400.

Additional Information

Permutation with Repetition

When 'n' objects have 'p' identical items of one kind and 'q' of another, arrangements = n! ÷ (p! × q!).

String Method (Togetherness)

To keep specific items together, tie them into a single block/unit and arrange them as one entity first.

Vowels Never Together

Calculated as (Total arrangements without constraints) − (Arrangements where vowels are always together).

Q90. Answer: (a) 39

Given: 24$3@8#45*5

After replacing the symbols we get:

24 + 3 x 8 - 45 ÷ 5

= 24 + 3 x 8 - 9

= 24 + 24 - 9

= 48 - 9

= 39

Hence, 39 is the correct answer.

Q91. Answer: (d) 4.25

Given: 6 × 5 – 4 + 80 ÷ 2

After replacing the symbols, we get:

6 + 5 × 4 ÷ 80 - 2

= 6 + 5 × 0.05 - 2

= 6 + 0.25 - 2

= 6.25 - 2

= 4.25

Hence, "4.25" is the correct answer.

Q92. Answer: (b) Species

The correct answer is Species.

Key Points

• The basic unit of classification of living organisms is species.

• Species diversity:

• The number of species of plants and animals that are present in a particular place or region constitutes its species diversity.

• The same diversity is seen both in natural ecosystems and in agricultural ecosystems.

Q93. Answer: (d) 180°

The correct answer is 180°.

Key Points

• Work done can be positive, negative, or zero. When a body is being lifted in the upward direction, the force of gravity is acting in the downward direction.

• But, the displacement of the body is in the upward direction. Since the angle between the force and displacement is 180 degrees, the work done by the gravitational force on the body is negative.

• Hence for negative work done, the angle between force and displacement is 180°.

Additional Information

• Work is a scalar quantity. It is calculated as W = F × s c o s θ, where θ is the angle between the force applied and the displacement.

• F and s are the force applied and the displacement respectively.

• When 0 ? < θ < 90 ?, the value of cos θ is greater than 0 and less than 1, the work done is positive.

• When 90 ? < θ < 270 ?, the value of cos θ is negative. So work done becomes negative.

• When cos θ = 90°, the value of cos θ is zero and so the work done is always zero.

Important Points

Q94. Answer: (d) Only Assumption I is implicit.

• Since the government has decided to increase the fair, it is safe to think that they are under the assumption that people can afford to pay it. So, assumption I is implicit.

• Just because the government has increased the fair, it cannot be assumed whether many people use public transport or not. Thus, assumption II is not implicit.

Hence the correct answer is option 4.

Q95. Answer: (d) During the given interval

The correct answer is During the given interval.

• Average speed and average velocity represent the speed of the object during the given interval.

Key Points

• Average speed

• The average speed of a particle for a given interval of time is defined as the ratio of total distance travelled to the total time taken.

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• Average ~speed = (Total~ distance)/(total ~time t~aken)
• It is a scalar quantity.
• Average velocity:
• It is defined as the ratio of total displacement to the total time taken in a given interval of time.
• It is a vector quantity.

Q96. Answer: (c) 351.155

Shortcut Trick
Apply Unit Digit and Decimal Alignment check.
Subtracting from 395.000: 395.000 − (39.500 + 3.950 + 0.395)
Sum of negative terms: 39.500 + 3.950 + 0.395 = 43.845
Final calculation: 395.000 − 43.845 = 351.155
Therefore The correct answer is 351.155.
Alternate Method
Given: 395 − 39.5 − 3.95 − 0.395
Step-by-step subtraction:
=> 395.0 − 39.5 = 355.5
=> 355.50 − 3.95 = 351.55
=> 351.550 − 0.395 = 351.155
Therefore The correct answer is 351.155.
Additional Information
BODMAS Rule
Always follow the order: Brackets, Orders, Division, Multiplication, Addition, and Subtraction.
Decimal Subtraction
Always align the decimal points and add placeholder zeros to ensure all numbers have the same number of decimal places before operating.

Q97. Answer: (c) B

The logic followed here is:
• All the option figures except option figure B has exactly half of the circle shaded with strips,
• Option figure B has the shaded part less than half in solid colour.
Hence, option figure B is the correct answer.

Q98. Answer: (a) 75 km/h, 80 km/h

Shortcut Trick
Total distance covered in 2 hours = Total distance − Remaining distance = 340 − 30 = 310 km.
Relative speed = Distance ÷ Time = 310 ÷ 2 = 155 km/h.
Since trains move towards each other, Relative Speed = S1 + S2.
Check options for sum = 155 and difference = 5: 75 + 80 = 155.
Therefore The correct answer is 75 km/h, 80 km/h.
Alternate Method
Given: Total distance = 340 km, Time = 2 hours, Remaining gap = 30 km.
Formula: Distance = Relative Speed × Time
=> Let the speed of the first train be x km/h.
=> Speed of the second train = (x + 5) km/h.
=> Distance covered by both = 340 − 30 = 310 km.
=> (x + x + 5) × 2 = 310
=> 2x + 5 = 310 ÷ 2
=> 2x + 5 = 155
=> 2x = 150
=> x = 75 km/h
=> Second train speed = 75 + 5 = 80 km/h.
Therefore The correct answer is 75 km/h, 80 km/h.

Additional Information

Relative Speed Concept

When two objects move in opposite directions, their relative speed is the sum of their individual speeds (S1 + S2).

Distance-Speed Relation

Distance covered = Speed × Time. For two bodies, Distance = Relative Speed × Time taken to meet or reach a certain gap.

Q99. Answer: (d) D

The logic followed here is as follows:

• After every clockwise rotation, alternately the left and the right side appears dotted.

Similarly,

• The figure is rotated by 180 degrees in the clockwise direction.

• In the answer figure, the right part should be dotted. This condition is only satisfied by option figure D.

Hence, option figure D is the correct answer.

Q100. Answer: (d) Both 1 and 2 follows.

The statement highlights the decision of the African Government towards the disease Ebola and to punish people if they do not report it.

• Action 1 talks about planning to enact laws to control Ebola which agrees with the given statement. So, it follows.

• Action 2 suggests that the proceedings of the punishment be made public through mass media so that people become more responsible, so action 2 also follows.

Hence the correct answer is option 4.

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