RRB NTPC (UG) CBT-I Official Paper (Held On: 08 Sept, 2025 Shift 3) (Previous Year Paper)

RRB Group D • 2025 • 100 questions • 90 minutes • Answer key and solutions

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GENERAL AWARENESS

Q1. Which Jain text is recognised in the West and known for its verses on monk conduct, sermons, and poetic teachings?

(a) Uttaradhyayana Sutra
(b) Kalpa Sutra
(c) Acaranga Sutra
(d) Bhagavati Sutra

Q2. Why is Sanskrit counted among the modern Indian languages by the Constitution of India?

(a) Given its designation as India's national language
(b) Because it continues to be actively used
(c) Due to its status as the most ancient classical language
(d) As it serves as the linguistic root for all contemporary Indian languages

Q3. The division of subjects between the Union and the States is laid out in which Schedule of the Constitution?

(a) Schedule IX
(b) Schedule V
(c) Schedule X
(d) Schedule VII

Q4. Which key combination is used to permanently delete a file without sending it to the Recycle Bin?

(a) Ctrl + D
(b) Alt + F4
(c) Shift + F2
(d) Shift + Delete

Q5. The Bhimbetka rock shelters are associated with which prehistoric period?

(a) Upper Neolithic
(b) Lower Paleolithic
(c) Iron Age
(d) Lower Chalcolithic

Q6. According to the 'List of India’s Major Defence Deals of 2024–2025' report, what is the primary objective of India's Rs. 20,506.65 crore acquisition of BrahMos supersonic cruise missiles?

(a) Enhance the Indian Army's artillery capabilities
(b) Strengthen the Indian Navy's maritime strike capacity
(c) Upgrade the Indian Air Force's fighter jets
(d) Develop indigenous missile technology

Q7. Which of the following practices promotes sustainable agriculture?

(a) Monocropping
(b) Crop rotation and organic farming
(c) Slash and burn cultivation
(d) Use of chemical pesticides

Q8. The office of Governor-General was renamed after 1858 as ____.

(a) Secretary of State
(b) Viceroy of India
(c) Chief Administrator
(d) Prime Minister

Q9. The Idukki Disaster Resilience and Information System (IDRIS), India's first integrated early warning and planning platform using AI and real-time data, was launched in which Indian state?

(a) Karnataka
(b) Kerala
(c) Tamil Nadu
(d) Himachal Pradesh

Q10. Which amendment granted constitutional status to Panchayati Raj institutions?

(a) Seventy-fourth Amendment Act, 1992
(b) Eighty-sixth Amendment Act, 2002
(c) Seventy-third Amendment Act, 1992
(d) Seventy-second Amendment Act, 1992

Q11. India's first prototype fast-breeder reactor to be commissioned by September 2026, is located at which of the following places?

(a) Kalpakkam
(b) Tarapur
(c) Bhavnagar
(d) Jaduguda

Q12. Which of the following was a major fiscal reform introduced in India as part of the 1991 economic reforms?

(a) Introduction of GST
(b) Introduction of the Modified Value Added Tax
(c) Abolition of wealth tax
(d) Implementation of the FRBM Act

Q13. Which of the following commissions was appointed to look into the question of states based on language?

(a) Gadgil Commission
(b) Sarkaria Commission
(c) Swaran Singh Committee
(d) Dhar Commission

Q14. Which of the following is a compound?

(a) Oxygen
(b) Iron
(c) Water
(d) Sulphur

Q15. Which missile was successfully flight-trialed by DRDO and the Indian Navy from Integrated Test Range, Chandipur, Odisha, in 2025, demonstrating capability against ship targets when launched from a Sea King helicopter?

(a) BrahMos Anti-Ship Missile
(b) Naval Anti-Ship Missile - Short Range
(c) Prithvi Surface-to-Surface Missile

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(d) Agni Ballistic Missile

Q16. Which major reform was aimed at redistributing land to the landless after independence?

(a) Land Ceiling Acts
(b) Crop Insurance Scheme
(c) Green Revolution
(d) Agricultural Export Policy

Q17. Which island group lies to the south-east of the Indian mainland?

(a) Agatti island
(b) Minicoy
(c) Andaman and Nicobar
(d) Lakshadweep

Q18. Akashteer, which is India's fully indigenous, automated Air Defence Control and Reporting System, that played a vital role during conflict with Pakistan in May 2025, was developed by which of the following organisations?

(a) Defence Research and Development Organisation (DRDO)
(b) Hindustan Aeronautics Limited (HAL)
(c) Bharat Electronics Limited (BEL)
(d) Bharat Dynamics Ltd

Q19. Which of the following crops is grown in waterlogged conditions?

(a) Maize
(b) Bajra
(c) Groundnut
(d) Rice

Q20. The Production Linked Incentive (PLI) scheme is aimed at boosting manufacturing. Which of the following sectors is NOT covered under the PLI scheme?

(a) Pharmaceuticals
(b) Automobiles
(c) Tourism
(d) Electronics

Q21. What was the main objective of the Pitt's India Act of 1784, passed by the British Parliament?

(a) Empower provincial councils
(b) Trade monopoly
(c) Abolish company rule
(d) Establish dual government

Q22. In 2025, on which date was the International Day for Biological Diversity observed globally?

(a) 5 June
(b) 5 May
(c) 22 May
(d) 15 May

Q23. Rural electrification has been a longstanding priority to support livelihoods and education in villages. Which scheme aimed to achieve 100% household electrification in rural India?

(a) Ujjwala Yojana
(b) Pradhan Mantri Gram Sadak Yojana
(c) Saubhagya Yojana
(d) Swabhimaan Scheme

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Q24. Which of the following companies has launched a commercial space surveillance satellite named SCOT in March 2025?

(a) Tata Advanced Systems
(b) Digantara
(c) Hindustan Aeronautics Limited
(d) Mahindra Aerospace

Q25. Who was assigned the portfolio of Health & Family Welfare, Transport, and Information Technology in the new Delhi cabinet formed in February 2025?

(a) Pankaj Kumar Singh
(b) Ravinder Indraj Singh
(c) Ashish Sood
(d) Manjinder Singh Sirsa

Q26. How did Public Interest Litigation (PIL) emerge in India as a tool of judicial activism?

(a) It originated under the 42nd Constitutional Amendment (1976).
(b) It was introduced by the Lok Adalat system in 2005.
(c) It began in 1979 when the Supreme Court allowed individuals to file cases for public interest.
(d) It was first used during the Emergency (1975-77).

Q27. Which government-owned organisation is primarily responsible for electricity transmission in India?

(a) National Thermal Power Corporation Limited
(b) Central Electricity Authority
(c) Bharat Heavy Electricals Limited
(d) Power Grid Corporation of India Limited

Q28. After deleting a file from a folder, a user realises that it was an important file. Which of the following steps should they follow to restore it?

(a) Press Ctrl + Z repeatedly until it reappears
(b) Restart the computer and the file will return
(c) Open Recycle Bin → Right-click the file → Click Restore
(d) Use Alt + Tab to recover the file

Q29. Which of the following organisations successfully conducted the first flight trial of a stratospheric airship platform at Sheopur, Madhya Pradesh, to enhance military surveillance capabilities?

(a) Bharat Electronics Limited (BEL)
(b) Hindustan Aeronautics Limited (HAL)
(c) Defence Research and Development Organisation (DRDO)
(d) Indian Space Research Organisation (ISRO)

Q30. The Northern Plains of India are primarily formed by the deposits of which rivers?

(a) Narmada and Tapti
(b) Ganga, Indus and Brahmaputra
(c) Yamuna and Chambal
(d) Krishna and Godavari

Q31. Which element from Group 17 is used to eliminate bacteria and viruses from surfaces, drinking water, sewage, industrial waste, and swimming pools and spas?

(a) Bromine
(b) Fluorine
(c) Iodine
(d) Chlorine

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Q32. What was the key electoral innovation introduced in the 1909 Act?

(a) Separate electorates
(b) Proportional representation
(c) Voting rights for all
(d) Women's suffrage

Q33. Who among the following was the first Indian cricketer to receive the Padma Bhushan award?

(a) CK Nayudu
(b) Sunil Gavaskar
(c) Sachin Tendulkar
(d) Kapil Dev

Q34. The Congo River is the deepest river in the world. It is located on which continent?

(a) South America
(b) Europe
(c) Asia
(d) Africa

Q35. When was K Sanjay Murthy sworn in as the Comptroller and Auditor General (CAG) of India by the president of India?

(a) April 2025
(b) December 2024
(c) November 2024
(d) February 2025

Q36. Which of the following features introduced by the 73rd Constitutional Amendment ensures the continuous functioning of Panchayati Raj Institutions (PRIs)?

(a) Creation of Lok Adalats at Panchayat level
(b) Elections within six months of dissolution of a Panchayat
(c) Inclusion of Panchayati Raj in the Union List
(d) Provision for direct funding from the Union government

Q37. WHO member states reached a draft legally-binding pandemic preparedness pact on 16 April 2025, despite which major donor's withdrawal?

(a) United States
(b) United Kingdom
(c) Germany
(d) Japan

Q38. What is the full form of the NAKSHA programme, the second phase of which was launched in 2025 by the Ministry of Rural Development?

(a) New Analytical Knowledge for Housing Areas
(b) NAtional geospatial Knowledge-based land Survey of urban HAbitations
(c) National Geo-based Urban Survey
(d) National Area Keeping Survey for Habitats

Q39. Reserve Bank of India advised all banks in india to commence the migration of their existing domains to the '.bank.in' domain and complete the process latest by _____.

(a) 31 October 2025
(b) 31 December 2025
(c) 31 August 2025
(d) 31 March 2026

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Q40. In accordance with the Modern Periodic Law, the characteristics of elements are periodic functions of their:

(a) atomic number
(b) isotopic mass
(c) atomic weight
(d) atomic mass

MATHEMATICS

Q41. A bus travelling at 14 km/hr completes a journey in 20 hours. What should its speed be to cover the same distance in 5 hours?

(a) 56 km/hr
(b) 53 km/hr
(c) 61 km/hr
(d) 63 km/hr

Q42. The average of first 149 odd natural numbers, is:

(a) 149.5
(b) 150
(c) 149
(d) 148.5

Q43. A sum of Rs. 2,500 amounts to Rs. 2,809 in 2 years at a certain rate of interest per annum, compounded annually. The rate of interest per annum is:

(a) 8%
(b) 6%
(c) 7%
(d) 3%

Q44. The number 877217 is divisible by which of the following?

(a) 2
(b) 16
(c) 12
(d) 11

Q45. The difference between a single discount of 52%, and two successive discounts of 35% and 4%, applied to a bill of Rs. 1,125, is _____.

(a) Rs. 162
(b) Rs. 152
(c) Rs. 132
(d) Rs. 144

Q46. If the 6-digit number N51M54 is divisible by 11, then which of the options below can give a possible correct relation between M and N?

(a) M - N = 1
(b) M - N = -3
(c) M + N = 3
(d) M = N

Q47. Two pipes can fill a cistern, individually, in 93 min and 31 min, respectively. There is a pipe located at the bottom of the cistern to empty it. If all the three pipes are opened simultaneously, then the empty cistern gets filled in 24 min. How long will the pipe at the bottom of the tank take to empty the completely filled cistern if no other pipe is then open?

(a) 730 min
(b) 744 min
(c) 784 min

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(d) 761 min

Q48. The height of a cylinder is 35 cm, and the radius of its circular base is 9 cm. Find its volume. (Take Π = 22/7 .)

(a) 8910 cm^3
(b) 8110 cm3
(c) 8900 cm3
(d) 8011 cm3

Q49. In covering a distance of 56 km, Pranshu takes 3 hours more than Chandu. If Pranshu doubles his speed, he would take 4 hours less than Chandu. Pranshu's speed is:

(a) 8 km/hr
(b) 10 km/hr
(c) 4 km/hr
(d) 9 km/hr

Q50. Find the mean proportional between 25 and 196.

(a) 68
(b) 73
(c) 67
(d) 70

Q51. Find the value of: [167 ÷ {17 + 4 × (3 − 7)}].

(a) 167
(b) 166
(c) 172
(d) 164

Q52. The current population of a town is 20,000. It increases by 30% and 50% in two successive years but decreases by 68% in the third year. What is the population of the town at the end of the third year?

(a) 12,480
(b) 12,485
(c) 12,481
(d) 12,475

Q53. Simplify:

$2(5/2x^2 - 22x + 11) - 5(x^2 + 9x - 11)$

(a) 89x − 77
(b) 89x + 77
(c) −89x + 77
(d) −89x − 77

Q54. If $\sin\theta = x$, then $(\sqrt{(1 + x)}(\tan \theta))/x =$ _____

(a) $1/(\sqrt{(1-x)})$
(b) $1/(\sqrt{(1+x)})$
(c) $\sqrt{(1-x)}$
(d) $1/(1-x^2)$

Q55. Nisha, Sameer, and Rupesh invest Rs. 1,730, Rs. 1,420, and Rs. 1,350 respectively to start a business. If the profit at the end of the year is Rs. 1,490, then what is the share of Rupesh in the profit?

(a) Rs. 449
(b) Rs. 447
(c) Rs. 446
(d) Rs. 445

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Q56. If the radius of the base of a right circular cylinder is decreased by 23% and its height is increased by 151%, then what is the percentage increase (closest integer) in its volume?

(a) 20%
(b) 49%
(c) 66%
(d) 69%

Q57. If 2 times the age of Ram is 24 years more than 2 times the age of Ramya, and 4 times the age of Ramya is 3 years less than the age of Ram, then what is the difference (in years) between the ages of Ram and Ramya?

(a) 15
(b) 12
(c) 11
(d) 9

Q58. The sum of two numbers is 78 and their L.C.M. is 180. What are the two numbers?

(a) 58, 20
(b) 53, 25
(c) 60, 18
(d) 65, 13

Q59. Kunal and Abhishek start a business. Kunal invests Rs. 33,000 more than Abhishek for 7 months and Abhishek invests for 3 months. Kunal's share is Rs. 2,654 more than that of Abhishek, out of a total profit of Rs. 5,308. Find the capital contributed by Kunal.

(a) Rs. 1,48,367
(b) Rs. 1,48,556
(c) Rs. 1,48,647
(d) Rs. 1,48,500

Q60. Two school bells ring at intervals of 36 minutes and 45 minutes. If both bells ring together at 9:00 a.m., when will they ring together again?

(a) 1:12 p.m.
(b) 11:36 a.m.
(c) 12 noon
(d) 11:48 a.m.

Q61. Sapna invested Rs. 22,800 on simple interest, partly at 5% per annum and partly at 14% per annum. If she earns equal interests from the two investments after 4 years, then find the sum invested at 5% per annum (in Rs.).

(a) 16,798
(b) 16,799
(c) 16,800
(d) 16,801

Q62. A shop offers 'Buy three for Rs. 6,000, get one free' for Dasara celebration, and also offers Rs. 600 cash back if a person pays in cash. What is the total percentage of discount offered for a customer who pays in cash?

(a) 25.5%
(b) 67.5%
(c) 33.33%
(d) 32.5%

Q63. I bought two dresses for Rs. 1,200. I sold the first one at a loss of 9% and the second at a gain of 15%. If, on the whole I made neither a loss nor a gain, find the cost price (in Rs.) of the first dress.

(a) 774
(b) 770
(c) 750
(d) 734

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Q64. The value of $7^2 + \sqrt{(2^2)} - 8\sqrt{81} - 7$ is

(a) -19
(b) -27
(c) -28
(d) -26

Q65. The interior angle between two adjacent sides of a regular n^- sided polygon is _____ degrees.

(a) 180 - 90/n
(b) 180 - 180/n
(c) 180 - 360/n
(d) 90 - 90/n

Q66. A can do a work in 9 days and B can do the same work in 21 days. If they work on it together for 2 days, then what fraction of the work is left?

(a) 41/63
(b) 38/63
(c) 43/63
(d) 47/63

Q67. The product of two consecutive positive natural numbers is 110. The greater of the two numbers is:

(a) 7
(b) 5
(c) 11
(d) 3

Q68. By how much is 65% of 75 greater than 4/5 of 25?

(a) 26.75
(b) 28.75
(c) 22.75
(d) 25.75

Q69. By selling an article at 4/14 of its actual selling price, Hitesh incurs a loss of 15%. If he sells it at 60% of its actual selling price, then the profit percentage is:

(a) 78.7%
(b) 77.5%
(c) 78.1%
(d) 78.5%

Q70. The sum of five numbers is 655. The average of the first two numbers is 80, and the third number is 104. Find the average of the remaining two numbers.

(a) 185
(b) 184
(c) 196.5
(d) 195.5

GENERAL INTELLIGENCE AND REASONING

Q71. Yash ranked 34^(th) from the top and 47^(th) from the bottom in his class. How many students are there in his class?

(a) 81
(b) 79
(c) 80
(d) 82

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Q72. In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. Select the pair in which the numbers are related in the same way as are the numbers of the following pairs.

(Note: Operations should be performed on the whole numbers, without breaking down the numbers into its constituent digits. E.g., 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

17, 36

16, 34

(a) 53, 97
(b) 23, 48
(c) 12, 24
(d) 18, 39

Q73. Select the pair that follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

SOQ−NJL

RNP−MIK

(a) CYA−XTV
(b) WRS−QMO
(c) WRS−RNP
(d) WSU−QNO

Q74. In the following triads, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one which follows the same logic.

GAPS - SPGA - GPAS

AUNT - TNAU - ANUT

(a) HAIR - RIHA - HIAR
(b) DINE - DNIE - ENID
(c) DIMS - IMDS - IMSD
(d) HALF - FLHA - ALHF

Q75. In a certain code language, ‘USER’ is coded as ‘4629’ and ‘LAST’ is coded as ‘1354’. What is the code for ‘S’ in the given code language?

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

Q76. H, I, J, K, U, V and W are sitting around a circular table facing the centre of the table. Only two people sit between V and I when counted from the right of V. Only three people sit between H and J when counted from the right of J. I sits to the immediate right of J. W sits to the immediate right of K.

Who sits fourth to the right of U?

(a) W
(b) K
(c) H
(d) J

Q77. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) MI-TX
(b) TP-AE
(c) JF-QU
(d) CY-JM

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Q78. 47 people are standing in a row facing north. Suhana is 24^(th) from the right end, while Bimla is 37^(th) from the left end. How many people are there between Suhana and Bimla?

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

Q79. If + means −, − means ×, × means ÷ and ÷ means +, then what will come in place of the question mark (?) in the following equation?

72 × 6 ÷ 18 + 10 − 2 = ?

(a) 10
(b) 18
(c) 12
(d) 5

Q80. Seven people, I, J, K, L, M, N and O, are sitting in a row, facing north. Only two people sit to the right of K. Only two people sit between K and O. Only two people sit between I and N. N sits to the immediate left of K. L sits to the immediate right of M. Who sits at the third position from the left end of the line?

(a) I
(b) O
(c) L
(d) J

Q81. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

All pages are crows.

Some crows are remotes.

Conclusion:

(I): Some pages are remotes.

(II): All crows are pages.

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

Q82. In a certain code language,

'A % B' means ‘A is the daughter of B’,

'A = B' means ‘A is the wife of B’,

'A ¥ B' means ‘A is the father of B’ and

'A # B' means ‘A is the brother of B’.

How is S related to T if 'S % M = A ¥ R # T'?

(a) Brother
(b) Father
(c) Mother
(d) Sister

Q83. BYAZ is related to AXZY in a certain way based on the English alphabetical order. In the same way, CZBA is related to BYAZ. To which of the given options is SPRQ related, following the same logic?

(a) ROPP
(b) RNPP
(c) ROQP

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(d) RPPW

Q84. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

AFH LQS WBD HMO ?

(a) SXZ
(b) ZXS
(c) SZX
(d) ZSX

Q85. Kartik ranked 46^(th) from the top and 19^(th) from the bottom in his class. How many students are there in his class?

(a) 62
(b) 64
(c) 65
(d) 63

Q86. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) MP-KO
(b) KN-IM
(c) GJ-EH
(d) OR-MQ

Q87. What will come in the place of the question mark (?) in the following equation, if '+' and '−' are interchanged and '×' and '÷' are interchanged?

22 ÷ 3 + 81 × 9 − 12 = ?

(a) 67
(b) 71
(c) 69
(d) 65

Q88. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to

that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) PJF
(b) HBW
(c) FZV
(d) WQM

Q89. In a certain code language, 'LISE' is coded as '0873' and 'SITE' is coded as '8763'. What is the code for 'T' in the given code language?

(a) 7
(b) 8
(c) 3
(d) 6

Q90. Mr. Sol starts from Point A and drives 6 km towards the east. He then takes a right turnand drives 3 km, then turns right and drives 7 km. He then takes a right turn and drives14 km. He takes a final right turn, drives 1 km and stops at Point P. How far (shortest distance) and in which direction should he drive in order to reach Point A again? (All turns are 90-degree turns only unless specified.)

(a) 13 km to the north
(b) 11 km to the east
(c) 12 km to the south

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(d) 11 km to the south

Q91. What will come in the place of the question mark (?) in the following equation, if '+' and '−' are interchanged and '×' and '÷' are interchanged?

91 × 13 − 9 ÷ 8 + 18 = ?

(a) 63
(b) 59
(c) 65
(d) 61

Q92. Each of the digits in the number 95423671 is arranged in ascending order from left to right. The position(s) of how many digits will remain unchanged as compared to that in the original number?

(a) Two
(b) Three
(c) None
(d) One

Q93. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some bottle are plastic.

Some plastic are glass.

Conclusions:

(I): Some bottle are glass.

(II): All glass are plastic.

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

Q94. What should come in place of the question mark (?) in the given series?

7 9 14 24 41 ?

(a) 75
(b) 78
(c) 71
(d) 67

Q95. What should come in place of the question mark (?) in the given series?

1600, 2025, 2500, 3025, 3600, ?

(a) 3825
(b) 4025
(c) 4225
(d) 5625

Q96. Rahul starts from Point A and drives 11 km towards North. He then takes a right turn, drives 7 km, turns right and drives 6 km. He then takes a left turn and drives 5 km. He takes a final right turn, drives 5 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90° turns only unless specified.)

(a) 12 km towards West
(b) 12 km towards East
(c) 10 km towards South
(d) 10 km towards West

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Q97. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

FTR KYW PDB UIG ?

(a) ZNM
(b) ZNL
(c) YNL
(d) ZNO

Q98. This question is based on the five, three-digit numbers given below.

(Left) 438 345 367 353 276 (Right)

(Example: 697 – first digit = 6, second digit = 9, and third digit = 7)

(NOTE: All operations are to be done from left to right.) What will be the resultant if the third digit of the largest number is added to the second digit of smallest number?

(a) 14
(b) 17
(c) 16
(d) 15

Q99. What should come in place of the question mark (?) in the given series?

25 40 58 79 103 ?

(a) 115
(b) 125
(c) 130
(d) 120

Q100. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only.

(NOTE: All numbers are single digit numbers only.)

(Left) % & 3 3 $ θ 8 π 3 π 5 * @ 1 δ 2 # 7 3 π 9 (Right)

How many such numbers are there, which are immediately preceded by a symbol and also immediately followed by another symbol?

(a) Two
(b) Five
(c) Four
(d) One

ANSWER KEY

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

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SOLUTIONS

Q1. Answer: (c) Acaranga Sutra

The correct answer is Acaranga Sutra.

Key Points

• The Acaranga Sutra is one of the oldest and most revered texts in Jainism.

• This sacred text primarily deals with the conduct and discipline of Jain monks and provides guidelines on leading an ascetic life.

• Written in the ancient Prakrit language, it is associated with the Shvetambara Jain tradition.

• The text emphasizes non-violence (Ahimsa) and self-restraint as the fundamental principles of Jainism.

• The Acaranga Sutra is also recognized for its poetic teachings and sermons, offering profound insights into spiritual and ethical living, which has garnered attention in the West.

Additional Information

• Uttaradhyayana Sutra

• The Uttaradhyayana Sutra is another significant Jain scripture, which contains teachings and stories aimed at guiding Jain monks and laypeople toward spiritual enlightenment.

• This text is presented in the form of dialogues and narratives, offering practical advice on moral conduct and religious principles.

• It is considered an important text for both Shvetambara and Digambara sects.

• Kalpa Sutra

• The Kalpa Sutra is a key text in Jainism, particularly for the Shvetambara sect, and is read during the holy festival of Paryushana.

• It includes biographies of the 24 Tirthankaras, including Lord Mahavira, along with rules for monastic conduct.

• The text also discusses the Jain monastic calendar and rituals.

• Bhagavati Sutra

• The Bhagavati Sutra, also known as Vyakhyaprajnapti, is an encyclopedic Jain text that forms part of the Shvetambara Jain canon.

• It consists of dialogues between Lord Mahavira and his disciples, covering a variety of topics such as cosmology, philosophy, and ethics.

• It is an important resource for understanding Jain metaphysics and doctrinal concepts.

Q2. Answer: (b) Because it continues to be actively used

The correct answer is Because it continues to be actively used.

Key Points

• Sanskrit is recognized as a modern Indian language under the Constitution of India because it continues to be actively used in academic, religious, and cultural domains.

• The language serves as a medium for traditional Hindu rituals, scholarly pursuits, and ancient Indian literature, keeping it relevant in contemporary society.

• Sanskrit is actively taught and spoken in some regions, such as in villages like Mattur (Karnataka) and Jhiri (Madhya Pradesh), where it remains a part of daily communication.

• It is utilized in modern scientific and technical terminology to coin new words, ensuring its adaptability and continued relevance.

• Government initiatives, such as Sanskrit universities and language promotion schemes, contribute to the preservation and active use of Sanskrit in India.

Additional Information

• India has 11 classical languages, including the original six (Tamil, Sanskrit, Kannada, Telugu, Malayalam, Odia) and

• five recently added in 2024 (Marathi, Pali, Prakrit, Assamese, Bengali), recognized for their antiquity, distinct literary heritage, and cultural importance, with

• Tamil being the first declared in 2004.

• These languages have ancient, original texts and a rich, distinct literary tradition, distinct from modern usage, and are promoted by the government for their cultural preservation.

Q3. Answer: (d) Schedule VII

The correct answer is Schedule VII.

Key Points

• The division of subjects between the Union and the States is outlined in Schedule VII of the Indian Constitution.

• Schedule VII contains three lists—Union List, State List, and Concurrent List—that distribute legislative powers between the

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Union and State governments.

• The Union List includes subjects such as defense, foreign affairs, and atomic energy, over which only the Parliament has exclusive legislative power.

• The State List includes subjects such as police, public health, and agriculture, over which only the State Legislatures can legislate.

• The Concurrent List includes subjects such as education, marriage, and bankruptcy, over which both the Parliament and State Legislatures can legislate, but in case of a conflict, the law enacted by Parliament prevails.

• The division of powers is based on the principle of federalism, allowing a clear demarcation of responsibilities and avoiding overlap.

Additional Information

• Schedule IX:

• This schedule was introduced by the First Amendment to the Constitution in 1951.

• It includes laws that are shielded from judicial review under Article 31B, ensuring their immunity from challenges based on fundamental rights violations.

• This schedule was primarily created to protect land reform and agrarian laws from being struck down by courts.

• However, in the 2007 I.R. Coelho vs. State of Tamil Nadu case, the Supreme Court ruled that laws under Schedule IX are not completely immune and can be reviewed if they violate the basic structure of the Constitution.

• Schedule V:

• This schedule deals with the administration and control of Scheduled Areas and Scheduled Tribes in states other than those in the North-Eastern region.

• It empowers the President to declare certain areas as Scheduled Areas and provides for the establishment of Tribal Advisory Councils.

• Provisions under this schedule aim to protect the rights and culture of Scheduled Tribes and ensure their socio-economic development.

• Schedule X:

• This schedule was added by the 52nd Amendment Act, 1985, and is also known as the Anti-Defection Law.

• It lays down provisions for the disqualification of Members of Parliament and State Legislatures on grounds of defection.

• Defection occurs when elected members voluntarily give up their party membership or vote against their party's direction in the legislature.

• The presiding officer of the legislature is the authority to decide on disqualification under this schedule, although this decision is subject to judicial review.

Q4. Answer: (d) Shift + Delete

The correct answer is Shift + Delete.

Key Points

• Shift + Delete is a Windows key combination that bypasses the Recycle Bin and permanently deletes a file or folder.

• When using this shortcut, the file is removed from the system and cannot be restored from the Recycle Bin.

• This method is especially useful when users want to free up space immediately without having to manually empty the Recycle Bin.

• It is important to use this shortcut with caution because once deleted, the file can only be recovered using advanced data recovery tools.

• Many operating systems prompt a confirmation dialogue before proceeding with permanent deletion using Shift + Delete.

Additional Information

• Ctrl + D:

• In most applications, Ctrl + D is used to bookmark a webpage or favorite an item.

• This shortcut does not delete files; instead, it is commonly associated with browsers like Google Chrome or Mozilla Firefox for bookmarking purposes.

• In other software, it may have different functionalities depending on the application.

• Alt + F4:

• Alt + F4 is a Windows shortcut used to close the currently active window or application.

• If used on the desktop, it opens the shutdown menu for the computer.

• It is unrelated to file deletion and serves the purpose of managing windows or system shutdown.

• Shift + F2:

• Shift + F2 is not commonly used for file management in Windows operating systems.

• In specific applications, such as Microsoft Excel, it may be used for editing cell comments.

Q5. Answer: (b) Lower Paleolithic

The correct answer is Lower Paleolithic.

Key Points

• The Bhimbetka rock shelters, located in Madhya Pradesh, India, are one of the most significant archaeological sites associated with the Lower Paleolithic period.

• These rock shelters are globally renowned for their prehistoric cave paintings, which date back to around 100,000 years ago, representing some of the earliest evidence of human life.

• The site contains evidence of human settlement and activity ranging from the Lower Paleolithic to the Mesolithic periods, making it an important link in understanding human evolution in South Asia.

• The rock shelters were added to the UNESCO World Heritage Sites list in 2003, highlighting their cultural and historical importance.

• The tools, artifacts, and paintings found in Bhimbetka provide a glimpse into early human life, including hunting, social behavior, and daily activities.

Additional Information

• Upper Neolithic

• The Upper Neolithic period, also referred to as the late Stone Age, is characterized by the development of agriculture and the use of polished stone tools.

• During this period, humans transitioned from a hunter-gatherer lifestyle to settled farming communities.

• Key innovations of this era include pottery, weaving, and domestication of animals.

• However, Bhimbetka is not associated with this period, as its primary relevance lies in earlier prehistoric periods like the Paleolithic and Mesolithic.

• Iron Age

• The Iron Age follows the Bronze Age and is characterized by the widespread use of iron tools and weapons.

• This period witnessed the rise of complex societies, urbanization, and advancements in agriculture and warfare.

• In India, the Iron Age is associated with the Vedic civilization and the rise of early kingdoms.

• The Bhimbetka rock shelters do not belong to this age, as they predate it by tens of thousands of years.

• Lower Chalcolithic

• The Chalcolithic period, also known as the Copper Age, marks the transition between the Neolithic and the Bronze Age.

• It is characterized by the use of copper tools alongside stone tools.

• This period witnessed the emergence of early trade, settlements, and social hierarchies.

• While Chalcolithic sites are significant in Indian prehistory, Bhimbetka is not primarily associated with this period.

Q6. Answer: (b) Strengthen the Indian Navy's maritime strike capacity

The correct answer is Strengthen the Indian Navy's maritime strike capacity.

Key Points

• The Rs. 20,506.65 crore acquisition of BrahMos supersonic cruise missiles primarily aims to enhance the Indian Navy's maritime strike capabilities.

• BrahMos missiles are known for their precision strike ability and can be deployed on various platforms, including ships and submarines, making them a critical asset for maritime defense.

• The acquisition aligns with India's efforts to modernize its naval fleet and address potential threats in the Indian Ocean Region (IOR), which is vital for India's strategic interests.

• The supersonic cruise missiles have a range of about 400-500 kilometers and are capable of carrying out both land-attack and anti-ship missions.

• BrahMos missiles are a joint venture between India's Defense Research and Development Organization (DRDO) and Russia's NPO Mashinostroyenia, showcasing a successful international defense collaboration.

Additional Information

• Key Missile Systems

• Agni Series (Ballistic): Nuclear-capable, ranging from short-range (Agni-I) to intercontinental (Agni-V), boosting India's strategic deterrence.

• BrahMos (Supersonic Cruise): World's fastest supersonic missile, adaptable for land, air, ship, and submarine use, with hypersonic BrahMos-II in development.

• Prithvi Series (Tactical Ballistic): Short-range surface-to-surface missiles for battlefield use, with naval variants (Prithvi-III/Dhanush) enhancing maritime power.

• Akash (Surface-to-Air): Medium-range, mobile SAM system with indigenous components and features like an indigenous seeker for 360° engagement.

• Nag (Anti-Tank): An advanced, "fire-and-forget" anti-tank guided missile (ATGM).

• K-Series (SLBM): Submarine-launched ballistic missiles (like K-4) for credible second-strike capability.

Q7. Answer: (b) Crop rotation and organic farming

The correct answer is Crop rotation and organic farming.

Key Points

• Crop rotation involves growing different types of crops in succession on the same land to improve soil health, reduce dependency on chemical fertilizers, and prevent soil degradation.

• Organic farming emphasizes the use of natural inputs like compost, green manure, and biological pest control instead of synthetic chemicals, promoting long-term soil fertility.

• This practice enhances biodiversity, encourages the natural balance of ecosystems, and reduces environmental pollution caused by chemical residues.

• Crop rotation helps prevent the build-up of pests and diseases, while organic farming improves soil structure and water retention capacity, leading to sustainable agriculture practices.

• These approaches align with global goals for sustainable development by promoting food security and reducing the environmental impact of agricultural activities.

Additional Information

• Monocropping

• Monocropping refers to the practice of growing the same crop on the same piece of land year after year.

• While it may increase short-term productivity, it depletes soil nutrients, leads to loss of biodiversity, and increases vulnerability to pests and diseases.

• It often requires heavy use of chemical fertilizers and pesticides, contributing to soil degradation and environmental pollution.

• Slash and burn cultivation

• This is an agricultural method where forests or vegetation are cut down and burned to create arable land.

• Though it provides short-term soil fertility, it leads to deforestation, loss of biodiversity, and soil erosion.

• It contributes significantly to greenhouse gas emissions and is unsustainable in the long term.

Q8. Answer: (b) Viceroy of India

The correct answer is Viceroy of India.

Key Points

• After the Revolt of 1857, the British Crown formally took over the administration of India from the East India Company.

• In 1858, under the Government of India Act 1858, the office of Governor-General was renamed as the Viceroy of India.

• The Viceroy acted as the direct representative of the British Crown in India, holding supreme authority over Indian administration.

• The first Viceroy of India was Lord Canning, who served from 1858 to 1862.

• The change in title symbolized the transition from company rule to direct imperial rule in India.

• The Viceroy's role included overseeing legislative, executive, and judicial functions and acting as the head of the British administration in India.

Additional Information

• Historical Context:

• The Government of India Act 1858 marked the beginning of direct British rule in India, ending the dominance of the East India Company.

• The Viceroy represented the British Crown and reported to the Secretary of State for India, ensuring centralized control of Indian affairs.

• This restructuring aimed to stabilize governance in India following the Revolt of 1857 and improve administrative efficiency.

Q9. Answer: (b) Kerala

The correct answer is Kerala.

Key Points

• The Idukki Disaster Resilience and Information System (IDRIS) is India's first integrated early warning and planning platform, employing artificial intelligence and real-time data for disaster risk reduction.

• IDRIS was launched in the state of Kerala, a region highly vulnerable to natural disasters, especially floods and landslides.

• This system aims to enhance disaster preparedness and response by providing real-time updates and early warnings to mitigate potential risks to life and infrastructure.

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• Developed in collaboration with scientific institutions and stakeholders, IDRIS integrates data from multiple sources such as weather forecasts, hydrological models, and geospatial information systems.

• Kerala has taken this step as part of its commitment to adopting innovative technologies for disaster management, particularly in light of the devastating floods of 2018 and 2019.

Additional Information

• Karnataka

• Karnataka, located in southern India, experiences frequent droughts in its northern regions, making water resource management crucial for the state.

• It houses the Karnataka State Natural Disaster Monitoring Centre (KSNDMC), which focuses on disaster monitoring, forecasting, and mitigation strategies.

• The state has also been proactive in implementing climate-resilient agricultural practices to counter the adverse effects of climate change.

• Tamil Nadu

• Tamil Nadu, a coastal state in southern India, is highly susceptible to cyclones, tsunamis, and flooding.

• The state government has implemented the Tamil Nadu Disaster Risk Reduction Agency (TNDRRA) to manage and mitigate the impact of disasters.

• It has also adopted advanced technologies, including GIS mapping, for disaster preparedness and response planning.

• Himachal Pradesh

• Himachal Pradesh, situated in the Himalayan region, faces risks such as earthquakes, landslides, and flash floods.

• The state has established the Himachal Pradesh State Disaster Management Authority (HPSDMA) to strengthen disaster management capacities.

• It emphasizes the use of early warning systems and community-based disaster management initiatives to reduce vulnerabilities in high-risk areas.

Q10. Answer: (c) Seventy-third Amendment Act, 1992

The correct answer is Seventy-third Amendment Act, 1992.

Key Points

• The Seventy-third Amendment Act, 1992 gave constitutional status to Panchayati Raj institutions in India.

• This amendment added Part IX to the Indian Constitution, titled "The Panchayats," and introduced Articles 243 to 243-O.

• The Act also introduced the Eleventh Schedule, which contains 29 functional items related to Panchayati Raj institutions.

• The objective of the amendment was to enhance grassroots democracy and empower rural self-government in India.

• The Act mandates a three-tier system of Panchayati Raj for states, including Gram Panchayat, Panchayat Samiti, and Zila Parishad, except in states with populations below 2 million.

Additional Information

• Seventy-fourth Amendment Act, 1992

• This amendment granted constitutional status to Urban Local Bodies (municipalities).

• It added Part IX-A to the Constitution, titled "The Municipalities," and introduced Articles 243-P to 243-ZG.

• The Act also introduced the Twelfth Schedule, which contains 18 functional items related to urban governance.

• The objective was to strengthen local urban governance and ensure democratic decentralization in urban areas.

• Eighty-sixth Amendment Act, 2002

• This amendment made education a fundamental right under Article 21A of the Constitution.

• It mandated free and compulsory education for children aged 6 to 14 years.

• It also amended Article 45 to promote early childhood care and education and added Article 51A(k), which places a duty on parents to provide education to their children.

• Seventy-second Amendment Act, 1992

• This amendment was related to providing reservation of seats in the Tripura State Legislative Assembly for Scheduled Tribes.

• It aimed to resolve the longstanding issues of representation and ensure political participation for Scheduled Tribes in Tripura.

Q11. Answer: (a) Kalpakkam

The correct answer is Kalpakkam.

Key Points

• The Prototype Fast Breeder Reactor (PFBR) is being developed by Bharatiya Nabhikiya Vidyut Nigam Limited (BHAVINI), a public sector undertaking under the Department of Atomic Energy.

• It is located at Kalpakkam, Tamil Nadu, which is already home to the Madras Atomic Power Station (MAPS) and the Indira

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Gandhi Centre for Atomic Research (IGCAR).

• The PFBR is a first-of-its-kind nuclear reactor in India that uses a mixed oxide (MOX) fuel of uranium-238 and plutonium-239, making it a fast breeder reactor.

• Fast breeder reactors are designed to generate more fissile material than they consume, contributing to India's vision of sustainable and self-reliant nuclear power.

• This project is a crucial part of India's three-stage nuclear power program, focusing on utilizing thorium reserves in the long term.

Additional Information

• Tarapur:

• Tarapur, located in Maharashtra, houses India's first nuclear power station, the Tarapur Atomic Power Station (TAPS).

• TAPS was commissioned in 1969 and uses boiling water reactor (BWR) technology.

• It marked the beginning of India's journey into nuclear power generation.

• Bhavnagar:

• Bhavnagar, in Gujarat, is not associated with any nuclear reactor projects but is known for the Central Salt and Marine Chemicals Research Institute (CSMCRI).

• This institute plays a significant role in marine chemical research and salt production.

• Jaduguda:

• Jaduguda, located in Jharkhand, is known for India's oldest uranium mines operated by the Uranium Corporation of India Limited (UCIL).

• The uranium extracted here is a critical resource for fueling India's nuclear power plants.

Important Points

• Fast Breeder Reactor Technology:

• Fast breeder reactors generate more fissile material (plutonium-239) than they consume, making them highly efficient.

• India's focus on developing such reactors stems from its limited uranium reserves and abundant thorium reserves.

• Thorium-based reactors are expected to play a significant role in India's future energy strategy, making PFBR a key stepping stone.

Q12. Answer: (b) Introduction of the Modified Value Added Tax

The correct answer is Introduction of the Modified Value Added Tax.

Key Points

• The Modified Value Added Tax (MODVAT) was introduced in India in 1991 as part of the economic reforms aimed at rationalizing the indirect tax structure.

• MODVAT allows manufacturers to receive credit for the excise duty paid on inputs used in the production of goods, reducing the cascading effect of taxation.

• It marked a significant step towards simplifying the tax regime and ensuring better compliance and efficiency in the indirect tax system.

• The introduction of MODVAT was designed to promote industrial growth by reducing production costs and encouraging investment in infrastructure and technology.

• This system laid the foundation for the Goods and Services Tax (GST) later introduced in 2017, which further streamlined the indirect taxation mechanism in India.

Additional Information

• Introduction of GST:

• The Goods and Services Tax (GST) was introduced in India on July 1, 2017, replacing multiple indirect taxes such as VAT, service tax, and excise duty.

• It is a comprehensive, destination-based tax system aimed at simplifying taxation and promoting a unified market across India.

• Abolition of Wealth Tax:

• The wealth tax was abolished in 2015 as part of efforts to simplify the tax structure and reduce compliance burdens.

• This tax was levied on the net wealth of individuals, Hindu Undivided Families (HUFs), and companies exceeding a specified limit.

• Implementation of the FRBM Act:

• The Fiscal Responsibility and Budget Management (FRBM) Act was enacted in 2003 to ensure fiscal discipline and reduce India's fiscal deficit.

Q13. Answer: (d) Dhar Commission

The correct answer is Dhar Commission.

Key Points

• The Dhar Commission was appointed in 1948 by the Government of India to examine the feasibility of reorganizing states on a linguistic basis.

• The Commission, chaired by Justice S.K. Dhar, recommended that the reorganization of states should not be solely based on language but also consider administrative convenience and economic viability.

• The Dhar Commission argued that linguistic reorganization could potentially disrupt national unity and lead to administrative complications.

• The findings of the Dhar Commission were opposed by linguistic groups, leading to the formation of subsequent committees like the JVP Committee in 1949.

• Despite its recommendations, the demand for linguistic states continued, eventually culminating in the formation of the first linguistic state, Andhra Pradesh, in 1953.

Additional Information

• Gadgil Commission

• The Gadgil Commission, officially known as the Committee on Plan Projects, was established in 1960 and focused on development planning in India.

• The Commission is primarily associated with recommending the Gadgil Formula, which allocates financial resources to states based on population, per capita income, and other factors.

• Sarkaria Commission

• The Sarkaria Commission was constituted in 1983 to review the Center-State relations in India.

• It focused on the distribution of powers between the Union and State governments and suggested measures to improve coordination and cooperation.

• Swaran Singh Committee

• The Swaran Singh Committee was set up in 1976 to recommend changes to the Constitution of India.

• It is best known for its recommendations on incorporating the Fundamental Duties of citizens into the Constitution, which were added as Part IV-A by the 42nd Amendment.

Q14. Answer: (c) Water

The correct answer is Water.

Key Points

• Water (H_2O) is a compound because it is formed by the chemical combination of two elements, hydrogen and oxygen, in a fixed ratio of 2:1.

• It has distinct chemical properties different from the properties of its constituent elements (hydrogen and oxygen).

• Water is a pure substance that cannot be separated into its elements by physical means but can be broken down into hydrogen and oxygen through electrolysis.

• It is essential for life on Earth, forming a major part of biological systems and being involved in various physical and chemical processes.

• As a compound, water exhibits unique properties like high boiling and melting points, surface tension, and its ability to dissolve numerous substances, making it a universal solvent.

Additional Information

• Oxygen (O_2):

• Oxygen is an element and exists as a diatomic molecule (O_2) in its most stable form.

• It is a colorless, odorless, and tasteless gas essential for respiration in living organisms and combustion reactions.

• Oxygen forms compounds with nearly all other elements and is a major component of the Earth's atmosphere (approximately 21%).

• Iron (Fe):

• Iron is a metallic element and is one of the most abundant elements on Earth.

• It is widely used in construction, manufacturing, and making alloys like steel.

• Iron is also essential for biological processes, as it is a key component of hemoglobin in blood, which transports oxygen throughout the body.

• Sulphur (S):

• Sulphur is a non-metallic element commonly found in nature in its elemental form or as part of various compounds like sulfates and sulfides.

• It has diverse applications, including the production of sulfuric acid, fertilizers, and rubber vulcanization.

• Sulphur is essential for life as it forms part of amino acids like cysteine and methionine.

• Compounds:

• Compounds are substances formed when two or more elements chemically combine in a fixed proportion.

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• They have properties distinct from their constituent elements.

• Examples include water (H2O), carbon dioxide (CO2), and sodium chloride (NaCl).

Q15. Answer: (b) Naval Anti-Ship Missile - Short Range

The correct answer is Naval Anti-Ship Missile - Short Range.

Key Points

• The Defence Research and Development Organisation (DRDO) and the Indian Navy successfully flight-tested the Naval Anti-Ship Missile - Short Range (NASM-SR) in 2025.

• The missile was launched from a Sea King helicopter at the Integrated Test Range (ITR), Chandipur, Odisha.

• This indigenously developed missile demonstrated its capability to engage ship targets effectively, marking a significant milestone in India's defense technology.

• The NASM-SR is designed to enhance India’s maritime strike capabilities and ensures advanced defense capabilities for the Navy.

• The missile is equipped with modern technologies, including an advanced navigation system and precision guidance, ensuring high accuracy and reliability.

Additional Information

• BrahMos Anti-Ship Missile

• The BrahMos is a supersonic cruise missile developed jointly by India and Russia.

• It is capable of being launched from submarines, ships, aircraft, or land platforms.

• BrahMos has a range of 290 km (upgraded to 450-500 km in newer versions) and can carry a conventional warhead of 200–300 kg.

• Its supersonic speed (Mach 2.8 to 3.0) makes it one of the fastest cruise missiles in the world.

• Prithvi Surface-to-Surface Missile

• The Prithvi missile is part of India’s Integrated Guided Missile Development Program (IGMDP).

• It is a short-range surface-to-surface ballistic missile with a range of 150-350 km depending on the variant.

• Prithvi is capable of carrying a nuclear or conventional warhead of up to 1,000 kg.

• It uses liquid propulsion and is primarily used by the Indian Army.

• Agni Ballistic Missile

• The Agni missile series is a family of medium to intercontinental-range ballistic missiles developed by DRDO.

• Agni missiles, such as Agni-I to Agni-VI, have ranges varying from 700 km to over 10,000 km.

• They are nuclear-capable and serve as a vital component of India’s strategic defense and deterrence capability.

• Agni-V is India’s first intercontinental ballistic missile (ICBM) with a range of over 5,000 km.

• Missile Development in India

• India has been actively developing indigenous missile systems to strengthen its defense capabilities under DRDO’s guidance.

• Key missile programs include the BrahMos, Agni, Prithvi, Akash, and Nag series, along with newer developments like NASM-SR.

Q16. Answer: (a) Land Ceiling Acts

The correct answer is Land Ceiling Acts.

Key Points

• The Land Ceiling Acts were aimed at redistributing agricultural land to the landless and poor farmers to reduce economic inequality in rural India.

• These acts imposed a limit on the maximum amount of land that an individual or family could own, with surplus land being acquired by the state and redistributed to the landless.

• Land Ceiling Acts were introduced after independence as part of land reforms to address the concentration of land in the hands of a few landlords.

• These reforms were included in the 1st Five-Year Plan (1951-56) and were implemented across various states in India, albeit with mixed success due to loopholes and resistance from landowning classes.

• The main aim was to ensure equitable distribution of land resources, increase agricultural productivity, and reduce rural poverty.

Additional Information

• Crop Insurance Scheme:

• The Crop Insurance Scheme refers to initiatives like the Pradhan Mantri Fasal Bima Yojana (PMFBY), launched in 2016 to protect farmers against crop loss due to natural disasters, pests, or diseases.

• Under this scheme, farmers pay a minimal premium, and the rest is subsidized by the government to ensure financial security for farmers.

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• It is not related to land redistribution but focuses on mitigating risks faced by farmers in agriculture.

• Green Revolution:

• The Green Revolution began in the 1960s and involved the adoption of high-yielding variety (HYV) seeds, fertilizers, and irrigation techniques to increase agricultural productivity in India.

• It played a vital role in making India self-sufficient in food grains but had no direct connection to land redistribution.

• While it enhanced agricultural production, it also led to regional disparities and benefited mainly large landowners.

• Agricultural Export Policy:

• The Agricultural Export Policy, introduced in 2018, aims to increase India's agricultural exports to $60 billion by 2022.

• It focuses on promoting export-oriented farming, ensuring the availability of export-quality produce, and creating a stable trade regime.

• This policy is unrelated to land redistribution and primarily deals with enhancing India's position in global agricultural trade.

Q17. Answer: (c) Andaman and Nicobar

The correct answer is Andaman and Nicobar.

Key Points

• The Andaman and Nicobar Islands are located in the southeastern region of the Indian mainland, in the Bay of Bengal.

• This island group consists of approximately 572 islands, out of which only 37 are inhabited.

• Geographically, the Andaman Islands lie to the north and the Nicobar Islands lie to the south, separated by the Ten Degree Channel.

• The capital of the Andaman and Nicobar Islands is Port Blair, situated on South Andaman Island.

• These islands are known for their rich biodiversity, coral reefs, and indigenous tribes such as the Jarawas and Sentinelese.

Additional Information

• Agatti Island

• Agatti Island is part of the Lakshadweep group of islands located in the Arabian Sea, off the southwestern coast of India.

• It is famous for its pristine beaches, coral reefs, and marine biodiversity.

• It is not located in the southeast of the Indian mainland but rather in the southwest.

• Minicoy Island

• Minicoy is another island belonging to the Lakshadweep group and is situated in the Arabian Sea.

• It is well-known for its lighthouse and vibrant culture, influenced by Maldives.

• Minicoy is not geographically related to the southeast of India as mentioned in the question.

• Lakshadweep

• The Lakshadweep Islands are a group of 36 islands situated in the Arabian Sea to the southwest of the Indian mainland.

• These islands are known for their lagoons, coral reefs, and scenic beauty.

• While Lakshadweep is an important part of India, it is not located to the southeast of the mainland.

Q18. Answer: (c) Bharat Electronics Limited (BEL)

The correct answer is Bharat Electronics Limited (BEL).

Key Points

• Akashteer is India's indigenous automated Air Defence Control and Reporting System.

• It was developed by Bharat Electronics Limited (BEL), a leading aerospace and defence company under the Ministry of Defence.

• The system is designed for effective monitoring, tracking, and interception of aerial threats during conflicts.

• Akashteer played a vital role during the India-Pakistan conflict in May 2025, showcasing its operational efficiency and reliability.

• It integrates advanced technologies such as radar systems, communication networks, and artificial intelligence to provide real-time situational awareness.

Additional Information

• Defence Research and Development Organisation (DRDO):

• DRDO is India's premier research agency responsible for the development of defence technologies.

• It has contributed to the development of several indigenous defence systems, including missiles like Agni and BrahMos.

• While DRDO oversees the conceptualization and research of defence systems, it primarily collaborates with organizations like BEL for production and deployment.

• Hindustan Aeronautics Limited (HAL):

• HAL is a major Indian aerospace and defence company specializing in aircraft manufacturing.

• It is known for producing fighter jets like Tejas and helicopters like Dhruv.

• Although HAL contributes significantly to air defence, it primarily focuses on aircraft and aviation systems rather than automated control systems like Akashteer.

• Bharat Dynamics Ltd:

• Bharat Dynamics Ltd is primarily known for manufacturing missiles and ammunition.

• It is responsible for the production of advanced weapon systems like Akash missile systems and anti-tank guided missiles.

Q19. Answer: (d) Rice

The correct answer is Rice.

Key Points

• Rice is a semi-aquatic crop that thrives in waterlogged conditions, making it suitable for cultivation in areas with heavy rainfall or where fields can be flooded.

• It requires a consistent supply of water during its growth stages, particularly during transplantation and early vegetative growth.

• Paddy fields are specifically prepared for rice cultivation by creating bunds to retain water, ensuring waterlogging conditions.

• The shallow roots of rice plants allow them to absorb nutrients efficiently in flooded conditions, making them highly adaptable to waterlogged environments.

• Rice cultivation is widespread in countries with monsoon climates, such as India, China, and Southeast Asian nations, due to the availability of waterlogged fields.

Additional Information

• Maize:

• Maize is a cereal crop that requires well-drained soil and cannot tolerate waterlogged conditions for long periods.

• It is highly sensitive to excess water, which can lead to root rot and hinder proper growth.

• The crop is generally grown in regions with moderate rainfall and does not require flooded fields like rice.

• Bajra:

• Bajra, or pearl millet, is a drought-resistant crop that thrives in dry and semi-arid regions.

• It requires sandy or loamy soil with good drainage and cannot be cultivated in waterlogged conditions.

• It is an important food crop in areas with scarce water resources due to its ability to withstand dry conditions.

• Groundnut:

• Groundnut, or peanut, is a leguminous crop that requires well-drained, sandy, or loamy soil for optimal growth.

• Excess water in the soil can lead to fungal diseases and hinder pod development, making it unsuitable for waterlogged conditions.

• The crop is typically cultivated in areas with moderate irrigation facilities.

Q20. Answer: (c) Tourism

The correct answer is Tourism.

Key Points

• The Production Linked Incentive (PLI) scheme is a flagship initiative by the Government of India to boost domestic manufacturing, attract investments, and enhance exports.

• The PLI scheme currently covers 14 key sectors, including pharmaceuticals, electronics, automobiles, and textiles, among others.

• Tourism is not one of the sectors included under the PLI scheme, as the initiative primarily focuses on sectors that can strengthen India's manufacturing capabilities and global competitiveness.

• The scheme aims to reduce import dependency and create additional employment opportunities in India.

• Under the PLI scheme, eligible companies are provided financial incentives based on incremental sales of goods manufactured in India.

Additional Information

• Pharmaceuticals:

• The PLI scheme for pharmaceuticals aims to enhance India's domestic manufacturing capacity of bulk drugs, active pharmaceutical ingredients (APIs), and drug intermediates.

• It seeks to reduce dependency on imports, particularly from China, and promote self-reliance in the pharmaceutical sector.

• The scheme has been allocated a financial outlay of Rs. 15,000 crore.

• Automobiles:

• The PLI scheme for the automobile and auto component sector focuses on promoting the production of advanced automotive technologies and components in India.

• It encourages the manufacturing of electric vehicles (EVs), hydrogen fuel cells, and other green mobility solutions.

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• This scheme is expected to attract significant investments and generate employment in the automotive sector.

• Electronics:

• The PLI scheme for electronics has been instrumental in establishing India as a global hub for manufacturing mobile phones and electronic components.

• It provides incentives to companies manufacturing smartphones, semiconductors, and other electronic devices in India.

• The initiative has attracted investments from global giants like Apple, Samsung, and Foxconn.

Q21. Answer: (d) Establish dual government

The correct answer is Establish dual government.

Key Points

• The Pitt's India Act of 1784 was enacted by the British Parliament to address the shortcomings of the Regulating Act of 1773 and impose tighter control on the East India Company.

• It introduced the concept of dual government, dividing the responsibilities of governance between the British Crown and the East India Company.

• The Act established a Board of Control to oversee political and administrative affairs in India, while the Court of Directors retained control over trade and financial matters.

• Through this Act, the British government gained direct control over Indian territories and ensured that the East India Company's activities aligned with Britain's imperial interests.

• This arrangement marked the beginning of British political intervention in India's administrative framework, paving the way for eventual direct rule under the Crown.

Additional Information

• Pitt's India Act of 1784

• The Act was a landmark in British colonial history, as it established a dual system of governance in India.

• It laid the foundation for greater British political control over Indian affairs while allowing the East India Company to continue its commercial operations.

• This legislation was crucial in shaping the future administrative structure of British India.

Q22. Answer: (c) 22 May

The correct answer is May 22.

Key Points

• The International Day for Biological Diversity is observed globally every year on May 22 to raise awareness about biodiversity issues.

• In 2025, the day falls on Thursday, May 22, as per the Gregorian calendar.

• This day was proclaimed by the United Nations to increase understanding of biodiversity conservation and sustainable use of ecosystems.

• The theme for the International Day for Biological Diversity changes every year, with a focus on challenges and solutions for biodiversity conservation.

• The event serves as a reminder of the importance of biodiversity in sustaining life on Earth and encourages actions to protect it.

Additional Information

• Jun 05

• June 5 is observed as World Environment Day, a global event organized by the United Nations to promote awareness and action for environmental protection.

• Established in 1972, this day highlights various environmental issues such as pollution, climate change, and deforestation.

• May 15

• May 15 is celebrated as the International Day of Families, designated by the United Nations in 1993.

• The day aims to promote awareness of family-related issues and the importance of families in social development.

Q23. Answer: (c) Saubhagya Yojana

The correct answer is Saubhagya Yojana.

Key Points

• The Saubhagya Scheme, also known as the Pradhan Mantri Sahaj Bijli Har Ghar Yojana, was launched by Prime Minister Narendra Modi on September 25, 2017.

• The scheme's primary objective was to achieve 100% household electrification in rural and urban areas of India.

• Under the scheme, free electricity connections were provided to poor households identified under the Socio-Economic Caste Census (SECC) 2011 data.

• Beneficiaries received a single-point connection, including an LED bulb, a mobile charging point, and a switchboard. Special attention was given to remote and tribal areas.

• The scheme was implemented by the Ministry of Power and funded through a mix of grants from the Government of India, state governments, and utilities.

Additional Information

• Ujjwala Yojana

• The Pradhan Mantri Ujjwala Yojana (PMUY) was launched on May 1, 2016, by PM Narendra Modi in Ballia, Uttar Pradesh.

• It aims to provide LPG connections to women belonging to Below Poverty Line (BPL) households.

• The scheme promotes clean cooking fuel and reduces health hazards caused by traditional biomass-based cooking methods.

• Over 9 crore LPG connections were distributed under this scheme as of 2023.

• Pradhan Mantri Gram Sadak Yojana (PMGSY)

• Launched in December 2000, this scheme aims to provide all-weather road connectivity to unconnected villages in India.

• The scheme focuses on improving rural infrastructure to enhance economic growth and accessibility for rural communities.

• It is a centrally sponsored scheme implemented by the Ministry of Rural Development.

• Swabhimaan Scheme

• Swabhimaan is a financial inclusion initiative launched in 2011 by the Government of India.

• The program aimed to bring banking services to unbanked rural areas through business correspondents.

• Under this scheme, banks provided basic banking services like savings accounts, remittances, and credit in rural regions.

Q24. Answer: (b) Digantara

The correct answer is Digantara.

Key Points

• Digantara, an Indian space-tech startup, launched a commercial space surveillance satellite named SCOT (Space-based Space Surveillance and Tracking) in March 2025.

• SCOT is designed to track and monitor space debris and active satellites, ensuring enhanced orbital safety and reducing risks in space operations.

• Digantara specializes in developing space situational awareness (SSA) solutions, including satellite-based monitoring systems for space debris.

• The SCOT satellite uses advanced optical sensors and algorithms to precisely track objects in Earth's orbit.

• Digantara's initiatives align with global efforts to improve space traffic management and mitigate the growing problem of space debris.

Additional Information

• Tata Advanced Systems:

• Tata Advanced Systems is a leading Indian defense and aerospace company specializing in designing and manufacturing defense equipment, including aircraft components and missile systems.

• Hindustan Aeronautics Limited (HAL):

• HAL is a premier Indian aerospace and defense company focused on manufacturing aircraft, helicopters, and related systems for defense and civilian use.

• Mahindra Aerospace:

• Mahindra Aerospace, a division of the Mahindra Group, focuses on manufacturing aircraft and components for the aviation industry.

• It primarily deals with aviation technologies rather than space surveillance systems.

Q25. Answer: (a) Pankaj Kumar Singh

The correct answer is Pankaj Kumar Singh.

Key Points

• Pankaj Kumar Singh was assigned the portfolio of Health & Family Welfare, Transport, and Information Technology in the new Delhi cabinet formed in February 2025.

• He is known for his extensive experience in public administration and policy formulation, particularly in sectors related to health and digital governance.

• The inclusion of Information Technology in his portfolio highlights the Delhi government's focus on integrating technology for better governance and service delivery.

• Health & Family Welfare has been one of the primary focus areas of the Delhi government, with initiatives like Mohalla Clinics and other public health reforms playing a significant role in improving healthcare access.

• The Transport portfolio is crucial for Delhi, given its focus on enhancing public transportation and addressing pollution concerns

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through the promotion of electric vehicles and sustainable mobility solutions.

Additional Information

• Ravinder Indraj Singh

• Ravinder Indraj Singh is a prominent political figure; however, he was not assigned any portfolio in the new Delhi cabinet formed in February 2025.

• He is known for his work in grassroots-level governance and local development initiatives.

• Ashish Sood

• Ashish Sood is a political leader with significant contributions in the fields of infrastructure development and civic administration.

• He has been actively involved in various community welfare programs, but he did not hold the Health & Family Welfare, Transport, and Information Technology portfolio in 2025.

• Manjinder Singh Sirsa

• Manjinder Singh Sirsa is a well-known leader, particularly associated with community outreach and minority welfare programs.

• Although an influential figure, he was not assigned the Health & Family Welfare, Transport, and Information Technology portfolio in the Delhi cabinet.

Q26. Answer: (c) It began in 1979 when the Supreme Court allowed individuals to file cases for public interest.

The correct answer is It began in 1979 when the Supreme Court allowed individuals to file cases for public interest.

Key Points

• Public Interest Litigation (PIL) in India was pioneered under judicial activism to provide access to justice for marginalized and underrepresented groups.

• The concept gained prominence in 1979 when the Supreme Court allowed individuals or organizations to file cases on behalf of those who were unable to approach the court themselves.

• Justice P.N. Bhagwati and Justice V.R. Krishna Iyer played a significant role in institutionalizing PIL in India, transforming it into a powerful tool for addressing systemic issues.

• PIL allows courts to address broader social issues such as environmental protection, human rights violations, corruption, and governmental accountability.

• Some landmark PIL cases include the Vishaka Guidelines (against sexual harassment at the workplace) and the Oleum Gas Leak case (which established the principle of absolute liability).

Additional Information

• 42nd Constitutional Amendment (1976)

• The 42nd Constitutional Amendment is known as the "Mini Constitution" and was enacted during the Emergency in 1976.

• It introduced changes aimed at strengthening the central government, including the insertion of the words "Socialist" and "Secular" in the Preamble.

• Lok Adalat

• The Lok Adalat system is a mechanism for resolving disputes through conciliation and arbitration outside regular courts.

• It was introduced in India under the Legal Services Authorities Act, 1987.

Q27. Answer: (d) Power Grid Corporation of India Limited

The correct answer is Power Grid Corporation of India Limited.

Key Points

• Power Grid Corporation of India Limited (PGCIL), also known as Power Grid, is a government-owned entity responsible for electricity transmission in India.

• It was established in 1989 and operates under the administrative control of the Ministry of Power, Government of India.

• The company is tasked with the planning, implementation, operation, and maintenance of India’s interstate and inter-regional transmission systems.

• PGCIL manages nearly 85% of India’s interstate and inter-regional power transmission systems, ensuring a stable and reliable power grid across the country.

• It operates the National Load Dispatch Centre (NLDC) and regional load dispatch centers for grid management and real-time operations.

• Power Grid is also involved in various consultancy and energy management projects, both domestically and internationally.

Additional Information

• National Thermal Power Corporation Limited (NTPC):

• NTPC is the largest power generation company in India, focusing on the generation of electricity through thermal, solar, wind, and hydroelectric power plants.

• It was established in 1975 and operates under the Ministry of Power.

• Though NTPC plays a critical role in power generation, it is not involved in electricity transmission.

• Central Electricity Authority (CEA):

• CEA is a statutory organization under the Ministry of Power, established as per the Electricity Act, 2003.

• Its primary functions include advising the government on electricity policy, planning, and development of the power sector.

• While CEA is crucial for policy formulation and technical standards, it does not directly handle transmission operations.

• Bharat Heavy Electricals Limited (BHEL):

• BHEL is a public sector undertaking specializing in the manufacturing of heavy electrical equipment such as turbines, generators, and boilers for power plants.

• It plays a vital role in supplying equipment for power generation but does not manage electricity transmission.

Q28. Answer: (c) Open Recycle Bin → Right-click the file → Click Restore

The correct answer is Open Recycle Bin → Right-click the file → Click Restore.

Key Points

• When a file is deleted in Windows, it is typically moved to the Recycle Bin, making it recoverable unless it has been permanently deleted (e.g., using Shift + Delete).

• The Recycle Bin acts as a temporary storage area for deleted files and allows users to restore them to their original location.

• To restore a file from the Recycle Bin, users can open the Recycle Bin, locate the file, right-click on it, and select the "Restore" option.

• Restoring a file from the Recycle Bin will place it back in the folder from which it was originally deleted.

• This method is straightforward and ensures that accidentally deleted files can be easily recovered without needing external tools or complex procedures.

Additional Information

• Ctrl + Z

• Ctrl + Z is the shortcut for the Undo command, which can reverse the most recent actions performed in many software applications, including file deletion.

• Alt + Tab

• Alt + Tab is a keyboard shortcut used to switch between open windows and applications in the operating system.

Q29. Answer: (c) Defence Research and Development Organisation (DRDO)

The correct answer is Defence Research and Development Organisation (DRDO).

Key Points

• The Defence Research and Development Organisation (DRDO) successfully conducted the first flight trial of a stratospheric airship platform at Sheopur, Madhya Pradesh.

• This airship platform is designed to enhance military surveillance capabilities, offering a high-altitude, persistent solution for monitoring activities over a wide area.

• The stratospheric airship is equipped with advanced sensors and communication systems to provide real-time intelligence and situational awareness to the armed forces.

• DRDO plays a pivotal role in developing technologies for India’s defence forces, including aerial platforms, missiles, and surveillance systems.

• This achievement reflects DRDO’s commitment to developing indigenous solutions to meet the strategic and tactical needs of the Indian military.

Additional Information

• Bharat Electronics Limited (BEL):

• BEL is a public sector undertaking under the Ministry of Defence, specializing in the design and manufacture of advanced electronic products for the Indian Armed Forces.

• Its key focus areas include radar systems, electronic warfare equipment, and communication systems.

• Hindustan Aeronautics Limited (HAL):

• HAL is a public sector aerospace and defence company primarily engaged in the production of aircraft, helicopters, and related systems.

• It is instrumental in manufacturing fighter aircraft like Tejas and Sukhoi-30 MKI under license agreements, as well as indigenous designs.

• HAL’s expertise lies in aviation and aerospace, rather than high-altitude airship platforms.

• Indian Space Research Organisation (ISRO):

• ISRO is India’s national space agency, focusing on satellite development, space exploration, and launch vehicle technology.

• It has achieved significant milestones, such as Chandrayaan and Mangalyaan missions, and launched numerous satellites for

communication, navigation, and remote sensing.

Important Points

• Stratospheric Airship Platforms:

• Stratospheric airships operate at high altitudes (20-50 km) in the stratosphere and are designed for long-duration missions.

• They serve applications such as surveillance, communication relay, disaster management, and environmental monitoring.

• These airships are powered by solar energy and equipped with advanced sensors and payloads for real-time data collection.

Q30. Answer: (b) Ganga, Indus and Brahmaputra

The correct answer is Ganga, Indus and Brahmaputra.

Key Points

• The Northern Plains of India are formed by the deposition of alluvium brought by the three major rivers: Ganga, Indus, and Brahmaputra, along with their tributaries.

• The plains are one of the most fertile regions in India and are known as the granary of India due to their agricultural productivity.

• These plains are spread across several states, including Punjab, Haryana, Uttar Pradesh, Bihar, West Bengal, and Assam, covering approximately 7 lakh square kilometers.

• The Northern Plains are divided into three distinct zones: Punjab Plains, Ganga Plains, and Brahmaputra Plains, based on the river systems dominating these regions.

• Alluvial soil deposited by these rivers is rich in nutrients, making the region ideal for cultivating crops such as wheat, rice, sugarcane, and pulses.

• The region has a dense population due to its fertile land, availability of water, and favorable climate for human habitation.

Additional Information

• Narmada and Tapti

• The Narmada and Tapti rivers flow through central India and are known for forming rift valleys.

• These rivers do not contribute to the formation of the Northern Plains but are significant for their unique geological features.

• The Narmada River flows westward into the Arabian Sea, while the Tapti River flows parallel to it, draining into the Arabian Sea.

• Yamuna and Chambal

• The Yamuna is a tributary of the Ganga River and does contribute to the Northern Plains, but Chambal is not a major contributor to the formation of these plains.

• The Chambal River is known for its rugged terrain and the Chambal ravines, which are famous for their badland topography.

• While the Yamuna aids in the deposition of alluvium in its basin, the Chambal primarily flows through plateau regions and does not contribute significantly to the Northern Plains.

• Krishna and Godavari

• The Krishna and Godavari rivers are major rivers of peninsular India and flow through the Deccan Plateau.

• These rivers are responsible for the formation of deltaic plains in their respective basins, not the Northern Plains.

• The Godavari is the second longest river in India, while the Krishna flows through states such as Maharashtra, Karnataka, Telangana, and Andhra Pradesh.

Q31. Answer: (d) Chlorine

The correct answer is Chlorine.

Key Points

• Chlorine is a highly effective disinfectant widely used to kill bacteria, viruses, and other pathogens in water and on surfaces.

• It is commonly used in the treatment of drinking water, swimming pools, and sewage to ensure hygiene and prevent waterborne diseases such as cholera and typhoid.

• Chlorine works by breaking the chemical bonds of the microorganisms, effectively destroying them and rendering the water safe for consumption.

• The process of chlorination, where chlorine is added to water, is one of the oldest and most reliable methods of disinfection, making it a global standard for water treatment.

• Chlorine is also used in industrial applications for sanitizing equipment and maintaining sterile environments.

Additional Information

• Bromine

• Bromine is another halogen in Group 17 but is not commonly used for large-scale disinfection.

• It is primarily used in the pharmaceutical and chemical industries, as well as in the production of flame retardants.

• In limited cases, bromine compounds are used as disinfectants in hot tubs and swimming pools, but they are less common than chlorine.

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• Fluorine

• Fluorine is a highly reactive and toxic gas that is not used for disinfection.

• Its primary application is in the fluoridation of drinking water, which helps prevent dental cavities.

• Fluoride compounds, rather than elemental fluorine, are added to water in very small quantities for this purpose.

• Iodine

• Iodine is used as an antiseptic and disinfectant, particularly in medical applications such as wound cleaning and surgical preparation.

• It is also used in emergency water purification, but it is not a practical choice for large-scale water treatment due to its cost and potential health effects at high concentrations.

• Group 17 Elements

• Group 17 elements are known as halogens and include fluorine, chlorine, bromine, iodine, and astatine.

• They are highly reactive non-metals and are commonly used in various industrial and domestic applications, including disinfection, chemical synthesis, and manufacturing.

• Each halogen has unique properties that determine its suitability for specific uses.

Q32. Answer: (a) Separate electorates

The correct answer is Separate electorates.

Key Points

• The Indian Councils Act of 1909 (also known as the Morley-Minto Reforms) introduced the concept of separate electorates in India.

• Separate electorates allowed members of a particular religious community (e.g., Muslims) to elect their representatives to the legislative councils, exclusively from their community.

• This reform was introduced to address communal representation demands and to appease the Muslim League, which was formed in 1906.

• It marked the beginning of the British policy of “divide and rule”, as it institutionalized communal divisions in Indian politics.

• Under this system, Muslims could only vote for Muslim candidates, and their representatives were chosen to safeguard their community’s interests.

Additional Information

• Proportional representation

• Proportional representation is an electoral system in which seats in a legislature are allocated to political parties in proportion to the number of votes they receive.

• This system ensures fair representation of diverse political views but was not a feature of the 1909 Act.

• India does not use proportional representation for its general elections; instead, it follows the First Past the Post (FPTP) system.

• Voting rights for all

• Universal adult suffrage (voting rights for all adults) was introduced in India after independence, through the Constitution in 1950.

• The 1909 Act did not grant universal voting rights. Voting was restricted to a small electorate based on property, income, and educational qualifications.

• Women's suffrage

• Women's suffrage refers to the right of women to vote in elections.

• This right was not granted under the 1909 Act. Women in India gained the right to vote with the adoption of the Constitution in 1950.

Q33. Answer: (a) CK Nayudu

The correct answer is CK Nayudu.

Key Points

• CK Nayudu was the first Indian cricketer to receive the prestigious Padma Bhushan award in 1956, recognizing his significant contributions to Indian cricket.

• He was the first-ever captain of the Indian cricket team in Test matches and led the team in its debut Test series against England in 1932.

• CK Nayudu was known for his exceptional batting and leadership skills, earning him the title of one of the pioneers of Indian cricket.

• He played first-class cricket for an extended period, scoring over 11,000 runs and proving his consistency and dedication to the sport.

• The Padma Bhushan award is the third-highest civilian award in India, and CK Nayudu's recognition highlighted the importance of cricket in the country during its formative years.

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Additional Information

• Sunil Gavaskar

• Sunil Gavaskar is one of the greatest batsmen in the history of cricket and was the first cricketer to score 10,000 runs in Test cricket.

• He received the Padma Bhushan award in 1980 for his outstanding achievements in cricket and his contributions to Indian sports.

• Gavaskar is renowned for his technique and consistency against some of the most fearsome bowling attacks in the world.

• Sachin Tendulkar

• Sachin Tendulkar, often referred to as the "God of Cricket," is widely regarded as one of the greatest cricketers of all time.

• He received the Padma Bhushan award in 1999 and was later honored with the Bharat Ratna in 2014, making him the first sportsperson to receive India's highest civilian award.

• Tendulkar holds numerous records in international cricket, including being the highest run-scorer in both Test and ODI formats.

• Kapil Dev

• Kapil Dev, one of India's legendary cricketers, captained the Indian team to its first-ever Cricket World Cup victory in 1983.

• He received the Padma Bhushan award in 1991 for his exceptional contributions to Indian cricket.

• Kapil Dev was an all-rounder known for his aggressive batting, fast bowling, and exceptional leadership skills.

Q34. Answer: (d) Africa

The correct answer is Africa.

Key Points

• The Congo River, also known as the Zaire River, is located in the continent of Africa, specifically in the central region.

• It is the deepest river in the world, with depths reaching up to 220 meters (720 feet).

• The Congo River is the second-largest river in the world by discharge volume, following the Amazon River.

• It flows through several African countries, including the Democratic Republic of Congo and the Republic of Congo, covering a length of approximately 4,700 kilometers.

• The river is a crucial waterway for trade and transportation, and its basin is home to dense rainforests rich in biodiversity.

Additional Information

• South America

• South America is home to the Amazon River, which is the largest river in the world by discharge volume.

• The Amazon River flows primarily through Brazil and is surrounded by the Amazon Rainforest, the largest tropical rainforest globally.

• The Amazon River is not as deep as the Congo River, but it is much wider and longer.

• Europe

• Europe has several major rivers, including the Danube, Rhine, and Volga, but none of these are close to the Congo River in terms of depth.

• The Volga River, located in Russia, is the longest river in Europe but not particularly deep.

• Asia

• Asia has many significant rivers, such as the Yangtze, Ganges, Brahmaputra, and Mekong, but none of them are the deepest.

• The Yangtze River in China is the longest river in Asia but does not match the depth of the Congo River.

Q35. Answer: (c) November 2024

The correct answer is November 2024.

Key Points

• K Sanjay Murthy was sworn in as the Comptroller and Auditor General (CAG) of India on November 1, 2024.

• The oath was administered by the President of India, as per the provisions of Article 148 of the Indian Constitution.

• The Comptroller and Auditor General (CAG) of India is responsible for auditing the accounts of the central and state governments and public sector organizations.

• This constitutional authority ensures transparency, accountability, and financial discipline in the government.

• The appointment of the CAG is crucial in maintaining the financial health of the nation and safeguarding public funds.

Additional Information

• Comptroller and Auditor General (CAG)

• The CAG is an independent authority established under Article 148 of the Indian Constitution.

• The primary role of the CAG is to audit the receipts and expenditures of the Government of India and the state governments, including those of bodies and authorities substantially financed by the government.

• The CAG reports its findings to the President or Governor, who then places them before the Parliament or state legislature for scrutiny.

• The CAG plays a vital role in promoting transparency and accountability in public finance management.

• The office of the CAG is often referred to as a watchdog of public finance in India.

Q36. Answer: (b) Elections within six months of dissolution of a Panchayat

The correct answer is Elections within six months of dissolution of a Panchayat.

Key Points

• The 73rd Constitutional Amendment Act, 1992, mandated elections to a Panchayat every five years and within six months in case of its dissolution, ensuring the continuous functioning of Panchayati Raj Institutions (PRIs).

• This provision is enshrined in Article 243E of the Indian Constitution, which guarantees regular elections to Panchayats at all levels.

• The amendment introduced uniformity in the governance structure of Panchayati Raj Institutions across all states and Union Territories, enhancing decentralization.

• The objective of this provision is to promote grassroots democracy, empower rural communities, and ensure uninterrupted governance at the local level.

• By mandating timely elections, the amendment prevents indefinite delays in reconstituting Panchayats, thereby upholding the democratic ethos.

Additional Information

• Panchayati Raj Institutions (PRIs)

• The 73rd Amendment institutionalized Panchayati Raj as the third tier of governance in India, ensuring democratic decentralization.

• It added Part IX to the Constitution, covering Articles 243 to 243O, and introduced the Eleventh Schedule, which lists 29 functional areas for Panchayats.

• Key provisions include the establishment of Gram Sabhas, reservation of seats for Scheduled Castes, Scheduled Tribes, and women, and the formation of State Election Commissions and State Finance Commissions.

• The amendment aims to empower rural communities, enhance participatory democracy, and promote socio-economic development at the grassroots level.

Q37. Answer: (a) United States

The correct answer is United States.

Key Points

• On April 16, 2025, WHO member states finalized a draft legally binding pandemic preparedness agreement aimed at improving global response mechanisms for future pandemics.

• The withdrawal of the United States from funding significantly impacted the agreement discussions, as the US has historically been one of the largest donors to WHO.

• The move by the US was driven by its concerns over transparency and governance issues within WHO, as well as political motivations under the administration at the time.

• Despite the US withdrawal, other member states remained committed to advancing the agreement, emphasizing the need for international cooperation during global health crises.

• This pandemic preparedness pact was designed to ensure equitable vaccine distribution, improve surveillance, and strengthen healthcare systems worldwide, even in low-income countries.

Additional Information

• United Kingdom

• The United Kingdom has been a major donor to WHO and actively supports global health initiatives.

• It played a significant role in vaccine development during the COVID-19 pandemic, particularly through partnerships like COVAX.

• The UK remains committed to global pandemic preparedness and has not withdrawn its support for WHO agreements.

• Germany

• Germany is one of the leading contributors to WHO and has consistently supported global health initiatives.

• During the COVID-19 pandemic, Germany increased its funding to WHO and promoted multilateral approaches to healthcare crises.

• Germany advocates for strengthening international cooperation and equitable access to healthcare resources.

• Japan

• Japan has been a supporter of WHO and global health initiatives, focusing on research and development for disease prevention.

• Japan contributed to pandemic preparedness by funding vaccine research and strengthening healthcare infrastructure,

particularly in Asia-Pacific regions.

• It continues to emphasize international collaboration for pandemic response and prevention.

Q38. Answer: (b) NAtional geospatial Knowledge-based land Survey of urban HAbitations

The correct answer is NAtional geospatial Knowledge-based land Survey of urban HAbitations.

Key Points

• The NAKSHA programme stands for NAtional geospatial Knowledge-based land Survey of urban HAbitations.

• It is an initiative by the Ministry of Rural Development aimed at using advanced geospatial technology for land surveys.

• The programme's objective is to enhance the accuracy and efficiency of land surveying in urban and semi-urban areas.

• NAKSHA employs technologies such as drones, satellite imagery, and Geographic Information Systems (GIS) to map urban habitations accurately.

• The second phase of the NAKSHA programme, launched in 2025, focuses on covering a larger area of urban and peri-urban land, ensuring better land management and dispute resolution mechanisms.

Additional Information

• For Mapping and Navigation (like NAKSHA's land mapping function)

• The primary "swadeshi" (homegrown Indian) alternative for general mapping is Mappls.

• Mappls / MapmyIndia: This is an Indian mapping and navigation tool that offers detailed, hyperlocal maps, doorstep navigation, and real-time traffic updates.

• Google Maps / Google Earth: These are widely used globally for navigation and viewing satellite imagery.

• QGIS: If you are looking for professional, open-source Geographic Information System (GIS) software for more in-depth mapping and spatial analysis, QGIS is a popular choice.

Q39. Answer: (a) 31 October 2025

The correct answer is 31 October 2025.

Key Points

• The Reserve Bank of India (RBI) instructed all banks in India to migrate their existing domains to the more secure and regulated '.bank.in' domain.

• This directive aims to enhance the security infrastructure of banking systems and protect them from potential cyber threats and phishing activities.

• The RBI has set a deadline of October 31, 2025, for banks to complete the migration process to '.bank.in'.

• The '.bank.in' domain is a restricted and verified domain, ensuring that only legitimate banking institutions are allowed to register under this domain.

• The initiative is in line with RBI’s ongoing efforts to ensure safety, security, and resilience in the banking ecosystem in India.

Additional Information

• Importance of '.bank.in' Domain Migration

• The '.bank.in' domain helps reduce the risk of fraud, phishing, and other cybercrimes targeting banking customers.

• This initiative is a part of the broader push for secure digital transactions and the Digital India mission.

• It ensures that users can distinguish legitimate banking websites from fraudulent ones, thereby enhancing trust in the banking system.

Q40. Answer: (a) atomic number

The correct answer is atomic number.

Key Points

• The Modern Periodic Law states that "The properties of elements are periodic functions of their atomic numbers."

• Atomic number refers to the number of protons in the nucleus of an atom and determines the identity of an element.

• The periodic table is arranged in increasing order of atomic numbers, which results in the periodic repetition of similar chemical and physical properties.

• For example, elements in the same group (vertical column) exhibit similar properties because they have the same number of valence electrons, which is determined by their atomic numbers.

• The concept of atomic number was introduced by Henry Moseley in 1913, which resolved inconsistencies in the earlier arrangement based on atomic mass.

Additional Information

• Isotopic Mass

• Isotopic mass refers to the mass of a specific isotope of an element, which is expressed in atomic mass units (amu).

• It does not affect the periodic arrangement of elements since isotopes of the same element have the same atomic number but

different numbers of neutrons.

• For example, carbon-12 and carbon-14 are isotopes of carbon with different isotopic masses but identical chemical properties.

• Atomic Weight

• Atomic weight is the weighted average of the masses of an element's naturally occurring isotopes, expressed in atomic mass units.

• Earlier periodic tables, such as Mendeleev's, were based on atomic weight, but this led to inconsistencies (e.g., iodine and tellurium).

• The modern periodic table corrects these anomalies by using atomic numbers instead.

• Atomic Mass

• Atomic mass represents the total number of protons and neutrons in the nucleus of an atom.

• While atomic mass is related to isotopes and is useful in nuclear chemistry, it is not the basis for the periodic classification of elements.

Important Points

• Modern Periodic Table

• The modern periodic table is a systematic arrangement of elements based on their atomic numbers, introduced by Moseley.

• It consists of groups (vertical columns) and periods (horizontal rows) that reflect periodic trends, such as electronegativity, atomic radius, and ionization energy.

• The periodic table is divided into blocks (s, p, d, and f) based on the electron configuration of elements.

Q41. Answer: (a) 56 km/hr

Shortcut Trick

When distance is constant, speed is inversely proportional to time.

Time ratio = 20 : 5 = 4 : 1

Speed ratio = 1 : 4

Initial speed (1 ratio part) = 14 km/hr

New speed (4 ratio parts) = 14 × 4 = 56 km/hr

Therefore The correct answer is 56 km/hr.

Alternate Method

Given:

Initial Speed (S1) = 14 km/hr

Initial Time (T1) = 20 hours

New Time (T2) = 5 hours

Formula Used:

Distance = Speed × Time

Constant Distance

Speed = 14 km/hr | Time = 20 hours

Speed = ? km/hr | Time = 5 hours

Calculations:

=> Total Distance = S1 × T1

=> Total Distance = 14 × 20 = 280 km

=> To cover the same distance in 5 hours, the new speed (S2) is required.

=> S2 = Distance ÷ T2

=> S2 = 280 ÷ 5 = 56 km/hr

Therefore The correct answer is 56 km/hr.

Additional Information

Proportionality of Speed and Time

When the distance is constant, speed is inversely proportional to the time taken (S prop. to 1/T).

Average Speed

Average Speed = Total Distance ÷ Total Time. If equal distances are covered at different speeds x and y, Average Speed = (2 × x × y) ÷ (x + y).

Unit Conversion Trick

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

Q42. Answer: (c) 149

Shortcut Trick

The sum of the first n odd natural numbers is n^2.

The average of the first n odd natural numbers is directly given by n.

Here, the total number of terms (n) is 149.

=> Average = n = 149

Therefore The correct answer is 149.

Alternate Method

Total Terms (n) = 149

Average = (1 + 297) / 2 = 149

1

3

5

...

149

Average

...

297

Given:

The sequence is the first 149 odd natural numbers: 1, 3, 5, 7, ...

Total number of terms (n) = 149

Formula Used:

n^(th) term of an A.P. (T_n) = a + (n − 1) × d

For an Arithmetic Progression (A.P.), Average = (First term + Last term) ÷ 2

Calculations:

=> First term (a) = 1

=> Common difference (d) = 2

=> Last term (T149) = 1 + (149 − 1) × 2

=> T149 = 1 + 148 × 2

=> T149 = 1 + 296 = 297

=> Average = (First term + Last term) ÷ 2

=> Average = (1 + 297) ÷ 2

=> Average = 298 ÷ 2 = 149

Therefore The correct answer is 149.

Additional Information

Average of first n even natural numbers

The average of the first n even natural numbers is always equal to (n + 1).

Average of first n natural numbers

The average of the first n natural numbers (1, 2, 3...) is given by the formula (n + 1) ÷ 2.

Sum of first n odd natural numbers

The sum of the first n odd natural numbers is calculated as n^2.

Arithmetic Progression Average Property

For any uniformly spaced series (A.P.), the average is exactly equal to the middle term or (First term + Last term) ÷ 2.

Q43. Answer: (b) 6%

Shortcut Trick

Ratio of Amount to Principal = 2809 / 2500

Since the time period is 2 years, we take the square root of the ratio to find the multiplying factor for 1 year.

Multiplying factor for 1 year = √(2809 / 2500) = 53 / 50

Interest earned in 1 year = 53 − 50 = 3 parts on a base principal of 50 parts.

Rate of interest = (3 / 50) × 100 = 6%

Therefore The correct answer is 6%.

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Alternate Method

Given:

Principal (P) = Rs. 2500

Amount (A) = Rs. 2809

Time (T) = 2 years

Formula Used:

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

Rs. 2500

Principal (P)

Rs. 2809

Amount (A)

Time = 2 years

Rate = R% p.a.

Calculations:

=> 2809 = 2500(1 + R / 100)²

=> 2809 / 2500 = (1 + R / 100)²

=> (53 / 50)² = (1 + R / 100)²

Taking the square root on both sides:

=> 53 / 50 = 1 + R / 100

=> R / 100 = 53 / 50 − 1

=> R / 100 = 3 / 50

=> R = (3 / 50) × 100

=> R = 6%

Therefore The correct answer is 6%.

Additional Information

SI vs CI Difference (for 2 years)

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

Half-Yearly Compounding

When interest is compounded half-yearly, the annual rate is halved (R / 2) and the time period in terms of conversion cycles is doubled (2T).

Rule of 72

A popular shortcut rule to estimate the number of years required to double the invested money at a given annual compound interest rate is T ≈ 72 ÷ Rate%.

Q44. Answer: (d) 11

Shortcut Trick

The unit digit of 877217 is 7 (an odd number), so it cannot be divisible by even numbers like 2, 12, or 16.

By elimination, the given number must be divisible by 11.

Verification for divisibility by 11:

Difference of sum of alternate digits = (8 + 7 + 1) − (7 + 2 + 7) = 16 − 16 = 0.

Since the difference is 0, the number is perfectly divisible by 11.

Therefore The correct answer is 11.

Alternate Method

Given:

Number = 877217

Options = 2, 16, 12, 11

Method Used:

Divisibility rules and elimination based on odd/even parity.

Calculations:

=> Check divisibility by 2: The last digit is 7, which is an odd number. Thus, it is not divisible by 2.

=> Check divisibility by 16: If a number is not divisible by 2, it cannot be divisible by 16.

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=> Check divisibility by 12: If a number is not divisible by 2, it cannot be divisible by 12 (since 12 = 3 × 4).

=> Check divisibility by 11: The rule states that the difference between the sum of digits at odd places and even places must be 0 or a multiple of 11.

=> Sum of digits at odd positions (from left) = 8 + 7 + 1 = 16

=> Sum of digits at even positions (from left) = 7 + 2 + 7 = 16

=> Difference = 16 − 16 = 0

=> Therefore, 877217 is exactly divisible by 11.

Therefore The correct answer is 11.

Additional Information

Divisibility Rule of 2, 4, and 8

A number is divisible by 2 if its last digit is even. It is divisible by 4 if the last two digits form a number divisible by 4, and divisible by 8 if the last three digits form a number divisible by 8.

Divisibility Rule of 3 and 9

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

Divisibility Rule of 11

A number is divisible by 11 if the difference between the sum of its digits at alternate positions is either 0 or a multiple of 11.

Q45. Answer: (a) Rs. 162

Shortcut Trick

Equivalent discount of successive 35% and 4% discounts = [35 + 4 − (35 × 4) ÷ 100]% = 37.6%

Difference between 52% and 37.6% discount = 52% − 37.6% = 14.4%

Required difference in amount = 14.4% of Rs. 1125 = 14.4 × 11.25 = Rs. 162

Therefore The correct answer is Rs. 162.

Alternate Method

Bill: Rs. 1125

Single: 52%

Eff = 52%

Succ: 35% & 4%

Eff = 37.6%

Diff = 14.4%

Val = Rs. 162

Given:

Bill amount = Rs. 1125

Single discount = 52%

Successive discounts = 35% and 4%

Formula Used:

Equivalent discount of a% and b% = [a + b − (a × b) ÷ 100]%

Calculations:

=> Equivalent discount for 35% and 4% = [35 + 4 − (35 × 4) ÷ 100]%

=> Equivalent discount = [39 − 140 ÷ 100]%

=> Equivalent discount = 39 − 1.4 = 37.6%

=> Difference in discount percentages = 52% − 37.6% = 14.4%

=> Difference in amount = 14.4% of Rs. 1125

=> Difference = (14.4 ÷ 100) × 1125

=> Difference = 0.144 × 1125 = 162

Therefore The correct answer is Rs. 162.

Additional Information

Successive Discount

When two discounts d1% and d2% are given one after another, effective discount is (d1 + d2 − d1×d2 ÷ 100)%.

Marked Price & Selling Price

Discount is always calculated on the Marked Price (MP). SP = MP × (100 − D%) ÷ 100.

Single vs Successive Discount

For the same sum of discount percentages (e.g., 52% vs 35%+17%), a single discount is always larger than equivalent successive discounts, thus yielding a lower selling price.

Q46. Answer: (b) M - N = -3

Shortcut Trick

A number is divisible by 11 if the difference between the sums of alternating digits is 0 or a multiple of 11.

Given Number = N51M54

Sum of odd placed digits (from right) = 4 + M + 5 = 9 + M

Sum of even placed digits (from right) = 5 + 1 + N = 6 + N

Difference = (9 + M) − (6 + N) = 3 + M − N

For divisibility by 11, 3 + M − N = 0 => M − N = −3

Therefore The correct answer is M − N = −3.

Alternate Method

Given:

The 6-digit number N51M54 is divisible by 11.

Formula Used:

A number is divisible by 11 if the difference between the sum of its digits at odd positions and the sum of its digits at even positions is either 0 or a multiple of 11.

Calculations:

=> Let us label the positions from right to left.

=> Sum of digits at odd positions = 4 + M + 5 = 9 + M

=> Sum of digits at even positions = 5 + 1 + N = 6 + N

=> Difference = (Sum of odd positions) − (Sum of even positions)

=> Difference = (9 + M) − (6 + N)

=> Difference = 3 + M − N

For the number to be divisible by 11, the calculated difference must be 0, 11, −11, etc.

=> Case 1: 3 + M − N = 0

=> M − N = −3

=> Case 2: 3 + M − N = 11

=> M − N = 8 (This is not available in the given options)

=> Comparing our valid cases with the provided options, we find M − N = −3 perfectly matches.

Therefore The correct answer is M − N = −3.

Additional Information

Divisibility Rule of 3 & 9

A number is divisible by 3 or 9 if the continuous sum of all its individual digits is a multiple of 3 or 9 respectively.

Divisibility Rule of 4 & 8

A number is divisible by 4 if its last two digits form a number divisible by 4. It is divisible by 8 if its last three digits are divisible by 8.

Divisibility Rule of 7, 11 & 13 (Block of 3 method)

For larger numbers, find the difference of the sums of alternating blocks of three digits from right to left. If the resulting difference is divisible by 7, 11, or 13, the original number is divisible by that prime.

Q47. Answer: (b) 744 min

Shortcut Trick

Total capacity of the cistern = LCM(93, 31, 24) = 744 units.

Individual filling efficiencies: Pipe 1 = 744 ÷ 93 = 8, Pipe 2 = 744 ÷ 31 = 24.

Combined filling efficiency of all three pipes = 744 ÷ 24 = 31.

Efficiency of the emptying pipe = (8 + 24) − 31 = 1 unit/min.

Time taken by the pipe to empty the completely filled cistern = 744 ÷ 1 = 744 min.

Therefore The correct answer is 744 min.

Alternate Method

Given:

First pipe (A) fills the cistern in 93 min.

Second pipe (B) fills the cistern in 31 min.

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All three pipes A, B, and the emptying pipe (C) together fill the cistern in 24 min.

Formula Used:

Total Work = LCM of given time values.

Efficiency = Total Work ÷ Time.

Pipe	Time (min)	Total Work	Efficiency
A	93	744	8
B	31	24	
A + B + C	24	31	

Calculations:

=> Let the efficiency of the emptying pipe C be E_c.

=> Total Efficiency (A + B + C) = Efficiency of A + Efficiency of B − E_c

=> 31 = 8 + 24 − E_c

=> 31 = 32 − E_c

=> E_c = 32 − 31 = 1 unit/min

=> Time taken by pipe C to empty the complete cistern = Total Work ÷ E_c

=> Time = 744 ÷ 1 = 744 min

Therefore The correct answer is 744 min.

Additional Information

Inlet and Outlet Pipes

An inlet pipe fills the tank and its efficiency is considered positive. An outlet pipe empties the tank, so its efficiency is taken as negative.

Net Part Filled

If an inlet pipe fills a tank in X hours and an outlet pipe empties it in Y hours (where Y > X), the net part filled in 1 hour = (1 ÷ X − 1 ÷ Y).

Time and Work Equivalence

Pipes and cisterns problems follow the exact same logical framework as time and work problems, where the total capacity of the cistern is treated as the total work unit.

Q48. Answer: (a) 8910 cm^3

Shortcut Trick

When computing volume involving π = 22/7, the final answer is usually a multiple of 11.

We can quickly check the given options for the divisibility rule of 11 (difference of alternating digit sums).

Option 1: 8910 → (8 + 1) − (9 + 0) = 0 (Multiple of 11)

Other options (8110, 8900, 8011) do not result in 0 or a multiple of 11.

Only 8910 satisfies this condition, giving us the answer instantly!

Therefore The correct answer is 8910 cm^3.

Alternate Method

Given:

Radius of the circular base (r) = 9 cm

Height of the cylinder (h) = 35 cm

r = 9 cm

h = 35 cm

Volume of Cylinder

Formula Used:

Volume of a cylinder = $\pi \times r^2 \times h$

Calculations:

=> Volume = $(22 / 7) \times 9^2 \times 35$

=> Volume = $(22 / 7) \times 81 \times 35$

=> Volume = $22 \times 81 \times 5$

=> Volume = 110×81

=> Volume = 8910 cm^3

Therefore The correct answer is 8910 cm³.

Additional Information

Curved Surface Area (CSA)

The curved surface area of a cylinder is the area of its outer rounded surface, excluding the flat circular ends. Formula: CSA = 2 × π × r × h

Total Surface Area (TSA)

The total surface area includes the curved surface and the two circular top and bottom bases. Formula: TSA = 2 × π × r × (h + r)

Relation to Cone Volume

A cone with the identical base radius and height occupies exactly one-third of the cylinder's volume. Formula: V = (1 / 3) × π × r² × h

Q49. Answer: (c) 4 km/hr

Shortcut Trick

Pranshu's speed ratio (Original : New) = 1 : 2 => Time ratio = 2 : 1

Difference in time ratio = 2 − 1 = 1 unit

Total time gap = 3 hours (more) + 4 hours (less) = 7 hours

=> 1 unit = 7 hours => Original time (2 units) = 14 hours

Pranshu's original speed = 56 ÷ 14 = 4 km/hr

Therefore The correct answer is 4 km/hr.

Alternate Method

Given:

Total distance = 56 km

Let Pranshu's original time be t_P and Chandu's time be t_C.

Formula Used:

Speed = Distance ÷ Time

Distance = 56 km

Original: Speed = P, Time = t subset of C&endsub; + 3

Doubled: Speed = 2P, Time = t subset of C&endsub; − 4

Difference in Time = 7 hours

Calculations:

=> Case 1: Pranshu takes 3 hours more than Chandu => t_P − t_C = 3 --- (Equation 1)

=> Case 2: When Pranshu doubles his speed, his time becomes half, i.e., t_P ÷ 2

=> Now, he takes 4 hours less than Chandu => t_C − (t_P ÷ 2) = 4 --- (Equation 2)

=> Adding Equation 1 and Equation 2:

=> (t_P − t_C) + (t_C − t_P ÷ 2) = 3 + 4

=> t_P − (t_P ÷ 2) = 7

=> t_P ÷ 2 = 7

=> t_P = 14 hours

=> Pranshu's speed = Total Distance ÷ t_P

=> Speed = 56 ÷ 14 = 4 km/hr

Therefore The correct answer is 4 km/hr.

Additional Information

Inverse Proportionality of Speed and Time

When distance is constant, speed is inversely proportional to time (S prop. to 1 ÷ T). If the ratio of speeds is a : b, the corresponding ratio of times taken will be b : a.

Relative Speed

When two bodies move in the same direction, relative speed = S1 − S2. When they move in opposite directions, relative speed = S1 + S2.

Average Speed

If two equal distances are covered at speeds S1 and S2, the Average Speed is given by (2 × S1 × S2) ÷ (S1 + S2).

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Q50. Answer: (d) 70

Shortcut Trick

The mean proportional between any two numbers a and b is given directly by √(a × b).

=> Mean proportional = √(25 × 196)

=> Mean proportional = 5 × 14 = 70

Therefore The correct answer is 70.

Alternate Method

Mean Proportional Relation

25 : x

x : 196

::

x × x = 25 × 196

Given:

The two numbers are 25 and 196.

Formula Used:

If x is the mean proportional between a and b, then the ratio holds as a : x :: x : b, which implies $x^2 = a \times b$.

Calculation:

=> Let the mean proportional be x.

=> $x^2 = 25 \times 196$

=> $x = \sqrt{(25 \times 196)}$

=> $x = \sqrt{(5^2 \times 14^2)}$

=> x = 5 × 14

=> x = 70

Therefore The correct answer is 70.

Additional Information

Third Proportional

If c is the third proportional to a and b, then a : b :: b : c, which gives $c = b^2 \div a$.

Fourth Proportional

If d is the fourth proportional to a, b, and c, then a : b :: c : d, which gives d = (b × c) ÷ a.

Duplicate Ratio

The duplicate ratio of a : b is structurally written as $a^2 : b^2$.

Sub-duplicate Ratio

The sub-duplicate ratio of a : b is defined by their square roots as √a : √b.

Q51. Answer: (a) 167

Shortcut Trick

Apply the BODMAS rule to solve the innermost bracket first: (3 − 7) = −4

Multiply the result by 4: 4 × (−4) = −16

Solve the remaining part of the curly bracket: {17 − 16} = 1

Divide the number outside the bracket by this result: 167 ÷ 1 = 167

Therefore The correct answer is 167.

Alternate Method

Given:

Expression: [167 ÷ {17 + 4 × (3 − 7)}]

Formula Used:

BODMAS Rule: Brackets, Orders, Division, Multiplication, Addition, Subtraction.

Calculations:

=> 167 ÷ {17 + 4 × (3 − 7)}

=> First, solve the innermost round bracket (3 − 7).

=> 167 ÷ {17 + 4 × (−4)}

=> Next, perform the multiplication inside the curly brackets.

=> 167 ÷ {17 − 16}

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=> Now, solve the subtraction inside the curly brackets.

=> 167 ÷ 1

=> Finally, perform the division.

=> 167

Therefore The correct answer is 167.

Additional Information

BODMAS Rule

BODMAS stands for Brackets, Order, Division, Multiplication, Addition, and Subtraction. Mathematical operations must be strictly performed in this sequence to obtain the correct result.

Order of Brackets

When multiple brackets are present in a single expression, they must be solved in the following order: Vinculum (line bracket) → Round brackets () → Curly brackets {} → Square brackets [].

Multiplication Sign Rules

The product of a positive number and a negative number is always negative. For example, 4 × (−4) = −16.

Q52. Answer: (a) 12,480

Shortcut Trick

Successive percentage change can be calculated using the multiplying factor method directly.

=> Final Population = Initial Population × (1 + 30/100) × (1 + 50/100) × (1 − 68/100)

=> Final Population = 20,000 × 1.3 × 1.5 × 0.32

=> Final Population = 20,000 × 0.624 = 12,480

Therefore The correct answer is 12,480.

Alternate Method

Given:

Initial Population = 20,000

First year change = +30%

Second year change = +50%

Third year change = −68%

Formula Used:

A = P × (1 ± R1/100) × (1 ± R2/100) × (1 ± R3/100)

Initial

Year 1

Year 2

Year 3

20,000

26,000

39,000

12,480

+30%

+50%

-68%

Successive Change Flowchart

Calculations:

=> Population after 1st year = 20,000 × (1 + 30/100) = 20,000 × 1.30 = 26,000

=> Population after 2nd year = 26,000 × (1 + 50/100) = 26,000 × 1.50 = 39,000

=> Population after 3rd year = 39,000 × (1 − 68/100) = 39,000 × 0.32 = 12,480

Therefore The correct answer is 12,480.

Additional Information

Successive Percentage Change

When a value is subjected to two consecutive percentage changes of x% and y%, the net percentage change can be derived using: Net Change = x + y + (x × y) ÷ 100.

Multiplying Factor Method

For sequential changes, the final value can be obtained by chaining multiplying factors. An x% increase means multiplying the base by (1 + x ÷ 100) and a y% decrease means multiplying by (1 − y ÷ 100).

Base Change Concept

In successive percentage problems, each new percentage must be calculated on the newly updated value of the previous step (the new base), not on the original starting value.

Q53. Answer: (c) −89x + 77

Shortcut Trick

Evaluate the algebraic coefficients of each degree separately:

x^2 term: 2 × (5/2) − 5 × 1 = 5 − 5 = 0

x term: 2 × (−22) − 5 × 9 = −44 − 45 = −89

Constant term: 2 × 11 − 5 × (−11) = 22 + 55 = 77

Combining the calculated terms, we directly get −89x + 77.

Therefore The correct answer is −89x + 77.

Alternate Method

Given:

$2(5/2\ x^2 - 22x + 11) - 5(x^2 + 9x - 11)$

Calculation:

=> Expand the first bracket by multiplying each term by 2:

=> $[2 \times (5/2)x^2] - [2 \times 22x] + [2 \times 11]$

=> $5x^2 - 44x + 22$

=> Expand the second bracket by multiplying each term by −5:

=> $[-5 \times x^2] - [5 \times 9x] - [-5 \times (-11)]$

=> $-5x^2 - 45x + 55$

=> Combine the two expanded parts:

=> $5x^2 - 44x + 22 - 5x^2 - 45x + 55$

=> Group the like terms together:

=> $(5x^2 - 5x^2) + (-44x - 45x) + (22 + 55)$

=> $0x^2 - 89x + 77$

=> −89x + 77

Therefore The correct answer is −89x + 77.

Additional Information

Distributive Property

It states that an expression of the form A(B + C) can be expanded as AB + AC. It applies to subtraction as well: A(B − C) = AB − AC.

Like Terms in Algebra

Terms whose variables and their exponents are exactly the same are called like terms. Only like terms can be combined using simple addition or subtraction operations.

Sign Rules for Multiplication

Multiplying two numbers with the same sign yields a positive product: (−) × (−) = (+). Multiplying two numbers with opposite signs yields a negative product: (+) × (−) = (−).

Q54. Answer: (a) 1/(√(1-x))

Shortcut Trick

Put θ = 30°, then x = sin30° = 1/2.

Given expression: [√(1 + x) × tanθ] ÷ x

=> $[\sqrt{(1 + 1/2)} \times \tan30°] \div (1/2) = [\sqrt{(3/2)} \times 1/\sqrt{3}] \times 2$

=> $(\sqrt{3} / \sqrt{2}) \times (1/\sqrt{3}) \times 2 = 2 / \sqrt{2} = \sqrt{2}$

Checking Option 1 with x = 1/2: $1 / \sqrt{(1 - 1/2)} = 1 / \sqrt{(1/2)} = \sqrt{2}$. (Matches exactly)

Therefore The correct answer is 1/√(1−x).

Alternate Method

Given:

sinθ = x

Formula Used:

$\tan\theta = \sin\theta \div \cos\theta$

$\cos\theta = \sqrt{(1 - \sin^2\theta)}$

$a^2 - b^2 = (a - b)(a + b)$

Calculations:

=> Expression = $[\sqrt{(1 + x)} \times (\sin\theta \div \cos\theta)] \div x$

=> Substitute $\sin\theta = x$ into the expression:

=> Expression = $[\sqrt{(1 + x)} \times (x \div \cos\theta)] \div x$

=> Expression = $\sqrt{(1 + x)} \div \cos\theta$

=> Since $\cos\theta = \sqrt{(1 - \sin^2\theta)} = \sqrt{(1 - x^2)}$:

=> Expression = $\sqrt{(1 + x)} \div \sqrt{(1 - x^2)}$

=> Expression = $\sqrt{(1 + x)} \div \sqrt{((1 - x)(1 + x))}$

=> Expression = $\sqrt{(1 + x)} \div [\sqrt{(1 - x)} \times \sqrt{(1 + x)}]$

=> Expression = $1 \div \sqrt{(1 - x)}$

Therefore The correct answer is $1/\sqrt{(1-x)}$.

Additional Information

Trigonometric Identities

The fundamental Pythagorean identity states that $\sin^2\theta + \cos^2\theta = 1$, which implies $\cos\theta = \sqrt{(1 - \sin^2\theta)}$.

Tangent Function Relation

The tangent of an angle can be expressed as the ratio of sine to cosine: $\tan\theta = \sin\theta \div \cos\theta$.

Algebraic Expansion Rule

The difference of squares formula is $a^2 - b^2 = (a - b)(a + b)$, which is highly useful for simplifying radical expressions.

Q55. Answer: (b) Rs. 447

Shortcut Trick

Ratio of investments = 1730 : 1420 : 1350 = 173 : 142 : 135.

Sum of all ratio parts = 173 + 142 + 135 = 450 parts.

Rupesh's share in profit = (135 ÷ 450) × Total Profit.

Rupesh's share = (3 ÷ 10) × 1490 = 3 × 149.

Rupesh's share = 447.

Therefore The correct answer is Rs. 447.

Alternate Method

Given:

Investment by Nisha = Rs. 1730

Investment by Sameer = Rs. 1420

Investment by Rupesh = Rs. 1350

Total profit earned at the end of the year = Rs. 1490

Formula Used:

When the time period is constant, Profit Ratio = Investment1 : Investment2 : Investment3

Rs. 1730Nisha173 partsRs. 1420Sameer142 partsRs. 1350Rupesh135 partsTotal Profit = Rs. 1490

Calculations:

=> Ratio of their profits = 1730 : 1420 : 1350

=> Simplifying the ratio = 173 : 142 : 135

=> Sum of profit ratio parts = 173 + 142 + 135 = 450

=> Rupesh's profit share = (Rupesh's ratio parts ÷ Total ratio parts) × Total profit

=> Rupesh's share = (135 ÷ 450) × 1490

=> Rupesh's share = (3 ÷ 10) × 1490

=> Rupesh's share = 3 × 149 = 447

Therefore The correct answer is Rs. 447.

Additional Information

Simple Partnership

When investments are made for the exact same time period, the profit or loss is distributed purely in the ratio of their original

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investments. Profit Ratio = Capital1 : Capital2 : Capital3.

Compound Partnership

When investments are made for different time periods, the profit is distributed in the ratio of the product of their investment amount and the time period. Profit Ratio = (C1 × T1) : (C2 × T2).

Active and Sleeping Partners

An active partner manages the business and typically receives a fixed percentage of the profit or a regular salary. A sleeping partner only invests capital and receives a share from the remaining profit based solely on their investment ratio.

Q56. Answer: (b) 49%

Shortcut Trick

The volume of a cylinder is proportional to r^2h.

Net percentage change in r^2 (successive decrease of 23%) = −23 − 23 + (23 × 23) ÷ 100 = −46 + 5.29 = −40.71%

Net change in volume combining r^2 change and height change (+151%) = −40.71 + 151 − (40.71 × 151) ÷ 100

=> Total change = 110.29 − 61.4721 = +48.8179%

Rounding to the closest integer gives a 49% increase.

Therefore The correct answer is 49%.

Alternate Method

r

h

Original Cylinder

$V = \pi r^2h$

0.77r

2.51h

New Cylinder

V' = ?

% Change?

Given:

Decrease in radius = 23%

Increase in height = 151%

Formula Used:

Volume of a Right Circular Cylinder, $V = \pi r^2h$

Percentage Increase = [(New Volume − Original Volume) ÷ Original Volume] × 100

Calculations:

=> Let the original radius be r and original height be h.

=> New radius r' = r − 0.23r = 0.77r

=> New height h' = h + 1.51h = 2.51h

=> New Volume $V' = \pi \times (0.77r)^2 \times (2.51h)$

=> $V' = \pi \times 0.5929r^2 \times 2.51h$

=> $V' = 1.488179 \times \pi r^2h = 1.488179V$

=> Increase in Volume = 1.488179V − 1V = 0.488179V

=> Percentage Increase = (0.488179V ÷ V) × 100 = 48.8179%

=> Rounding to the closest integer gives 49%.

Therefore The correct answer is 49%.

Additional Information

Successive Percentage Change Formula

For two successive changes of a% and b%, the net percentage change is given by (a + b + (a × b) ÷ 100)%. Use positive signs for increments and negative signs for decrements.

Volume of a Right Circular Cylinder

The volume represents the capacity of the cylinder and is calculated as $V = \pi r^2h$. Any percentage change in radius impacts the volume by its square factor.

Curved Surface Area of a Cylinder

The curved surface area is CSA = 2πrh. The percentage change in CSA depends strictly on the linear product of the changed radius and height.

Q57. Answer: (b) 12

Shortcut Trick

Read the first statement carefully: 2 times the age of Ram is 24 years more than 2 times the age of Ramya.

Taking the common factor 2 out, we get: (Ram's age − Ramya's age) × 2 = 24.

Dividing by 2 directly gives the age difference as 12 years.

The second condition given in the question is extra information and completely redundant.

Therefore The correct answer is 12 years.

Alternate Method

Given:

Let the age of Ram be R and the age of Ramya be Y.

Condition 1: 2R = 2Y + 24

Condition 2: 4Y = R − 3

Ages Representation

Ram's Age (R = 15)

Ramya's Age (Y = 3)

Difference = 12

Calculations:

=> From Condition 1, we can simplify the equation:

=> 2R − 2Y = 24

=> R − Y = 12

=> R = Y + 12

=> Substitute R in Condition 2:

=> 4Y = (Y + 12) − 3

=> 4Y = Y + 9

=> 3Y = 9

=> Y = 3 years (Ramya's age)

=> Now, substitute Y = 3 in the simplified Condition 1 equation:

=> R = 3 + 12 = 15 years (Ram's age)

=> Difference between their ages = 15 − 3 = 12 years

Therefore The correct answer is 12 years.

Additional Information

Problems on Ages

Age-based problems often involve formulating linear equations. Always set variables for current ages to keep the equations simple and solve them simultaneously.

Redundant Data in Word Problems

In many competitive exams, questions may contain extraneous conditions (like the second statement here) that are not mathematically required to find the specifically asked value. Identifying direct relationships early can save valuable calculation time.

Linear Equations in Two Variables

A system of linear equations involves two variables (x and y) representing unknown values. A unique solution exists if the two equations are independent and logically consistent.

Q58. Answer: (c) 60, 18

Shortcut Trick

The fastest way to solve this is by verifying the given options.

Condition 1: Sum of the numbers = 78. (All given options sum up to 78)

Condition 2: L.C.M. of the numbers = 180.

Option 1: L.C.M. of 58 and 20 is 580. (Incorrect)

Option 3: L.C.M. of 60 and 18 is 180. (Matches perfectly)

Therefore The correct answer is 60, 18.

Alternate Method

Given:

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Sum of two numbers = 78
L.C.M. of the two numbers = 180
Formula Used:
Numbers = Hx and Hy (where H is the H.C.F., and x, y are co-prime integers)
Sum = H(x + y)
L.C.M. = Hxy
Calculations:
=> The H.C.F. of two numbers perfectly divides both their sum and their L.C.M.
=> H.C.F. of the numbers = H.C.F. of (78, 180) = 6
=> Let the two numbers be 6x and 6y, where x and y are co-prime.
=> Sum = 6x + 6y = 78
=> 6(x + y) = 78 => x + y = 13
=> L.C.M. = 6xy = 180
=> xy = 30
=> We need two co-prime numbers that add to 13 and multiply to 30.
=> The numbers x and y are 10 and 3.
=> The original numbers are 6 × 10 = 60 and 6 × 3 = 18.
Therefore The correct answer is 60, 18.
Additional Information
Product of Numbers Rule
For any two numbers, the product of the numbers is equal to the product of their H.C.F. and L.C.M. (i.e., a × b = H.C.F. × L.C.M.).
Co-prime Factors
If two numbers have an H.C.F. of H, they can be represented as Hx and Hy, where x and y are always co-prime to each other.
Relation between Sum, L.C.M., and H.C.F.
The highest common factor (H.C.F.) of two numbers is mathematically equal to the H.C.F. of their Sum and their L.C.M.

Q59. Answer: (d) Rs. 1,48,500

Shortcut Trick
Kunal's Profit = (Total Profit + Difference) ÷ 2 = (5308 + 2654) ÷ 2 = Rs. 3981.
Abhishek's Profit = (Total Profit − Difference) ÷ 2 = (5308 − 2654) ÷ 2 = Rs. 1327.
Profit ratio of Kunal and Abhishek = 3981 : 1327 = 3 : 1.
Capital ratio = (Profit ÷ Time) = (3 ÷ 7) : (1 ÷ 3) = 9 : 7.
Difference in capital ratio = 9 − 7 = 2 parts = Rs. 33,000 => 1 part = Rs. 16,500.
Kunal's capital = 9 parts = 9 × 16500 = Rs. 1,48,500.
Therefore The correct answer is Rs. 1,48,500.
Alternate Method
Given:
Kunal's extra investment over Abhishek = Rs. 33,000
Investment duration of Kunal = 7 months
Investment duration of Abhishek = 3 months
Total profit = Rs. 5,308
Kunal's extra profit = Rs. 2,654
Formula Used:
Profit Ratio = Ratio of (Capital × Time)
Profit Ratio = Capital × Time
Kunal
Capital: 9 parts
Time: 7 months
Abhishek
Capital: 7 parts
Time: 3 months
Diff: 2 parts

= Rs. 33,000

Profit: 3 parts

(Rs. 3981)

Profit: 1 part

(Rs. 1327)

Calculations:

=> Profit of Kunal = (Total Profit + Extra Profit) ÷ 2

=> Profit of Kunal = (5308 + 2654) ÷ 2 = 7962 ÷ 2 = Rs. 3981

=> Profit of Abhishek = 5308 − 3981 = Rs. 1327

=> Profit ratio (Kunal : Abhishek) = 3981 : 1327 = 3 : 1

=> Let Abhishek's capital be Rs. x.

=> Kunal's capital = Rs. (x + 33000)

=> Ratio of Profit = [7 × (x + 33000)] : [3 × x]

=> 3 : 1 = [7 × (x + 33000)] : 3x

=> 3 × 3x = 1 × 7(x + 33000)

=> 9x = 7x + 231000

=> 2x = 231000

=> x = 115500

=> Kunal's capital = x + 33000 = 115500 + 33000 = Rs. 1,48,500

Therefore The correct answer is Rs. 1,48,500.

Additional Information

Compound Partnership

When capitals are invested for different time periods, the profit ratio is directly proportional to the product of Capital and Time (P1 : P2 = C1×T1 : C2×T2).

Active vs Sleeping Partner

An active partner manages the business and usually receives a fixed salary or a specific percentage of the total profit, while a sleeping partner only invests their capital.

Joining Mid-way

If a partner joins 'x' months after the start of an annual business, their investment duration is taken as (12 − x) months when calculating their respective profit share.

Q60. Answer: (c) 12 noon

Shortcut Trick

The bells will ring together again at the LCM of their individual intervals.

LCM(36, 45) = 180 minutes.

Time in hours = 180 ÷ 60 = 3 hours.

Next simultaneous ring = 9:00 a.m. + 3 hours = 12 noon.

Therefore The correct answer is 12 noon.

Alternate Method

Given:

Interval of the first school bell = 36 minutes

Interval of the second school bell = 45 minutes

Initial simultaneous ring time = 9:00 a.m.

Concept Used:

The bells will ring together again after a time interval which is the Least Common Multiple (LCM) of their individual intervals. The LCM finds the smallest time that is exactly divisible by both intervals.

Calculations:

=> Prime factorization of 36 = $2^2 \times 3^2$

=> Prime factorization of 45 = $3^2 \times 5^1$

=> LCM = Product of the highest powers of all prime factors present

=> LCM(36, 45) = $2^2 \times 3^2 \times 5^1$

=> LCM(36, 45) = 4 × 9 × 5

=> LCM(36, 45) = 180 minutes

=> Convert 180 minutes into hours = 180 ÷ 60 = 3 hours

=> Next ringing time = Initial time + 3 hours

=> Next ringing time = 9:00 a.m. + 3 hours

=> 9:00 a.m. + 3 hours = 12:00 noon

Therefore The correct answer is 12 noon.

Additional Information

LCM in Real Life Scenarios

LCM is used whenever events repeat at different intervals and you need to find the next time they will happen simultaneously. Common examples include flashing traffic lights, tolling bells, and runners meeting on a circular track.

Prime Factorization Method

To find the LCM, express each number as a product of prime factors. The LCM is calculated by multiplying the highest power of all prime factors present in the numbers.

HCF vs LCM

While LCM finds the smallest common multiple (used for synchronizing repeating events), HCF (Highest Common Factor) finds the greatest common divisor (used for dividing groups of items into the largest equal segments).

Q61. Answer: (c) 16,800

Shortcut Trick

When time periods are the same and the simple interests from both parts are equal, the ratio of invested sums is inversely proportional to their respective interest rates.

Ratio of sum at 5% to sum at 14% = P1 : P2 = R2 : R1 = 14 : 5.

Total ratio parts = 14 + 5 = 19 parts.

19 parts = Rs. 22,800 => 1 part = 22,800 ÷ 19 = Rs. 1,200.

Sum invested at 5% (14 parts) = 14 × 1,200 = Rs. 16,800.

Therefore The correct answer is Rs. 16,800.

Alternate Method

Given:

Total Investment = Rs. 22,800

Rate 1 (R1) = 5% per annum, Rate 2 (R2) = 14% per annum

Time (T) = 4 years for both investments.

Simple Interests are equal: SI1 = SI2

Formula Used:

Simple Interest (SI) = (P × R × T) ÷ 100

Total Sum = Rs. 22,800

Part 1 (P1)

R = 5%, T = 4 yrs

Part 2 (P2)

R = 14%, T = 4 yrs

SI1 = SI2 → P1 × 20% = P2 × 56%

Calculations:

=> Let the sum invested at 5% be P1 and at 14% be P2.

=> P1 + P2 = 22,800

=> (P1 × 5 × 4) ÷ 100 = (P2 × 14 × 4) ÷ 100

=> 20 × P1 = 56 × P2

=> 5 × P1 = 14 × P2

=> P1 ÷ P2 = 14 ÷ 5

=> The ratio of their respective investments is 14 : 5.

=> Sum invested at 5% (P1) = [14 ÷ (14 + 5)] × 22,800

=> P1 = (14 ÷ 19) × 22,800

=> P1 = 14 × 1,200 = 16,800

Therefore The correct answer is Rs. 16,800.

Additional Information

When Simple Interests are Equal

If a certain total sum is divided into parts P1, P2, P3... and their simple interests are equal, then their investment ratio is given by P1 : P2 : P3 = (1 ÷ R1T1) : (1 ÷ R2T2) : (1 ÷ R3T3).

When Final Amounts are Equal

If the final amounts (Principal + Interest) obtained from different parts are equal, their investment ratio is P1 : P2 = 1 ÷ (100 + R1T1) : 1 ÷ (100 + R2T2).

Core Principle of Simple Interest

In simple interest, the interest is calculated only on the initial principal for the entire time duration, making it uniformly linear compared to compound interest.

Q62. Answer: (d) 32.5%

Shortcut Trick

Total items received = 4. MP of 3 items = Rs. 6000 => MP of 1 item = Rs. 2000.

Total Marked Price (MP) of 4 items = 4 × 2000 = Rs. 8000.

Final Selling Price (SP) after Rs. 600 cashback = 6000 − 600 = Rs. 5400.

Total Discount = 8000 − 5400 = Rs. 2600.

Discount % = (2600 ÷ 8000) × 100 = 32.5%.

Therefore The correct answer is 32.5%.

Alternate Method

Paid 1

Rs. 2000

Paid 2

Rs. 2000

Paid 3

Rs. 2000

Free 1

Rs. 2000

Total Marked Price = 4 × Rs. 2000 = Rs. 8000

Final Price = Rs. 6000 − Rs. 600 (Cashback) = Rs. 5400

Given:

=> Offer 1: Buy 3 for Rs. 6,000, get 1 free.

=> Offer 2: Cashback of Rs. 600 on cash payment.

Formula Used:

=> Discount % = (Total Discount ÷ Marked Price) × 100

Calculations:

=> Price to be paid for 3 items = Rs. 6000.

=> Marked Price (MP) of 1 item = 6000 ÷ 3 = Rs. 2000.

=> The customer gets a total of 4 items (3 paid + 1 free).

=> Total MP of 4 items = 4 × 2000 = Rs. 8000.

=> Amount paid initially for 3 items = Rs. 6000.

=> Cash back received = Rs. 600.

=> Net Selling Price (SP) = 6000 − 600 = Rs. 5400.

=> Total Discount = Total MP − Net SP = 8000 − 5400 = Rs. 2600.

=> Total Discount % = (2600 ÷ 8000) × 100

=> Total Discount % = (26 ÷ 80) × 100

=> Total Discount % = (13 ÷ 40) × 100 = 32.5%

Therefore The correct answer is 32.5%.

Additional Information

Buy X Get Y Free Discount

When a shopkeeper offers 'Buy X Get Y free', the discount percentage is evaluated based on the total items received. The formula is: Discount % = [Y ÷ (X + Y)] × 100.

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Successive Discounts

If two successive discounts of a% and b% are given, the single equivalent discount is calculated using: Equivalent Discount % = a + b − (a × b ÷ 100).

Marked Price vs Selling Price

Discount is always computed on the Marked Price (MP). The fundamental relationship is Selling Price (SP) = Marked Price (MP) − Discount.

Q63. Answer: (c) 750

Shortcut Trick

When overall profit or loss is zero, the absolute Loss amount equals the Profit amount.

=> 9% of CP1 = 15% of CP2

=> CP1 : CP2 = 15 : 9 = 5 : 3

Total CP parts = 5 + 3 = 8 parts = Rs. 1200

=> CP of first dress (5 parts) = (5 ÷ 8) × 1200 = Rs. 750

Therefore The correct answer is Rs. 750.

Alternate Method

Given:

=> Total Cost Price (CP) of two dresses = Rs. 1200

=> Loss on the first dress = 9%

=> Gain on the second dress = 15%

=> Overall net profit/loss = 0%

Method Used:

=> We can apply the mixture and alligation cross method on the profit/loss percentages to directly find the ratio of their Cost Prices.

Dress 1

-9%

Dress 2

+15%

Overall

0%

15

9

Ratio = 15 : 9 = 5 : 3

Calculations:

=> From the alligation diagram, the ratio of CP of Dress 1 to Dress 2 = 15 : 9 = 5 : 3

=> Let the Cost Price of Dress 1 be 5x and Dress 2 be 3x

=> Total CP = 5x + 3x = 8x

=> 8x = 1200

=> x = 1200 ÷ 8 = 150

=> CP of the first dress = 5x = 5 × 150 = 750

Therefore The correct answer is Rs. 750.

Additional Information

Alligation Cross Method

A powerful rule that enables us to find the required ratio in which two quantities/percentages must be mixed to produce a desired mean percentage. The base quantity ratio is directly obtained by taking the absolute cross differences.

No Profit No Loss Condition

When the total Selling Price equals the total Cost Price, the overall transaction yields 0% profit/loss. This directly implies that the actual monetary profit earned on one item perfectly balances the monetary loss incurred on the other.

Base of Percentage in Profit & Loss

Unless otherwise stated, all profit and loss percentages are strictly calculated on the Cost Price (CP) of the given articles. Formula: Profit/Loss % = (Profit/Loss ÷ CP) × 100.

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Q64. Answer: (c) -28

Shortcut Trick

Apply BODMAS and simplify powers and roots directly in one line:

$7^2 + \sqrt{(2^2)} - 8\sqrt{81} - 7$

=> 49 + 2 − 8 × 9 − 7

=> 51 − 72 − 7

=> 51 − 79 = −28

Therefore The correct answer is −28.

Alternate Method

Given:

$7^2 + \sqrt{(2^2)} - 8\sqrt{81} - 7$

Concept Used:

BODMAS Rule (Brackets, Orders, Division, Multiplication, Addition, Subtraction) is applied to simplify mathematical expressions. Here, Orders (powers and roots) are solved first.

Calculations:

=> $7^2 = 7 \times 7 = 49$

=> $\sqrt{(2^2)} = \sqrt{4} = 2$

=> $\sqrt{81} = 9$

Substituting the values back into the given expression:

=> 49 + 2 − (8 × 9) − 7

=> 49 + 2 − 72 − 7

=> 51 − 72 − 7

=> 51 − 79

=> −28

Therefore The correct answer is −28.

Additional Information

BODMAS Rule

It dictates the sequence of operations: Brackets, Orders (powers and roots), Division, Multiplication, Addition, and Subtraction.

Square Roots

The principal square root of a positive number is the positive value that when multiplied by itself gives the number. Example: $\sqrt{(x^2)} = |x|$.

Exponents

a^n represents a multiplied by itself n times. For example, $a^2 = a \times a$.

Q65. Answer: (c) 180 - 360/n

Shortcut Trick

For any regular polygon of n sides, the exterior angle is directly calculated as 360° ÷ n.

The interior and exterior angles lie on a straight line and always sum up to 180°.

Interior angle = 180° − Exterior angle

Interior angle = 180 − 360/n

Therefore The correct answer is 180 − 360/n degrees.

Alternate Method

Interior Angle

Exterior Angle = 360/n

Polygon Vertex

Interior Angle + Exterior Angle = 180°

Given:

A regular polygon with n sides.

Formula Used:

Sum of interior angles of an n-sided polygon = (n − 2) × 180°

Each interior angle = Sum of interior angles ÷ n

Calculations:

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=> Interior angle = [(n − 2) × 180] ÷ n

=> Interior angle = (180n − 360) ÷ n

=> Interior angle = (180n ÷ n) − (360 ÷ n)

=> Interior angle = 180 − 360/n

Therefore The correct answer is 180 − 360/n degrees.

Additional Information

Sum of Interior Angles

The sum of all interior angles of a regular polygon with n sides is calculated using the formula (n − 2) × 180°.

Sum of Exterior Angles

For any convex polygon, regardless of the number of sides, the sum of all exterior angles is always exactly 360°.

Number of Diagonals

The total number of diagonals in an n-sided polygon is given by the formula n(n − 3) ÷ 2.

Central Angle

In a regular polygon, the angle subtended by each side at the center is exactly equal to its exterior angle, which is 360° ÷ n.

Q66. Answer: (c) 43/63

Shortcut Trick

Let Total Work = LCM(9, 21) = 63 units.

Efficiency of A = 63 ÷ 9 = 7 units/day.

Efficiency of B = 63 ÷ 21 = 3 units/day.

Work done together in 2 days = (7 + 3) × 2 = 20 units.

Remaining work = 63 − 20 = 43 units.

Therefore The correct answer is 43/63.

Alternate Method

Given:

Time taken by A = 9 days

Time taken by B = 21 days

Time they worked together = 2 days

Person	Days	Total Work	Efficiency
A	9	63	7
B	21	3	

Calculations:

=> Total combined efficiency of A and B = 7 + 3 = 10 units/day.

=> Total work done by them in 2 days = 10 × 2 = 20 units.

=> Work left to be done = Total Work − Work completed

=> Work left = 63 − 20 = 43 units.

=> Fraction of work left = Remaining Work ÷ Total Work

=> Fraction of work left = 43/63

Therefore The correct answer is 43/63.

Additional Information

Total Work using LCM Method

Total work can be assumed as the Least Common Multiple (LCM) of the time taken by all individuals. This ensures the calculated efficiencies are integers, completely avoiding complex fractional calculations.

Work done by (A + B) together

If A can do a piece of work in x days and B can do the same work in y days, then working together they can complete the whole work in (x × y) / (x + y) days.

Work Left or Dropping Out Mid-way

When someone leaves early, always calculate the total work completed until they left using their combined efficiency. Then subtract it from the total work to get the remaining work.

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Q67. Answer: (c) 11

Shortcut Trick

The product of two consecutive positive integers is 110.

Find the closest perfect square to 110, which is 100 (since 102 = 100).

Check the product of 10 and the next integer: 10 × 11 = 110.

The two consecutive numbers are 10 and 11.

Therefore, the greater number is 11.

Therefore The correct answer is 11.

Alternate Method

Given:

The product of two consecutive positive natural numbers is 110.

Formula Used:

Let the two consecutive positive natural numbers be x and (x + 1).

Product = x × (x + 1)

Calculations:

=> x × (x + 1) = 110

=> x2 + x = 110

=> x2 + x − 110 = 0

=> x2 + 11x − 10x − 110 = 0

=> x(x + 11) − 10(x + 11) = 0

=> (x − 10)(x + 11) = 0

=> x = 10 or x = −11

Since x must be a positive natural number, we ignore x = −11.

=> x = 10

The greater number = x + 1 = 10 + 1 = 11.

Therefore The correct answer is 11.

Additional Information

Consecutive Numbers

Numbers that follow each other continuously in the order from smallest to largest with a common difference of 1. Expressed generally as n, n + 1, n + 2, etc.

Quadratic Equation Roots

For a standard quadratic equation ax2 + bx + c = 0, the nature of the roots is determined by the discriminant D = b2 − 4ac. When D > 0, the roots are real and distinct.

Natural Numbers

The set of all positive integers starting from 1 up to infinity (1, 2, 3, 4, ...). It strictly excludes zero, fractions, decimals, and negative integers.

Q68. Answer: (b) 28.75

Shortcut Trick

First value = 65% of 75 = 65 × (3/4) = 195/4 = 48.75

Second value = 4/5 of 25 = 4 × 5 = 20

Required difference = 48.75 − 20 = 28.75

Therefore The correct answer is 28.75.

Alternate Method

Given:

Value 1 = 65% of 75

Value 2 = 4/5 of 25

Calculations:

=> 65% of 75 = (65 / 100) × 75

=> Simplifying the fraction by dividing by 25: 65 × (3 / 4)

=> 65 × 3 = 195

=> 195 / 4 = 48.75

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=> 4/5 of 25 = (4 / 5) × 25
=> 4 × 5 = 20
=> Difference = 48.75 − 20
=> Difference = 28.75
Therefore The correct answer is 28.75.
Additional Information
Percentage and Fractions
Percentages can be easily calculated by converting them to basic fractions. For example, 75% = 3/4, 25% = 1/4, and 20% = 1/5.
BODMAS Rule
The word 'Of' denotes multiplication but takes precedence over division and standard multiplication in mathematical expressions.
Decimal Equivalents
Some common fraction to decimal conversions speed up calculations during exams: 1/4 = 0.25, 1/2 = 0.5, 3/4 = 0.75, and 4/5 = 0.8.

Q69. Answer: (d) 78.5%

Shortcut Trick
Let the Cost Price (CP) of the article be 100.
At 15% loss, Selling Price (SP1) = 100 − 15 = 85.
Actual SP = 85 × (14 ÷ 4) = 297.5.
New Selling Price (SP2) = 60% of Actual SP = 0.60 × 297.5 = 178.5.
Profit % = SP2 − CP = 178.5 − 100 = 78.5%.
Therefore The correct answer is 78.5%.
Alternate Method
Given:
Selling at 4/14 of Actual SP results in a 15% loss.
New Selling Price is 60% of Actual SP.
SP1 = 85
CP = 100
SP2 = 178.5
Actual SP
297.5
−15% Loss
+78.5% Profit
4/14 of Actual SP
60% of Actual SP
New Profit = 178.5 − 100 = 78.5%
Calculations:
=> Let the Cost Price (CP) of the article be 100 units.
=> Selling at 15% loss means the first selling price SP1 = 100 − 15 = 85 units.
=> We are given that SP1 = (4/14) × Actual SP.
=> Actual SP = SP1 × (14 ÷ 4)
=> Actual SP = 85 × 3.5 = 297.5 units.
=> New Selling Price (SP2) = 60% of Actual SP.
=> SP2 = 0.60 × 297.5 = 178.5 units.
=> Profit = SP2 − CP = 178.5 − 100 = 78.5 units.
=> Profit Percentage = (Profit ÷ CP) × 100 = (78.5 ÷ 100) × 100 = 78.5%.
Therefore The correct answer is 78.5%.
Additional Information
Cost Price vs Selling Price Relation
CP / SP = 100 / (100 + Profit%) or CP / SP = 100 / (100 − Loss%).
Marked Price & Discount
Discount is always calculated on the Marked Price (MP). Final SP = MP × (100 − Discount%) ÷ 100.

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Successive Discounts

For two successive discounts of a% and b%, the equivalent overall discount is given by: (a + b − a×b ÷ 100)%.

Q70. Answer: (d) 195.5

Shortcut Trick

Total sum of 5 numbers = 655

Sum of the first 2 numbers = 80 × 2 = 160

Sum of the remaining 2 numbers = 655 − (160 + 104) = 391

Average of the remaining 2 numbers = 391 ÷ 2 = 195.5

Therefore The correct answer is 195.5.

Alternate Method

Given:

Sum of 5 numbers = 655

Average of first 2 numbers = 80

Third number = 104

Formula Used:

Average = Sum of values ÷ Number of values

Total Sum of 5 numbers = 655

First Two

Sum = 160

(Avg = 80)

Third

Value = 104

Remaining Two

Sum = 391

Avg = 195.5

Calculations:

=> Sum of first 2 numbers = 80 × 2 = 160

=> Sum of first 3 numbers = 160 + 104 = 264

=> Sum of remaining 2 numbers = Total sum − Sum of first 3 numbers

=> Sum of remaining 2 numbers = 655 − 264 = 391

=> Average of remaining 2 numbers = 391 ÷ 2 = 195.5

Therefore The correct answer is 195.5.

Additional Information

Combined Average

If group 1 has n1 items with average A1 and group 2 has n2 items with average A2, then Combined Average = (n1A1 + n2A2) ÷ (n1 + n2).

Effect of Operations on Average

If a constant value is added, subtracted, multiplied or divided to every observation in a dataset, the average of the dataset also changes by the same operation and value.

Weighted Average

Used when different values have different frequencies or weights. Weighted Average = (w1x1 + w2x2 + ... + w_nx_n) ÷ (w1 + w2 + ... + w_n).

Q71. Answer: (c) 80

Given :

Yash is:34th from the top and 47th from the bottom

Total students = (Rank from top) + (Rank from bottom) − 1

= 34 + 47 − 1

= 80

There are 80 students in the class.

Hence, the correct answer is "Option 3"

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Q72. Answer: (b) 23, 48

Logic: (First Number x 2) + 2 = Second Number

Similarly,

Hence, the correct answer is "Option 2"

Q73. Answer: (a) CYA−XTV

The logic followed here is:

Similarly,

Hence, the correct answer is "Option 1"

Q74. Answer: (a) HAIR - RIHA - HIAR

The logic follows here,

Similarly,

Hence, the correct answer is "Option 1"

Q75. Answer: (c) 4

'USER' is coded as '4629' and 'LAST' is coded as '1354'

'USER' - '4 6 2 9'

'LAST' -'1 3 5 4'

The Code for S is 4.

Hence, the correct answer is "Option 3"

Q76. Answer: (a) W

• H, I, J, K, U,V and W are sitting around a circular table facing the centre of the table.

• Only two people sit between V and I when counted from the right of V.

• Only three people sit between H and J when counted from the right of J.

• I sits to the immediate right of J.

• W sits to the immediate right of K.

The final arrangement is,

Hence, the correct answer is "Option 1"

Q77. Answer: (d) CY-JM

The logic followed here is:

Hence, the correct answer is "Option 4"

Q78. Answer: (a) 12

Suhana is 24th from the right

• Her position from the left:

• 47-24+1=24

• So Suhana is 24th from the left.

• • Bimla is 37th from the left.

Number of people between them:

(37 - 24) - 1

= 13 - 1

=12

Hence, the correct answer is "Option 1"

Q79. Answer: (a) 10

Given Equation : 72 × 6 ÷ 18 + 10 − 2 = ?

• means −, − means ×, × means ÷ and ÷ means +

Using BODMAS rule,

72 ÷ 6 + 18 − 10 × 2 = ?

12 + 18 − 20 = ?

30 − 20 = ?

= 10

Hence, the correct answer is "Option 1"

Q80. Answer: (d) J

Seven people, I, J, K, L, M, N and O, are sitting in a row, facing north.

• Only two people sit to the right of K.

• Only two people sit between K and O.

• Only two people sit between I and N.

• N sits to the immediate left of K.

• L sits to the immediate right of M

The Final Arrangement is,

Hence, the correct answer is "Option 4"

Q81. Answer: (a) Neither conclusion (I) nor (II) follows

The least possible Venn diagram is:

Conclusion:

(I): Some pages are remotes. - False (All pages are crows.Some crows are remotes.As their is no relation between pages and remote may be it is possible but not definite. Hence, it is false)

(II): All crows are pages. - False (All pages are crows.Some crows are remotes. Hence, it is false)

Neither conclusion (I) nor (II) follows

Hence, the correct answer is "Option 1"

Q82. Answer: (d) Sister

Preparing the family tree diagram by using the following symbols:

As per the given information:

Hence, the correct answer is "Option 4"

Q83. Answer: (c) ROQP

The logic followed here is:

Hence, the correct answer is "Option 3"

Q84. Answer: (a) SXZ

The logic followed here is:

Hence, the correct answer is "Option 1"

Q85. Answer: (b) 64

Kartik's position from the top = 46

Kartik's position from the bottom = 19

Number of students in the class = position from top+ position from bottom - 1

46 + 19 − 1 = 64

Hence, the correct answer is "Option 2"

Q86. Answer: (c) GJ-EH

The logic followed here is:

Hence, the correct answer is "Option 3"

Q87. Answer: (c) 69

Given Equation : 22 ÷ 3 + 81 × 9 − 12 = ?

'+' and '−' are interchanged and '×' and '÷' are interchanged

Using BODMAS rule,

22 × 3 − 81 ÷ 9 + 12 = ?

22 × 3 − 9 + 12 = ?

66 + 12 − 9 = ?

78 − 9 = ?

69.

Hence, the correct answer is "Option 3"

Q88. Answer: (b) HBW

The logic followed here is:

Hence, the correct answer is "Option 2"

Q89. Answer: (d) 6

'LISE' is coded as '0873' and 'SITE' is coded as '8763'

'LISE' - '0873'

'SITE' -'8763'

The Code for T is 6.

Hence, the correct answer is "Option 4"

Q90. Answer: (d) 11 km to the south

• Mr. Sol starts from Point A and drives 6 km towards the east.

• He then takes a right turnand drives 3 km, then turns right and drives 7 km.

• He then takes a right turn and drives14 km.

• He takes a final right turn, drives 1 km and stops at Point P

The Final Diagram,

Hence, the correct answer is "Option 4"

Q91. Answer: (d) 61

Given Equation : 91 × 13 − 9 ÷ 8 + 18 = ?

+' and '−' are interchanged and '×' and '÷' are interchanged

Using BODMAS rule,

91 ÷ 13 + 9 × 8 − 18 = ?

7 + 9 × 8 − 18 = ?

7 + 72 − 18 = ?

79 − 18 = ?

= 61.

Hence, the correct answer is "Option 4"

Q92. Answer: (a) Two

Given number 95423671

Arranged in ascending order from left to right.

left 1 2 3 4 5 6 7 9 right.

The place values of 6 and 7 remain unchanged.

Hence, the correct answer is "Option 1"

Q93. Answer: (d) Neither conclusion (I) nor (II) follows.

The least possible Venn diagram is:

Conclusions:

(I): Some bottle are glass. - False (As their is no direct relation between bottle and glass may be it is possible but not definite. Hence, it is false)

(II): All glass are plastic - False (Some bottle are plastic.Some plastic are glass.Hence, it is false)

Neither conclusion (I) nor (II) follows.

Hence, the correct answer is "Option 4"

Q94. Answer: (d) 67

The logic follows here,

Hence, the correct answer is "Option 4"

Q95. Answer: (c) 4225

The logic follows here,

Hence, the correct answer is "Option 3"

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Q96. Answer: (a) 12 km towards West

• Rahul starts from Point A and drives 11 km towards North.
• He then takes a right turn, drives 7 km, turns right and drives 6 km.
• He then takes a left turn and drives 5 km.
• He takes a final right turn, drives 5 km and stops at Point P.

The Final Diagram,

Hence, the correct answer is "Option 1"

Q97. Answer: (b) ZNL

The logic followed here is:

Hence, the correct answer is "Option 2"

Q98. Answer: (d) 15

Given Equation : (Left) 438 345 367 353 276 (Right)

The third digit of the largest number = 438

Second digit of smallest number = 276

Resultant = 8 + 7 = 15.

Hence, the correct answer is "Option 4"

Q99. Answer: (c) 130

The logic follows here,

Hence, the correct answer is "Option 3"

Q100. Answer: (b) Five

Given Equation : (Left) % & 3 3 $ θ 8 π 3 π 5 * @ 1 δ 2 # 7 3 π 9 (Right)

Required Condition : Symbol - Number - Another Symbol

(Left) % & 3 3 $ θ 8 π 3 π 5 * @ 1 δ 2 # 7 3 π 9 (Right)

Hence, the correct answer is "Option 2"

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