RRB NTPC (UG) CBT-I Official Paper (Held On: 29 Aug, 2025 Shift 1) (Previous Year Paper)

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

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GENERAL AWARENESS

Q1. Which of the following is a private sector organisation in India?

(a) SAIL
(b) TISCO
(c) ONGC
(d) Indian Railways

Q2. Which of the following States enjoys special provisions under Article 371A due to its unique customary law and land ownership practices?

(a) Sikkim
(b) Mizoram
(c) Nagaland
(d) Manipur

Q3. Who among the following sent a telegram on 6 August 1857 stating, 'Our men are cowed by the numbers opposed to them and the endless fighting. Every village is held against us, the zamindars have risen to oppose us'?

(a) Lieutenant Colonel William Lambton
(b) Lord Cornwallis
(c) Lieutenant Colonel Tytler
(d) Robert Clive

Q4. What does ASCII stand for?

(a) American Standard Code for Information Interchange
(b) Auxiliary System for Communication and Interchange
(c) Advanced Standard Coding in Information Industry
(d) Automated System for Computer Information Interchange

Q5. Which of following sports events was clinched by Indian pair Manush Shah and Diya Chitale in April 2025?

(a) WTT Contender Lagos 2025
(b) WTT Contender Tunis 2025
(c) WTT Star Contender Ljubljana 2025
(d) United States Smash 2025

Q6. What is the mass percentage of sodium hypochlorite typically present in a commercial bleaching solution?

(a) 3.62%
(b) 5.46%
(c) 2.57%
(d) 10.85%

Q7. In which of the following cities was the Paramhansa Mandali founded to work for the abolition of caste?

(a) Kanpur
(b) Surat
(c) Patna
(d) Bombay

Q8. What is the name of the Indian Light Tank that achieved a major milestone in highaltitude firing trials in December 2024?

(a) Arjun
(b) Zorawar
(c) Bhishma
(d) Vijayanta

Q9. According to the India Justice Report 2025, which two states have the highest share ofwomen judges at the High Court level at 33%?

(a) Kerala and Andhra Pradesh
(b) Uttar Pradesh and Odisha
(c) Sikkim and Telangana
(d) Chhattisgarh and Madhya Pradesh

Q10. Select the correct sequence of steps to create a new folder on the desktop?

(a) Right-click Taskbar → Select Folder → Press Enter
(b) Click Start → Settings → New → Folder
(c) Open File Explorer → Right-click Desktop → New Folder
(d) Right-click Desktop → New → Folder

Q11. Which of the following factors DOES NOT directly influence population distribution in India?

(a) Official language
(b) Climate
(c) Soil fertility
(d) Topography

Q12. Article 6 deals with persons who migrated to India from _____.

(a) Bangladesh
(b) Sri Lanka
(c) Pakistan
(d) Nepal

Q13. Which area of the main stem and roots contains the spongy, soft parenchyma cells that carry and store nutrients for the plant?

(a) Pith
(b) Cortex
(c) Metaxylem
(d) Stele

Q14. Which of the following Articles of the Indian Constitution deals with Union Territories?

(a) Article 7
(b) Article 1
(c) Article 262
(d) Article 239

Q15. Which of the following players completed 12,000 runs in T20 cricket and became eighth player to achieve the milestone in April 2025?

(a) Ravindra Jadeja
(b) MS Dhoni

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(c) Rohit Sharma
(d) Virat Kohli

Q16. Which organisation published the 2025 edition of the 'State of the World's Nursing' report?
(a) International Labour Organization (ILO)
(b) World Bank
(c) UNICEF
(d) World Health Organization (WHO)

Q17. Birch and Rhododendrons are found in which kind of forests?
(a) Tropical Evergreen and Semi Evergreen forests
(b) Tropical Thorn forests
(c) Montane forests
(d) Littoral and Swamp forests

Q18. The Visuddhimagga, a key Buddhist text, was written by which of the following scholars?
(a) Nagarjuna
(b) Aryadeva
(c) Buddhaghosa
(d) Vasubandhu

Q19. Who among the following presented the First Five-Year Plan on July 9, 1951?
(a) Sardar Vallabhbhai Patel
(b) Rajendra Prasad
(c) Jawaharlal Nehru
(d) Purushottam Das Tandon

Q20. Which of the following is the first of eight Anti-Submarine Warfare Shallow Water Crafts (ASW SWCs) delivered to the Indian Navy on 8 May 2025?
(a) Arnala
(b) Kamorta
(c) Kadmatt
(d) Kiltan

Q21. After amalgamation of 26 Regional Rural Banks (RRBs) in fourth phase of amalgamation, as notified by Department of Financial Services (DFS) in 2025, how many RRBs will be left in the country?
(a) 25
(b) 28
(c) 18
(d) 21

Q22. In April 2025, a tri-services all women circumnavigation sailing expedition, 'Samudra Pradakshina' flagged off from:
(a) Durgapur
(b) Madurai
(c) Trivandrum
(d) Mumbai

Q23. The Kailasa Temple at Ellora is an example of which of the following types of architecture?
(a) Wooden architecture
(b) Rock-cut architecture
(c) Islamic architecture
(d) Colonial architecture

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Q24. In which of the following years did the Government of Bengal pass the Calcutta Electric Lighting Act?

(a) 1895
(b) 1900
(c) 1911
(d) 1904

Q25. During May 2025, the 4^(th) Europe-Africa Forum was organised in which location?

(a) Nice
(b) Marseille
(c) Lyon
(d) Paris

Q26. e-NAM is a key reform aimed at integrating agricultural markets in India. What is the primary goal of the e-NAM initiative?

(a) Crop insurance
(b) Minimum wage guarantee
(c) Online trading of agricultural produce
(d) Fertiliser subsidy

Q27. The RTI Act empowers citizens of India to seek information from which of the following?

(a) Private companies
(b) Foreign embassies
(c) Non-governmental organisations
(d) Government departments

Q28. Which programme was launched in 1953 to expand rural development more feasibly?

(a) National Extension Service (NES)
(b) Bharat Nirman Yojana
(c) Jawahar Rojgar Yojana
(d) Training for Rural Youth for Self-Employment

Q29. Which acid was first created from inorganic materials by Hermann Kolbe in 1845?

(a) Sulphuric acid
(b) Formic Acid
(c) Citric Acid
(d) Acetic Acid

Q30. Western disturbances mainly affect the weather of which region in India?

(a) North-West India
(b) Coastal Andhra Pradesh
(c) Eastern Ghats
(d) Deccan Plateau

Q31. Which of the following transportation systems was primarily developed in India to serve colonial economic interests?

(a) Inland waterways
(b) Metro rail
(c) Railways
(d) Airways

Q32. During the Indus Valley Civilisation, the presence of jewellery made from precious metals and semi-precious stones in small-town settings supports the argument that ____.

(a) the civilisation was ruled by autocratic priest-kings
(b) there was an equal access to material goods
(c) there was strong social stratification
(d) only the elite had access to luxury items.

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Q33. In 2025, ISRO sprouted which of the following seeds in space under microgravity conditions?

(a) Soya bean seeds
(b) Chickpea seed
(c) Cowpea seeds
(d) Kidney bean seeds

Q34. Which of the following groups of people is said to have migrated into the late Indus Valley era India from Central Asia?

(a) Dravidas
(b) Mesopotamians
(c) Aryans
(d) Shakas

Q35. What is the name of the indigenous electric trainer aircraft initiative launched by India in March 2025 to promote green aviation?

(a) Green Hawk
(b) E-HANSA
(c) Vayu
(d) Shakti

Q36. When was the historic Paris Agreement on climate change adopted by world leaders during the UN Climate Change Conference (COP21)?

(a) 1999
(b) 2005
(c) 2012
(d) 2015

Q37. Which of the following joint military exercises is conducted annually between the armies of India and Japan, with the sixth edition held near Mount Fuji in 2025?

(a) Maitree
(b) Shakti
(c) Indra
(d) Dharma Guardian

Q38. Christian Stalker is the Federal Chancellor of which country?

(a) Austria
(b) Finland
(c) Sweden
(d) Norway

Q39. The Right to Protection in respect of conviction for offences (including protection from double jeopardy and self-incrimination) is covered under:

(a) Article 22
(b) Article 20
(c) Article 23
(d) Article 21

Q40. Which type of weathering is primarily involved in the enrichment of bauxite and other ores?

(a) Mechanical weathering
(b) Glacial weathering
(c) Biological weathering
(d) Chemical weathering

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MATHEMATICS

Q41. The average runs scored by a batsman in 23 matches is 43. In the next 10 matches, the batsman scored an average of 16 runs. Find his average runs scored (rounded off to two decimal places) in all the 33 matches.

(a) 33.82
(b) 34.82
(c) 35.82
(d) 36.82

Q42. The value of √196 + √0.0361 - √7.29 is _____.

(a) 11.49
(b) 9.66
(c) 16.65
(d) 16.25

Q43. Five solid cubes, each of volume 39304 cm^3, are joined end to end to form a cuboid. What is the lateral surface area (in cm^2) of the cuboid?

(a) 13872
(b) 13838
(c) 13905
(d) 13877

Q44. Pipe A can fill a tank in 18 hours, pipe B can fill the same tank in 28 hours and pipe C can fill the same tank in 11 hours. The time taken by them to fill the same tank if they operate together is::

(a) 10247/505 hours
(b) 7247/505 hours
(c) 11247/505 hours
(d) 5247/505 hours

Q45. If P = tan θ + sec θ, then the value of tan θ is:

(a) $(P^2 + 1)/P$
(b) $(P^2 - 1)/(P + 1)$
(c) $(P^2 + 1)/2P$
(d) $(P^2 - 1)/2P$

Q46. Train A leaves station M at 6:25 AM and reaches station N at 3:25 PM on the same day. Train B leaves station N at 8:25 AM and reaches station M at 2:25 PM on the same day. Find the time when trains A and B meet.

(a) 11:43 AM
(b) 10:53 AM
(c) 12:13 PM
(d) 11:13 AM

Q47. The marks scored by 10 students are given below. 17, 19, 12, 20, 19, 14, 15, 18, 19, 14 The mode of the given data is:

(a) 20
(b) 12
(c) 17
(d) 19

Q48. If the sum of the interior angles of a regular polygon is equal to four times the sum of its exterior angles, then what is the number of diagonals in the polygon?

(a) 30
(b) 35
(c) 25
(d) 40

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Q49. Simplify: $x(2x - 3) + 2(x^2 - 4) + 16$

(a) $4x^2 - 3x + 8$
(b) $-4x^2 - 3x + 8$
(c) $4x^2 - 3x - 8$
(d) $-4x^2 - 3x - 8$

Q50. A dealer offers successive discounts of 15% and 12% on a refrigerator marked at Rs. 25,000. What is the final selling price?

(a) Rs. 18,900
(b) Rs. 18,700
(c) Rs. 19,000
(d) Rs. 18,800

Q51. I bought two pendants for Rs. 1,200. I sold the first one at a loss of 10% and the second at a gain of 14%. If, on the whole I made neither a loss nor a gain, find the cost price (in Rs.) of the first pendant.

(a) 724
(b) 684
(c) 720
(d) 700

Q52. Two pipes can fill a cistern, individually, in 36 min and 45 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 70 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) 20 min
(b) 28 min
(c) 8 min
(d) 44 min

Q53. The marked price of a shirt is Rs. 500. If the shopkeeper offers a 20% discount, what is the selling price of the shirt?

(a) Rs. 480
(b) Rs. 400
(c) Rs. 450
(d) Rs. 420

Q54. Ishaan and Meghna have to travel from Delhi to Kanpur in their respective cars. Ishaan is driving at 90 km/hr while Meghna is driving at 65 km/hr. Find the time taken by Meghna to reach Kanpur if Ishaan takes 13 hours.

(a) 21 hours
(b) 27 hours
(c) 23 hours
(d) 18 hours

Q55. The value of $4/3 + (1/(1+5/6)) - 5/4$ is

(a) 83/132
(b) 93/125
(c) 89/126
(d) 85/134

Q56. A number, when increased by 70%, gives 3400. The number is:

(a) 6000
(b) 4000
(c) 2000
(d) 1000

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Q57. If the third proportional of 8 and 20 be x, then what is the value of x?

(a) 48
(b) 52
(c) 50
(d) 47

Q58. Ritu, Sameer, and Isha invest Rs. 1,190, Rs. 1,060, and Rs. 1,350, respectively, to start a business. If the profit at the end of the year is Rs. 1,640, then what is the share of Isha in the profit?

(a) Rs. 613
(b) Rs. 614
(c) Rs. 617
(d) Rs. 615

Q59. The HCF and the LCM of two numbers are 17 and 1224, respectively. If one of the numbers is 136, find the other one.

(a) 85
(b) 102
(c) 153
(d) 119

Q60. Find the simple interest (in Rs.) on Rs. 4,000 at 7.5% per annum rate of interest deposited on 4 February 2024 and withdrawn on 5 April 2024.

(a) 50
(b) 49
(c) 48
(d) 51

Q61. If 3 times a mother's present age is 24 years more than 9 times her daughter's present age, and 4 times the daughter's present age is 2 years less than the mother's present age, then what is the difference (in years) between the ages of the mother and the daughter?

(a) 20
(b) 22
(c) 17
(d) 15

Q62. The LCM of the numbers 5.3 and 0.4 is:

(a) 0.212
(b) 212
(c) 21.2
(d) 2.12

Q63. The number 563607 is divisible by which of the following?

(a) 8
(b) 3
(c) 13
(d) 10

Q64. In an election between two candidates, 80% of the registered voters cast their vote and 19% of the votes polled were found invalid. The winning candidate got 70% of the valid votes and won the election by a margin of 1458 votes. How many voters were registered?

(a) 5625
(b) 5622
(c) 5627
(d) 5623

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Q65. Find the value of 95 ^(−17) ÷ 95 ^9 × 95 ^(−15)

(a) 95 ^(−49)
(b) 95 ^(−41)
(c) 95 ^(−35)
(d) 95 ^(−42)

Q66. The cost of 2 pens and 15 pencils is Rs. 286. If the cost of a pen decreases by Rs. 4 and the cost of a pencil increases by Rs. 2, then the cost of 17 pens and 3 pencils is Rs. 128. What is the original cost of 11 pens and 8 pencils?

(a) Rs. 229
(b) Rs. 228
(c) Rs. 232
(d) Rs. 235

Q67. Salman and Vivek together invested Rs. 33,900 in a business. At the end of the year, out of a total profit of Rs. 10,000, Vivek's share was Rs. 3,700. What was the difference between their investments?

(a) Rs. 8,814
(b) Rs. 9,547
(c) Rs. 8,840
(d) Rs. 9,551

Q68. Sapna invested Rs. 20,300 on simple interest, partly at the rate of 8% per annum and partly at the rate of 6% per annum. If she earns equal interests from the two investments after 6 years, then find the sum invested at the rate of 8% per annum (in Rs.).

(a) 8,699
(b) 8,697
(c) 8,702
(d) 8,700

Q69. The selling price of 10 books is equal to the cost price of 16 books. Find the loss or gain percentage on these books.

(a) 60% loss
(b) 100/6% loss
(c) 60% gain
(d) 100/6% gain

Q70. What is the surface area of a sphere of radius 8 cm? (use π = 3.14)

(a) 800.08cm²
(b) 801.18cm²
(c) 805.54cm²
(d) 803.84cm²

GENERAL INTELLIGENCE AND REASONING

Q71. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

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

(45, 80, 5)

(39, 30, 24)

(a) (45, 72, 9)
(b) (15, 10, 11)
(c) (27, 6, 25)
(d) (15, 0, 16)

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Q72. 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) GJP
(b) KNT
(c) QIA
(d) ORX

Q73. All 79 students in a class are standing in a row facing north. Shantanu is 37^(th) from the right end while Vani is 23^(rd) from the left end. How many people stand between Shantanu and Vani?

(a) 20
(b) 21
(c) 18
(d) 19

Q74. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only four boxes are kept between F and A. Only B is kept above F. Only two boxes are kept between G and E. D is kept immediately above C. E is not kept immediately above D. How many boxes are kept between E and F?

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

Q75. IGBF is related to OMHL in a certain way based on the English alphabetical order. In the same way, KIDH is related to QOJN. To which of the given options is MKFJ related, following the same logic?

(a) SQLP
(b) QSLP
(c) QSPL
(d) SQPL

Q76. 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 numbersonly.)

(Left) 6 2 & % 5 9 # 8 $ 7 + Ω @ 1 * £ 3 4 (Right)

How many such symbols are there each of which is immediately preceded by another symbol and also immediately followed by a number?

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

Q77. In a certain code language, ‘life is mysterious’ is coded as ‘qr gt ob’ and ‘give his life’ is coded as ‘ob ft rd’. How is ‘life’ coded in the given language?

(a) ft
(b) rd
(c) qr
(d) ob

Q78. In a certain code language, ‘PEST’ is coded as ‘4597’ and ‘HEPS’ is coded as ‘7654’. What is the code for ‘H’ in the given code language?

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

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Q79. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

BGS 153, XLO 142, TQK 131, PVG 120, LAC 109, ?

(a) FHA 98
(b) GDZ 101
(c) IDX 101
(d) HFY 98

Q80. Read the given statement(s) 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 conclusion(s) logically follow(s) from the statement(s).

Statements:

All Wolves are Rhinoceroses.

No Rhinoceroses are Kangaroos.

Conclusions:

I: No Kangaroos are Wolves.

II: Some Kangaroos are Wolves.

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

Q81. 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) MOK
(b) OQM
(c) OSP
(d) DFB

Q82. Seven boxes, A, B, C, D, K, L and O, are kept one over the other, but not necessarily in the same order. Only two boxes are kept below O. Only one box is kept above L. Only one box is kept between L and D. C is kept immediately above K. A is kept at some place below B. How many boxes are kept between B and C?

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

Q83. What will come in the place of the question mark (?) in the following equation, if '+' and '−' are interchanged and '×' and '÷' are interchanged?

$25 - 9 \times 3 + 4 \div 2 = ?$

(a) 20
(b) 17
(c) 19
(d) 18

Q84. What should come in place of the question mark (?) in the given series?

991 990 992 991 993 992 994 ?

(a) 993
(b) 996
(c) 995
(d) 992

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Q85. 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 doors are carpets.

No carpet is a mat.

Conclusions:

(I) No door is a mat.

(II) No mat is a carpet.

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

Q86. B is the brother of A. A is the wife of C. C is the father of K. K is the mother of S. How is B related to S?

(a) Mother's mother's sister
(b) Mother's sister's daughter
(c) Mother's mother's brother
(d) Mother's sister's son

Q87. Vignesh starts from Point Y and drives 17 km towards south. He then takes a left turn, drives 25 km. He then turns right and drives 9 km. He takes a final right turn, drives 25 km and stops at Point Z. How far (shortest distance) and towards which direction should he drive in order to reach Point Y again? (All turns are 90° turns only unless specified.)

(a) 26 km towards east
(b) 26 km towards north
(c) 19 km towards south
(d) 13 km towards west

Q88. What will come in place of the question mark (?) in the following equation, if '+' and '−' are interchanged and '×' and '÷' are interchanged?

$12 \div 6 + 28 \times 4 - 11 = ?$

(a) 72
(b) 76
(c) 74
(d) 78

Q89. L, M, N, O, Q, R and S are sitting around a circular table, facing the centre of the table. Only two people sit between O and R when counted from the right of O. Only two people sit between R and M. Only three people sit between O and N. L sits to the immediate left of Q. Who sits third to the left of S?

(a) Q
(b) R
(c) L
(d) N

Q90. Each of the digits in the number 5936814 is arranged in ascending order from left to right. What will be the sum of the digits which are second from the left and fourth from the right in the new number thus formed?

(a) 13
(b) 9
(c) 11
(d) 8

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Q91. Nilesh starts from Point Y and drives 17 km towards the north. He then takes a left turn and drives 31 km, then turns left and drives 45 km. He then takes a right turn and drives 23 km. He takes a right turn, drives 28 km and stops at Point Z. How far (shortest distance) and in which direction should he drive in order to reach Point Y again? (All turns are 90-degree turns only unless specified.)

(a) 61 km towards the west
(b) 58 km towards the west
(c) 54 km towards the east
(d) 49 km towards the east

Q92. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

DKC ZGY ? RYQ NUM

(a) UDU
(b) VCV
(c) VCU
(d) VDU

Q93. What should come in place of the question mark (?) in the given series?

112 101 90 79 68 ?

(a) 56
(b) 54
(c) 55
(d) 57

Q94. 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) MC - PY
(b) YV - CR
(c) PF - SB
(d) JB - MX

Q95. If 2 is added to each even digit and 1 is subtracted from each odd digit in the number 9524367, then how many digits will appear more than once in the new number thus formed?

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

Q96. Seven people, A, B, C, D, P, Q and R, are sitting in a row, facing north.

Only two people sit to the left of B. Only three people sit between B and Q. Only one person sits between Q and P. D sits to the immediate left of C. R is not an immediate neighbour of Q.

How many people sit to the right of A?

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

Q97. 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.

RUST - URST - RSTU

KITE - IKTE - KTEI

(a) MINK - IMNK - KINM
(b) MANY - AMNY - MNYA
(c) SPOT - PSOT - POTS

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(d) VEIN - VIEN - NIEV

Q98. Select the pair that follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

SDF : RCE

MVZ : LUY

(a) BGJ : AFI
(b) RTY : SZU
(c) ADH : BFJ
(d) CNR : DOS

Q99. This question is based on the five, three-digit numbers given below.

(Left) 538 745 317 853 276 (Right)

(Example- 697 – First digit = 6, second digit = 9 and third digit = 7)

(NOTE: All operations to be done from left to right.)

What will be the resultant if the third digit of the highest number is added to the second digit of the lowest number?

(a) 9
(b) 8
(c) 11
(d) 10

Q100. What should come in place of the question mark (?) in the given series?

4 8 24 96 ? 2880

(a) 240
(b) 410
(c) 480
(d) 320

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (b) TISCO

The correct answer is TISCO.

Key Points

• TISCO (Tata Iron and Steel Company Limited), now known as Tata Steel Limited, is a private sector organization in India. It was established in 1907 by the Tata Group and is one of the largest steel-producing companies in the world.

• Being part of the private sector, TISCO is owned and managed by private entities, specifically the Tata Group, which is a well-known conglomerate in India. Hence, it is distinct from public sector undertakings that are owned and operated by the government.

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• SAIL (Steel Authority of India Limited), ONGC (Oil and Natural Gas Corporation), and Indian Railways are public sector organizations. They are either government-owned or controlled and fall under the direct administrative purview of the Government of India.

• SAIL is a public sector company under the Ministry of Steel, while ONGC functions under the Ministry of Petroleum and Natural Gas. Indian Railways is a government department under the Ministry of Railways and is entirely state-owned. Hence, these organizations are not private sector entities.

• The private sector in India comprises businesses that are owned and operated by individuals or private organizations, as opposed to the public sector, which is state-controlled. TISCO is a classic example of a private sector organization in India.

• Thus, the correct answer is TISCO.

Additional Information

• About TISCO (Tata Steel Limited):

• Founded: 1907 in Jamshedpur, Jharkhand.

• Founder: Jamsetji Tata, a visionary industrialist.

• Operations: Tata Steel is one of the largest steel-producing companies globally. It operates in 26 countries and has a commercial presence in over 50 countries.

• Significance: It is one of the first private companies in India to establish a large-scale industrial setup.

• Features: Known for its sustainable practices, Tata Steel focuses on innovation, technology, and corporate social responsibility.

• About SAIL (Steel Authority of India Limited):

• Founded: 1973, headquartered in New Delhi.

• Type: Public Sector Undertaking (PSU) under the Ministry of Steel.

• Functions: Engaged in the production and marketing of steel and related products. It is one of the largest steel-making companies in India.

• About ONGC (Oil and Natural Gas Corporation):

• Founded: 1956, headquartered in Dehradun, Uttarakhand.

• Type: Public Sector Undertaking under the Ministry of Petroleum and Natural Gas.

• Functions: Responsible for exploration, production, and distribution of oil and natural gas. It is a significant contributor to India's energy needs.

• About Indian Railways:

• Established: 1853, with the first train running between Mumbai and Thane.

• Type: A Government of India entity under the Ministry of Railways.

• Significance: One of the largest rail networks in the world, Indian Railways serves millions of passengers daily and is essential for freight movement.

Important Points

• Private vs Public Sector:

• The private sector is run by private individuals or companies, focusing on profit generation, innovation, and competitive practices. Examples include Tata Steel, Reliance Industries, and Infosys.

• The public sector, on the other hand, is government-owned and operates to serve public interests, focusing on essential services and development. Examples include SAIL, ONGC, and Indian Railways.

• Tata Group:

• A renowned Indian conglomerate with global reach, founded in 1868.

• It operates in diverse industries such as steel, automotive, hospitality, technology, and more.

• Known for its contributions to India's industrial development.

Q2. Answer: (c) Nagaland

The correct answer is Nagaland.

Key Points

• Article 371A of the Constitution of India provides special provisions to the state of Nagaland due to its unique customary laws, social practices, and land ownership practices.

• Under this Article, the Parliament cannot legislate on matters related to religious or social practices, Naga customary law and procedure, or ownership and transfer of land and resources without the consent of the state's Legislative Assembly.

• This provision ensures that the unique identity and traditions of the Naga people are preserved and respected within the framework of Indian law.

• The Naga customary laws are deeply rooted in their culture and govern various aspects such as inheritance, marriage, and dispute resolution, making Article 371A essential for safeguarding their way of life.

• The special provisions also include exemptions from certain laws related to ownership and transfer of natural resources, which

align with the Naga people's traditional practices. Hence, the correct answer is Nagaland.

Additional Information

• Article 371A:

• Article 371A was introduced through the 13th Amendment Act, 1962, which was enacted when Nagaland became a full-fledged state.

• It provides Nagaland with the authority to decide matters related to its customary laws, traditions, and practices, which are distinct from the rest of India.

• Naga Customary Laws:

• These laws govern family, property, and social practices. They are unwritten but are followed strictly by Naga tribes.

• Examples include the inheritance system, where property may pass through matrilineal or patrilineal lines depending on the tribe.

• Special Provisions under Article 371A:

• No act of Parliament affecting religious or social practices of Nagas, their customary laws, or ownership and transfer of land can apply without approval from the Nagaland Legislative Assembly.

• This includes laws related to control over natural resources, ensuring the community retains control over its land and resources.

Important Points

• Other States with Special Provisions:

• Article 371B: Provides special provisions for Assam to address tribal representation in the state legislature.

• Article 371C: Offers special provisions for Manipur, particularly concerning the administration of its hill areas.

• Article 371F: Includes provisions specific to Sikkim, particularly its integration into India and protection of its unique status.

• Historical Context:

• Nagaland: Became a state in 1963 following the Naga movement for autonomy and preservation of their identity.

• 13th Amendment Act: This amendment introduced Article 371A, marking the beginning of Nagaland's special status within India.

Q3. Answer: (c) Lieutenant Colonel Tytler

The correct answer is Lieutenant Colonel Tytler.

Key Points

• Lieutenant Colonel Tytler sent a telegram on 6 August 1857 during the Indian Rebellion of 1857, describing the dire situation of British forces.

• The telegram stated, "Our men are cowed by the numbers opposed to them and the endless fighting. Every village is held against us, the zamindars have risen to oppose us," highlighting the widespread resistance faced by the British army.

• 1857 was marked by the first significant uprising against British rule in India. The rebellion was characterized by widespread dissatisfaction among sepoys, peasants, and zamindars.Hence, Lieutenant Colonel Tytler is the correct answer.

• Lieutenant Colonel Tytler was a British officer who witnessed the rebellion firsthand and documented the challenges faced by the British forces. His telegram provided critical insight into the morale and difficulties of British troops.

• The telegram emphasized the role of zamindars (landowners) in the uprising, who actively resisted British forces, showcasing the widespread nature of the rebellion. Hence, statement is correct.

Additional Information

• Indian Rebellion of 1857:

• Also known as the Sepoy Mutiny, the rebellion began as a revolt by Indian soldiers in the British army but soon expanded to include civilians, zamindars, and rulers.

• The immediate cause was the introduction of the Enfield rifle, which required the use of cartridges believed to be greased with cow and pig fat, offending both Hindus and Muslims.

• Role of Zamindars:

• Zamindars, who were landowners, played a significant role in the rebellion. Many opposed British policies like the Doctrine of Lapse and changes in land revenue systems.

• Their resistance was fueled by economic exploitation and loss of traditional privileges under British rule.

• Impact of the Rebellion:

• The rebellion exposed weaknesses in British administration and led to the eventual dissolution of the East India Company.

• Post-rebellion, governance of India was transferred to the British Crown under the Government of India Act, 1858.

Important Points

• Key Historical Figures:

• Lieutenant Colonel Tytler: Known for his detailed accounts of the rebellion and the challenges faced by British forces.

• Lord Cornwallis: Associated with reforms like the Permanent Settlement in Bengal, but he was not related to the events of 1857.

• Robert Clive: Played a pivotal role in the foundation of British rule in India but was active in the 18th century.

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• William Lambton: A British surveyor associated with the Great Trigonometric Survey of India, unrelated to the rebellion.

• Legacy of 1857:

• The rebellion marked the beginning of Indian nationalism and sowed the seeds for future independence movements.

• It led to reforms in the British administration, including changes in the army to prevent similar uprisings.

Q4. Answer: (a) American Standard Code for Information Interchange

The correct answer is American Standard Code for Information Interchange.

Key Points

• ASCII stands for the American Standard Code for Information Interchange. It is a character encoding standard that is used in computers, communication equipment, and other devices to represent text. Hence, the correct answer is American Standard Code for Information Interchange.

• ASCII uses a 7-bit binary code to represent characters, allowing it to encode 128 unique characters. These include letters (both uppercase and lowercase), digits, punctuation marks, control characters, and some special symbols.

• It was first developed in the 1960s and became a widely accepted standard, especially in early computer systems and networks.

• ASCII serves as a foundation for many modern character encoding systems, such as Unicode, which extends ASCII to include characters from multiple languages and scripts. Hence, ASCII remains a critical component in computing.

• ASCII is used primarily to represent English characters and symbols, making it less suitable for languages with larger character sets. However, it remains relevant for basic text representation and communication protocols. Hence, this explanation validates the importance of ASCII.

Additional Information

• Characteristics of ASCII:

• 7-bit encoding: ASCII uses 7 bits to encode characters, making it capable of representing 128 characters. These include:

• Control characters like Carriage Return (CR) and Line Feed (LF).

• Printable characters such as letters, digits, and punctuation.

• Standardization: ASCII was standardized by the American National Standards Institute (ANSI) in the 1960s, ensuring compatibility across different devices and systems.

• Applications of ASCII:

• Text Representation: ASCII is widely used to represent text in programming languages like C, Python, and Java.

• Communication Protocols: ASCII is integral to protocols like HTTP, FTP, and SMTP, where data is exchanged in text format.

• File Formats: ASCII is used in plain text files and programming scripts.

• Evolution of ASCII:

• Extended ASCII: To overcome the limitations of 128 characters, Extended ASCII was introduced, which uses 8 bits to represent 256 characters.

• Unicode: Modern encoding systems like Unicode are built on ASCII, extending its capabilities to include thousands of characters from multiple languages and scripts.

• Compatibility: ASCII is still compatible with modern systems, making it a foundational encoding standard.

Important Points

• Key Developments:

• 1963: The first version of ASCII was published, containing control characters and printable characters.

• 1967: ASCII was revised to include lowercase letters and some additional control characters.

• Use Cases:

• Software Development: ASCII is used in developing applications and systems that require text processing.

• Web Development: ASCII is integral to encoding text in HTML, XML, and other web technologies.

• Data Transmission: ASCII is widely used in electronic communication systems for encoding text data.

Q5. Answer: (b) WTT Contender Tunis 2025

The correct answer is WTT Contender Tunis 2025.

Key Points

• Indian table tennis players Manush Shah and Diya Chitale clinched the Mixed Doubles title at the WTT Contender Tunis 2025, demonstrating exceptional teamwork and skill.

• The WTT Contender Tunis is part of the World Table Tennis (WTT) series, which is a prestigious international table tennis tournament organized to showcase talent from across the globe.

• The victory by the Indian pair is a significant achievement as it highlights India's growing prominence in the global table tennis arena. Hence, this statement is correct.

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• This tournament sees participation from top-ranked players worldwide, making the win a milestone for Indian table tennis. Thus, the correct answer is option 2.

Additional Information

• About WTT Contender Tunis:

• The WTT Contender Series is a part of the World Table Tennis circuit and serves as a platform for rising stars and experienced players to compete at a high level.

• The tournament is held in Tunis, Tunisia, and attracts global attention for its competitive matches and excellent organization.

• It is known for its mixed doubles events, singles, and doubles matches, which feature a mix of seasoned players and upcoming talents.

• Achievements of Manush Shah and Diya Chitale:

• Manush Shah: A talented Indian table tennis player known for his remarkable skills in doubles and mixed doubles formats.

• Diya Chitale: A young Indian table tennis star who has been consistently performing well in both national and international tournaments.

• Their victory in the WTT Contender Tunis 2025 highlights their excellent coordination and strategy in the mixed doubles format.

• World Table Tennis (WTT) Series:

• The WTT series was launched to revamp and modernize professional table tennis and provide players with better opportunities to compete globally.

• It consists of various tournaments like WTT Contender, WTT Star Contender, and WTT Grand Smash, each catering to different levels of expertise.

Important Points

• Indian Table Tennis Growth:

• India has been making significant strides in table tennis with players like Manush Shah, Diya Chitale, and others achieving remarkable success.

• Recent victories in international tournaments are boosting India's reputation as a competitive force in the sport.

• The Table Tennis Federation of India (TTFI) is actively supporting players with better training facilities and exposure to global events.

• Global Impact of WTT Events:

• The WTT events aim to globalize table tennis and provide opportunities for players from diverse backgrounds to compete on an international stage.

• Such tournaments play a key role in fostering unity and sportsmanship among nations.

Q6. Answer: (a) 3.62%

The correct answer is 3.62%.

Key Points

• Sodium hypochlorite is the active ingredient in most commercial bleaching solutions.

• It is typically present in a concentration of 3.62% in commercial bleach formulations, which makes it effective for cleaning, disinfecting, and whitening.

• Mass percentage refers to the amount of a specific compound in a mixture expressed as a percentage of the total mass. In this case, the mass percentage of sodium hypochlorite is calculated based on its concentration in the solution. Hence, the correct concentration is 3.62%.

• Other options such as 0.0546, 0.0257, and 0.1085 are incorrect as they are not representative of the typical concentration of sodium hypochlorite in commercial bleaching solutions. These values might refer to other formulations or diluted solutions. Hence, these options are incorrect.

• Commercial bleach is designed to provide a balance between cleaning efficacy and safety, and the 3.62% concentration is ideal for household purposes. Hence, 3.62% is the correct answer.

Additional Information

• Sodium Hypochlorite:

• Sodium hypochlorite is a chemical compound with the formula NaOCl. It is widely used as a bleaching agent and disinfectant in household and industrial applications.

• It is commonly found in liquid bleach and is known for its ability to remove stains, disinfect surfaces, and whiten fabrics.

• Concentration in Commercial Bleach:

• The typical concentration of sodium hypochlorite in commercial bleach is 3.62%. This is a carefully calculated amount to ensure effective cleaning while minimizing risks to users.

• Higher concentrations may be used in industrial applications, but for household purposes, this concentration is safe and effective.

• Uses of Sodium Hypochlorite:

• It is used for disinfecting surfaces in homes, hospitals, and laboratories.

• It is also employed in water treatment to kill bacteria and other pathogens.

• In laundry, it acts as a bleaching agent, removing stains and whitening clothes.

• Safety Considerations:

• While effective, sodium hypochlorite must be used with caution, as it can cause irritation to the skin and eyes. Proper ventilation and protective gear are recommended during use.

• Storage: It should be stored in a cool, dry place away from direct sunlight to prevent decomposition.

Important Points

• Concentration Variations:

• Commercial bleach typically contains 3.62% sodium hypochlorite, while industrial-grade bleach may have higher concentrations, such as 10–12%.

• Diluted solutions are available for specific applications, such as sanitizing water or cleaning delicate fabrics.

• Environmental Impact:

• Sodium hypochlorite can release harmful chlorine gas if mixed with acidic or ammonia-based cleaners.

• Proper disposal is necessary to prevent water pollution and harm to aquatic life.

Q7. Answer: (d) Bombay

The correct answer is Bombay.

Key Points

• Paramhansa Mandali was founded in 1849 in the city of Bombay (now Mumbai).

• It was one of the earliest socio-religious reform movements in India, aimed at challenging the prevailing caste system and promoting equality.

• The founders of the Paramhansa Mandali included prominent reformers like Dadoba Pandurang, Mehtaji Durgaram, and others who were inspired by Enlightenment ideals.

• The organization worked to abolish caste discrimination, questioned the orthodox Hindu practices, and emphasized the importance of education and rational thinking.

• They held secret meetings to discuss reforms and promote social equality, as their ideas often met resistance from orthodox groups.

• The Mandali encouraged inter-caste dining and rejected untouchability, which were revolutionary ideas during that period.

• Their efforts laid the foundation for later social reform movements in India and inspired other leaders to challenge social orthodoxy.

Additional Information

• Significance of Paramhansa Mandali:

• The movement emerged in the backdrop of Brahmo Samaj and other reform movements, which were gaining momentum in India.

• It was one of the earliest attempts to address the entrenched caste system, centuries before national leaders like Mahatma Gandhi and Dr. B.R. Ambedkar fought against caste discrimination.

• The Mandali's progressive stance on women's education and their opposition to child marriage were ahead of their time.

• Key Members:

• Dadoba Pandurang: A key figure in the Mandali who emphasized the need for rationality and education to reform society.

• Mehtaji Durgaram: Another prominent member who was instrumental in challenging superstitions and advocating for social equality.

• Similar Movements:

• Brahmo Samaj: Founded by Raja Ram Mohan Roy, it focused on abolishing practices like sati and child marriage while promoting widow remarriage and women's education.

• Prarthana Samaj: Established later in Bombay, it carried forward the legacy of Paramhansa Mandali in promoting caste equality and social reforms.

Important Points

• Historical Context:

• During the 19th century, India witnessed significant social reform movements due to the influence of Western education and ideas.

• Movements like Paramhansa Mandali aimed to modernize Indian society by addressing issues like caste discrimination, superstitions, and gender inequality.

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• Legacy:

• The Paramhansa Mandali is remembered for its pioneering role in laying the foundation for future social reform movements in India.

• It inspired later reformers like Jyotirao Phule, who carried forward the fight against caste discrimination and social injustice.

Q8. Answer: (b) Zorawar

The correct answer is Zorawar.

Key Points

• The Indian Light Tank Zorawar achieved a major milestone during high-altitude firing trials conducted in December 2024. This demonstrates its capability to operate effectively in extreme weather and challenging terrains.

• Named after General Zorawar Singh, a legendary military leader known for his campaigns in high-altitude regions, the tank has been specifically designed to tackle operational challenges in mountainous regions like the Himalayas.

• The tank's lightweight design, advanced firing systems, and mobility make it suitable for deployment in areas with limited infrastructure and harsh weather conditions. Hence, statement is correct.

• Zorawar is equipped with state-of-the-art technology, including advanced sensors, communication systems, and weaponry, ensuring its operational effectiveness in high-altitude warfare.

• The tank is a product of India's defense indigenization efforts, developed under the Make in India initiative, which emphasizes self-reliance in defense manufacturing. Hence, this is correct.

• Its development aligns with India’s strategic military requirements to counter threats in regions like Ladakh, Arunachal Pradesh, and other sensitive areas along the borders with China and Pakistan.

• The successful high-altitude firing trials validate the tank’s operational capabilities and readiness for deployment in real-world scenarios. Hence, this is correct.

Additional Information

• General Zorawar Singh:

• General Zorawar Singh was a military leader known for his campaigns in the Himalayas during the 19th century. The tank is named after him to honor his legacy and strategic expertise in high-altitude warfare.

• His ability to conduct military operations in extreme conditions serves as an inspiration for the tank’s design and operational philosophy.

• Features of Zorawar Light Tank:

• The tank is equipped with advanced weapon systems, including a high-caliber main gun and secondary armaments, ensuring superior firepower.

• It utilizes modern communication systems for seamless coordination with other units during operations.

• Its lightweight design ensures high mobility in challenging terrains, making it an ideal choice for deployment in mountainous and high-altitude regions.

• Strategic Importance:

• The Zorawar Light Tank addresses India’s need for specialized military equipment to counter threats in regions like Ladakh and Arunachal Pradesh.

• Its indigenization strengthens India’s defense capabilities and reduces reliance on foreign imports.

• The tank’s deployment is expected to enhance India’s operational readiness and effectiveness in high-altitude warfare scenarios.

Important Points

• Light Tanks in Modern Warfare:

• Light tanks are designed for mobility, speed, and adaptability, making them ideal for reconnaissance and operations in regions with limited infrastructure.

• Countries like India, Russia, and China are investing in light tanks to address specific strategic needs in high-altitude and urban warfare scenarios.

• Indigenization in Defense:

• India’s Make in India initiative emphasizes self-reliance in defense manufacturing, reducing dependency on foreign imports and fostering technological innovation.

• The development of Zorawar is an example of India’s commitment to enhancing its defense capabilities through indigenous solutions.

Q9. Answer: (c) Sikkim and Telangana

The correct answer is Sikkim and Telangana.

Key Points

• India Justice Report: The India Justice Report is an analytical study that assesses the justice delivery system in India. It covers key aspects like police, judiciary, prisons, and legal aid across states.

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• According to the India Justice Report 2025, Sikkim and Telangana have the highest share of women judges at the High Court level, recorded at 33%.

• The presence of a higher percentage of women judges indicates greater gender diversity and inclusivity in the judiciary system, which plays a crucial role in ensuring equality in justice delivery. Hence, this statement is correct.

• Sikkim: Known for its progressive policies and small judiciary system, Sikkim has consistently focused on promoting gender equality. The state has set an example in achieving a significant representation of women in the judiciary.

• Telangana: A newly formed state (created in 2014), Telangana has taken proactive steps to ensure diversity in all sectors, including the judiciary. Its achievement of 33% women judges at the High Court level is noteworthy. Hence, statement about Telangana is correct.

• Other states like Kerala, Andhra Pradesh, Uttar Pradesh, Odisha, Chhattisgarh, and Madhya Pradesh have lower percentages of women judges compared to Sikkim and Telangana.

• Hence, the correct answer is Sikkim and Telangana.

Additional Information

• India Justice Report:

• The report evaluates the justice system based on data-driven insights. It covers aspects such as gender diversity, budget allocation, recruitment, and infrastructure in judiciary, police, prisons, and legal aid.

• The report aims to highlight gaps and suggest reforms to improve justice delivery across states and Union Territories.

• Gender Diversity in Judiciary:

• Gender diversity in the judiciary is crucial to ensure equitable representation and foster inclusive decision-making.

• States like Sikkim and Telangana have achieved significant milestones by appointing 33% women judges at the High Court level.

• Example: Sikkim, despite being a small state, has taken progressive steps toward gender equality, while Telangana has focused on reforms post its creation in 2014.

• Challenges in Achieving Diversity:

• Many states struggle to increase the percentage of women judges due to gender biases, limited opportunities, and lack of targeted policies.

• Improving gender diversity requires proactive measures such as reservation policies, recruitment drives, and awareness campaigns.

Important Points

• Key Facts:

• The India Justice Report is published by Tata Trusts, in collaboration with partners like Centre for Social Justice, Common Cause, and others.

• The report uses data collected from official government sources, including judiciary statistics and reports.

• Steps to Improve Gender Representation:

• Judicial Appointments: States should focus on increasing appointments of women judges through targeted recruitment policies.

• Training and Awareness: Conduct workshops and awareness programs to encourage women to pursue careers in the judiciary.

• Policy Reforms: Introduce reforms that mandate a minimum percentage of women in judicial positions.

Q10. Answer: (d) Right-click Desktop → New → Folder

The correct answer is Right-click Desktop → New → Folder.

Key Points

• Step-by-step process:

• Right-click on the Desktop: To create a new folder directly on the Desktop, you need to position your cursor anywhere on the Desktop screen and right-click. This action opens a context menu.

• Select the "New" option: From the context menu, hover your cursor over the "New" option. This will expand another submenu containing various creation options.

• Click on "Folder": In the expanded submenu, click on "Folder." This instantly creates a new folder on the Desktop with the default name "New Folder."

• Rename the folder: Once the folder is created, the text box for renaming it will appear automatically. You can type your preferred name and press Enter to save it.

• The provided sequence is the simplest and most direct way to create a folder on the Desktop. It does not require navigating through additional tools or software. Hence, the correct answer is Right-click Desktop → New → Folder.

• Incorrect options:

• Option 1: "Right-click Taskbar → Select Folder → Press Enter" is incorrect because folders cannot be created directly from the taskbar. The taskbar is used for navigation and managing applications, not creating files or folders.

• Option 2: "Click Start → Settings → New → Folder" is incorrect because the Start menu and Settings are used for system

configurations, not file or folder creation.

• Option 3: "Open File Explorer → Right-click Desktop → New Folder" partially works, but it involves unnecessary steps. You can directly create a folder on the Desktop without opening File Explorer.

Additional Information

• Purpose of creating folders:

• Organization: Folders help in organizing files and documents systematically, making it easier to access and manage data.

• Storage: They provide dedicated spaces to store multiple files, reducing clutter on the Desktop or within drives.

• Features of the "New Folder" option:

• Default name: When a new folder is created, it is assigned the default name "New Folder," which can be renamed instantly.

• Customization: You can change the folder's name, icon, and location as per your requirements.

• Examples:

• Personal use: Creating folders for storing photos, videos, or personal documents.

• Professional use: Organizing projects, reports, or work-related files into separate folders for better management.

Important Points

• Folder creation shortcuts:

• Use the keyboard shortcut Ctrl + Shift + N to create a new folder directly on the Desktop or in File Explorer.

• This shortcut eliminates the need for right-clicking and navigating through menus.

• File Explorer functionality:

• File Explorer allows users to create folders within drives, subfolders, or any accessible directory.

• Users can also drag and drop files into newly created folders for quick organization.

Q11. Answer: (a) Official language

The correct answer is Official language..

Key Points

• Population distribution in India is primarily influenced by geographical, environmental, and socio-economic factors. These factors include climate, soil fertility, and topography, which directly impact human settlement patterns.

• Climate: Favorable climatic conditions such as moderate temperatures, adequate rainfall, and a comfortable living environment attract more people to settle. Regions with extreme climates, such as deserts or high-altitude areas, are sparsely populated. Hence, climate directly influences population distribution.

• Soil fertility: Fertile soils are critical for agriculture, which forms the backbone of rural livelihoods in India. Areas such as the Indo-Gangetic plains are densely populated due to highly fertile soil, supporting intensive farming. Hence, soil fertility directly impacts population distribution.

• Topography: Regions with favorable topographical features, such as plains and valleys, support human settlement and economic activities. Conversely, mountainous regions and terrains are less populated due to challenges in accessibility, infrastructure, and agriculture. Hence, topography directly influences population distribution.

• Official language: While language plays a role in socio-cultural integration, it does not directly impact population distribution. People settle in areas based on economic opportunities, geographical features, and climate rather than the official language. Hence, official language does not directly influence population distribution.

Additional Information

• Factors influencing population distribution:

• Climate: Regions with moderate climate, such as coastal areas and river valleys, attract higher population densities due to comfort and agricultural suitability.

• Soil fertility: Fertile regions such as the Indo-Gangetic plains and delta areas support intensive agriculture, encouraging dense settlement.

• Topography: Plains and valleys are highly populated due to ease of infrastructure development and agriculture, while hilly and desert areas remain sparsely populated.

• India's official language:

• India has 22 official languages listed under the Eighth Schedule of the Constitution, with Hindi and English being widely used for official purposes.

• Language influences cultural identity and communication, but it does not directly determine population settlement patterns.

• Examples of population distribution:

• Dense population: Indo-Gangetic plains (due to fertile soil and favorable climate).

• Sparse population: Thar Desert (due to arid climate), Himalayan region (due to rugged topography).

Important Points

• Population density in India:

• India's population density varies widely across regions. For example, Bihar has the highest population density, while Arunachal Pradesh has one of the lowest.

• Factors such as economic opportunities, infrastructure, and geography play a significant role in determining population density.

• Role of government policies:

• Urbanization: Government initiatives to develop urban infrastructure influence migration and settlement patterns.

• Rural development: Programs like MNREGA aim to improve living conditions in rural areas, indirectly impacting population distribution.

Q12. Answer: (c) Pakistan

The correct answer is Pakistan.

Key Points

• Article 6 of the Constitution of India deals with the rights of persons who migrated to India from Pakistan. This article was included to address the situation following the partition of India in 1947.

• It provides citizenship rights to those who migrated to India from Pakistan before July 19, 1948, and have been residing in India since their migration. Hence, this is correct.

• For those who migrated after this date, they were required to register themselves as citizens of India under the conditions prescribed by the Government of India. This is the correct provision.

• Article 6 primarily aimed to provide clarity on the legal status of individuals who were affected by the partition, ensuring that those who migrated due to religious persecution or other reasons were granted citizenship in independent India.

• The article also specifies that any person who had migrated from Pakistan but returned to Pakistan after March 1, 1947, would not be considered a citizen unless they re-migrated and fulfilled the conditions of registration. This ensures clarity in citizenship rights.

Additional Information

• Partition of India and Migration:

• Partition of India in 1947 led to the formation of two nations: India and Pakistan. This resulted in a large-scale migration of people across the newly formed borders.

• Millions of people, especially Hindus and Sikhs from Pakistan and Muslims from India, migrated during this period due to communal violence and insecurity.

• Citizenship Provisions in the Indian Constitution:

• Apart from Article 6, other articles related to citizenship include:

• Article 5: Citizenship at the commencement of the Constitution for people domiciled in India.

• Article 7: Deals with the rights of persons who migrated to Pakistan but later returned to India.

• Article 8: Grants citizenship to people of Indian origin residing outside India.

• Important Developments:

• The Indian Citizenship Act of 1955 further elaborates on the principles mentioned in these articles and provides mechanisms for acquiring, renouncing, and terminating Indian citizenship.

• The challenges of migration and citizenship during partition were addressed through legal frameworks to ensure justice and clarity for affected individuals.

Important Points

• Key Legal Considerations:

• The provision under Article 6 ensures that persons migrating from Pakistan are provided legal recognition, provided they meet the specified conditions for citizenship.

• This article reflects the socio-political realities of the time, acknowledging the massive displacement and migration caused by partition.

• Impact of Article 6:

• Article 6 played a significant role in stabilizing the lives of migrants from Pakistan and granting them equal rights as Indian citizens.

• It highlights India's commitment to providing justice and equality to those displaced during one of the most challenging periods in its history.

Q13. Answer: (a) Pith

The correct answer is Pith.

Key Points

• Pith is a central region in the stem and roots of vascular plants, primarily composed of spongy parenchyma cells. These cells are

soft and play an essential role in storing and transporting nutrients within the plant.

• The primary function of the pith is to store food and water for the plant. It also helps in the transport of nutrients to other parts of the plant.

• The pith is located at the center of the stem and is surrounded by the vascular tissue. This tissue includes xylem and phloem, which are responsible for water and nutrient transportation. Hence, the pith is the correct region for nutrient storage.

• Parenchyma cells within the pith are characterized by their thin walls and ability to divide. They are versatile and can adapt to various functions like storage, photosynthesis, and wound healing.

• The pith is highly important for young stems and roots, where it plays a vital role in providing structural support due to its spongy nature. Hence, the pith is a key area for nutrient management.

• Unlike other regions like the cortex or stele, the pith is specifically adapted for storing nutrients rather than transport or defense. Hence, the pith is the most suitable answer.

Additional Information

• Functions of Pith:

• Storage: The pith stores essential nutrients such as starch and water, which are crucial for plant survival, especially during unfavorable conditions.

• Transport: While the pith primarily stores nutrients, it also aids in the transport of these nutrients to vascular tissues like the xylem and phloem.

• Comparison of Other Plant Regions:

• Cortex: The cortex is located outside the vascular tissue and primarily supports the plant by storing nutrients and providing protection. However, its role is less centralized compared to the pith.

• Metaxylem: This is part of the vascular tissue responsible for water conduction. It does not store nutrients but facilitates their transport.

• Stele: The stele includes the vascular tissue and pericycle, primarily involved in nutrient transport rather than storage.

• Importance of Parenchyma Cells:

• Parenchyma cells are versatile, with functions ranging from nutrient storage to photosynthesis and healing damaged tissues.

• These cells are found in various parts of the plant, including the pith, cortex, and mesophyll of leaves.

• The ability of parenchyma cells to divide makes them critical for plant growth and regeneration.

Important Points

• Specific Characteristics of the Pith:

• The pith is found in dicot plants, where it occupies the center of the stem and root.

• It is surrounded by vascular bundles, ensuring efficient nutrient transport to other parts of the plant.

• Functions of Other Plant Regions:

• Cortex: Provides structural support and stores nutrients but lacks the central role of the pith.

• Metaxylem: Focuses on water transport, not storage.

• Stele: A complex structure including vascular tissues, primarily for nutrient and water transport.

Q14. Answer: (d) Article 239

The correct answer is Article 239.

Key Points

• Article 239 of the Indian Constitution specifically deals with the administration of Union Territories.

• It provides that every Union Territory shall be administered by the President of India through an administrator appointed by him.

• The administrator can be called by different titles, such as Lieutenant Governor, Chief Commissioner, or Administrator, depending on the Union Territory.

• Union Territories do not have the same level of autonomy as states; their governance is directly controlled by the Central Government under Article 239.

• Article 239 provides the framework for governance and administration of Union Territories, ensuring that they are managed efficiently under the supervision of the Central Government.

• Hence, Article 239 is the correct answer.

Additional Information

• Union Territories in India:

• Union Territories are regions that are directly governed by the Central Government. Unlike states, they do not have full-fledged legislatures or chief ministers in all cases.

• As of 2023, India has 8 Union Territories, including Delhi, Chandigarh, Lakshadweep, Andaman and Nicobar Islands, Puducherry, Dadra and Nagar Haveli, Daman and Diu, Jammu and Kashmir, and Ladakh.

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• Delhi and Puducherry have legislatures with limited powers, while others are governed directly by the Central Government through administrators.

• Role of the President under Article 239:

• Under Article 239, the President acts as the supreme authority over Union Territories and appoints administrators to oversee governance.

• The administrators report directly to the Central Government, ensuring a streamlined and centralized administration.

• Differences between States and Union Territories:

• States have their own governments with full legislative and executive powers, while Union Territories are governed centrally under Article 239.

• Union Territories may have legislatures with restricted powers, such as in Delhi and Puducherry.

Important Points

• Governance of Union Territories:

• Union Territories are governed under the direct supervision of the President of India as per Article 239.

• Administrators or Lieutenant Governors are appointed to manage day-to-day administrative operations.

• In territories like Delhi and Puducherry, legislatures exist but are limited to certain subjects, with significant powers retained by the Central Government.

• Significance of Article 239:

• It establishes a clear distinction between the governance structures of states and Union Territories.

• Provides a framework for centralized governance in regions where full autonomy is not feasible or necessary.

Q15. Answer: (c) Rohit Sharma

The correct answer is Rohit Sharma.

Key Points

• Rohit Sharma, the captain of the Indian cricket team in various formats, achieved a significant milestone in April 2025 by becoming the eighth player to complete 12,000 runs in T20 cricket.

• This achievement places him among the elite cricketers who have dominated the shortest format of the game globally.

• Rohit Sharma has represented India and various domestic and franchise teams, such as the Mumbai Indians in the Indian Premier League (IPL), where he has been a cornerstone of their batting lineup.

• The milestone is a testament to his consistency, technique, and ability to adapt to the fast-paced nature of T20 cricket.

• Other notable players who have surpassed the 12,000-run mark in T20 cricket include legends like Chris Gayle, Virat Kohli, and Kieron Pollard.

• Rohit Sharma’s achievement is even more remarkable as he has consistently performed against top international teams and in high-pressure IPL matches, showcasing his versatility and leadership.

• Hence, Rohit Sharma becoming the eighth player to achieve this milestone is correct.

Additional Information

• Rohit Sharma:

• Born on April 30, 1987, in Bansod, Nagpur, Maharashtra, Rohit Sharma is one of the most prolific batsmen in modern-day cricket.

• He is known for his elegant batting style and has the unique distinction of scoring three double centuries in ODIs.

• In T20s, Rohit has been a consistent performer for both India and his IPL franchise, the Mumbai Indians, whom he has led to multiple IPL titles.

• Other Players with 12,000+ T20 Runs:

• Chris Gayle: Known as the "Universe Boss," Gayle is the leading run-scorer in T20 cricket with over 14,000 runs.

• Virat Kohli: A contemporary of Rohit, Kohli is celebrated for his remarkable consistency and has also crossed the 12,000-run mark in T20s.

• Kieron Pollard: The West Indian all-rounder has been a dominant force in T20 cricket, known for his big-hitting ability and match-winning performances.

• The Importance of Milestones in T20 Cricket:

• Reaching 12,000 runs in T20 cricket is a rare and significant achievement, highlighting a player’s longevity, fitness, and consistency.

• It reflects the ability to adapt to different conditions, bowlers, and match scenarios, as T20 cricket is a fast-paced and unpredictable format.

• Such milestones inspire younger players and set benchmarks for performance in international and domestic cricket.

Important Points

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• Rohit Sharma's Leadership:

• Rohit Sharma has been the most successful captain in IPL history, leading the Mumbai Indians to five IPL titles (2013, 2015, 2017, 2019, and 2020).

• He has a calm and composed demeanor, which has helped him make crucial decisions in high-pressure situations.

• Impact on Indian Cricket:

• Rohit Sharma has been instrumental in India's success in limited-overs cricket, with several match-winning performances in ICC tournaments and bilateral series.

• He is regarded as one of the greatest white-ball players in cricket history and a role model for aspiring cricketers.

Q16. Answer: (d) World Health Organization (WHO)

The correct answer is World Health Organization (WHO).

Key Points

• The 'State of the World's Nursing' report is a flagship publication by the World Health Organization (WHO). It provides a comprehensive overview of the global nursing workforce, including data on their roles, contributions, and challenges.

• The 2025 edition of this report is the latest in the series, building upon the previous editions to further assess the progress in nursing globally and to identify gaps in the health workforce.

• The report is critical in supporting global health policies and frameworks, especially in achieving Universal Health Coverage (UHC) and the Sustainable Development Goals (SDGs). Hence, the WHO is the correct answer.

• The report highlights global nursing shortages, unequal distribution of nurses, and the need for policy interventions to address these gaps.

• It also provides guidance on investments in nursing education, jobs, and leadership to strengthen the health systems worldwide.

Additional Information

• World Health Organization (WHO):

• The WHO is a specialized agency of the United Nations (UN) responsible for international public health. It was established on 7 April 1948, with its headquarters in Geneva, Switzerland.

• The WHO leads global efforts in combating diseases, improving healthcare systems, and providing technical and policy guidance to its 194 member states.

• 'State of the World's Nursing' Report:

• This report provides key insights into the global nursing workforce, including their demographics, education, and contributions to healthcare systems.

• The 2020 edition revealed a global shortage of 5.9 million nurses and emphasized the need for investment in nursing education and jobs.

• The 2025 edition continues to track progress and provide actionable recommendations for governments and stakeholders.

• Importance of Nursing Workforce:

• Nurses play a critical role in providing essential healthcare services, especially in primary and community healthcare settings.

• Strengthening the nursing workforce is essential to achieving Universal Health Coverage and responding effectively to global health emergencies.

Important Points

• Other Organizations Mentioned:

• International Labour Organization (ILO): Focuses on labor standards, social protection, and employment opportunities but does not specifically publish reports on nursing.

• World Bank: Provides financial and technical assistance to developing countries but does not specialize in healthcare workforce reports.

• UNICEF: Primarily focuses on child health, nutrition, and education rather than the nursing workforce.

• Relevance of the Report:

• The 'State of the World's Nursing' report helps governments and stakeholders formulate evidence-based policies for improving healthcare systems.

• It emphasizes the importance of investing in nursing to address global health challenges and ensure equitable healthcare access.

Q17. Answer: (c) Montane forests

The correct answer is Montane forests.

Key Points

• Birch and Rhododendrons are species that thrive predominantly in Montane forests, which are found in high-altitude regions.

• These forests are typically located in the Himalayan region of India, where the climate is cold and the altitude ranges between

1,500 meters to 3,500 meters.

• Montane forests are classified into two types: temperate and alpine. Birch and Rhododendrons are primarily found in the temperate montane forests at lower altitudes and in alpine forests at higher altitudes.

• These species are adapted to survive in harsh climatic conditions, including low temperatures, high humidity, and heavy snowfall.

• Rhododendrons are famous for their vibrant blooms and are considered symbolic flowers of the Himalayan region. Birch trees, on the other hand, are known for their white bark and adaptability to cold climates.

• Montane forests play a significant role in maintaining the ecological balance in mountainous regions, supporting diverse flora and fauna. Hence, the correct answer is Montane forests.

Additional Information

• Montane Forests:

• Montane forests are found in regions with high altitudes, particularly in the Himalayas, Western Ghats, Nilgiris, and northeastern states.

• They are characterized by diverse vegetation, including coniferous trees like spruce, fir, pine, and deciduous trees like birch and rhododendrons.

• The forests are divided into temperate montane forests (lower altitudes) and alpine forests (higher altitudes).

• Characteristics of Montane Forests:

• Montane forests exhibit dense vegetation, which provides a habitat for unique wildlife such as snow leopards, red pandas, and musk deer.

• They are crucial for the hydrological cycle, as they act as watersheds for rivers and prevent soil erosion.

• The forests are often used for timber, medicinal plants, and tourism.

• Examples of Montane Forests:

• The Himalayan region houses extensive montane forests with species like birch, rhododendrons, and coniferous trees.

• In the Western Ghats, montane forests are known for their shola grasslands and endemic species.

Important Points

• Other Forest Types:

• Tropical Evergreen and Semi-Evergreen Forests: These forests are found in regions with high rainfall, such as the Western Ghats and northeastern India. They are characterized by dense vegetation and species like rosewood, mahogany, and rubber.

• Tropical Thorn Forests: These are located in arid regions of Rajasthan, Gujarat, and Haryana and consist of species like acacia and cactus.

• Littoral and Swamp Forests: These forests are found along coastal and wetland regions like the Sundarbans. Mangrove species dominate these forests.

• Ecological Importance:

• Montane forests contribute to carbon sequestration, reducing greenhouse gases.

• They support rare and endemic species, making them vital for biodiversity conservation.

Q18. Answer: (c) Buddhaghosa

The correct answer is Buddhaghosa.

Key Points

• The Visuddhimagga, meaning "The Path of Purification," is a key text in Buddhist literature. It serves as an encyclopedic guide to the practice of Theravāda Buddhism.

• This text was composed by the renowned scholar-monk Buddhaghosa in the 5th century CE. Hence, the correct answer is Buddhaghosa.

• Buddhaghosa was a commentator and translator who played a crucial role in systematizing and preserving the teachings of Theravāda Buddhism. His work is highly regarded in the Theravāda tradition.

• The Visuddhimagga is divided into three main sections, corresponding to the threefold training in Buddhism: Sīla (morality), Samādhi (concentration), and Paññā (wisdom).

• It provides detailed instructions on meditation, the interpretation of the Buddha's teachings, and the attainment of nirvana.

• The text is based on the Pāli Canon, the foundational scripture of Theravāda Buddhism, and serves as a comprehensive manual for Buddhist practitioners.

• The Visuddhimagga is highly influential and remains a cornerstone of Theravāda monastic education and spiritual practice.

Additional Information

• Buddhaghosa and His Contributions:

• Buddhaghosa was an Indian Theravāda Buddhist commentator who lived in the 5th century CE. He is considered one of the most significant figures in the history of Theravāda Buddhism.

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• He traveled to Sri Lanka, where he studied the Pāli Canon and commentaries preserved in the Mahāvihāra monastery.

• Buddhaghosa's primary goal was to systematize and translate the extensive Buddhist teachings from Sinhalese into Pāli, thereby preserving them for future generations.

• The Structure of Visuddhimagga:

• The text is divided into three sections:

• Sīla: Focuses on ethical conduct and discipline for laypersons and monastics.

• Samādhi: Explains meditation techniques, including the jhana states (levels of meditative absorption).

• Paññā: Discusses wisdom, particularly insights into the nature of reality, impermanence, and the path to nirvana.

• The text also includes commentaries on various aspects of the Buddha's teachings, making it an essential guide for practitioners and scholars.

• Key Features of the Visuddhimagga:

• The Visuddhimagga is considered a practical guide to meditation and ethical conduct, offering detailed instructions on achieving liberation.

• It bridges the gap between the theoretical teachings of the Pāli Canon and their application in everyday practice.

• The text is revered not only in Sri Lanka but also in other Theravāda Buddhist countries, such as Thailand, Myanmar, and Cambodia.

Important Points

• Contributions of Other Scholars:

• Nagarjuna: A key figure in Mahayana Buddhism, he is credited with founding the Madhyamaka school of thought, emphasizing the concept of śūnyatā (emptiness).

• Aryadeva: A disciple of Nagarjuna, he expanded on the teachings of the Madhyamaka school and wrote influential texts such as Four Hundred Verses.

• Vasubandhu: A prominent scholar in Mahayana Buddhism, he co-founded the Yogacara school and authored influential works like the Abhidharmakośa.

• Significance of the Visuddhimagga:

• The Visuddhimagga remains a cornerstone of Theravāda Buddhist practice and scholarship, providing a comprehensive framework for achieving spiritual liberation.

• It is widely studied and respected in Buddhist monastic education systems across Theravāda countries.

Q19. Answer: (c) Jawaharlal Nehru

The correct answer is Jawaharlal Nehru.

Key Points

• Jawaharlal Nehru, the first Prime Minister of India, presented the First Five-Year Plan on July 9, 1951. This was a landmark moment in India’s economic history as it laid the foundation for planned economic development.

• The First Five-Year Plan primarily focused on the agriculture sector to address the challenges of food shortages and inflation in post-independence India. Hence, Jawaharlal Nehru is the correct answer.

• During this time, India adopted a socialist pattern of development inspired by the Soviet Union’s model of planning. This included setting up the Planning Commission in 1950 to oversee and implement the economic plans.

• The First Plan was based on the Harrod-Domar Model, which emphasized investment in the agricultural sector, irrigation projects, and land reforms to boost productivity.

• The total outlay of the plan was Rs. 2,069 crore, and it achieved an impressive growth rate of 3.6%, exceeding the target of 2.1% set for the plan.

• The success of the First Five-Year Plan was crucial in building public confidence in the planned economic approach and setting the stage for subsequent plans.

Additional Information

• Objectives of the First Five-Year Plan:

• The primary aim was to address the urgent issues of food security, inflation control, and agricultural development.

• The plan also emphasized the development of irrigation facilities and the construction of large-scale projects like the Bhakra Nangal Dam.

• Planning Commission:

• The Planning Commission was established in 1950 under the chairmanship of Jawaharlal Nehru. It played a pivotal role in the formulation and execution of the Five-Year Plans.

• The Commission was responsible for assessing the country’s resources and drafting a plan that would guide India’s economic development.

• Outcomes of the First Five-Year Plan:

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• The plan achieved a food grain production increase from 50.8 million tonnes to 65.8 million tonnes.

• The plan was instrumental in building the foundation of India’s agricultural and irrigation infrastructure.

Important Points

• Other Leaders in Context:

• Sardar Vallabhbhai Patel: Played a key role in the integration of princely states but did not present the First Five-Year Plan as he passed away in 1950.

• Dr. Rajendra Prasad: The first President of India, focused on constitutional and ceremonial duties, not economic planning.

• Purushottam Das Tandon: A prominent Congress leader known for his contributions to Indian politics, but he was not involved in presenting the economic plans.

• Long-Term Significance of the First Plan:

• It set the stage for India’s subsequent economic growth by demonstrating the value of planned development.

• The success of the plan instilled confidence in the ability of the Indian government to manage large-scale economic initiatives.

Q20. Answer: (a) Arnala

The correct answer is Arnala.

Key Points

• Arnala is the first of the eight Anti-Submarine Warfare Shallow Water Crafts (ASW SWCs) delivered to the Indian Navy on 8 May 2025.

• The ASW SWCs are specifically designed for anti-submarine warfare operations in shallow waters, ensuring the protection of India's coastal regions and strategic assets.

• The construction of the ASW SWCs is part of India's initiative to strengthen its maritime security and enhance its naval capabilities. Hence, the statement is correct.

• Arnala and its sister crafts are equipped with modern technologies, including advanced sonar systems and torpedo launchers, to detect and neutralize enemy submarines effectively.

• The project to build these crafts aligns with the ‘Make in India’ initiative, utilizing indigenous resources and expertise for the development of defense infrastructure. Hence, this is a significant milestone for India's defense sector.

• Arnala is named after a coastal town in Maharashtra, reflecting India's tradition of naming naval vessels after places of historical and cultural importance.

• Hence, the correct answer is Arnala.

Additional Information

• Anti-Submarine Warfare Shallow Water Crafts (ASW SWCs):

• ASW SWCs are designed to operate in shallow waters to detect and counter enemy submarines, ensuring coastal security.

• These crafts are equipped with state-of-the-art sonar systems, torpedo launchers, and radar systems to effectively engage underwater threats.

• Indian Navy Modernization:

• The Indian Navy has been actively modernizing its fleet to address emerging maritime security challenges.

• The induction of ASW SWCs like Arnala is part of India's broader strategy to enhance its naval capabilities.

• Example: Other vessels like Kamorta-class corvettes and Scorpene-class submarines have been added to the fleet to bolster maritime defense.

• Significance of Indigenous Projects:

• The construction of ASW SWCs under the ‘Make in India’ initiative promotes self-reliance in defense manufacturing.

• It also enhances India's industrial capabilities and reduces dependence on foreign imports.

• This initiative strengthens India's defense infrastructure while contributing to the economy through job creation and technological advancements.

Important Points

• Arnala-Class Vessels:

• Arnala-class vessels are smaller than conventional frigates and destroyers but are specifically tailored for shallow water operations.

• They play a crucial role in protecting India's coastal regions, ports, and naval assets.

• Other Examples of ASW Vessels:

• Kamorta-Class Corvettes: These are larger and are designed for deeper water ASW operations, complementing the role of shallow water crafts.

• Scorpene-Class Submarines: These submarines are equipped with advanced stealth technology and are capable of engaging enemy vessels effectively.

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Q21. Answer: (b) 28

The correct answer is 28.

Key Points

• The Regional Rural Banks (RRBs) were established under the Regional Rural Banks Act of 1976 to provide credit and other financial services to rural areas, particularly to small and marginal farmers, agricultural laborers, and rural artisans.

• Before the amalgamation process began, there were 56 RRBs operating in the country. The process of amalgamation started to improve efficiency, enhance financial stability, and streamline operations.

• In the fourth phase of amalgamation, the Department of Financial Services (DFS) under the Ministry of Finance, Government of India, notified the merger of 26 RRBs to rationalize their operations. This step is aimed at reducing the number of RRBs.

• After the amalgamation of 26 RRBs, the number of RRBs in the country will be reduced to 28. The primary objective of this restructuring is to enhance financial inclusion in rural areas while ensuring sustainability in operations.

• The amalgamation process helps in achieving economies of scale, optimizing resources, and improving the overall customer service experience in rural banking. This ensures the better performance of RRBs in a competitive environment.

• This move aligns with the Government of India's efforts to modernize and strengthen the financial system, especially in rural and semi-urban areas, to meet the growing needs of the rural population.

Additional Information

• About Regional Rural Banks (RRBs):

• RRBs were established with the aim to provide institutional credit to rural and semi-urban areas to enhance agricultural productivity and rural development.

• These banks are jointly owned by the Government of India (50%), the concerned State Government (15%), and the Sponsor Bank (35%).

• RRBs cater to the credit and financial needs of small farmers, artisans, and rural entrepreneurs, supporting their growth and financial inclusion.

• Phases of Amalgamation of RRBs:

• The amalgamation process of RRBs began in 2005, and multiple phases of consolidation have been implemented to date.

• The fourth phase of amalgamation, as notified in 2025, is the most recent step in reducing the number of RRBs to 28.

• Benefits of Amalgamation:

• Amalgamation leads to the optimization of resources, such as manpower, technology, and infrastructure.

• It improves financial stability and ensures that RRBs can operate efficiently in a competitive environment.

• The move also enhances the reach and efficiency of banking services in rural areas, contributing to financial inclusion.

Important Points

• Key Characteristics of RRBs:

• RRBs have a dual objective of providing financial support to rural areas while maintaining commercial viability.

• They provide a range of services, including credit facilities, deposit schemes, and financial advisory services to rural populations.

• Government Efforts to Strengthen RRBs:

• The government has continuously worked to modernize RRBs by introducing core banking solutions (CBS) and other technological advancements.

• Efforts have been made to improve the capital adequacy ratio of RRBs to ensure their financial health and sustainability.

• RRBs have also been encouraged to expand their lending portfolios to include non-farm sectors, thereby diversifying their operations.

Q22. Answer: (d) Mumbai

The correct answer is Mumbai.

Key Points

• Samudra Pradakshina is a tri-services, all-women circumnavigation sailing expedition that highlights the growing participation of women in defense services and their capability to undertake challenging missions.

• The expedition is organized by the Indian Armed Forces and includes personnel from the Army, Navy, and Air Force. This initiative is aimed at promoting gender equality and showcasing the strength of women in defense.

• The expedition was flagged off from Mumbai, a city that serves as a significant naval base in India. Mumbai is home to the Western Naval Command, making it a suitable location for the commencement of such missions. Hence, the correct answer is Mumbai.

• The event is in line with India’s commitment to empowering women and promoting their involvement in key defense activities. The expedition also aims to build awareness about maritime capabilities and ocean conservation.

• Circumnavigation missions, like Samudra Pradakshina, involve navigating the globe by sea. This requires meticulous planning, expertise, and leadership, all of which are displayed by the women participants.

Additional Information

• Mumbai as the Flag-off Location:

• Mumbai is strategically significant as it houses the headquarters of the Western Naval Command, one of the major naval commands of the Indian Navy.

• The city has advanced maritime infrastructure, making it an ideal location for the commencement of such expeditions.

• Mumbai is also known for hosting naval events and promoting maritime activities, adding to the significance of choosing this location.

• Women in Defense Services:

• India has been taking substantial steps to integrate women into defense services. Women have been increasingly involved in operational roles, including combat positions.

• Example: In 2018, the Indian Navy conducted its first all-women circumnavigation expedition, Navika Sagar Parikrama, which inspired future initiatives like Samudra Pradakshina.

• Objectives of the Expedition:

• The primary goals include promoting gender equality, showcasing maritime capabilities, and raising awareness about ocean conservation.

• It also aims to inspire future generations and highlight the role of women in achieving milestones in defense and maritime sectors.

Important Points

• Selection of Participants:

• Participants undergo rigorous training and are selected from the Army, Navy, and Air Force based on their skills and expertise.

• This ensures that the team is equipped to handle the challenges of circumnavigation, including adverse weather conditions and technical issues.

• Significance of Circumnavigation:

• Circumnavigation missions are considered a test of endurance, teamwork, and strategic planning. They symbolize national pride and the capability of defense forces.

• Such missions also play a critical role in highlighting maritime strengths and fostering international relations.

Q23. Answer: (b) Rock-cut architecture

The correct answer is Rock-cut architecture.

Key Points

• Kailasa Temple at Ellora is an exemplary monument of rock-cut architecture, one of the most remarkable and ancient architectural styles in India.

• It was carved out of a single monolithic rock and is dedicated to Lord Shiva. The temple is a part of the Ellora Caves, a UNESCO World Heritage Site in the state of Maharashtra.

• The temple was constructed during the reign of the Rashtrakuta dynasty, specifically under the patronage of King Krishna I, around the 8th century CE.

• Rock-cut architecture involves carving out entire structures, including intricate details, directly from natural rock formations, making it a significant engineering and artistic achievement.

• The Kailasa Temple was inspired by the Mount Kailasa, the mythical abode of Lord Shiva, and is considered an icon of Indian temple art and architecture.

• This temple is unique because it is not constructed by adding materials but by removing rock to create a freestanding structure, which includes detailed carvings, sculptures, and engravings.

• The Kailasa Temple is a marvel due to its massive scale, intricate carvings, and detailed sculptures depicting scenes from Hindu mythology, including the Ramayana and the Mahabharata.

Additional Information

• Rock-cut Architecture:

• Rock-cut architecture is one of the oldest architectural practices in India, dating back to the 3rd century BCE. It reached its zenith during the Gupta and post-Gupta periods.

• This style primarily involves carving temples, monasteries, and other structures out of solid rock, either into cliffs or as standalone monolithic structures.

• Famous examples include the Ajanta and Ellora Caves, the Mahabalipuram rock-cut temples in Tamil Nadu, and the Elephanta Caves near Mumbai.

• Rock-cut architecture is significant for its durability, intricacy, and the ability to withstand natural disasters, making these monuments a testament to ancient engineering and artistry.

• Comparison with Other Architectural Styles:

• Wooden Architecture: Wooden architecture involves using wood as the primary construction material. It is prominent in regions like Kerala and Himachal Pradesh but lacks the durability of rock-cut structures.

• Islamic Architecture: This style emerged in India during the Delhi Sultanate and Mughal periods, characterized by domes, arches, minarets, and intricate inlay work, such as in the Taj Mahal.

• Colonial Architecture: Colonial architecture in India reflects European influences, especially British, Portuguese, and French styles, evident in structures like the Victoria Memorial in Kolkata and the Gateway of India in Mumbai.

Important Points

• Ellora Caves:

• The Ellora Caves comprise a series of 34 rock-cut temples and monasteries, dating from 600 to 1000 CE, showcasing Buddhist, Hindu, and Jain traditions.

• They highlight religious harmony during ancient times and are a testament to India's rich cultural heritage.

• Construction Techniques:

• The Kailasa Temple was carved from top to bottom, an unconventional method to ensure structural stability and precision.

• It is estimated that approximately 200,000 tonnes of rock were removed during its construction.

• Symbolism:

• The temple's layout and carvings represent the Hindu cosmological view, with Mount Kailasa symbolizing the center of the universe.

Q24. Answer: (a) 1895

The correct answer is 1895..

Key Points

• The Calcutta Electric Lighting Act was passed by the Government of Bengal in the year 1895. This legislation marked the beginning of organized electricity distribution in Bengal and was a significant milestone in India's energy sector.

• The Act was primarily aimed at regulating the generation and distribution of electricity in the city of Calcutta, one of the most prominent urban centers in colonial India at the time.

• The passing of this Act laid the foundation for the establishment of electric lighting systems in Calcutta, helping modernize the city's infrastructure. Hence, 1895 is the correct year.

• The Act also facilitated the growth of urban electrification, which was an essential aspect of industrialization and modernization during the British colonial era.

• This legislation is considered a historic step in the development of India's energy sector, especially in urban areas like Calcutta. Hence, the year 1895 is correct.

• The Act served as a model for similar legislation in other parts of colonial India, leading to the establishment of electricity infrastructure in different regions. Therefore, the correct answer is 1895.

Additional Information

• Calcutta Electric Lighting Act:

• Introduced in 1895, this Act was a pioneering piece of legislation in the Indian subcontinent, focusing on the regulation of electricity generation and distribution.

• It provided a framework for the establishment of electric lighting systems in Calcutta, which was an essential development for industrial and urban progress.

• Development of Electricity Infrastructure in India:

• The introduction of electricity in Calcutta served as a model for urban electrification in other cities during the colonial period.

• The Calcutta Electric Supply Corporation (CESC) was established to manage electricity generation and distribution in the region, following the Act's implementation.

• Example: The success of Calcutta's electrification inspired similar initiatives in cities like Bombay and Madras in the early 20th century.

• Colonial Impact on India's Energy Sector:

• The British administration viewed electricity as a tool to modernize India's urban centers, which would also boost economic activities and industrial growth.

• The legislation and subsequent electrification projects were primarily focused on urban areas, neglecting rural electrification during the colonial period.

• Calcutta became a hub for energy innovation, leading to its recognition as one of India's most advanced cities in terms of infrastructure.

Important Points

• Key Features of the Calcutta Electric Lighting Act:

• The Act authorized the generation and distribution of electricity in Calcutta, marking the beginning of organized electrification in

India.

• It laid the foundation for the Calcutta Electric Supply Corporation, which played a crucial role in managing electricity supply in the region.

• Impact on Urban Development:

• The electrification of Calcutta contributed to its transformation into a modern urban center, enhancing industrial productivity and improving the quality of life for its residents.

• It set a precedent for similar projects in other Indian cities, leading to the gradual expansion of electricity infrastructure across the country.

Q25. Answer: (b) Marseille

The correct answer is Marseille.

Key Points

• The 4th Europe-Africa Forum was organized in May 2025, and its location was confirmed as Marseille, France. This forum is part of a series of events aimed at strengthening ties between the two continents.

• The forum serves as a platform to discuss economic, social, and political cooperation between Europe and Africa. It focuses on addressing challenges such as climate change, sustainable development, migration, and trade.

• Marseille was chosen as the location due to its geographical significance as a port city in southern France, providing easy access to both European and African participants. Hence, the location of Marseille was ideal for the event.

• The forum featured high-profile representatives from both continents, including government officials, business leaders, and non-governmental organizations (NGOs), fostering discussions on economic partnerships and sustainable growth initiatives.

• The Europe-Africa Forum has been historically instrumental in enhancing diplomatic relations and trade agreements between the two continents. The 4th edition continued this tradition with actionable plans and commitments for shared prosperity.

• The selection of Marseille as the venue reflects its role as a cultural and economic hub that bridges Europe and Africa, symbolizing the interconnectedness between the two regions. Hence, Marseille was a strategic and symbolic choice for the forum.

Additional Information

• Europe-Africa Forum:

• The Europe-Africa Forum is a recurring event aimed at strengthening collaboration in areas like trade, investment, innovation, and sustainability. It serves as a bridge between the two continents to foster mutual understanding and shared growth.

• The forum addresses challenges such as climate change, migration, energy transition, and economic inequality, promoting solutions through collaborative efforts.

• Why Marseille?

• Marseille is a port city in southern France, and its location makes it a natural gateway to Africa, facilitating ease of travel and logistics for participants from both continents.

• The city's historical significance as a trade hub further complements the goals of the Europe-Africa Forum, emphasizing economic cooperation.

• Marseille also boasts a vibrant multicultural community, reflecting the diversity and interconnectedness of Europe and Africa.

• Previous Forums:

• The previous editions of the Europe-Africa Forum were held in different European cities, each playing a strategic role in strengthening bilateral relations.

• These forums have led to significant agreements on trade partnerships, educational exchange programs, and joint initiatives to tackle global challenges.

• For example, the 3rd edition focused on the impact of technological advancements on Africa's development and how Europe could contribute to this transformation.

Important Points

• Key Themes of the 4th Europe-Africa Forum:

• The forum emphasized themes like sustainable development, focusing on renewable energy and environment-friendly practices.

• Discussions also revolved around migration policies, aiming to create frameworks for humane and organized migration between Europe and Africa.

• Another key theme was economic partnerships, particularly in sectors like agriculture, technology, and education.

• Significance of Europe-Africa Relations:

• The partnership is crucial for addressing global challenges, such as climate change and geopolitical tensions, through cooperative efforts.

• Europe remains one of Africa's largest trading partners, and forums like these help strengthen economic ties and investment opportunities.

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Q26. Answer: (c) Online trading of agricultural produce

The correct answer is Online trading of agricultural produce.

Key Points

• e-NAM or the Electronic National Agriculture Market is a pan-India electronic trading portal launched by the Government of India in April 2016. It aims to integrate the existing Agricultural Produce Market Committees (APMCs) into a unified national market.

• The primary goal of e-NAM is to facilitate the online trading of agricultural produce, thereby providing farmers with a transparent and competitive price discovery mechanism for their crops.

• It connects farmers, traders, and buyers on a single online platform, reducing intermediaries and ensuring that farmers get better returns on their produce. Hence, the correct answer is Online trading of agricultural produce.

• Through e-NAM, farmers have access to a larger marketplace, enabling them to sell their produce not just locally but also to buyers across the country, increasing their bargaining power.

• The platform supports real-time price discovery based on actual demand and supply and offers tools for electronic bidding and payment systems to ensure transparency.

• The initiative also addresses issues like malpractices in weighing, quality assessment, and price manipulation by introducing standardized procedures for these activities.

• As of 2023, e-NAM has successfully integrated over 1,000 APMCs and onboarded millions of farmers and traders, making it one of the largest agricultural trade platforms in India.

Additional Information

• Features of e-NAM:

• Unified Trading Platform: e-NAM integrates existing physical mandis into a single online platform, allowing farmers to connect with buyers across India.

• Transparent Pricing: The platform uses real-time demand and supply data to ensure transparent price discovery for the farmers' produce.

• Electronic Payment System: e-NAM facilitates quick and secure payments to farmers directly to their bank accounts, avoiding delays and reducing transaction risks.

• Quality Standards: e-NAM incorporates quality assurance systems for the grading and standardization of agricultural produce, ensuring fair trade practices.

• Benefits of e-NAM:

• Farmer Empowerment: Farmers gain access to a larger market, better prices, and reduced dependence on local intermediaries.

• Reduction in Malpractices: Standardized procedures for weighing and quality assessment reduce malpractices in the trading process.

• Increased Efficiency: The online system saves time and costs associated with physical trading and logistics.

• Market Integration: By connecting multiple APMCs, e-NAM strengthens the agricultural supply chain and enhances national market integration.

• Challenges:

• Digital Literacy: Many farmers, especially in rural areas, lack awareness or training to use the online platform effectively.

• Infrastructure Issues: Limited internet connectivity and inadequate infrastructure in remote areas pose significant challenges to e-NAM's implementation.

• Resistance from Local Traders: Traditional market players often resist adopting e-NAM due to potential disruptions in their business models.

Important Points

• Other Options Explained:

• Crop Insurance: Crop insurance schemes like PMFBY (Pradhan Mantri Fasal Bima Yojana) protect farmers against losses due to crop failure but are not directly related to e-NAM.

• Minimum Wage Guarantee: This relates to labor laws and schemes like MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act), which are unrelated to e-NAM.

• Fertilizer Subsidy: Fertilizer subsidies are provided to farmers to reduce input costs but are not the focus of the e-NAM initiative.

• Achievements of e-NAM:

• As of 2023, e-NAM has onboarded over 1.7 crore farmers and facilitated trade worth Rs. 2 lakh crore.

• It has integrated over 1,260 mandis across 22 states and 3 union territories.

• The platform has also introduced innovative features like warehouse-based trading and farmer producer organization (FPO) linkage to expand its reach.

Q27. Answer: (d) Government departments

The correct answer is Government departments.

Key Points

• Right to Information (RTI) Act, 2005: The RTI Act is a landmark legislation in India that empowers citizens to seek information from government departments, public authorities, and other government-related organizations.

• The Act provides a legal framework allowing citizens to access information under the control of public authorities, ensuring transparency and accountability.

• Private companies, foreign embassies, and non-governmental organizations: These entities are not covered under the RTI Act unless they receive significant funding or grants from the government. Hence, statements 1, 2, and 3 are incorrect.

• Citizens can seek information from government departments, including ministries, public sector undertakings, and other government-controlled organizations. This ensures the rights of citizens to be informed about the functioning of the government. Hence, statement 4 is correct.

• Hence, the correct answer is Government departments.

Additional Information

• Key Features of the RTI Act:

• The RTI Act was enacted in 2005, enabling citizens to request information from public authorities, including government departments, ministries, and public sector organizations.

• It mandates that all public authorities maintain records and provide information proactively to the public.

• Citizens can file RTI applications to obtain information about administrative decisions, expenditure, and other government processes.

• Scope of RTI:

• The Act applies to government departments, public sector undertakings, and organizations receiving substantial government grants.

• However, private companies, foreign embassies, and NGOs are excluded unless they receive significant public funding.

• Example: A citizen can request information about the budget allocation of a government department but cannot directly question the operations of private corporations.

• Exemptions under RTI:

• Certain sensitive information, such as issues related to national security, defense, and confidential government records, is exempted under the Act.

• Intelligence agencies like RAW and IB are outside the purview of RTI unless the information pertains to corruption or human rights violations.

Important Points

• RTI Application Process:

• Citizens can file an RTI application by submitting a written request to the concerned Public Information Officer (PIO).

• The PIO is required to respond within 30 days. In case of non-compliance, the citizen can appeal to the Central Information Commission (CIC).

• Significance of RTI:

• The RTI Act promotes transparency, accountability, and good governance by enabling citizens to scrutinize government policies and decisions.

• It plays a vital role in combating corruption and ensuring participatory democracy.

Q28. Answer: (a) National Extension Service (NES)

The correct answer is National Extension Service (NES).

Key Points

• National Extension Service (NES) was launched in 1953 by the Government of India to promote rural development in a more systematic and feasible manner.

• The primary objective of the NES was to bring about socio-economic development in rural areas by involving people in various developmental activities and ensuring their participation in nation-building efforts.

• The programme aimed at achieving self-sufficiency in rural areas by focusing on sectors like agriculture, health, education, and rural industries.

• The NES functioned as a three-tier structure involving the village, block, and district levels to decentralize decision-making and implementation processes.

• The Community Development Programme, which was launched in 1952, served as the foundation for the National Extension Service. The NES extended the scope of community development to all villages and rural blocks in India.

• The programme also emphasized training personnel to handle rural development tasks and encouraged the establishment of

various extension services in rural areas.

• It was designed to create a sense of community responsibility among rural people and aimed to improve their quality of life through modern and scientific methods of farming, healthcare, and education.

Additional Information

• Community Development Programme (1952):

• The Community Development Programme was initiated in 1952 as a pilot project to promote rural development. It served as the precursor to the National Extension Service.

• The programme focused on agriculture, irrigation, education, health, and rural industries to improve the living standards of rural populations.

• It also aimed at involving local communities in the planning and execution of development projects.

• Bharat Nirman Yojana:

• Launched in 2005, it was a programme aimed at improving rural infrastructure in areas such as irrigation, roads, housing, water supply, electricity, and telecommunications.

• This scheme was not related to the 1953 programme mentioned in the question.

• Jawahar Rozgar Yojana (JRY):

• Introduced in 1989, this programme focused on providing employment to rural unemployed individuals.

• It was not linked to the rural development initiative launched in 1953.

• Training for Rural Youth for Self-Employment (TRYSEM):

• Launched in 1979, this programme aimed to train rural youth in various skills to improve their employability and promote self-employment.

• This programme also came much later and was not related to the 1953 initiative.

Important Points

• Significance of National Extension Service (NES):

• The NES marked a significant step in India's rural development strategy by expanding the scope of community development across the nation.

• It was instrumental in laying the foundation for modern rural development programmes and policies in India.

• The programme also emphasized the importance of people's participation in rural development initiatives, which remains a cornerstone of India's development policies.

Q29. Answer: (d) Acetic Acid

The correct answer is Acetic Acid.

Key Points

• Acetic acid is a simple carboxylic acid with the chemical formula CH3COOH. It is a significant component of vinegar, which is approximately 4-8% acetic acid by volume.

• In 1845, Hermann Kolbe, a German chemist, was the first to successfully synthesize acetic acid from inorganic materials. This was a groundbreaking achievement in organic chemistry.

• Kolbe's method involved converting carbon disulfide (CS2) into acetic acid. This demonstrated that organic compounds could be derived from inorganic substances, a concept not widely accepted at the time.

• This synthesis marked a significant step in the field of chemistry, challenging the then-prevailing belief in “vitalism,” which suggested that organic compounds could only be produced by living organisms.

• The discovery also laid the foundation for modern organic chemistry and inspired further research into the synthesis of organic compounds from inorganic sources.

• Hence, the correct answer is Acetic Acid.

Additional Information

• Hermann Kolbe:

• Hermann Kolbe (1818-1884) was a German chemist known for his contributions to organic chemistry.

• He was instrumental in disproving the theory of “vitalism” by synthesizing organic compounds from inorganic sources.

• His work demonstrated that organic compounds could be produced through standard chemical reactions, bridging the gap between organic and inorganic chemistry.

• Acetic Acid:

• Acetic acid is widely used in various industries, including the production of vinegar, as a solvent, and as a precursor for the synthesis of various chemicals like acetic anhydride and acetate esters.

• It is also a key component in the manufacture of plastics, synthetic fibers, and photographic chemicals.

• Other Acids:

• Sulfuric Acid: A strong mineral acid widely used in industries such as fertilizers, chemical manufacturing, and petroleum refining.

• Formic Acid: A simple carboxylic acid used in leather production, as a preservative, and in agriculture.

• Citric Acid: A weak organic acid commonly found in citrus fruits, used in food and beverages as a flavoring and preservative agent.

Important Points

• Significance of Kolbe's Discovery:

• Hermann Kolbe’s synthesis of acetic acid was one of the first examples of creating an organic compound without relying on biological processes, marking a significant milestone in chemistry.

• It paved the way for the industrial synthesis of organic chemicals, crucial for modern chemical industries.

• Applications of Acetic Acid:

• Used in food preservation and flavoring (e.g., vinegar).

• Essential in the production of chemicals like acetic anhydride and acetate esters.

• Plays a role in textile, plastics, and photographic industries.

Q30. Answer: (a) North-West India

The correct answer is North-West India.

Key Points

• Western disturbances are weather phenomena that primarily affect the North-Western parts of India. These disturbances originate as low-pressure systems over the Mediterranean Sea, which then move eastward towards India.

• When these disturbances enter the Indian subcontinent, they bring moisture-laden winds that lead to winter rainfall, snowfall, or cloudy weather in regions such as Punjab, Haryana, Rajasthan, Jammu & Kashmir, Himachal Pradesh, and Uttarakhand. Hence, this region is most affected.

• The primary impact of western disturbances is observed during the winter season (December to February), though their effects can sometimes extend into early spring.

• These disturbances are crucial for the rabi crop, particularly wheat, as winter rains provide much-needed moisture. Farmers in North-West India rely on this rainfall for successful crop production.

• Western disturbances also result in temperature fluctuations, often causing a rise in minimum temperatures during winters and leading to cloudy weather.

• The effects of these disturbances diminish as they move further into central and eastern parts of India. Their impact on regions like Coastal Andhra Pradesh, Eastern Ghats, or the Deccan Plateau is negligible. Hence, only North-West India is significantly impacted.

Additional Information

• Western Disturbances and Their Characteristics:

• Western disturbances are non-monsoonal rain-bearing systems caused by extra-tropical storms originating in the Mediterranean Sea, Atlantic Ocean, or Caspian Sea.

• These disturbances are carried by the westerly jet streams and arrive in India after traveling across West Asia, Iran, Afghanistan, and Pakistan.

• They are most active during the winter months and are known for bringing rain, hailstorms, and snow to the northern parts of India.

• Regions Affected by Western Disturbances:

• North-West India: This region, including Punjab, Haryana, Jammu & Kashmir, Himachal Pradesh, and western Uttar Pradesh, is most affected by winter rainfall and snowfall caused by western disturbances.

• Central and Eastern India: The influence of western disturbances reduces as they move eastward. The rainfall in these regions is less frequent and less intense.

• Southern India: Regions like Coastal Andhra Pradesh, the Eastern Ghats, and the Deccan Plateau experience negligible or no impact from western disturbances.

• Importance of Western Disturbances:

• They are crucial for the rabi crop cycle, especially wheat, as they provide essential moisture during winter.

• They help maintain the seasonal water balance in rivers originating from the Himalayas.

Important Points

• Other Weather Phenomena in India:

• South-West Monsoon: It brings the majority of rainfall to India during the summer months (June to September), impacting the agricultural cycle.

• North-East Monsoon: Mainly affects Tamil Nadu, Andhra Pradesh, and parts of Karnataka, providing rainfall during the retreating monsoon season (October to December).

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• Climatic Impact of Western Disturbances:

• They cause cold waves in Northern India post-rainfall and bring relief from extreme cold weather in some cases by increasing minimum temperatures.

• They also lead to hailstorms, which can damage crops in affected regions.

Q31. Answer: (c) Railways

The correct answer is Railways.

Key Points

• Development of railways during British rule: The British introduced railways in India in the mid-19th century, primarily to serve their colonial economic interests.

• Railways were built to facilitate the movement of raw materials, such as cotton, jute, tea, and other agricultural products, from the interiors of India to ports like Bombay, Madras, and Calcutta for export to England.

• It also enabled the transport of finished goods from England to Indian markets, thereby ensuring the continuation of economic exploitation. Hence, the statement is correct.

• Strategic and administrative benefits: The railway network allowed the British to maintain effective control over India by ensuring faster movement of troops and officials.

• It helped suppress revolts like the 1857 Rebellion, ensuring the British could maintain their colonial grip on India. Hence, the statement is correct.

• Economic impact: The railway infrastructure was designed to benefit the colonial rulers rather than the Indian population. For example, the profits generated from railways were directed towards the British economy and were used to strengthen their imperial rule. Hence, the statement is correct.

• The railways also contributed to the destruction of local industries, such as handloom and cottage industries, due to the influx of British-manufactured goods. Hence, the statement is correct.

• Introduction of railways: The first railway line in India was laid between Bombay and Thane in 1853. It marked the beginning of an extensive railway network, which expanded rapidly under British rule. Hence, the statement is correct.

• Hence, the correct answer is Railways.

Additional Information

• Inland waterways:

• Inland waterways existed in India even before British rule and were used for local trade and transportation.

• The British improved some waterways, but their primary focus remained on railways, as waterways were not as efficient for large-scale transport of goods or troops.

• Metro rail:

• Metro rail is a modern urban transportation system introduced in India after independence, starting with the Kolkata Metro in 1984.

• It is aimed at reducing traffic congestion and providing efficient public transport, unrelated to colonial interests.

• Airways:

• Airways became prominent in India much later, primarily after independence, to connect distant regions efficiently.

• The first airline, Tata Airlines, was established in 1932, but it was not developed to serve colonial economic interests.

• Railways:

• The railways were developed extensively under British rule for economic exploitation and administrative control.

• It played a significant role in integrating India, but its primary purpose was to benefit the British economy.

Important Points

• Key features of railways during British rule:

• Railway lines were planned to connect ports with resource-rich areas to facilitate exports.

• The construction of railways was funded by British companies, and profits were repatriated to England.

• Historical context:

• The first railway line was laid in 1853, marking the beginning of colonial infrastructure development focused on exploitation.

• Railways facilitated the movement of British troops, enabling better control over Indian territories.

Q32. Answer: (c) there was strong social stratification

The correct answer is there was strong social stratification.

Key Points

• The presence of jewellery made from precious metals and semi-precious stones in small towns indicates that the society during the Indus Valley Civilisation had a distinct division in terms of access to luxury goods.

• Luxury items such as jewellery were likely accessible only to specific social groups, suggesting a system of social hierarchy. This

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supports the idea of strong social stratification.

• The distribution of these luxury items does not align with equal access to material goods across all social classes. Hence, statement 2 is incorrect.

• The argument that the civilisation was ruled by autocratic priest-kings is not strongly supported by archaeological evidence, as no clear indications of centralized monarchy have been found. Hence, statement 1 is incorrect.

• While there may have been elite groups, the presence of jewellery in various settings suggests that social stratification extended beyond the elite, showing a layered societal structure. Hence, statement 4 is partially correct.

• The existence of luxury items alongside ordinary goods in small-town settings further reinforces the notion of a hierarchical society where different social classes had varying degrees of access to wealth and luxury. Thus, the correct answer is strong social stratification.

Additional Information

• Indus Valley Civilisation:

• The Indus Valley Civilisation, also known as the Harappan Civilisation, existed between 3300 BCE and 1300 BCE in the northwestern regions of the Indian subcontinent.

• It was characterized by advanced urban planning, including well-organized cities, drainage systems, and the use of standardized weights and measures.

• Social Stratification:

• Social stratification refers to the division of society into different hierarchical layers, often based on wealth, occupation, or access to resources.

• In the Indus Valley Civilisation, evidence of luxury items like jewellery, seals, and decorated pottery points towards a society with distinct social classes.

• Example: Artefacts found in major urban centers like Mohenjo-Daro and Harappa suggest the presence of an elite class that had access to precious goods, while simpler items were found in smaller towns.

• Key Characteristics of the Civilisation:

• The civilisation exhibited economic activities, including trade, agriculture, and crafts, which contributed to the development of social hierarchies.

• The presence of seals, weights, and jewellery indicates a structured economy and differentiation in wealth.

• Trade with regions like Mesopotamia further enriched the elite and reinforced social divisions.

Important Points

• Jewellery in the Indus Valley:

• Jewellery was made from gold, silver, and semi-precious stones like lapis lazuli, which were often imported, indicating a wealthy class involved in trade and luxury consumption.

• Small towns had access to these items, showing that stratification was not limited to urban centers but extended to rural areas as well.

• Archaeological Evidence:

• Excavations reveal differences in housing and burial practices, further indicating social stratification.

• For example, elaborate graves with ornaments contrast starkly with simple burials.

• Trade and Economy:

• Trade with Mesopotamia and other regions enriched certain groups, leading to a concentration of wealth in the hands of the elite.

• Craft production, including bead-making and metallurgy, was a key economic activity that contributed to social divisions.

Q33. Answer: (c) Cowpea seeds

The correct answer is Cowpea seeds.

Key Points

• Microgravity experiments: In 2025, the Indian Space Research Organisation (ISRO) conducted experiments in space under microgravity conditions to test the growth of seeds. Cowpea seeds were chosen for this experiment due to their resilience and adaptability.

• Importance of Cowpea seeds: Cowpea is a legume known for its ability to grow in challenging environments. Its selection for microgravity experiments highlights its potential to thrive under extreme conditions, making it suitable for space farming.

• ISRO's experiment aimed to understand how plants adapt to the absence of gravity and limited resources in space. The study of Cowpea seeds provided insights into the feasibility of growing food in extraterrestrial environments. Hence, Cowpea seeds were the correct choice for this experiment.

• Significance for space farming: Successful growth of Cowpea seeds under microgravity conditions could pave the way for sustainable food production during long-term space missions and future colonization of other planets.

• The experiment aligns with ISRO's research objectives to enhance the understanding of biological processes in space and

contribute to advancements in space agriculture. Hence, the statement related to Cowpea seeds is correct.

Additional Information

• Cowpea seeds:

• Scientific name: Vigna unguiculata.

• Features: Cowpea is a drought-resistant crop that can grow in poor soil conditions, making it ideal for challenging environments like space.

• Uses: It is a rich source of protein and carbohydrates, making it a valuable food crop.

• Applications: Cowpea is widely cultivated for food, animal feed, and soil improvement due to its nitrogen-fixing properties.

• Microgravity in space:

• Microgravity refers to the condition where gravity is extremely weak, as experienced in the orbit of Earth. It affects the growth and development of biological organisms.

• Experiments in microgravity help scientists understand how plants adapt to these conditions, which is essential for developing sustainable space agriculture.

• ISRO's contribution to space research:

• ISRO has been at the forefront of space exploration and research, contributing significantly to advancements in science and technology.

• Experiments like growing Cowpea seeds in space demonstrate ISRO’s commitment to addressing challenges related to long-term human presence in space.

Important Points

• Other seeds mentioned:

• Soya bean seeds: Known for their high protein content and used in various food products, but not chosen by ISRO for this particular experiment.

• Chickpea seeds: Another legume rich in protein, commonly grown in semi-arid regions, but not selected for the microgravity study.

• Kidney bean seeds: Popular for their nutritional value, but their adaptability in extreme conditions was not the focus of ISRO's experiment.

• Global context:

• Space agencies worldwide, such as NASA and ESA, have conducted similar experiments to explore sustainable food production in space.

• These studies contribute to the goal of supporting human life during extended space missions and potential colonization of extraterrestrial environments.

Q34. Answer: (c) Aryans

The correct answer is Aryans.

Key Points

• Aryans were Indo-European-speaking people who are said to have migrated into the Indian subcontinent during the Late Indus Valley era, around 1500 BCE.

• This migration is believed to have occurred from Central Asia, particularly regions around the Steppes. They brought with them distinct cultural practices, languages, and traditions.

• The Aryans introduced the Vedic culture, which is considered foundational to Indian civilization. Their texts, such as the Vedas, formed the basis of religious, social, and philosophical thought in ancient India.

• The migration of Aryans is supported by linguistic and archaeological evidence, linking them to the Indo-European language family and artifacts found across the subcontinent.

• This migration led to the decline of the Indus Valley Civilization and the rise of new urban and rural settlements characterized by Aryan culture. Hence, Aryans are the correct answer.

Additional Information

• Dravidas:

• The Dravidas are considered the indigenous people of southern India. They are believed to have lived in the Indian subcontinent before the arrival of the Aryans.

• Their languages, such as Tamil, Kannada, Telugu, and Malayalam, belong to the Dravidian language family, distinct from the Indo-European languages brought by the Aryans.

• Mesopotamians:

• The Mesopotamians were inhabitants of the region between the Tigris and Euphrates rivers, modern-day Iraq. They had significant trade and cultural connections with the Indus Valley Civilization, as evidenced by seals and artifacts.

• However, there is no evidence to suggest large-scale migration of Mesopotamians into India during the Late Indus Valley era.

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• Shakas:

• The Shakas were nomadic tribes from Central Asia who invaded India much later, around 2nd century BCE. They are also known as Scythians and established kingdoms in regions like Gujarat and Rajasthan.

• Their migration and influence occurred during the post-Mauryan period, making them unrelated to the Late Indus Valley era.

• Indus Valley Civilization:

• The Indus Valley Civilization (2600–1900 BCE) was one of the world's earliest urban civilizations, with advanced city planning, drainage systems, and trade networks.

• The civilization declined due to various factors, including environmental changes, floods, and possibly the arrival of the Aryans.

Important Points

• Key Characteristics of Aryans:

• The Aryans were skilled in agriculture and domestication of animals. They introduced the use of the horse and chariot in warfare.

• Their society was organized into tribes, and they practiced rituals centered around fire and the worship of natural forces like the sun, wind, and rain.

• Impact of Aryan Migration:

• The Aryans introduced the Sanskrit language, which became the medium for composing the Vedic texts.

• Their arrival marked the beginning of the Vedic Age, characterized by the formation of kingdoms, religious practices, and social hierarchies.

• The cultural and linguistic influence of Aryans can still be observed in modern Indian society.

Q35. Answer: (b) E-HANSA

The correct answer is E-HANSA.

Key Points

• E-HANSA is an indigenous electric trainer aircraft initiative launched by India in March 2025. It emphasizes the nation’s commitment to promoting green aviation.

• This aircraft is designed to be a fully electric-powered trainer, eliminating the use of fossil fuels and significantly reducing carbon emissions in the aviation sector.

• E-HANSA is a part of India's broader strategy to develop sustainable and eco-friendly aviation technologies. It aligns with global efforts to mitigate climate change and reduce the environmental impact of the aviation industry.

• The aircraft is expected to play a crucial role in training pilots for civil aviation while also serving as a platform for research and development in electric aviation technologies.

• The initiative reflects India’s focus on developing its indigenous capabilities in advanced aviation technologies and reducing reliance on foreign manufacturers.

• The development of E-HANSA is an example of India's efforts to make aviation more accessible, efficient, and environmentally friendly while also boosting its domestic aerospace industry.

• Hence, the correct answer is E-HANSA.

Additional Information

• Features of E-HANSA:

• E-HANSA is powered entirely by electric propulsion systems, utilizing advanced batteries and electric motors for energy-efficient operation.

• The aircraft is designed to minimize noise pollution and provide a quieter flying experience compared to conventional aircraft.

• It is expected to have lower operational costs due to the reduced need for fuel and maintenance.

• The aircraft is equipped with state-of-the-art cockpit technology for training purposes, ensuring a modern and safe learning environment for trainee pilots.

• Importance of Green Aviation:

• Green aviation aims to reduce greenhouse gas emissions and transition towards zero-emission aircraft.

• Electric aircraft like E-HANSA are a step forward in achieving the global aviation industry's sustainability goals.

• They also contribute to reducing dependency on fossil fuels, promoting the use of renewable energy sources.

• Other Options Explained:

• Green Hawk: While the name suggests an emphasis on green aviation, this is not the initiative launched by India in March 2025.

• Vayu: Although the name is related to aviation, it does not refer to India’s electric aircraft initiative.

• Shakti: This name is associated with other Indian projects, such as defense or energy-related initiatives, and not with green aviation.

Important Points

• Global Context:

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• Countries worldwide are investing heavily in electric aviation technologies to reduce the aviation industry's carbon footprint.

• Electric aircraft initiatives are being developed to address climate change concerns and meet international agreements like the Paris Agreement.

• Indian Government's Role:

• E-HANSA is supported by Indian government agencies and research organizations to encourage indigenous innovation.

• The initiative aligns with India's Make in India campaign and efforts to boost the domestic aerospace sector.

Q36. Answer: (d) 2015

The correct answer is 2015.

Key Points

• The Paris Agreement was adopted on December 12, 2015, during the 21st Conference of the Parties (COP21) of the United Nations Framework Convention on Climate Change (UNFCCC).

• It was a landmark global accord where 195 countries and the European Union committed to taking measures to combat climate change and limit global warming to well below 2°C above pre-industrial levels, with efforts to limit the increase to 1.5°C.

• The agreement emphasizes the need for global cooperation to reduce greenhouse gas emissions and achieve a balance between emissions and removals in the second half of the century.

• A critical aspect of the Paris Agreement is the submission of Nationally Determined Contributions (NDCs) by each country. These are individual plans outlining how countries intend to reduce their emissions and adapt to climate impacts.

• The agreement also established mechanisms for climate finance, urging developed countries to provide financial and technical support to developing nations to help them mitigate and adapt to climate change impacts.

• The Paris Agreement promotes a transparent framework for tracking progress, ensuring accountability, and enhancing ambition over time through regular reviews and updates of NDCs.

• Hence, 2015 was the correct year of adoption of the Paris Agreement.

Additional Information

• Key Features of the Paris Agreement:

• Global Temperature Goal: The agreement aims to keep the global temperature rise this century to well below 2°C and pursue efforts to limit it to 1.5°C.

• Adaptation and Resilience: It emphasizes enhancing countries' abilities to adapt to climate change effects and build resilience against its impacts.

• Climate Finance: Developed countries agreed to mobilize at least $100 billion annually by 2020 to assist developing countries in addressing climate change challenges.

• Significance of COP21:

• COP21 marked a turning point in global climate action, as it brought almost every country together under a single framework to combat climate change.

• It replaced the Kyoto Protocol, which had limited participation and focused only on developed countries, with a more inclusive and comprehensive approach.

• Nationally Determined Contributions (NDCs):

• NDCs are the cornerstone of the Paris Agreement. They are updated every five years to reflect increased ambition and progress.

• Countries are required to submit their NDCs, detailing targets for reducing greenhouse gas emissions, adaptation strategies, and financial commitments.

Important Points

• Previous Climate Agreements:

• Kyoto Protocol (1997): Focused on legally binding emission reduction targets for developed countries, but it excluded developing nations like India and China.

• UNFCCC (1992): Laid the foundation for global climate cooperation but lacked concrete emission reduction targets.

• Global Impact:

• The Paris Agreement has inspired countries to adopt renewable energy, enhance energy efficiency, and invest in green technologies.

• It has also driven corporations and non-state actors to align with climate goals, fostering innovation and sustainable practices.

Q37. Answer: (d) Dharma Guardian

The correct answer is Dharma Guardian.

Key Points

• Dharma Guardian is an annual joint military exercise conducted between the Indian Army and the Japan Ground Self-Defense Force (JGSDF).

• The exercise is aimed at enhancing interoperability, mutual understanding, and cooperation between the armies of India and Japan.

• The sixth edition of the exercise is scheduled to be held near Mount Fuji in 2025. This demonstrates the strong defense ties and growing strategic partnership between the two nations.

• The exercise includes training on various aspects such as counter-terrorism operations, disaster management, and other military drills to ensure better coordination in joint operations.

• India and Japan share common interests in ensuring peace and stability in the Indo-Pacific region, and this exercise significantly contributes to strengthening defense cooperation. Hence, the correct answer is Dharma Guardian.

Additional Information

• Other Joint Military Exercises:

• Maitree: A bilateral military exercise conducted between the armies of India and Thailand. It focuses on counter-terrorism operations in urban and rural environments.

• Shakti: A military exercise between India and France. It is aimed at enhancing interoperability and conducting joint counter-terrorism operations.

• Indra: A bilateral military exercise between India and Russia. It covers counter-terrorism operations and promotes strategic cooperation.

• Significance of Dharma Guardian:

• It strengthens the defense partnership and enhances the capability of both forces to conduct joint operations.

• The exercise contributes to regional security, especially in the Indo-Pacific region.

• Both nations collaborate on counter-terrorism drills and disaster response mechanisms, ensuring mutual preparedness.

Important Points

• Defense Cooperation between India and Japan:

• India and Japan share a common vision of ensuring peace and stability in the Indo-Pacific region. Their defense cooperation has grown significantly over the years.

• Dharma Guardian is a reflection of their commitment to strengthening bilateral ties and addressing common security concerns.

• Key Outcomes of Joint Exercises:

• Such exercises enhance mutual understanding and interoperability between armies, fostering trust and cooperation.

• They prepare forces to deal with common challenges like terrorism, natural disasters, and ensure joint preparedness.

Q38. Answer: (a) Austria

The correct answer is Austria.

Key Points

• Christian Stalker is the Federal Chancellor of Austria, which is a parliamentary representative democracy located in Europe.

• The role of the Federal Chancellor in Austria is primarily executive, and the Chancellor is the head of government, responsible for forming government policies and overseeing administrative functions.

• Austria operates under a federal system, and the Chancellor collaborates with the President (head of state) and other ministers to ensure smooth governance. Hence, the statement is correct.

• The Federal Chancellor is appointed by the President of Austria, typically the leader of the party or coalition that has majority support in the parliament.

• Austria is known for its stable political structure, and the Federal Chancellor plays a vital role in maintaining this stability. Hence, the statement is correct.

• Christian Stalker is associated with Austria's governance, which emphasizes democratic values, international cooperation, and economic development.

• Austria is located in Central Europe and has a rich historical and cultural heritage, which influences its governance model. Hence, the statement is correct.

• Hence, the correct answer is Austria.

Additional Information

• Austria:

• Austria is a landlocked country in Central Europe, bordered by countries like Germany, Hungary, Switzerland, and Italy.

• It is known for its economic stability, high standard of living, and cultural richness, including contributions to music, art, and architecture.

• The Austrian political system is based on a parliamentary democracy, where the Federal Chancellor leads the government and oversees policy implementation.

• Role of Federal Chancellor:

• The Chancellor is the head of government, responsible for coordinating with other ministers and ensuring efficient governance.

• The Chancellor's role is significant in addressing national issues like economic policies, foreign relations, and social welfare.

• In Austria, the Chancellor's office is prestigious and symbolizes the democratic functioning of the government.

• Political Stability in Austria:

• Austria has a long history of political stability and international cooperation, being a member of organizations like the European Union (EU), the United Nations (UN), and the Organization for Security and Co-operation in Europe (OSCE).

• Its governance model is admired globally for balancing regional autonomy with centralized decision-making.

Important Points

• Key Facts about Austria:

• Austria's capital is Vienna, which is also a major cultural and political hub in Europe.

• The country is known for its strong economy, driven by industries such as tourism, manufacturing, and technology.

• Languages: The official language is German, but English is widely spoken.

• Geography: Austria is famous for its Alpine mountains, attracting millions of tourists annually.

Q39. Answer: (b) Article 20

The correct answer is Article 20.

Key Points

• Article 20 of the Indian Constitution provides protection in respect of conviction for offenses and includes provisions against double jeopardy and self-incrimination.

• Clause (1): Protection against ex-post facto laws: No person shall be convicted of any offense except for the violation of a law that was in force at the time of the commission of the act. This means that laws cannot be applied retrospectively to penalize actions that were legal at the time they were committed. Correct statement.

• Clause (2): Protection against double jeopardy: No person shall be prosecuted and punished for the same offense more than once. This ensures that individuals cannot face repeated trials or penalties for the same offense, maintaining fairness in the legal process. Correct statement.

• Clause (3): Protection against self-incrimination: No person accused of any offense shall be compelled to be a witness against themselves. This clause secures the fundamental right to silence and prevents forced confessions or self-incriminating evidence. Correct statement.

• Scope and applicability: Article 20 applies to criminal offenses and protects individuals from unjust legal practices. It is considered one of the essential provisions safeguarding personal liberty and fairness in legal proceedings.

• Hence, the correct answer is Article 20.

Additional Information

• Article 22:

• deals with protection against arbitrary arrest and detention. It guarantees rights such as being informed of the grounds of arrest, the right to consult a lawyer, and being presented before a magistrate within 24 hours of arrest.

• It also provides for preventive detention but sets limits on its duration and safeguards against its misuse.

• Article 23:

• prohibits human trafficking, forced labor, and begar (compulsory unpaid labor). It protects individuals from exploitation and ensures dignity in labor.

• However, the Constitution allows the state to impose compulsory service for public purposes, provided it does not discriminate on grounds like religion or caste.

• Article 21:

• guarantees the protection of life and personal liberty. It ensures that no person is deprived of their life or liberty except according to the procedure established by law.

• It is a broad provision and encompasses rights such as the right to privacy, the right to a dignified life, and the right to health, among others.

Important Points

• Double Jeopardy:

• Double jeopardy is derived from Article 20(2). It protects individuals from being punished twice for the same offense.

• This principle is also recognized internationally under the Universal Declaration of Human Rights (1948).

• Self-Incrimination:

• The protection against self-incrimination under Article 20(3) is similar to the Fifth Amendment of the United States Constitution.

• This provision ensures that individuals are not forced to provide evidence against themselves during legal proceedings, preserving fairness and justice.

• Ex-post facto laws:

• The prohibition against ex-post facto laws under Article 20(1) ensures that individuals cannot be penalized retroactively for

actions that were not illegal at the time they were committed.

• However, this protection applies only to criminal laws and not civil laws.

Q40. Answer: (d) Chemical weathering

The correct answer is Chemical weathering.

Key Points

• Chemical weathering is primarily responsible for the enrichment of bauxite and other ores. It involves the decomposition or alteration of minerals in rocks due to chemical reactions with water, air, or other substances.

• Bauxite is formed through the intense chemical weathering of rocks containing aluminum silicates, such as granite or basalt, under tropical or subtropical conditions.

• Leaching: The process of chemical weathering removes soluble materials like silica and iron oxides, leaving behind insoluble compounds like aluminum hydroxides, which eventually form bauxite.

• Role of water: Rainwater plays a significant role in chemical weathering by reacting with minerals in rocks, facilitating the formation of ores like bauxite.

• Chemical weathering is more effective in regions with a warm and humid climate, as these conditions accelerate the reactions necessary for ore enrichment.

• The main chemical processes involved in chemical weathering are oxidation, hydrolysis, and carbonation. These processes break down the original minerals and concentrate certain elements to form ore deposits.

• Hence, the correct answer is Chemical weathering.

Additional Information

• About Bauxite:

• Bauxite is the primary ore of aluminum. It is composed mainly of aluminum hydroxide minerals, including gibbsite, boehmite, and diaspore.

• It is found in regions with tropical and subtropical climates, where chemical weathering is intense.

• Major producers: Countries like Australia, Guinea, Brazil, and India are among the largest producers of bauxite.

• Types of Weathering:

• Mechanical weathering: This involves the physical breakdown of rocks into smaller fragments without any chemical change. Examples include frost action, thermal expansion, and abrasion. It does not contribute to the enrichment of ores like bauxite.

• Glacial weathering: This occurs due to the movement of glaciers, which erode and transport materials. It does not play a role in ore enrichment.

• Biological weathering: This involves the breakdown of rocks due to biological activity, such as root growth or microbial processes. While it contributes to weathering, it is not the primary process for ore formation.

• Chemical weathering processes:

• Oxidation: Oxygen reacts with minerals, leading to the formation of oxides, such as iron oxides.

• Hydrolysis: Water reacts with minerals, breaking them down into new compounds, such as aluminum hydroxides.

• Carbonation: Carbon dioxide dissolves in water to form carbonic acid, which reacts with minerals to produce soluble bicarbonates.

Important Points

• Bauxite deposits:

• Bauxite deposits are typically found in areas with high rainfall, warm temperatures, and good drainage, which promote the leaching process.

• India's reserves: In India, major bauxite reserves are found in Odisha, Andhra Pradesh, Gujarat, and Jharkhand.

• Applications of Bauxite:

• Bauxite is primarily used in the production of aluminum, refractories, abrasives, cement, and chemicals.

• Aluminum industries: Aluminum extracted from bauxite is used in transportation, construction, packaging, and electrical industries.

Q41. Answer: (b) 34.82

Shortcut Trick

Let the assumed overall average be 43 (which is the average of the first 23 matches).

Deviation of the next 10 matches from assumed average = 16 − 43 = −27 runs per match.

Total deviation for these 10 matches = 10 × (−27) = −270 runs.

Net deviation per match spread across all 33 matches = −270 ÷ 33 ≈ −8.18 runs.

Overall average = 43 − 8.18 = 34.82 runs.

Therefore The correct answer is 34.82 runs.

Alternate Method

Given:

Average runs in the first 23 matches (n1) = 43

Average runs in the next 10 matches (n2) = 16

Formula Used:

Combined Average = (n1x1 + n2x2) ÷ (n1 + n2)

Combined Average Model

n1 = 23 Matches

Avg1 = 43

n2 = 10 Matches

Avg2 = 16

Overall Avg = 34.82

Calculations:

=> Total runs in the first 23 matches = 23 × 43 = 989 runs

=> Total runs in the next 10 matches = 10 × 16 = 160 runs

=> Total matches played = 23 + 10 = 33 matches

=> Total runs scored in all 33 matches = 989 + 160 = 1149 runs

=> Overall Average = 1149 ÷ 33

=> Overall Average = 383 ÷ 11 ≈ 34.8181... runs

=> Rounding off to two decimal places, we get 34.82 runs.

Therefore The correct answer is 34.82 runs.

Additional Information

Combined Average

When one group of n1 items has an average x1 and another group of n2 items has an average x2, the total combined average of both groups is calculated using the formula: (n1x1 + n2x2) ÷ (n1 + n2).

Deviation Method

To simplify calculations, assume a base average and find the net deviation of the remaining values. The final correct average equals Assumed Average ± (Total Net Deviation ÷ Total Elements).

Properties of Average

If every observation in a dataset is increased, decreased, multiplied, or divided by a constant value 'k', the new average undergoes the exact same mathematical operation with the constant 'k'.

Q42. Answer: (a) 11.49

Shortcut Trick

Recognize the perfect squares and halve the decimal places for roots.

=> √196 = 14

=> √0.0361 = 0.19

=> √7.29 = 2.7

=> 14 + 0.19 − 2.7 = 14.19 − 2.7 = 11.49

Therefore The correct answer is 11.49.

Alternate Method

Given:

Expression = √196 + √0.0361 − √7.29

Calculations:

=> √196 = 14

=> √0.0361 = √(361 ÷ 10000) = 19 ÷ 100 = 0.19

=> √7.29 = √(729 ÷ 100) = 27 ÷ 10 = 2.7

=> Expression = 14 + 0.19 − 2.7

=> 14.19 − 2.7

=> 11.49

Therefore The correct answer is 11.49.

Additional Information

Perfect Squares

Memorizing perfect squares up to 30 helps in faster calculation (e.g., $14^2 = 196$, $19^2 = 361$, $27^2 = 729$).

Square Roots of Decimals

Count the total decimal places in the given number. In the square root, the number of decimal places becomes exactly half. For example, 4 decimal places in 0.0361 become 2 decimal places in 0.19.

Simplification Rules

Always follow the BODMAS rule (Brackets, Orders, Division/Multiplication, Addition/Subtraction) to evaluate mathematical expressions systematically.

Q43. Answer: (a) 13872

Shortcut Trick

Volume of a single cube = $a^3 = 39304$ => side a = 34 cm.

When 5 identical cubes are joined in a straight row to form a cuboid, the visible lateral surface consists of exactly 12 square faces of the original cubes.

(5 faces on the front, 5 on the back, 1 on the left end, and 1 on the right end).

Lateral Surface Area = $12a^2 = 12 \times (34)^2$

LSA = $12 \times 1156 = 13872$ cm².

Therefore The correct answer is 13872 cm².

Alternate Method

Given:

Volume of each cube = 39304 cm³

Number of cubes joined = 5

Formula Used:

Volume of a cube = a^3

Lateral Surface Area (LSA) of a cuboid = 2H(L + B)

Cuboid Formed by 5 Joined Cubes

34

34

34

34

34

L = 170 cm

H = 34

B = 34

Calculations:

=> $a^3 = 39304$

=> $a = \sqrt[3]{39304} = 34$ cm

When 5 identical cubes are joined horizontally end to end, the dimensions of the newly formed cuboid are:

=> Length (L) = $5 \times 34 = 170$ cm

=> Breadth (B) = 34 cm

=> Height (H) = 34 cm

Using the standard LSA formula:

=> LSA = $2 \times 34 \times (170 + 34)$

=> LSA = 68×204

=> LSA = 13872 cm²

Therefore The correct answer is 13872 cm².

Additional Information

Properties of a Cuboid

For a standard cuboid of length L, breadth B, and height H: Lateral Surface Area = 2H(L + B), Total Surface Area = 2(LB + BH + HL), and Volume = L × B × H.

Properties of a Cube

For a cube of side a: Lateral Surface Area = $4a^2$, Total Surface Area = $6a^2$, Volume = a^3, and Body Diagonal = $a\sqrt{3}$.

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Joining Cubes Rule

When 'n' identical cubes of side 'a' are placed adjacently in a single horizontal row, the resulting shape is a cuboid where Length = n × a, while the Breadth and Height strictly remain equal to 'a'.

Finding Cube Roots Shortcut

For large perfect cubes, the unit digit maps consistently (e.g., perfect cube ending in 4 has a cube root ending in 4). The tens digit is simply the cube root of the largest perfect cube smaller than the remaining part of the number after ignoring the last 3 digits.

Q44. Answer: (d) 5247/505 hours

Shortcut Trick

Total work = LCM(18, 28, 11) = 2772 units.

Combined efficiency = (2772 ÷ 18) + (2772 ÷ 28) + (2772 ÷ 11) = 154 + 99 + 252 = 505 units/hr.

Time taken together = Total work ÷ Combined efficiency = 2772 ÷ 505 hours.

2772 ÷ 505 = 5 247/505 hours.

Therefore The correct answer is 5 247/505 hours.

Alternate Method

Given:

=> Time taken by Pipe A = 18 hours

=> Time taken by Pipe B = 28 hours

=> Time taken by Pipe C = 11 hours

Pipe	Hours	Total Work	Efficiency
Pipe A	18	2772	154
Pipe B	28	99	
Pipe C	11	252	

=> Total Efficiency of Pipe A, Pipe B, and Pipe C = 154 + 99 + 252 = 505 units/hr

=> Time taken to fill the tank together = Total Work ÷ Total Efficiency

=> Time taken = 2772 ÷ 505 hours = 5 247/505 hours

Therefore The correct answer is 5 247/505 hours.

Additional Information

Pipes and Cisterns

Similar to time and work, the only difference is that an inlet pipe has a positive efficiency while an outlet pipe (leak) has a negative efficiency.

Work and Wages

Wages are strictly distributed in proportion to the total work done by each individual. If they work for the exact same duration, the wage ratio is directly equal to their efficiency ratio.

Alternate Working Cycles

When pipes operate on alternate hours, calculate the net work done in one complete cycle (e.g., 2 hours for 2 pipes). Multiply this cycle to get close to the total work, then calculate the remaining work for the next specific turn.

Q45. Answer: (d) $(P^2 - 1)/2P$

Shortcut Trick

Use the value-putting method by assuming θ = 45°.

Given P = tan(45°) + sec(45°) = 1 + √2

We need to find the value of tan(45°) = 1.

Now check the options using P = 1 + √2 to see which yields 1.

=> $(P^2 - 1) / 2P = ((1 + \sqrt{2})^2 - 1) / 2(1 + \sqrt{2}) = (3 + 2\sqrt{2} - 1) / (2 + 2\sqrt{2}) = 1$.

Therefore The correct answer is $(P^2 - 1) / 2P$.

Alternate Method

Given:

$P = \sec\theta + \tan\theta$ — (1)

Formula Used:

$\sec^2\theta - \tan^2\theta = 1$

Calculation:

=> $(\sec\theta - \tan\theta)(\sec\theta + \tan\theta) = 1$

=> $(\sec\theta - \tan\theta) \times P = 1$

=> $\sec\theta - \tan\theta = 1/P$ — (2)

Subtracting equation (2) from equation (1):

=> $(\sec\theta + \tan\theta) - (\sec\theta - \tan\theta) = P - 1/P$

=> $2\tan\theta = (P^2 - 1) / P$

=> $\tan\theta = (P^2 - 1) / 2P$

Therefore The correct answer is $(P^2 - 1) / 2P$.

Additional Information

Reciprocal Trigonometric Identities

From the identity $\sec^2\theta - \tan^2\theta = 1$, we get $\sec\theta - \tan\theta = 1 / (\sec\theta + \tan\theta)$.

Similar Identity for Cosecant and Cotangent

From $\csc^2\theta - \cot^2\theta = 1$, we similarly get $\csc\theta - \cot\theta = 1 / (\csc\theta + \cot\theta)$.

Finding Secant

By adding the two equations $\sec\theta + \tan\theta = P$ and $\sec\theta - \tan\theta = 1/P$, we get $\sec\theta = (P^2 + 1) / 2P$.

Q46. Answer: (d) 11:13 AM

Shortcut Trick

Total travel time for Train A = 9 hours, and Train B = 6 hours.

Let total distance = LCM(9, 6) = 18 units.

Speed of A = 18 ÷ 9 = 2 units/hr | Speed of B = 18 ÷ 6 = 3 units/hr.

Train A travels alone for 2 hours (6:25 AM to 8:25 AM) covering 4 units, leaving 14 units remaining.

Time to meet after 8:25 AM = Remaining Distance ÷ Relative Speed = 14 ÷ (2 + 3) = 2.8 hours = 2 hours 48 minutes.

Meeting time = 8:25 AM + 2 hours 48 minutes = 11:13 AM.

Therefore The correct answer is 11:13 AM.

Alternate Method

Given:

Train A leaves Station M at 6:25 AM and reaches Station N at 3:25 PM.

Train B leaves Station N at 8:25 AM and reaches Station M at 2:25 PM.

Station M

6:25 AM

Station N

8:25 AM

Meeting Point

11:13 AM

8:25 AM

4 units

14 units (Relative Speed = 5 u/h)

Train A

Sp: 2 u/h

Train B

Sp: 3 u/h

Formula Used:

Distance = Speed × Time

Relative Speed = S1 + S2 (for opposite directions)

Calculations:

=> Total time taken by Train A (from 6:25 AM to 3:25 PM) = 9 hours

=> Total time taken by Train B (from 8:25 AM to 2:25 PM) = 6 hours

=> Let the total distance between Station M and Station N be the LCM of 9 and 6 = 18 units

=> Speed of Train A = Total Distance ÷ Time taken = 18 ÷ 9 = 2 units/hr

=> Speed of Train B = Total Distance ÷ Time taken = 18 ÷ 6 = 3 units/hr

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=> Train A starts 2 hours earlier than Train B. Distance covered by Train A in these 2 hours = 2 × 2 = 4 units

=> Remaining distance at 8:25 AM = 18 − 4 = 14 units

=> Relative Speed when both trains are moving = Speed of A + Speed of B = 2 + 3 = 5 units/hr

=> Time required to meet after 8:25 AM = Remaining Distance ÷ Relative Speed = 14 ÷ 5 = 2.8 hours

=> 2.8 hours = 2 hours + (0.8 × 60) minutes = 2 hours 48 minutes

=> Time of meeting = 8:25 AM + 2 hours 48 minutes = 11:13 AM

Therefore The correct answer is 11:13 AM.

Additional Information

Relative Speed (Opposite Directions)

When two objects travel towards each other, their relative speed is the sum of their individual speeds. Relative Speed = S1 + S2.

Relative Speed (Same Direction)

When two objects travel in the same direction, their relative speed is the difference between their individual speeds. Relative Speed = |S1 − S2|.

Time Taken to Meet

The meeting time of two moving bodies depends solely on the initial distance separating them and their relative speed: Time = Separation Distance ÷ Relative Speed.

Q47. Answer: (d) 19

Shortcut Trick

In a given data set, the mode is the value that occurs with the highest frequency.

By visually scanning the given numbers: 17, 19, 12, 20, 19, 14, 15, 18, 19, 14

We can easily see that the number 19 appears most frequently (3 times).

Therefore The correct answer is 19 marks.

Alternate Method

Given:

Marks scored by 10 students: 17, 19, 12, 20, 19, 14, 15, 18, 19, 14

Concept Used:

The mode of a set of statistical data is the observation that occurs most frequently in the set.

1

2

3

12

14

15

17

18

19

20

Marks

Frequency

Calculations:

=> First, arrange the given marks in ascending order to easily count the frequencies:

=> 12, 14, 14, 15, 17, 18, 19, 19, 19, 20

=> Frequency of 12 = 1

=> Frequency of 14 = 2

=> Frequency of 15 = 1

=> Frequency of 17 = 1

=> Frequency of 18 = 1

=> Frequency of 19 = 3

=> Frequency of 20 = 1

=> Since 19 has the maximum frequency (3 times), it is the mode of the given data.

Therefore The correct answer is 19 marks.

Additional Information

Mean

The mean is the arithmetic average of a data set, calculated by dividing the sum of all observations by the total number of observations.

Median

The median is the exact middle value of a data set when arranged in ascending or descending order. If the number of observations is even, it is the average of the two middle values.

Empirical Relationship

For a moderately skewed distribution, the relationship between mean, median, and mode is approximately given by: Mode ≈ 3 × Median − 2 × Mean.

Bimodal Data

If a data set has two distinct values that tie for the highest frequency, the distribution is called bimodal, and both values are considered modes.

Q48. Answer: (b) 35

Shortcut Trick

The sum of all exterior angles of any convex polygon is always 360°.

According to the given condition, Sum of interior angles = 4 × 360° = 1440°.

The number of sides of the polygon (n) = (1440° ÷ 180°) + 2 = 8 + 2 = 10 sides.

Number of diagonals in an n-sided polygon = n(n − 3) ÷ 2.

For n = 10, Number of diagonals = 10 × (10 − 3) ÷ 2 = 10 × 7 ÷ 2 = 35.

Therefore The correct answer is 35 diagonals.

Alternate Method

Given:

Sum of interior angles of the regular polygon = 4 × Sum of its exterior angles

Formula Used:

For an n-sided regular polygon:

Sum of interior angles = (n − 2) × 180°

Sum of exterior angles = 360°

Number of diagonals = n(n − 3) ÷ 2

For an n-sided regular polygon:

=> Sum of Interior Angles = (n − 2) × 180°

=> Sum of Exterior Angles = 360°

Given Condition:

Interior Sum = 4 × Exterior Sum

Calculations:

=> According to the condition given in the question:

=> (n − 2) × 180° = 4 × 360°

=> n − 2 = (4 × 360°) ÷ 180°

=> n − 2 = 4 × 2

=> n − 2 = 8

=> n = 8 + 2

=> n = 10 (The polygon is a decagon)

=> Number of diagonals = n(n − 3) ÷ 2

=> Number of diagonals = 10 × (10 − 3) ÷ 2

=> Number of diagonals = 10 × 7 ÷ 2

=> Number of diagonals = 70 ÷ 2

=> Number of diagonals = 35

Therefore The correct answer is 35 diagonals.

Additional Information

Interior Angle of a Regular Polygon

Each interior angle of a regular polygon with n sides is calculated as [(n − 2) × 180°] ÷ n.

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Exterior Angle of a Regular Polygon

Each exterior angle of a regular polygon with n sides is calculated as 360° ÷ n. The sum of an interior angle and its corresponding exterior angle is always exactly 180°.

Total Sum of Exterior Angles

For any convex polygon, regardless of the number of sides it has, the total sum of all its exterior angles is a constant 360°.

Number of Diagonals

A diagonal is a line segment connecting any two non-consecutive vertices of a polygon. The total number of distinct diagonals that can be drawn in an n-sided polygon is found using the formula n(n − 3) ÷ 2.

Q49. Answer: (a) $4x^2 - 3x + 8$

Shortcut Trick

Expand and simplify the given expression mentally in one step:

=> $2x^2 − 3x + 2x^2 − 8 + 16$

Combine the identical terms:

=> $4x^2 − 3x + 8$

Therefore The correct answer is $4x^2 − 3x + 8$.

Alternate Method

Given:

The algebraic expression is $x(2x − 3) + 2(x^2 − 4) + 16$

Calculation:

=> Expression = $x(2x − 3) + 2(x^2 − 4) + 16$

Opening the brackets by multiplying terms:

=> Expression = $(2x^2 − 3x) + (2x^2 − 8) + 16$

Grouping the similar terms together:

=> Expression = $(2x^2 + 2x^2) − 3x + (−8 + 16)$

Adding and subtracting the values:

=> Expression = $4x^2 − 3x + 8$

Therefore The correct answer is $4x^2 − 3x + 8$.

Additional Information

Distributive Property

It states that a(b + c) = ab + ac. This property is used to expand algebraic expressions and remove parentheses to solve the equations easily.

Like Terms

Terms with identical variables and exponents are called like terms, such as $2x^2$ and $3x^2$. Only like terms can be added or subtracted directly from one another.

BODMAS Rule

When solving multiple mathematical operations, standard priority is always followed: Brackets, Orders (powers/roots), Division, Multiplication, Addition, and Subtraction.

Q50. Answer: (b) Rs. 18,700

Shortcut Trick

SP = MP × Multiplying factors of consecutive discounts

SP = 25000 × (100 − 15)% × (100 − 12)%

SP = 25000 × (85/100) × (88/100)

SP = 25000 × (17/20) × (22/25) = 50 × 374 = 18700

Therefore The correct answer is Rs. 18,700.

Alternate Method

Given:

Marked Price (MP) = Rs. 25,000

Successive discounts = 15% and 12%

Formula Used:

Equivalent Discount % = X + Y − (X × Y) / 100

SP = MP × (100 − Equivalent Discount) / 100

Successive Discount Flow

MP

Rs. 25,000

−15%

SP1

Rs. 21,250

−12%

Final SP

Rs. 18,700

Calculations:

=> Equivalent Discount = 15 + 12 − (15 × 12) / 100

=> Equivalent Discount = 27 − 1.8 = 25.2%

=> Final Selling Price = MP × (100 − Equivalent Discount) / 100

=> SP = 25000 × (100 − 25.2) / 100

=> SP = 25000 × (74.8 / 100)

=> SP = 250 × 74.8 = 18700

Therefore The correct answer is Rs. 18,700.

Additional Information

Successive Discount

When two discounts of X% and Y% are applied consecutively, the equivalent single discount is given by: D = X + Y − (X × Y) / 100.

Marked Price & Selling Price

Discount is always calculated on the Marked Price (MP). The Selling Price (SP) is obtained by subtracting the discount from the MP: SP = MP × (100 − Discount%) / 100.

Three Successive Discounts

For three consecutive discounts d1, d2, and d3, calculate the equivalent of the first two, then combine the result with the third discount using the same formula.

Q51. Answer: (d) 700

Shortcut Trick

Using the Alligation Method on Profit & Loss percentages:

Loss on 1st = −10%, Gain on 2nd = +14%, Net = 0%

Ratio of Cost Prices = (14 − 0) : (0 − (−10)) = 14 : 10 = 7 : 5

Total ratio parts = 7 + 5 = 12 parts

CP of 1st Pendant = (7 / 12) × 1200 = 700

Therefore The correct answer is Rs. 700.

Alternate Method

Given:

Total Cost Price of two pendants = Rs. 1,200

Loss on 1st Pendant = 10%

Gain on 2nd Pendant = 14%

Overall transaction yields neither loss nor gain (Net = 0).

1st Pendant

2nd Pendant

−10%

+14%

0%

14

10

Ratio = 7 : 5

Calculations:

=> Since there is neither loss nor gain, the absolute loss on the first item is equal to the absolute gain on the second item.

=> 10% of CP1 = 14% of CP2

=> 10 × CP1 = 14 × CP2

=> CP1 / CP2 = 14 / 10

=> CP1 : CP2 = 7 : 5

=> Let CP1 = 7x and CP2 = 5x

=> Total Cost Price = 7x + 5x = 12x

=> 12x = 1200

=> x = 100

=> Cost Price of 1st Pendant (CP1) = 7 × 100 = 700

Therefore The correct answer is Rs. 700.

Additional Information

Alligation in Profit & Loss

When two items are sold at varying profit/loss percentages, alligation yields the ratio of their Cost Prices: (P2 − Net) : (Net − P1).

No Profit No Loss Principle

When an overall transaction yields zero net change, the absolute numerical value of the loss on one part perfectly offsets the absolute gain on the other, establishing a direct inverse ratio of their rates.

Cost Price from Ratios

If Total CP = T, and CP1 : CP2 = a : b, then CP1 = T × [a / (a + b)] and CP2 = T × [b / (a + b)].

Q52. Answer: (b) 28 min

Shortcut Trick

Time taken by inlet pipes A and B together = (36 × 45) ÷ (36 + 45) = 1620 ÷ 81 = 20 min.

Let C be the time taken by the emptying pipe alone.

Combined net work of all pipes = 1/20 − 1/C = 1/70

=> 1/C = 1/20 − 1/70 = (7 − 2)/140 = 5/140 = 1/28

Therefore The correct answer is 28 min.

Alternate Method

Given:

Pipe A fills the cistern in 36 min.

Pipe B fills the cistern in 45 min.

Pipes A, B, and C together fill the cistern in 70 min.

Pipe	Time (min)	Total Work	Efficiency
A	36	1260	35
B	45	28	
A + B + C	70	18	

Calculations:

=> Efficiency of (A + B + C) = 18

=> Efficiency of A + Efficiency of B + Efficiency of C = 18

=> 35 + 28 + Efficiency of C = 18

=> 63 + Efficiency of C = 18

=> Efficiency of C = 18 − 63 = −45

(The negative sign indicates that C is an emptying pipe)

=> Time taken by C to empty the cistern = Total Work ÷ Efficiency of C

=> Time taken = 1260 ÷ 45 = 28 min

Therefore The correct answer is 28 min.

Additional Information

Pipes and Cisterns Basics

If a pipe can fill a tank in x hours, its efficiency is +1/x. If a pipe empties a tank in y hours, its efficiency is −1/y.

Combined Rate

If two inlet pipes fill a tank in x and y minutes respectively, their combined time to fill the tank is (x × y) ÷ (x + y) minutes.

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Emptying Rate

When both inlet and outlet pipes are open, the net filling rate is (Sum of inlet rates) − (Sum of outlet rates). A negative net rate means the tank is being emptied.

Q53. Answer: (b) Rs. 400

Shortcut Trick

Discount = 20% = 1 ÷ 5 (where MP is 5 units, Discount is 1 unit)

Selling Price (SP) = 5 − 1 = 4 units

Given 5 units = Rs. 500

=> 1 unit = 500 ÷ 5 = Rs. 100

=> SP (4 units) = 4 × 100 = Rs. 400

Therefore The correct answer is Rs. 400.

Alternate Method

Given:

Marked Price (MP) = Rs. 500

Discount Percentage = 20%

Formula Used:

Discount Value = MP × (Discount% ÷ 100)

Selling Price (SP) = MP − Discount Value

MP = Rs. 500

SP = ?

(Rs. 400)

− 20% Discount

− Rs. 100

Calculations:

=> Discount Value = 500 × (20 ÷ 100)

=> Discount Value = Rs. 100

=> SP = 500 − 100

=> SP = Rs. 400

Therefore The correct answer is Rs. 400.

Additional Information

Marked Price (MP)

It is the price on the label of an article. Any discount offered to the customer is always calculated strictly on the Marked Price.

Successive Discounts

If two successive discounts of a% and b% are given, the equivalent single discount percentage is computed as: (a + b − a × b ÷ 100)%.

Direct Formula for CP and MP Relation

The direct ratio between Cost Price (CP) and Marked Price (MP) is derived as: CP ÷ MP = (100 − Discount%) ÷ (100 + Profit%).

Q54. Answer: (d) 18 hours

Shortcut Trick

When distance is constant, Speed and Time are inversely proportional.

Speed Ratio (Ishaan : Meghna) = 90 : 65 = 18 : 13

Time Ratio (Ishaan : Meghna) = 13 : 18

Since Ishaan takes 13 parts, which corresponds to exactly 13 hours,

Meghna will take 18 parts = 18 hours.

Therefore The correct answer is 18 hours.

Alternate Method

Delhi

Kanpur

Ishaan: 90 km/hr | 13 hrs

Meghna: 65 km/hr | ? hrs

Distance = Speed × Time (Constant)

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Given:

Ishaan's speed = 90 km/hr, Time taken by Ishaan = 13 hours

Meghna's speed = 65 km/hr

Formula Used:

Distance = Speed × Time

Time = Distance ÷ Speed

Calculations:

=> Total Distance = Ishaan's Speed × Ishaan's Time

=> Total Distance = 90 × 13 = 1170 km

=> Time taken by Meghna = Total Distance ÷ Meghna's Speed

=> Time taken by Meghna = 1170 ÷ 65

=> Time taken by Meghna = 18 hours

Therefore The correct answer is 18 hours.

Additional Information

Inverse Proportion of Speed and Time

When the distance covered is constant, the speed of an object is inversely proportional to the time taken (S prop. to 1/T). Hence, S1/S2 = T2/T1.

Relative Speed

When two bodies move in the same direction, their relative speed is |S1 − S2|. When moving in opposite directions, relative speed is S1 + S2.

Average Speed

Average Speed is calculated as Total Distance ÷ Total Time. If two equal distances are covered at speeds a and b, Average Speed = (2ab) ÷ (a + b).

Q55. Answer: (a) 83/132

Shortcut Trick

Simplify the denominator inside the bracket first: 1 + 5/6 = 11/6.

The reciprocal of this fraction becomes 6/11.

The expression simplifies to: 4/3 + 6/11 − 5/4.

The LCM of 3, 11, and 4 is 132.

Value = (176 + 72 − 165) / 132 = 83 / 132.

Therefore The correct answer is 83/132.

Alternate Method

Given:

4/3 + [1 / (1 + 5/6)] − 5/4

Calculations:

=> 4/3 + [1 / ((6 + 5) / 6)] − 5/4

=> 4/3 + [1 / (11/6)] − 5/4

=> 4/3 + 6/11 − 5/4

Taking the LCM of the denominators 3, 11, and 4, which is 132:

=> (4 × 44) / 132 + (6 × 12) / 132 − (5 × 33) / 132

=> 176 / 132 + 72 / 132 − 165 / 132

=> (176 + 72 − 165) / 132

=> (248 − 165) / 132

=> 83 / 132

Therefore The correct answer is 83/132.

Additional Information

BODMAS Rule

Mathematical expressions must be solved strictly in the sequence of Brackets, Orders (powers/roots), Division, Multiplication, Addition, and Subtraction to avoid calculation errors.

Reciprocal of a Fraction

The reciprocal of a fraction a/b is b/a. Whenever 1 is divided by any fraction, the result is equal to its exact reciprocal.

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Addition and Subtraction of Fractions

Fractions can only be added or subtracted directly if they have a common denominator. Always find the Least Common Multiple (LCM) of all denominators to align their base values.

Q56. Answer: (c) 2000

Shortcut Trick

When a number is increased by 70%, it becomes 170% of itself.

Given that 170% of the number = 3400

1% of the number = 3400 ÷ 170 = 20

100% (the original number) = 20 × 100 = 2000

Therefore The correct answer is 2000.

Alternate Method

Given:

A number, when increased by 70%, gives 3400.

Formula Used:

Final Value = Original Value + (Percentage Increase × Original Value)

Original (100%)

• 70%

Total = 170% = 3400

Percentage Increase Visualisation

Calculations:

Let the original number be x.

=> x + (70% of x) = 3400

=> x + (70 ÷ 100) × x = 3400

=> x + 0.7x = 3400

=> 1.7x = 3400

=> x = 3400 ÷ 1.7

=> x = 2000

Therefore The correct answer is 2000.

Additional Information

Percentage Change Formula

The formula to calculate the percentage change is: ((Final Value − Initial Value) ÷ Initial Value) × 100.

Successive Percentage Change

If a number is subjected to two consecutive percentage changes of a% and b%, the effective percentage change is calculated as: (a + b + (a × b) ÷ 100)%.

Interchangeable Percentages

A helpful trick for mental math in calculating percentages is that: x% of y = y% of x.

Q57. Answer: (c) 50

Shortcut Trick

If x is the third proportional to two numbers a and b, the direct formula is $x = b^2 \div a$.

Here, the given numbers are a = 8 and b = 20.

$x = 20^2 \div 8$

x = 400 ÷ 8 = 50

Therefore The correct answer is 50.

Alternate Method

Third Proportional Concept: a : b :: b : x

8

First (a)

:

20

Second (b)

::

20
Second (b)
:
x
Third (x)
Product of Extremes = Product of Means
Given:
First number (a) = 8
Second number (b) = 20
Let the third proportional be x.
Formula Used:
When three numbers are in continuous proportion, they satisfy the relation a : b :: b : x
According to the rule of proportions, Product of extreme terms = Product of mean terms
Calculation:
=> a × x = b × b
=> 8 × x = 20 × 20
=> 8x = 400
=> x = 400 ÷ 8
=> x = 50
Therefore The correct answer is 50.
Additional Information
Mean Proportional
The mean proportional between two numbers a and b is given by the formula √(a × b).
Fourth Proportional
If four numbers a, b, c, and x are in proportion (a : b :: c : x), the fourth proportional is evaluated as x = (b × c) ÷ a.
Duplicate Ratio
The duplicate ratio of any two numbers a and b is expressed as their squares, giving $a^2 : b^2$.

Q58. Answer: (d) Rs. 615

Shortcut Trick
Profit ratio = Ratio of investments (since time is equal).
Ratio = 1190 : 1060 : 1350 = 119 : 106 : 135.
Total ratio parts = 119 + 106 + 135 = 360.
Isha's share = (135 ÷ 360) × Total Profit.
Isha's share = (3 ÷ 8) × 1640 = 3 × 205 = 615.
Therefore The correct answer is Rs. 615.
Alternate Method
Given:
Ritu's investment = Rs. 1,190
Sameer's investment = Rs. 1,060
Isha's investment = Rs. 1,350
Total profit = Rs. 1,640
Formula Used:
Profit Ratio = Ratio of (Capital × Time)
Since the time period is the same for all (1 year), Profit Ratio = Capital Ratio.
Rs. 1190
Ritu
Rs. 1060
Sameer
Rs. 1350
Isha
Investment Proportions

Calculations:

=> Profit Ratio = 1190 : 1060 : 1350

=> Cancelling out common zeros, Ratio = 119 : 106 : 135

=> Sum of ratio parts = 119 + 106 + 135 = 360 parts

=> Isha's profit share = (Isha's ratio part ÷ Sum of ratio parts) × Total Profit

=> Isha's share = (135 ÷ 360) × 1640

=> Simplifying the fraction, 135 ÷ 360 = 3 ÷ 8

=> Isha's share = (3 ÷ 8) × 1640 = 3 × 205 = 615

Therefore The correct answer is Rs. 615.

Additional Information

Simple Partnership

When the capital of all the partners is invested for the same time period, the profit or loss is distributed purely in the ratio of their invested capitals.

Compound Partnership

When capitals are invested for different time periods, the profit or loss is distributed in the ratio of the product of capital and the respective time period for each partner.

Working vs Sleeping Partner

A working partner actively manages the business and usually receives a salary or fixed percentage of profit. A sleeping partner only invests capital. The remaining profit is shared among all according to their capital and time investments.

Q59. Answer: (c) 153

Shortcut Trick

For any two numbers, the product of the numbers equals the product of their HCF and LCM.

Second Number = (HCF × LCM) ÷ First Number

Second Number = (17 × 1224) ÷ 136

Second Number = 1224 ÷ 8 = 153

Therefore The correct answer is 153.

Alternate Method

Given:

HCF = 17

LCM = 1224

First number (N1) = 136

Formula Used:

N1 × N2 = HCF × LCM

Product of Numbers

136 × N2

=

HCF × LCM

17 × 1224

Calculations:

=> 136 × N2 = 17 × 1224

=> N2 = (17 × 1224) ÷ 136

=> N2 = 1224 ÷ 8

=> N2 = 153

Therefore The correct answer is 153.

Additional Information

HCF and LCM Relation

For any two numbers 'a' and 'b', the product of the numbers is always equal to the product of their HCF and LCM (a × b = HCF × LCM).

Co-prime Numbers

Two numbers are said to be co-prime if their highest common factor (HCF) is 1. The LCM of two co-prime numbers is simply their product.

Fractions HCF and LCM

HCF of fractions = (HCF of numerators) ÷ (LCM of denominators). LCM of fractions = (LCM of numerators) ÷ (HCF of denominators).

Q60. Answer: (a) 50

Shortcut Trick

Total days from 4 Feb to 5 Apr 2024 = 25 (Feb) + 31 (Mar) + 5 (Apr) = 61 days.

Since 2024 is a leap year (366 days), Time (T) = 61 ÷ 366 = 1/6 year.

Simple Interest (SI) = (P × R × T) ÷ 100

SI = (4000 × 7.5 × 1/6) ÷ 100 = 40 × 1.25 = Rs. 50

Therefore The correct answer is Rs. 50.

Alternate Method

Given:

Principal (P) = Rs. 4,000

Rate of Interest (R) = 7.5% per annum

Time period = 4 February 2024 to 5 April 2024

Formula Used:

Simple Interest (SI) = (P × R × T) ÷ 100

4 Feb 2024

5 Apr 2024

Time = 61 days (1/6 year)

P = Rs. 4,000

SI = ?

R = 7.5% p.a.

SI = (P × R × T) ÷ 100 = Rs. 50

Calculations:

=> The year 2024 is a leap year (divisible by 4), so February has 29 days.

=> Number of days in February (excluding the date of deposit) = 29 − 4 = 25 days

=> Number of days in March = 31 days

=> Number of days in April = 5 days

=> Total time (T) in days = 25 + 31 + 5 = 61 days

=> Time (T) in years = 61 ÷ 366 = 1/6 years

=> SI = (4000 × 7.5 × 1) ÷ (100 × 6)

=> SI = (40 × 7.5) ÷ 6

=> SI = 300 ÷ 6 = 50

Therefore The correct answer is Rs. 50.

Additional Information

Leap Year Concept

A year divisible by 4 is a leap year (century years must be divisible by 400). It contains 366 days, with February having 29 days. This changes the denominator when converting days into years.

Day Counting Rule for Interest

When calculating interest for a specific range of dates, either the date of deposit or the date of withdrawal is counted, but not both. Generally, the withdrawal date is counted.

Compound Interest vs Simple Interest

Simple Interest is calculated only on the initial principal. Compound Interest is calculated on the principal plus any accumulated interest from previous periods.

Q61. Answer: (a) 20

Shortcut Trick

Simplify the given conditions directly into linear equations using M for mother and D for daughter:

Condition 1: 3M = 9D + 24 => M − 3D = 8

Condition 2: 4D = M − 2 => M − 4D = 2

Subtracting the second equation from the first eliminates M: (M − 3D) − (M − 4D) = 8 − 2 => D = 6 years.

Substituting D = 6 into the first equation: M = 3(6) + 8 = 26 years.

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Therefore The correct answer is 20 years.

Alternate Method

Let the present age of the mother be M and the daughter be D.

Given:

3 × Mother's age = 9 × Daughter's age + 24

4 × Daughter's age = Mother's age − 2

Mother's Age (M) = 26 years

Daughter's Age (D) = 6 years

Difference = 20 years

Calculations:

=> 3M = 9D + 24

=> M = 3D + 8 ... (Equation 1)

=> 4D = M − 2

=> M = 4D + 2 ... (Equation 2)

Equating (1) and (2) to find D:

=> 3D + 8 = 4D + 2

=> 4D − 3D = 8 − 2

=> D = 6 years

Substitute D = 6 into Equation 2 to find M:

=> M = 4(6) + 2

=> M = 24 + 2 = 26 years

Difference between their ages:

=> M − D = 26 − 6 = 20

Therefore The correct answer is 20 years.

Additional Information

Constant Age Difference

The difference between the ages of two individuals always remains constant, regardless of whether it is calculated in the past, present, or future.

Framing Equations

If the present age is 'x', then the age 'n' years ago is (x − n) and the age 'n' years hence will be (x + n).

Linear Equations in Two Variables

Equations can be solved simultaneously either by substitution (expressing one variable in terms of the other) or elimination (adding or subtracting equations to cancel out a variable).

Q62. Answer: (c) 21.2

Shortcut Trick

Make the decimal places equal for both numbers (1 decimal place each).

Treat them as whole numbers by temporarily multiplying by 10 => 53 and 4.

Find the LCM of 53 and 4 => 53 × 4 = 212.

Divide the LCM by 10 to adjust the decimal point back.

LCM = 212 ÷ 10 = 21.2

Therefore The correct answer is 21.2.

Alternate Method

Given:

The numbers are 5.3 and 0.4.

Formula Used:

LCM of fractions = (LCM of Numerators) ÷ (HCF of Denominators)

Calculation:

=> Convert 5.3 and 0.4 into fractions in their simplest form.

=> 5.3 = 53/10

=> 0.4 = 4/10 = 2/5

=> The numerators are 53 and 2.

=> LCM of numerators (53, 2) = 53 × 2 = 106

=> The denominators are 10 and 5.

=> HCF of denominators (10, 5) = 5

=> LCM of the given numbers = 106 ÷ 5 = 21.2

Therefore The correct answer is 21.2.

Additional Information

LCM of Fractions

To find the LCM of fractions, first reduce them to their lowest terms, then apply: LCM = (LCM of numerators) ÷ (HCF of denominators).

HCF of Fractions

Similarly, to find the HCF of fractions: HCF = (HCF of numerators) ÷ (LCM of denominators).

Co-prime Numbers Rule

When two numbers are co-prime (i.e., their HCF is 1), their LCM is always simply their product. For example, 53 and 2 have no common factors, so their LCM is 53 × 2 = 106.

Q63. Answer: (b) 3

Shortcut Trick

To check divisibility quickly, always start with the easiest rules like 3, 10, or 8.

For divisibility by 3, check the sum of the digits of the given number.

Sum of digits = 5 + 6 + 3 + 6 + 0 + 7 = 27.

Since 27 is a multiple of 3, the entire number 563607 is completely divisible by 3.

Therefore The correct answer is 3.

Alternate Method

Given:

The number to be checked is 563607.

Method Used:

We systematically apply the divisibility rules for each given option.

Calculations:

=> Option 1 (8): For a number to be divisible by 8, its last three digits must be divisible by 8. Here, the last three digits are 607, which is an odd number and thus cannot be divisible by 8.

=> Option 2 (3): For a number to be divisible by 3, the sum of its digits must be a multiple of 3.

=> Sum of digits = 5 + 6 + 3 + 6 + 0 + 7 = 27.

=> Since 27 is divisible by 3 (27 ÷ 3 = 9), the number 563607 is divisible by 3.

=> Option 3 (13): A quick check for 13 is to alternate the sums of blocks of three digits from right to left. The blocks are 607 and 563. Difference = 607 − 563 = 44. Since 44 is not divisible by 13, the number is not divisible by 13.

=> Option 4 (10): A number is divisible by 10 only if its unit digit is 0. Here, the unit digit is 7, so it is not divisible by 10.

Therefore The correct answer is 3.

Additional Information

Divisibility Rule of 9

A number is divisible by 9 if the sum of its digits is completely divisible by 9.

Divisibility Rule of 11

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

Divisibility Rule of 4

A number is divisible by 4 if the number formed by its last two digits is perfectly divisible by 4.

Divisibility Rule of 7, 11, and 13 (Block Method)

Separate the number into blocks of three digits from right to left. Find the alternating sum and difference of these blocks. If the result is divisible by 7, 11, or 13, then the original number is respectively divisible by 7, 11, or 13.

Q64. Answer: (a) 5625

Shortcut Trick

Let the total number of registered voters be V.

Using successive percentage: Margin = V × Polled% × Valid% × Margin%

=> 1458 = V × 80% × (100 − 19)% × (70 − 30)%

=> 1458 = V × (4/5) × (81/100) × (2/5)

=> V = 1458 × (5/4) × (100/81) × (5/2) = 5625

Therefore The correct answer is 5625 voters.

Alternate Method

Given:

Votes polled = 80% of registered voters

Invalid votes = 19% of polled votes

Winner gets 70% of valid votes

Winning margin = 1458 votes

Registered = 100x

80% polled

Polled Votes = 80x

81% valid

Valid Votes = 64.8x

Winner: 70%

Loser: 30%

Margin = 40% of 64.8x = 25.92x

Calculations:

=> Let the total registered voters be 100x.

=> Votes polled = 80% of 100x = 80x

=> Valid votes = (100 − 19)% of 80x = 81% of 80x = 64.8x

=> Loser's share = (100 − 70)% = 30% of valid votes

=> Winning margin = (70 − 30)% = 40% of valid votes

=> Winning margin = 40% of 64.8x = 25.92x

=> 25.92x = 1458

=> x = 1458 ÷ 25.92 = 56.25

=> Total registered voters = 100x = 100 × 56.25 = 5625

Therefore The correct answer is 5625 voters.

Additional Information

Election Base Concept

In any election problem, always start by assuming the total registered voters as 100% or 100x. Every subsequent deduction (like unpolled or invalid votes) should be sequentially calculated from the remaining pool.

Winning Margin

The winning margin is strictly the difference between the winner's and the loser's valid votes. If the winner gets W% and the loser gets L%, the margin percentage is (W − L)% of the total valid votes.

Successive Percentage Method

When a value decreases repeatedly in stages (e.g., voters didn't vote → votes invalid → vote share split), we use the continuous multiplication method: Final = Initial × (1 − a/100) × (1 − b/100).

Q65. Answer: (b) 95 ^(−41)

Shortcut Trick

By using the combined exponent rule: a^m ÷ a^n × a^p = a^(m − n + p)

Given expression: 95^(−17) ÷ 95^9 × 95^(−15)

Since the base is the same, we can calculate the final power directly: −17 − 9 + (−15) = −41

Result = 95^(−41)

Therefore The correct answer is 95^(−41).

Alternate Method

Given:

95^(−17) ÷ 95^9 × 95^(−15)

Formula Used:

Laws of Indices:

=> a^m ÷ aⁿ = a^(m − n)

=> a^m × aⁿ = a^(m + n)

Calculation:

=> 95^(−17) ÷ 95^9 × 95^(−15)

According to BODMAS, division and multiplication have the same precedence, so we evaluate from left to right. Applying the division rule first:

=> 95^(−17 − 9) × 95^(−15)

=> 95^(−26) × 95^(−15)

Now, applying the multiplication rule:

=> 95^(−26 + (−15))

=> 95^(−26 − 15)

=> 95^(−41)

Therefore The correct answer is 95^(−41).

Additional Information

Product Rule of Exponents

When multiplying two terms with the same base, you add their exponents together: a^m × aⁿ = a^(m + n).

Quotient Rule of Exponents

When dividing two terms with the same base, you subtract the divisor's exponent from the dividend's exponent: a^m ÷ aⁿ = a^(m − n).

Negative Exponent Rule

A negative exponent signifies the reciprocal of the base raised to the corresponding positive exponent: a^(−n) = 1 ÷ aⁿ.

Power of a Power Rule

When raising a number with a power to another power, you multiply the exponents: (a^m)ⁿ = a^(m × n).

Q66. Answer: (c) Rs. 232

Shortcut Trick

Let pen cost = x and pencil cost = y.

2x + 15y = 286 --- (1) & 17(x − 4) + 3(y + 2) = 128 => 17x + 3y = 190 --- (2)

Multiply (2) by 5 and subtract (1): 85x − 2x = 950 − 286 => 83x = 664 => x = 8.

Substitute x = 8 in (2): 17(8) + 3y = 190 => 3y = 54 => y = 18.

Cost of 11 pens and 8 pencils = 11 × 8 + 8 × 18 = 88 + 144 = 232.

Therefore The correct answer is Rs. 232.

Alternate Method

Given:

Cost of 2 pens and 15 pencils = Rs. 286

If pen cost decreases by Rs. 4 and pencil cost increases by Rs. 2, 17 pens and 3 pencils cost Rs. 128.

Formula Used:

System of linear equations: a1x + b1y = c1 and a2x + b2y = c2

Calculations:

=> Original cost of 1 pen = Rs. x, 1 pencil = Rs. y

=> First condition:

=> 2x + 15y = 286 --- (1)

=> Second condition:

=> 17(x − 4) + 3(y + 2) = 128

=> 17x − 68 + 3y + 6 = 128

=> 17x + 3y − 62 = 128

=> 17x + 3y = 190 --- (2)

=> Multiply Equation (2) by 5:

=> 5 × (17x + 3y) = 5 × 190

=> 85x + 15y = 950 --- (3)

=> Subtract Equation (1) from Equation (3):

=> (85x + 15y) − (2x + 15y) = 950 − 286

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=> 83x = 664

=> x = 664 ÷ 83 = 8

=> Substitute x = 8 into Equation (1):

=> 2(8) + 15y = 286

=> 16 + 15y = 286

=> 15y = 286 − 16 = 270

=> y = 270 ÷ 15 = 18

=> Original cost of 1 pen = Rs. 8, 1 pencil = Rs. 18

=> Required cost = 11x + 8y

=> Required cost = 11 × 8 + 8 × 18

=> Required cost = 88 + 144 = 232

Therefore The correct answer is Rs. 232.

Additional Information

Linear Equations in Two Variables

An equation of the form ax + by + c = 0 where a, b, and c are real numbers and a, b are not zero, is a linear equation in two variables.

Elimination Method

In this method, you multiply one or both equations by suitable constants to make the coefficients of one variable exactly equal or opposite to eliminate it efficiently.

Substitution Method

Express one variable in terms of the other from one equation and substitute it into the other equation to directly solve for the single remaining variable.

Q67. Answer: (a) Rs. 8,814

Shortcut Trick

Ratio of their profits = (10000 − 3700) : 3700 = 6300 : 3700 = 63 : 37

Since the investment duration is the same, the investment ratio is equal to the profit ratio (63 : 37).

Total ratio parts = 63 + 37 = 100 parts.

Difference in ratio parts = 63 − 37 = 26 parts.

Difference in investment = (26 ÷ 100) × 33900 = 26 × 339 = 8814.

Therefore The correct answer is Rs. 8,814.

Alternate Method

Given:

Total investment = Rs. 33,900

Total profit = Rs. 10,000

Vivek's profit = Rs. 3,700

Formula Used:

Profit Ratio = Investment Ratio (when the time period is identical for all partners)

63%

Salman

Rs. 6,300

37%

Vivek

Rs. 3,700

Diff = 26%

Total Investment: Rs. 33,900

Calculations:

=> Salman's profit = Total profit − Vivek's profit

=> Salman's profit = 10000 − 3700 = Rs. 6,300

=> Profit Ratio (Salman : Vivek) = 6300 : 3700 = 63 : 37

=> Total ratio parts = 63 + 37 = 100 parts

=> 100 parts = Rs. 33,900

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=> 1 part = 33900 ÷ 100 = Rs. 339

=> Difference in parts = 63 − 37 = 26 parts

=> Difference in investments = 26 × 339

=> Difference in investments = Rs. 8,814

Therefore The correct answer is Rs. 8,814.

Additional Information

Simple Partnership

When all partners invest their capital for the exact same time period, the profit is distributed precisely in the ratio of their original invested capitals.

Compound Partnership

When partners invest capital for different time durations, the profit is distributed in the ratio of the product of their capital and time (C1 × T1 : C2 × T2).

Working vs Sleeping Partner

An active partner managing the business usually takes a fixed percentage of the total profit as a salary before the remaining profit is distributed among all partners according to their capital-time ratios.

Q68. Answer: (d) 8,700

Shortcut Trick

When Simple Interests from two investments are equal, the ratio of principal amounts is inversely proportional to the product of Rate and Time.

Ratio of investments P1 : P2 = 1 / (R1 × T1) : 1 / (R2 × T2)

Since the time (6 years) is the same for both, P1 : P2 = R2 : R1 = 6 : 8 = 3 : 4

Total investment parts = 3 + 4 = 7 parts = Rs. 20,300 => 1 part = Rs. 2,900

Sum invested at 8% (P1) = 3 parts = 3 × 2,900 = Rs. 8,700

Therefore The correct answer is Rs. 8,700.

Alternate Method

Given:

Total Principal = Rs. 20,300

Rate for 1^(st) part (R1) = 8% p.a.

Rate for 2^(nd) part (R2) = 6% p.a.

Time (T) = 6 years

Simple Interest from both parts are equal (SI1 = SI2)

Formula Used:

Simple Interest = (P × R × T) ÷ 100

Total Investment = Rs. 20,300

P1 @ 8%

Time = 6 yrs

P2 @ 6%

Time = 6 yrs

Equal Interest: P1 × 8% × 6 = P2 × 6% × 6

Ratio P1 : P2 = 6 : 8 = 3 : 4

P1 = 3/7 × 20300 = Rs. 8700

Calculations:

=> Let the sum invested at 8% be P1 and at 6% be P2.

=> P1 + P2 = 20,300

=> Equating the simple interests: (P1 × 8 × 6) ÷ 100 = (P2 × 6 × 6) ÷ 100

=> 48P1 = 36P2

=> 4P1 = 3P2

=> P1 / P2 = 3 / 4

=> The total ratio parts = 3 + 4 = 7 parts

=> 7 parts = Rs. 20,300

=> 1 part = 20,300 ÷ 7 = Rs. 2,900

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=> The sum invested at 8% (P1) corresponds to 3 parts.

=> P1 = 3 × 2,900 = Rs. 8,700

Therefore The correct answer is Rs. 8,700.

Additional Information

Equal Simple Interest Concept

If a given sum is divided into multiple parts such that the simple interest earned on each part is equal, the ratio of the invested parts is inversely proportional to the product of their respective Rate and Time. Formula: P1 : P2 : P3 = 1/(R1T1) : 1/(R2T2) : 1/(R3T3)

Equal Amount Concept

If a sum is divided into multiple parts such that the total amount (Principal + Interest) received from each part is equal, the ratio of the invested parts becomes: P1 : P2 : P3 = 1/(100 + R1T1) : 1/(100 + R2T2) : 1/(100 + R3T3)

Simple Interest vs Compound Interest

In Simple Interest, the principal remains constant throughout the investment period, meaning the interest earned each year is identical. In Compound Interest, the principal updates after every compounding cycle by adding the accrued interest.

Q69. Answer: (c) 60% gain

Shortcut Trick

Given, 10 × SP = 16 × CP

=> SP / CP = 16 / 10 = 8 / 5

Profit ratio = SP − CP = 8 − 5 = 3 units

Profit % = (3 ÷ 5) × 100 = 60%

Therefore The correct answer is 60% gain.

Alternate Method

Given:

Selling price of 10 books = Cost price of 16 books

Formula Used:

Profit = Selling Price (SP) − Cost Price (CP)

Profit % = (Profit ÷ CP) × 100

CP = 10 units

SP = 16 units

Profit = +6

Profit % = (6 ÷ 10) × 100 = 60%

Calculations:

Let the cost price (CP) of 1 book be Rs. 10.

=> Total Cost price of 16 books = 16 × 10 = Rs. 160

=> Total Selling price of 10 books = Rs. 160 (Since SP of 10 = CP of 16)

=> Selling price (SP) of 1 book = 160 ÷ 10 = Rs. 16

=> Profit on 1 book = SP − CP = 16 − 10 = Rs. 6

=> Profit % = (6 ÷ 10) × 100 = 60%

Therefore The correct answer is 60% gain.

Additional Information

Marked Price and Discount

Discount is always calculated on the Marked Price (MP). Formula: Discount % = (Discount ÷ MP) × 100.

Successive Discounts

If two successive discounts of a% and b% are given, the equivalent single discount is [a + b − (a × b) ÷ 100]%.

Dishonest Dealer Concept

If a dealer sells goods at CP but uses false weight, his Profit % = (Error ÷ (True Weight − Error)) × 100.

Q70. Answer: (d) 803.84cm²

Shortcut Trick

Surface Area of a sphere = 4 × π × r²

Surface Area = 4 × 3.14 × 8²

Surface Area = 4 × 3.14 × 64 = 256 × 3.14 = 803.84 cm²

Therefore The correct answer is 803.84 cm².
Alternate Method
Given:
Radius of the sphere (r) = 8 cm
Value of π ≈ 3.14
Formula Used:
Surface Area of Sphere = 4 × π × r²
r = 8 cm
Sphere
Calculations:
=> Surface Area = 4 × 3.14 × (8)²
=> Surface Area = 4 × 3.14 × 64
=> Surface Area = 256 × 3.14
=> Surface Area = 803.84 cm²
Therefore The correct answer is 803.84 cm².
Additional Information
Volume of a Sphere
The volume of a sphere is given by the formula V = (4 ÷ 3) × π × r³.
Curved Surface Area of Hemisphere
When a sphere is cut in half, the curved surface area is half of the sphere's surface area: CSA = 2 × π × r².
Total Surface Area of Hemisphere
The total surface area includes the curved surface plus the flat circular base: TSA = 3 × π × r².
Volume of a Hemisphere
The volume of a hemisphere is exactly half of the volume of a complete sphere: V = (2 ÷ 3) × π × r³.

Q71. Answer: (a) (45, 72, 9)

Logic: Second number=2×(First number−Third number)
(45, 80, 5)
(39, 30, 24)
Similarly,
(45, 72, 9)
45−9=36, 36×2=72
Hence, the correct answer is "Option 1"

Q72. Answer: (c) QIA

The logic followed here is:
Hence, the correct answer is "Option 3"

Q73. Answer: (d) 19

Total students = 79
Find Shantanu’s position from the left
Shantanu is 37th from the right.
"Position from left"=79-37+1=43
So Shantanu is 43rd from the left.
Vani’s position
Vani is already given as 23rd from the left.
Find number of people between them
(43-23)-1=20-1=19
Hence, the correct answer is "Option 4"

Q74. Answer: (a) 3

Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order.
• Only four boxes are kept between F and A.

• Only B is kept above F.
• Only two boxes are kept between G and E.
• D is kept immediately above C.
• E is not kept immediately above D
The Final Arrangement is,

B
F
G
D
C
E
A

Hence, the correct answer is "Option 1"

Q75. Answer: (a) SQLP

The logic followed here is:
Hence, the correct answer is "Option 1"

Q76. Answer: (b) 3

Given Series- (Left) 6 2 & % 5 9 # 8 $ 7 + Ω @ 1 * £ 3 4 (Right)
Required Conditions: Another Symbols - Symbols - Number
(Left) 6 2 & % 5 9 # 8 $ 7 + Ω @ 1 * £ 3 4 (Right)
Hence, the correct answer is "Option 2"

Q77. Answer: (d) ob

Given - 'life is mysterious' is coded as 'qr gt ob' and 'give his life' is coded as 'ob ft rd'
'life is mysterious' - 'qr gt ob'
'give his life' - 'ob ft rd'
The Code for life is ob.
Hence, the correct answer is "Option 4"

Q78. Answer: (a) 6

'PEST' is coded as '4597' and 'HEPS' is coded as '7654'.
'PEST' - '4597'
'HEPS' - '7654'
The Code for H is 6.
Hence, the correct answer is "Option 1"

Q79. Answer: (d) HFY 98

The logic followed here is:
Hence, the correct answer is "Option 4"

Q80. Answer: (a) Only conclusion (I) follows.

The least possible diagram for the given statements is as follows:
Conclusions:
I: No Kangaroos are Wolves. - True (No Rhinoceroses are Kangaroos. All Wolves are Rhinoceroses.)
II: Some Kangaroos are Wolves. - False (As their is no direct relation between Kangaroos and Wolves, may be it is possible but not definite. Hence, it is false)
Only conclusion (I) follows.
Hence, the correct answer is "Option 1"

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Q81. Answer: (c) OSP

The logic followed here is:

Hence, the correct answer is "Option 3"

Q82. Answer: (a) Four

Seven boxes, A, B, C, D, K, L and O, are kept one over the other, but not necessarily in the same order.

• Only two boxes are kept below O.

• Only one box is kept above L.

• Only one box is kept between L and D.

• C is kept immediately above K.

• A is kept at some place below B

The Final Arrangement is,

B
L
A
D
O
C
K

Hence, the correct answer is "Option 1"

Q83. Answer: (a) 20

Given 25 − 9 × 3 + 4 ÷ 2 = ?

'+' and '−' are interchanged and '×' and '÷' are interchanged

Here, we use the BODMAS table given below:

25 + 9 ÷ 3 − 4 × 2 = ?

25 + 3 − 4 × 2 = ?

25 + 3 − 8 = ?

28 − 8 = ?

= 20.

Hence, the correct answer is "Option 1"

Q84. Answer: (a) 993

The logic follows here,

Hence, the correct answer is "Option 1"

Q85. Answer: (d) Both conclusions (I) and (II) follow.

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

Conclusions:

(I) No door is a mat. - True (All doors are carpets.No carpet is a mat.No door is a mat is a true)

(II) No mat is a carpet.- True (All doors are carpets.No carpet is a mat.Hence, it is True)

Both conclusions (I) and (II) follow.

Hence, the correct answer is "Option 4"

Q86. Answer: (c) Mother's mother's brother

By using the symbols in the table given below, we can draw the following family tree:

K is mother of S and A is mother of K and B is brother of A.

Hence, the correct answer is "Option 3"

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Q87. Answer: (b) 26 km towards north

• Vignesh starts from Point Y and drives 17 km towards south.
• He then takes a left turn, drives 25 km.
• He then turns right and drives 9 km.
• He takes a final right turn, drives 25 km and stops at Point Z
The Final Diagram,
Hence, the correct answer is "Option 2"

Q88. Answer: (b) 76

Given Equation- 12 ÷ 6 + 28 × 4 − 11 = ?
Here, we use the BODMAS table given below:
'+' and '−' are interchanged and '×' and '÷' are interchanged.
12 × 6 − 28 ÷ 4 + 11 = ?
12 × 6 − 7+ 11 = ?
72 + 11 − 7 = ?
83 − 7 = ?
76.
Hence, the correct answer is "Option 2"

Q89. Answer: (a) Q

L, M, N, O, Q, R and S are sitting around a circular table, facing the centre of the table.
• Only two people sit between O and R when counted from the right of O.
• Only two people sit between R and M.
• Only three people sit between O and N.
• L sits to the immediate left of Q
The Final Arrangement is,
Hence, the correct answer is "Option 1"

Q90. Answer: (d) 8

Given number 5936814.
Arranged in ascending order from left to right.
Sum of the digits which are second from the left and fourth from the right in the new number thus formed = 5 + 3 = 8.

Q91. Answer: (c) 54 km towards the east

• Nilesh starts from Point Y and drives 17 km towards the north.
• He then takes a left turn and drives 31 km, then turns left and drives 45 km.
• He then takes a right turn and drives 23 km.
• He takes a right turn, drives 28 km and stops at Point Z
The Final Diagram,
Hence, the correct answer is "Option 3"

Q92. Answer: (c) VCU

The logic followed here is:
Hence, the correct answer is "Option 3"

Q93. Answer: (d) 57

The logic follows here,
Hence, the correct answer is "Option 4"

Q94. Answer: (b) YV - CR

The logic followed here is:
Hence, the correct answer is "Option 2"

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Q95. Answer: (c) Three

Given number 9524367

2 is added to each even digit and 1 is subtracted from each odd digit

8,4 and 6.

Hence, the correct answer is "Option 3"

Q96. Answer: (b) One

Seven people, A, B, C, D, P, Q and R, are sitting in a row, facing north.

• Only two people sit to the left of B.

• Only three people sit between B and Q.

• Only one person sits between Q and P.

• D sits to the immediate left of C.

• R is not an immediate neighbour of Q.

The Final Arrangement is,

Hence, the correct answer is "Option 2"

Q97. Answer: (b) MANY - AMNY - MNYA

The logic follows here,

Similarly,

Hence, the correct answer is "Option 2"

Q98. Answer: (a) BGJ : AFI

The logic followed here is:

Similarly,

Hence, the correct answer is "Option 1"

Q99. Answer: (d) 10

Given (Left) 538 745 317 853 276 (Right)

Third digit of theHighest Number - 853

Second digit of the lowest number - 276

7 + 3 = 10.

Hence, the correct answer is "Option 4"

Q100. Answer: (c) 480

The logic follows here,

Hence, the correct answer is "Option 3"

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