RRB NTPC (UG) CBT-I Official Paper (Held On: 21 Aug, 2025 Shift 2) (Previous Year Paper)

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

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GENERAL AWARENESS

Q1. What does the abbreviation ASCII stand for?

(a) American Standard Code for Information Interchange
(b) American Scientific Code for Internet Integration
(c) Advanced System for Computer Input and Integration
(d) Automatic System for Coding Interactive Interfaces

Q2. Which of the following dynasties initiated the practice of land grants to Brahmanas?

(a) Kushanas
(b) Cholas
(c) Satavahanas
(d) Guptas

Q3. Which islands of India are strategically important due to their location near the Malacca Strait?

(a) Gulf of Kutch Islands
(b) Andaman and Nicobar Islands
(c) Lakshadweep Islands
(d) Rameswaram Islands

Q4. How did globalisation affect India’s economic growth?

(a) Made it grow faster
(b) Slowed it down
(c) Reduced GDP
(d) Had no effect

Q5. What was the Supreme Court's directive regarding the NEET-PG 2025 examination format?

(a) Cancel the examination
(b) Conduct the exam in a single shift
(c) Conduct the exam in two shifts
(d) Postpone the examination indefinitely

Q6. Which party regained power in the 2025 Delhi Legislative Assembly elections, ending AAP’s 15-year hold?

(a) Trinamool Congress
(b) Samajwadi Party
(c) Bharatiya Janata Party
(d) Indian National Congress

Q7. Acid rain is mainly caused due to the presence of which two gases in the atmosphere?

(a) Oxygen and Hydrogen
(b) Carbon dioxide and Carbon monoxide
(c) Nitrogen and Methane

(d) Sulphur dioxide and Nitrogen oxides

Q8. Which of the following foods is a source of animal protein?

(a) Pulses
(b) Beans
(c) Eggs
(d) Nuts

Q9. Which physical feature acts as a barrier to the southwest monsoon winds, causing heavy rainfall on one side and dry conditions on the other?

(a) Aravalli Range
(b) Western Ghats
(c) Vindhya Range
(d) Satpura Range

Q10. What is the core objective of the ISRO- European Space Agency (ESA) collaboration in the Axiom-4 mission?

(a) Communications satellite deployment
(b) Deep-space observation
(c) Microgravity-based scientific experiments
(d) Lunar rover development

Q11. When was the States Reorganisation Act passed, implementing the Commission's recommendations?

(a) 1956
(b) 1953
(c) 1959
(d) 1954

Q12. Which of the following Amendments made Education a subject in the Concurrent List?

(a) 42^(nd) Amendment
(b) 86^(th)Amendment
(c) 44^(th) Amendment
(d) 52^(nd) Amendment

Q13. Which of the following falls under the Supreme Court's original jurisdiction, according to the Constitution of India (Article 131)?

(a) Appeals from criminal cases in High Courts
(b) Disputes between States or between a State and the Union
(c) Enforcement of fundamental rights of individuals
(d) Election petitions against sitting Members of Parliaments

Q14. What new facility was introduced by the Election Commission of India (ECI) at polling stations in May 2025?

(a) Voter ID kiosks
(b) Mobile phone deposit facility
(c) Online voting portal
(d) Free Wi-Fi for voters

Q15. Which law explains the colours of black bodies including the Sun and other stars in terms of their temperatures?

(a) Hooke's Law
(b) Snell's Law
(c) Wien's Displacement Law
(d) Kepler's laws of planetary motion

Q16. Which Article of the Indian Constitution provides for the Council of Ministers at the Union level?

(a) Article 75
(b) Article 85
(c) Article 74

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(d) Article 65

Q17. The introduction of English education in India was promoted through which of the following documents?

(a) Regulating Act
(b) Pitts India Act
(c) Macaulay's Minute
(d) Charter Act of 1813

Q18. Which of the following industries was operational in India at the time of independence?

(a) Aerospace industry
(b) Electronics industry
(c) Iron and steel industry
(d) Automobile industry

Q19. The 'National Mission on High Yielding Seeds' aims to:

(a) develop cold storage infrastructure
(b) increase production of high-quality seeds
(c) enhance irrigation facilities
(d) promote organic farming practices

Q20. Population density is calculated as:

(a) total number of people in a country
(b) average number of people per family
(c) number of persons living per unit area
(d) number of children born per year

Q21. At the 2025 Asian Athletics Championships, which Indian athlete won gold medals in both the men's 5000m and 10,000m events?

(a) Tejaswin Shankar
(b) Avinash Sable
(c) Sachin Yadav
(d) Gulveer Singh

Q22. Sher Shah divided his empire into shiqqs, equivalent to which administrative division under the Mughals?

(a) Suba
(b) Pargana
(c) Mandal
(d) Sarkar

Q23. Which ministry has introduced a technology-driven initiative called e-Zero FIR on 19 May 2025 to boost India's cybercrime-fighting capabilities?

(a) Ministry of Home Affairs
(b) Ministry of Communications
(c) Ministry of Information and Broadcasting
(d) Ministry of Electronics and Information Technology

Q24. Which option in the Control Panel allows a user to add or remove hardware devices in MS Windows?

(a) Security and Maintenance
(b) System and Security
(c) Network and Sharing Center
(d) Device Manager

Q25. Which of the following is a well-known bronze artefact from the Indus Valley Civilisation, dating to around 2500 BCE?

(a) Stone seal of unicorn from Lothal
(b) Priest-King statue from Mohenjo-daro
(c) Painted pottery vase from Dholavira

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(d) Dancing Girl statue from Mohenjo-daro

Q26. The Western Ghats and the Eastern Ghats mark the western and the eastern edges of which plateau?

(a) Shillong Plateau
(b) Chotanagpur Plateau
(c) Malwa Plateau
(d) Deccan Plateau

Q27. In which year was the Indian Civil Service (ICS) officially replaced by the Indian Administrative Service (IAS)?

(a) 1949
(b) 1947
(c) 1951
(d) 1950

Q28. Henry Vivian Derozio, a teacher at the Hindu College of Calcutta, promoted radical ideas and encouraged his pupils to question all authority. This movement became known as the:

(a) Social Service League
(b) Justice Movement
(c) Young Bengal Movement
(d) Servants of India Society

Q29. Consider the following vitamins.

1. Vitamin D
2. Vitamin B12
3. Vitamin K
4. Vitamin C

Which of them are water soluble?

(a) Only 2 and 3
(b) Only 1 and 2
(c) Only 1, 2 and 3
(d) Only 2 and 4

Q30. Which of the following organisations conducted the CROPS experiment to study plant growth in space in February 2025?

(a) National Aeronautics and Space Administration (NASA)
(b) European Space Agency (ESA)
(c) Indian Space Research Organisation (ISRO)
(d) Japan Aerospace Exploration Agency (JAXA)

Q31. Which province of Pakistan, known for its rich resources but low development, has long witnessed separatist movements and demands for greater autonomy or independence?

(a) Balochistan
(b) Punjab
(c) Khyber Pakhtunkhwa
(d) Sindh

Q32. Which province of Pakistan, known for its rich resources but low development, has long witnessed separatist movements and demands for greater autonomy or independence?

(a) Balochistan
(b) Punjab
(c) Khyber Pakhtunkhwa
(d) Sindh

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Q33. The Atomic Energy Establishment, established at Trombay in 1954, was later renamed as:

(a) Indira Gandhi Atomic Centre
(b) Bhabha Atomic Research Centre
(c) Indian Institute of Nuclear Science
(d) Nehru Institute of Atomic Energy

Q34. The currently shelved (as of June 2025) InCyber Forum, a leading cybersecurity conference, was initially set to take place in which US city?

(a) Seattle, Washington
(b) San Francisco, California
(c) San Antonio, Texas
(d) Austin, Texas

Q35. Which mission by the Indian Government, launched in 2023, aims to develop quantum technologies and has established four Thematic Hubs across premier institutions, as of 2025?

(a) National Quantum Mission
(b) Tech India Initiative
(c) Quantum India Program
(d) Digital India Mission

Q36. On which day is Good Friday observed in 2025?

(a) 12 May
(b) 18 April
(c) 14 March
(d) 7 June

Q37. What is the total number of cave structures at the Ajanta Caves location in Maharashtra, India, including the one that was never completed?

(a) Thirty-two
(b) Thirty
(c) Twenty-nine
(d) Thirty-one

Q38. Which book by Sophie Elmhirst was honoured with the Nero Book of the Year award in 2025?

(a) The Adversary
(b) Flow
(c) Maurice and Maralyn
(d) The Girl with the Seven Lives

Q39. Which of the following is true regarding the tenure and independence of the Chief Election Commissioner (CEC) of India?

(a) The other Election Commissioners can only be removed by the CEC, not by the government.
(b) The CEC's removal requires assent of the Chief Justice of India but not necessarily the Parliament's approval.
(c) The CEC enjoys a fixed tenure of ten years and cannot be replaced before that term under any circumstances.
(d) The CEC can only be removed like a Supreme Court judge by a two-thirds majority in Parliament.

Q40. What percentage of the Indian population was dependent on agriculture around the time of independence?

(a) About 30%
(b) About 90%
(c) About 50%
(d) About 70%

MATHEMATICS

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Q41. A cuboid has length 10 cm, breadth 5 cm and height 2 cm. What is its surface area?

(a) 160 cm²
(b) 180 cm2
(c) 140 cm2
(d) 130 cm2

Q42. In triangle ABC, BD ? AC at D and angle DBC = 71°. E is a point on BC such that angle CAE = 17°. What is the measure of angle AEB?

(a) 31°
(b) 36°
(c) 40°
(d) 34°

Q43. Find the value of x satisfying: 2(3x2 - 7) - 3(2x2 + 7x - 9) = 13

(a) 0
(b) -1
(c) -3
(d) 4

Q44. If cot A=√5, then find the value of (cosec²A-sec²A)/(cosec²A+sec²A)

(a) 3/2
(b) (√5-1)/(√5+1)
(c) (√5+1)/(√5-1)
(d) 2/3

Q45. Anshuman and Kunal together invested Rs. 36,400 in a business. At the end of the year, out of a total profit of Rs. 19,500, Kunal's share was Rs. 6,300. What was the difference between their investments?

(a) Rs. 14,688
(b) Rs. 14,879
(c) Rs. 12,892
(d) Rs. 12,880

Q46. I bought two toy guns for Rs. 1,200. I sold the first one at a loss of 8% and the second at a gain of 16%. If, on the whole I made neither a loss nor a gain, find the cost price (in Rs.) of the first toy gun.

(a) 800
(b) 824
(c) 820
(d) 784

Q47. The number 576499 is divisible by which of the following?

(a) 6
(b) 7
(c) 15
(d) 16

Q48. Find a single discount equivalent to successive discounts of 5% and 20%.

(a) 26%
(b) 28%
(c) 22%
(d) 24%

Q49. If the interest earned during the 2nd year on a certain sum is Rs. 6,258, and the rate of interest is 20% per annum compounded annually, then the sum is:

(a) Rs. 26,630
(b) Rs. 26,075

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(c) Rs. 25,120
(d) Rs. 25,235

Q50. Find the simple interest (in Rs.) on Rs. 1,200 at an interest rate of 4% per month for 11 months.
(a) Rs. 88
(b) Rs. 528
(c) Rs. 64
(d) Rs. 44

Q51. If the 6-digit number N09M82 is divisible by 11, then which of the options below can give a possible correct relation between M and N?
(a) M = N
(b) M - N = 1
(c) M + N = -4
(d) M - N = 4

Q52. A man riding on a bicycle at a speed of 36 km/hr crosses a bridge in 54 seconds. Find the length (in metres) of the bridge.
(a) 550
(b) 350
(c) 440
(d) 540

Q53. The income of Raman is Rs. 77,600. He saves 13% of his income. If his income increases by 50% and expenditure increases by 50%, then his savings will:
(a) increase by Rs. 19,015
(b) decrease by Rs. 19,012
(c) decrease by Rs. 6,406
(d) increase by Rs. 5,044

Q54. Anjani can do a certain piece of work in 24 days. Anjani and Khushbu can together do the same work in 12 days, and Anjani, Khushbu and Sushmita can do the same work together in 9 days. In how many days can Anjani and Sushmita do the same work together?
(a) 70/7
(b) 86/6
(c) 65/5
(d) 72/5

Q55. If 2 times a son's age is added to his father's age, the sum is 46 years. If 2.5 times the father's age is added to the son's age, the sum is 97 years. What is the father's age (in years)?
(a) 35
(b) 37
(c) 33
(d) 34

Q56. The length, breadth and height of a cuboid are in the ratio of 5 : 4 : 3. If the sum of the length, breadth and height is 120 cm, then what will be its volume?
(a) 60,000 cm^3
(b) 50,000 cm3
(c) 40,000 cm3
(d) 45,000 cm3

Q57. Wasim travels 455 km at 91 km/hr, the next 390 km at 78 km/hr and the next 476 km at 68 km/hr. What is his average speed (in km/hr) for the whole journey? (Round off your answer to two decimal places)
(a) 78.27
(b) 73.67

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(c) 77.71
(d) 78.96

Q58. Which of the following ratios is the greatest?
(a) 29 : 57
(b) 22 : 82
(c) 23 : 75
(d) 31 : 85

Q59. A vendor claims to sell wheat at a loss of 50%, but he cheats by using weights that are 65% less than the stated weight. What is his actual profit percentage (round off to two decimal places)?
(a) 42.86%
(b) 43.08%
(c) 46.81%
(d) 47.33%

Q60. P, Q and R invested a sum in the ratio of 12 : 82 : 38, respectively. If they earned a total profit of Rs. 3,510 at the end of year, what is the difference between the shares of Q and R?
(a) Rs. 1,281
(b) Rs. 1,170
(c) Rs. 1,215
(d) Rs. 1,092

Q61. Find a single discount equivalent to successive discounts of 15% and 18%.
(a) 32.3%
(b) 34.3%
(c) 30.3%
(d) 28.3%

Q62. The average price of three items of furniture is Rs. 16875. If their prices are in the ratio 3:5:7, the price of the costliest item (in Rs.) is
(a) 10125
(b) 23625
(c) 5625
(d) 7875

Q63. By how much is 65% of 65 greater than 2/5 of 15?
(a) 34.25
(b) 33.25
(c) 30.25
(d) 36.25

Q64. The product of two positive numbers is 1445. If the first number is five times of the second number, then the sum of the two numbers is:
(a) 105
(b) 93
(c) 102
(d) 115

Q65. Given that 76^(0.44) = x, 76^(0.93)= y and x^z = y^3, then the value of z is close to:
(a) 5.18
(b) 7.73
(c) 6.34
(d) 7.48

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Q66. A can lay railway track between two given stations in 21 days and B can do the same job in 16 days. With the help of C, they did the job in 2 days only. Then, C alone can do the job in

(a) 12 74/131 days
(b) 4 74/131 days
(c) 2 74/131 days
(d) 6 74/131 days

Q67. The average price of three items of furniture is Rs. 5,305. If their prices are in the ratio 3 : 5 : 7, the price of the cheapest item (in Rs.) is:

(a) 3,183
(b) 1,061
(c) 7,427
(d) 5,305

Q68. The sum of two numbers is 132 and their L.C.M. is 630. What are the two numbers?

(a) 83, 49
(b) 90, 42
(c) 95, 37
(d) 88, 44

Q69. Find the value of: 93^(−6) ÷ 93^(16) × 93^(−12)

(a) 93^(−33)
(b) 93^(−25)
(c) 93^(−26)
(d) 93^(−34)

Q70. The LCM of the numbers 12.8 and 0.004 is:

(a) 12.8
(b) 128
(c) 0.128
(d) 1.28

GENERAL INTELLIGENCE AND REASONING

Q71. If 1 is added to each even digit and 1 is subtracted from each odd digit in the number 937612548, then what will be the sum of all the odd digits in the new number thus formed?

(a) 26
(b) 24
(c) 20
(d) 22

Q72. A, B, C, D, Q, R and S are sitting around a circular table, facing the centre of the table. Only one person sits between Q and S, when counted from the right of Q. Only one person sits between S and C. Only one person sits between Q and R. Only two people sit between A and C. Only one person sits between B and R. Who sits third to the right of D?

(a) C
(b) S
(c) A
(d) Q

Q73. 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) PJFB
(b) QKFC
(c) XRMJ

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(d) MGBY

Q74. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

HYP 8, LCT 15, PGX 29, TKB 57, XOF 113, ?

(a) CSJ 225
(b) BCJ 225
(c) BSI 225
(d) BSJ 225

Q75. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only A is kept above F. Only C is kept between F and D. Only B is kept below E. How many boxes are kept between E and F?

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

Q76. In a certain code language, 'PART' is coded as '2467' and 'AIDS' is coded as '1573'. What is the code for 'A' in that language?

(a) 7
(b) 3
(c) 4
(d) 1

Q77. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only.

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

How many such symbols are there, each of which is immediately preceded by an odd number but NOT immediately followed by an even number?

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

Q78. Refer to the following letter and symbol series and answer the question that follows. Counting to be done from left to right only. (Note: All numbers are single digit numbers only).

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

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

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

Q79. All 97 students in a class are standing in a row facing north. Hansa is 46th from the right end while Neeti is 35th from the left end. How many people stand between Hansa and Neeti?

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

Q80. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

CHR HMW MRB RWG ?

(a) WKB
(b) WBK

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(c) WBL
(d) WLB

Q81. Gaurav ranked 29th from the top and 45th from the bottom in his class. How many students are there in his class?
(a) 72
(b) 74
(c) 71
(d) 73

Q82. R is the father of O. O is the wife of A. A is the brother of S. S is the daughter of T. How is R related to T?
(a) Brother's wife's brother
(b) Son's wife's father
(c) Brother's wife's sister
(d) Brother's wife's mother

Q83. 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) SVZ
(b) CEJ
(c) PRW
(d) GIN

Q84. 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) LC - IN
(b) JA - GK
(c) NE - KO
(d) PG - MQ

Q85. LN 23 is related to JI 6 in a certain way. In the same way, LJ 18 is related to JE 1. To which of the following is PP 7 related, following the same logic?
(a) NK 10
(b) MK 10
(c) NL 12
(d) ML 10

Q86. RP 4 is related to WU 16 in a certain way. In the same way, LJ 3 is related to QO 9. To which of the following is TR 6 related, following the same logic?
(a) YX 32
(b) VT 36
(c) VT 32
(d) YW 36

Q87. In the following number-pairs, the second number is obtained by applying certain mathematical operation(s) to the first number. Select the number-pair in which the numbers are related in the same way as are the numbers of the following pairs. (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into 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.)
34, 136
53, 212
(a) 32, 114
(b) 59, 229
(c) 72, 288

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(d) 66, 248

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

6 + 3 ÷ 48 − 4 × 25 = ?

(a) 25
(b) 31
(c) 44
(d) 38

Q89. In a certain code language, 'HIKE' is coded as '4627' and 'SACK' is coded as '1365'. What is the code for 'K' in the given code language?

(a) 5
(b) 6
(c) 1
(d) 7

Q90. Hashini starts from Point Y and drives 16 km towards north. She then takes a left turn, drives 5 km. She then turns left and drives 25 km. She takes a final left turn, drives 5 km and stops at Point Z. How far (shortest distance) and towards which direction should she drive in order to reach Point Y again? (All turns are 90-degree turns only unless specified)

(a) 8 km towards east
(b) 15 km towards south
(c) 12 km towards west
(d) 9 km towards north

Q91. 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 flats are villas.

No villa is an apartment.

Conclusions:

(I) No flat is an apartment.

(II) No apartment is a villa.

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

Q92. If 1 is added to each even digit and 2 is subtracted from each odd digit in the number 9283745, what will be the sum of the digits that are second from the left and second from the right?

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

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

Statements:

All pins are bugs.

All pins are cows.

Conclusions:

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(I): Some bugs are cows.

(II): All cows are pins.

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

Q94. DJMS is related to JPRX in a certain way based on the English alphabetical order. In the same way, BHGM is related to HNLR. To which of the given options is TZVB related, following the same logic?

(a) ZFGA
(b) ZFAG
(c) ZAGF
(d) ZAFG

Q95. If 'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '−', what will come in place of the question mark (?) in the following equation?

7 B 5 D 48 A 4 C 13 = ?

(a) 52
(b) 40
(c) 36
(d) 47

Q96. Town N is to the north of Town M. Town O is to the east of Town N. Town P is to the north of Town O. Town Q is to the east of Town P. Town R is to the east of Town Q. What is the position of Town R with respect to Town M?

(a) North
(b) Southeast
(c) South
(d) Northeast

Q97. What should come in place of the question mark (?) in the given series?

98 102 110 126 158 ?

(a) 221
(b) 223
(c) 222
(d) 224

Q98. What should come in place of the question mark (?) in the given series?

679 680 690 691 701 702 712 ?

(a) 714
(b) 711
(c) 713
(d) 712

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

7 13 25 43 67 ?

(a) 95
(b) 97
(c) 90
(d) 100

Q100. Seven people, A, B, C, T, U, V and W are sitting in a row, facing north. No one sits to the left of V. Only four people sit between V and B. Only three people sit to the right of C. A sits to the immediate left of W. T is not an immediate neighbour of C. Who sits at the rightmost end of the line?

(a) U
(b) T

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(c) A
(d) C

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) American Standard Code for Information Interchange

The correct answer is American Standard Code for Information Interchange.

Key Points

• ASCII stands for American Standard Code for Information Interchange. It is a character encoding standard used in computers and electronic devices.

• ASCII was developed in 1963 by the American National Standards Institute (ANSI), primarily for the representation of English characters and symbols in digital systems.

• The ASCII code consists of 128 characters, including control characters (0–31), printable characters (32–127), numbers, uppercase and lowercase letters, and special symbols.

• ASCII is widely used in computer systems for text processing, communication protocols, and file formats. It provides a standardized way to represent and transfer textual data.

• The ASCII standard ensures compatibility across various devices and platforms, making it a foundational element in computer science and digital communication.

Additional Information

• Control Characters in ASCII:

• Control characters (0–31) are non-printable and used for specific functions like formatting or device control. Examples include carriage return (CR), line feed (LF), and escape (ESC).

• These characters are essential for managing data transmission and communication protocols.

• Printable Characters in ASCII:

• Printable characters range from 32 to 127 and include letters, digits, punctuation marks, and special symbols.

• Examples: A-Z, 0-9, !, @, #, and $.

• Extended ASCII:

• Extended ASCII includes an additional 128 characters (128–255) for representing international symbols, graphical characters, and additional mathematical symbols.

• It is commonly used in systems supporting languages beyond English.

• Applications of ASCII:

• ASCII is extensively used in file formats, such as .txt, .csv, and HTML.

• It is a fundamental standard for network communication protocols like HTTP and SMTP.

• ASCII also plays a key role in programming, data storage, and text processing systems.

• Evolution and Alternatives:

• ASCII served as the foundation for modern character encoding standards like Unicode, which supports a wider range of characters from different languages.

• Unicode is backward compatible with ASCII, ensuring seamless integration in global systems.

Q2. Answer: (c) Satavahanas

The correct answer is Satavahanas.

Key Points

• The Satavahana dynasty is credited with initiating the practice of land grants to Brahmanas (Brahmins) and religious institutions.

• This tradition of land grants, also known as brahmadeya, started during the rule of the Satavahanas in ancient India and became a notable feature of Indian polity and economy in later periods.

• The grants were generally given to Brahmanas for performing Vedic rituals and maintaining religious and educational institutions.

• These land grants were typically recorded in inscriptions, and the beneficiaries were often exempted from taxes and other obligations.

• The Satavahanas used these grants as a means to consolidate their political power and gain the support of the Brahmin class, which held significant social and religious influence.

Additional Information

• Satavahana Dynasty:

• The Satavahanas ruled parts of central and southern India from the 1st century BCE to the 3rd century CE.

• Their capital cities included Pratishthana (modern Paithan) and Amaravati.

• The dynasty played a crucial role in promoting Buddhism and Brahmanism simultaneously, reflecting religious tolerance.

• Prominent rulers included Gautamiputra Satakarni and Vashishtiputra Pulumavi.

• Land Grants in Indian History:

• The practice of granting land to Brahmanas started with the Satavahanas and was later adopted by dynasties like the Guptas and Cholas.

• Such grants were often made in perpetuity, and the beneficiaries had the right to collect taxes from the land.

• These grants contributed to the development of agrarian economies and the spread of Brahmanical culture.

• Other Dynasties Mentioned in the Question:

• Kushanas: Known for their patronage of Buddhism and the Silk Road trade, the Kushanas ruled during the 1st-3rd centuries CE. However, they are not associated with initiating land grants.

• Cholas: The Cholas, especially in the medieval period, extensively granted land to temples and Brahmins. However, they adopted the tradition much later than the Satavahanas.

• Guptas: Known as the "Golden Age of India," the Gupta Empire also issued land grants, but this practice gained prominence after the Satavahana period.

• Significance of Brahmadeya Grants:

• These grants facilitated the spread of Brahmanical culture and religious practices in rural areas.

• They helped in integrating local communities into the larger political framework of the ruling dynasty.

Q3. Answer: (b) Andaman and Nicobar Islands

The correct answer is Andaman and Nicobar Islands.

Key Points

• The Andaman and Nicobar Islands are strategically located near the Malacca Strait, one of the most important maritime choke points in the world.

• The Malacca Strait is a crucial maritime passage that connects the Indian Ocean to the South China Sea and the Pacific Ocean, making it a vital route for global trade.

• India’s control over the Andaman and Nicobar Islands enhances its ability to monitor and secure this critical sea lane, which is essential for energy and trade flow between countries like China, Japan, and Southeast Asia.

• The islands are home to the Tri-services Command of the Indian armed forces, the only joint command in India, allowing for coordinated defense operations in the region.

• Due to their proximity to Southeast Asia and the Indian Ocean, the islands act as a critical outpost for ensuring maritime security, combating piracy, and asserting India’s presence in the Indo-Pacific region.

Additional Information

• Andaman and Nicobar Islands:

• Located in the Bay of Bengal, these islands comprise 572 islands, of which only about 37 are inhabited.

• The islands span an area of approximately 8,249 square kilometers and have immense ecological and geopolitical significance.

• The Indira Point, located on Great Nicobar Island, is the southernmost point of India.

• The islands support India’s strategic interests in the Indo-Pacific region and act as a natural barrier to shipping routes.

• Malacca Strait:

• The Malacca Strait is a narrow stretch of water between the Malay Peninsula and the Indonesian island of Sumatra.

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• It is one of the busiest shipping lanes globally, with about 25% of the world's traded goods passing through it annually.

• The strait is especially crucial for countries like China and Japan, which depend heavily on imported oil transported through this route.

• The strategic importance of the strait makes it a potential hotspot for geopolitical tensions and maritime piracy.

• Importance of Andaman and Nicobar Islands for India:

• The islands are equipped with naval bases and airstrips, enabling India to monitor activities in the Indian Ocean and the South China Sea.

• India has plans to further develop the islands under the Act East Policy to improve maritime connectivity with Southeast Asia.

• The islands play a crucial role in disaster management and humanitarian assistance missions in the region.

• Other Island Groups of India:

• Gulf of Kutch Islands: Located in Gujarat, these islands are not strategically close to the Malacca Strait but are significant for marine biodiversity and oil exploration.

• Lakshadweep Islands: Situated in the Arabian Sea, these islands are significant for India's western maritime boundary but are not near the Malacca Strait.

• Rameswaram Islands: Located in Tamil Nadu, these islands are closer to Sri Lanka and are important for religious tourism and local fishing activities.

Q4. Answer: (a) Made it grow faster

The correct answer is Made it grow faster.

Key Points

• Globalisation has significantly contributed to India's economic growth by fostering integration with the global economy, boosting trade, and encouraging investment.

• India adopted the Liberalisation, Privatisation, and Globalisation (LPG) model in 1991, which opened up various sectors to foreign investment and competition, leading to a surge in economic activities.

• The Gross Domestic Product (GDP) of India witnessed a steady growth trajectory post-globalisation. In the 1990s, the GDP growth rate averaged around 5.5%, and it increased to over 7% in the 2000s.

• Globalisation attracted Foreign Direct Investment (FDI) in key sectors like technology, manufacturing, and services. For example, FDI inflows into India increased from $129 million in 1991 to $67 billion in 2020.

• Globalisation also led to the rise of the IT and software services sector in India, with companies like Infosys, TCS, and Wipro becoming global players. This sector is now a major contributor to India's GDP and exports.

• India's participation in global markets also boosted exports of goods and services, which increased from $18 billion in 1991 to over $400 billion in 2023.

Additional Information

• Impact of Globalisation on Various Sectors:

• Agriculture: Globalisation introduced modern farming techniques and equipment, improving productivity. However, it also led to challenges like dependency on imports for fertilizers and seeds.

• Manufacturing: The "Make in India" initiative was launched to attract global manufacturers. This sector benefited from FDI and technological advancements.

• Services: The IT and outsourcing industry flourished due to global demand for software and customer service. India became a hub for Business Process Outsourcing (BPO).

• Key Reforms During Globalisation in India:

• Industrial Policy of 1991: Reduced licensing requirements and restrictions on private sector participation.

• Foreign Trade Policy: Encouraged exports and reduced import duties to facilitate trade.

• Banking Reforms: Allowed private and foreign banks to operate in India, increasing competition.

• Challenges of Globalisation:

• Income Inequality: While urban areas saw rapid development, rural areas often lagged behind.

• Environmental Concerns: Industrialisation led to increased pollution and resource depletion.

• Dependency: Over-reliance on foreign technology and investment made certain sectors vulnerable to global economic fluctuations.

• Economic Milestones Post-Globalisation:

• The IT revolution put India on the global map as a technology hub.

• Introduction of the Goods and Services Tax (GST) streamlined taxation and improved ease of doing business.

• The Start-up India initiative encouraged innovation and entrepreneurship, making India the third-largest start-up ecosystem globally.

Important Points

• Important Indicators of Growth:

• Human Development Index (HDI): India's HDI improved significantly post-1991, reflecting better life expectancy, education, and standard of living.

• Ease of Doing Business: India climbed from 142nd position in 2014 to 63rd in 2020 in the World Bank's Ease of Doing Business rankings.

• Exports: Key export items include textiles, pharmaceuticals, and software services, contributing to India's foreign exchange reserves.

• Global Partnerships:

• India became a member of the World Trade Organization (WTO) in 1995, expanding trade opportunities.

• Free Trade Agreements (FTAs) with countries like ASEAN, Japan, and South Korea facilitated market access.

Q5. Answer: (b) Conduct the exam in a single shift

The correct answer is Conduct the exam in a single shift.

Key Points

• The Supreme Court of India directed that the NEET-PG 2025 examination should be conducted in a single shift to ensure uniformity and fairness in the evaluation process.

• This decision was made to address discrepancies and prevent any unfair advantage that might arise due to different difficulty levels in multiple shifts. Uniformity in examination standards is critical for a competitive test like NEET-PG.

• The court emphasized that conducting the examination in a single shift would ensure a level playing field for all candidates competing for postgraduate medical seats.

• The directive also highlighted the importance of transparency and fairness in competitive examinations, which are crucial for maintaining public trust in the education system.

• Thus, the decision to conduct the examination in a single shift aligns with the principles of equity and justice in the academic and competitive testing environment.

Additional Information

• About NEET-PG:

• NEET-PG (National Eligibility cum Entrance Test - Postgraduate) is a competitive examination conducted in India for admission to postgraduate medical courses like MD, MS, and PG Diploma.

• It is conducted by the National Board of Examinations (NBE) and is mandatory for admission to postgraduate medical programs in government and private institutions across India.

• The test assesses the knowledge and aptitude of MBBS graduates in various medical disciplines.

• Challenges of Conducting Exams in Multiple Shifts:

• Examinations conducted in multiple shifts often face issues related to variation in question paper difficulty.

• Despite normalization techniques, ensuring absolute fairness across shifts is challenging.

• This can lead to grievances among candidates, potentially resulting in legal disputes and a loss of trust in the examination system.

• Single Shift Examination Benefits:

• Conducting exams in a single shift ensures uniformity in question paper difficulty, eliminating the need for normalization procedures.

• It reduces the chances of logistical errors and ensures smoother administration of the examination process.

• It enhances transparency and boosts the confidence of candidates in the examination system.

• Supreme Court and Educational Reforms:

• The Supreme Court of India has often intervened in matters of education to ensure fairness, transparency, and justice.

• For instance, in the past, it has addressed issues related to exam cancellations, postponements, and reforms to uphold the principles of equity in education.

• Its directives are aimed at safeguarding the interests of students and maintaining the credibility of academic institutions.

Q6. Answer: (c) Bharatiya Janata Party

The correct answer is Bharatiya Janata Party.

Key Points

• The Bharatiya Janata Party (BJP) regained power in the 2025 Delhi Legislative Assembly elections, ending the 15-year rule of the Aam Aadmi Party (AAP). This marks a significant shift in political dynamics in Delhi.

• The BJP achieved this victory due to effective campaign strategies, strong grassroots mobilization, and addressing key concerns such as development, infrastructure, and public welfare.

• The Aam Aadmi Party, which had dominated Delhi politics since its formation, faced declining popularity due to allegations,

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governance challenges, and voter dissatisfaction.

• Delhi has historically been a politically diverse region, with frequent shifts in party dominance. The BJP's win in 2025 reflects its ability to consolidate votes across various demographics and regions within the city.

• The BJP's return to power in Delhi aligns with its broader national strategy of expanding its influence and dominance in urban areas across India.

Additional Information

• Bharatiya Janata Party (BJP):

• The BJP was founded in 1980 and is one of the two major national political parties in India. It emerged from the Bharatiya Jana Sangh and has a strong ideological base rooted in Hindutva and nationalism.

• The BJP is known for its focus on economic reforms, national security, and cultural nationalism. It has been in power at the national level since 2014 under the leadership of Prime Minister Narendra Modi.

• In Delhi, the BJP has historically struggled to maintain power due to the dominance of regional parties like AAP and Congress. However, it has consistently worked on urban development and infrastructure issues.

• Aam Aadmi Party (AAP):

• The AAP was founded in 2012 by Arvind Kejriwal. It is known for its focus on anti-corruption policies and governance reforms.

• AAP's governance in Delhi since 2015 has focused on initiatives like free electricity, water, public education reforms, and healthcare improvements.

• Despite its achievements, AAP faced criticism for alleged mismanagement, internal conflicts, and declining voter trust, which impacted its performance in the 2025 elections.

• Indian National Congress:

• The Congress Party, once dominant in Delhi politics, has seen a decline in influence over the last two decades due to the rise of regional parties like AAP and BJP.

• Congress failed to make a significant impact in the 2025 elections, continuing its struggle to regain relevance in Delhi.

• Key Factors in Election Outcomes:

• The 2025 Delhi elections were marked by a focus on urban development, public welfare schemes, and addressing issues like pollution, traffic congestion, and housing.

• Voter demographics and the ability to connect with the aspirations of the electorate played a major role in determining the outcome of the elections.

Important Points

• Delhi Legislative Assembly:

• The Delhi Legislative Assembly was established in 1993 under the Government of National Capital Territory of Delhi Act. It consists of 70 members elected by the people of Delhi.

• Delhi has a unique governance structure where power is shared between the elected government and the central government.

• The Assembly elections are highly contested, often reflecting broader political trends in India.

• Role of Election Commission:

• The Election Commission of India ensures free and fair elections in Delhi and across India. It oversees the entire electoral process, from voter registration to result declaration.

• Technology advancements like EVMs (Electronic Voting Machines) and VVPATs have been employed to enhance transparency.

Q7. Answer: (d) Sulphur dioxide and Nitrogen oxides

The correct answer is Sulphur dioxide and Nitrogen oxides.

Key Points

• Acid rain is caused mainly due to the presence of Sulphur dioxide (SO_2) and Nitrogen oxides (NO_x) in the atmosphere. These gases react with water, oxygen, and other chemicals to form acidic compounds like sulfuric acid (H_2SO_4) and nitric acid (HNO_3).

• These acidic compounds mix with rainwater and fall to the earth in the form of acid rain. This phenomenon significantly affects ecosystems, buildings, and human health.

• Sulphur dioxide is primarily released from the burning of fossil fuels such as coal and oil at power plants and industrial facilities.

• Nitrogen oxides are mainly emitted from vehicles, industrial processes, and power generation.

• Acid rain is harmful as it leads to the acidification of water bodies, damages forests, corrodes buildings and monuments, and depletes soil nutrients.

Additional Information

• Sources of Sulphur Dioxide and Nitrogen Oxides:

• Sulphur Dioxide: Emissions are largely from burning fossil fuels (coal and oil), industrial processes like smelting, and natural sources like volcanic eruptions.

• Nitrogen Oxides: Emissions come from vehicle exhausts, industrial processes, and power plants. Natural sources include

lightning and microbial processes in soils.

• Effects of Acid Rain:

• Acid rain lowers the pH of lakes and rivers, making them uninhabitable for aquatic life.

• It damages vegetation by leaching essential nutrients from the soil and weakening plants.

• It causes corrosion of historical monuments and buildings, such as the Taj Mahal in India.

• Acid rain can have adverse effects on human health by causing respiratory issues due to inhalation of fine acidic particles.

• Prevention and Control Measures:

• Reduction in the use of fossil fuels and adoption of cleaner energy sources like solar, wind, and hydropower.

• Implementation of technologies like scrubbers in industrial plants to reduce SO2 emissions.

• Promotion of public transportation to reduce vehicle emissions of NOx.

• International agreements like the Convention on Long-Range Transboundary Air Pollution (CLRTAP) aim to reduce acid rain-causing emissions globally.

• Important Points:

• The pH level of normal rainwater is around 5.6 due to the presence of dissolved carbon dioxide. Acid rain typically has a pH below 4.5.

• The phenomenon of acid rain was first discovered by the Scottish chemist Robert Angus Smith in 1852.

• Regions affected by acid rain include industrial areas of the United States, Europe, and parts of Asia.

Q8. Answer: (c) Eggs

The correct answer is Eggs.

Key Points

• Eggs are a rich source of animal protein, which contains all nine essential amino acids required by the human body for muscle repair, enzyme function, and overall growth.

• Animal proteins, such as those found in eggs, are known for their high biological value, meaning they provide all essential nutrients in the right proportions.

• Eggs are also packed with other key nutrients, including vitamin B12, selenium, phosphorus, and riboflavin, which are vital for maintaining healthy bodily functions.

• Unlike plant-based proteins (e.g., pulses and beans), eggs contain complete protein, making them an excellent choice for meeting daily protein requirements.

• Eggs are widely consumed globally due to their nutritional profile and versatility in cooking, making them a common part of diets across different cultures.

Additional Information

• Pulses:

• Pulses, such as lentils and chickpeas, are excellent sources of plant-based protein but lack one or more essential amino acids, making them incomplete proteins.

• They are high in dietary fiber and low in fat, contributing to heart health and digestion.

• Beans:

• Beans, including kidney beans and black beans, are another rich source of plant protein, iron, and folate.

• While beans are nutritious, they do not contain all essential amino acids required by the human body.

• Nuts:

• Nuts like almonds and walnuts are known for their healthy fats, including omega-3 fatty acids, but they are not significant sources of complete protein.

• Nuts are commonly consumed as snacks or added to recipes for their nutritional benefits and flavor.

• Animal Protein:

• Animal protein sources include eggs, meat, fish, and dairy products, all of which are complete proteins.

• Animal protein is essential for individuals with increased protein requirements, such as athletes and pregnant women.

• Importance of Protein:

• Proteins are vital for cell repair, enzyme production, and hormonal balance.

• A balanced intake of protein, including both plant and animal sources, is recommended for optimal health.

Q9. Answer: (b) Western Ghats

The correct answer is Western Ghats.

Key Points

• The Western Ghats, also known as the Sahyadri Hills, run parallel to the western coast of India, covering states like

Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu.

• The range intercepts the southwest monsoon winds, causing orographic rainfall on the windward side (western slopes), resulting in heavy rainfall.

• The leeward side (eastern slopes) of the Western Ghats experiences a rain shadow effect, leading to dry conditions in regions like the Deccan Plateau.

• This geographical feature plays a critical role in shaping the climate and biodiversity of the western coastal plains and the adjacent areas.

• The dense forests and unique ecology of the Western Ghats have earned it the status of a UNESCO World Heritage Site due to its rich biodiversity.

Additional Information

• Aravalli Range:

• Located in the northwestern part of India, the Aravalli Range is one of the oldest mountain ranges in the world.

• It runs through Rajasthan, Haryana, and Gujarat, and does not significantly impact the monsoon winds.

• Unlike the Western Ghats, it is oriented in a northeast-southwest direction, parallel to the monsoon winds, offering no significant barrier effect.

• Vindhya Range:

• The Vindhya Range lies in central India and forms a natural divide between northern and southern India.

• It does not have a significant impact on monsoon winds as it is not located in the path of the southwest monsoon.

• Satpura Range:

• The Satpura Range lies to the south of the Vindhya Range in central India, separating the northern plains from the Deccan Plateau.

• Although it influences local climatic patterns, it does not significantly impact the southwest monsoon winds like the Western Ghats.

• Significance of the Western Ghats:

• The Western Ghats are home to several important rivers such as the Godavari, Krishna, and Kaveri, which originate from its slopes.

• They are a biodiversity hotspot, hosting a variety of endemic flora and fauna.

• The heavy rainfall supports dense forests, agriculture, and hydropower projects in the region.

Q10. Answer: (c) Microgravity-based scientific experiments

The correct answer is Microgravity-based scientific experiments.

Key Points

• ISRO and the European Space Agency (ESA) are collaborating in the Axiom-4 mission to conduct microgravity-based scientific experiments. These experiments are aimed at studying the behavior of materials, biological systems, and physical phenomena in the absence of gravity.

• Microgravity environments provide a unique opportunity to study processes that are influenced by Earth's gravity, such as fluid dynamics, combustion, and protein crystallization, which are otherwise difficult to analyze in terrestrial laboratories.

• The collaboration focuses on enhancing scientific knowledge in areas like pharmaceuticals, material science, and fundamental physics, which have applications in industrial research and healthcare sectors.

• The mission also aims to utilize the microgravity environment for testing innovative technologies that could be used in future space exploration missions, including long-duration spaceflights.

• Such collaborative efforts between space agencies foster international scientific cooperation, sharing of resources, and advancements in space exploration and research. Hence, the correct answer is Microgravity-based scientific experiments.

Additional Information

• Microgravity:

• The term "microgravity" refers to a condition in which gravitational forces are extremely weak, typically experienced in space.

• It allows scientists to study phenomena such as fluid behavior, biological processes, and material formation without the interference of gravity.

• Microgravity research has applications in developing better pharmaceutical drugs, understanding disease mechanisms, and designing lighter and stronger materials.

• ISRO-ESA Collaboration:

• The Indian Space Research Organisation (ISRO) and the European Space Agency (ESA) have a longstanding partnership in space exploration, including satellite development, deep-space missions, and scientific research.

• Such collaborations leverage the technological expertise and resources of both agencies to achieve shared scientific and exploration goals.

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• Previous collaborations include joint missions like Chandrayaan-1 (India's lunar exploration program) and Mars exploration initiatives.

• Axiom-4 Mission:

• The Axiom Space missions are private spaceflights that focus on conducting research and technology testing in the International Space Station (ISS).

• Axiom-4 is part of a series of missions aimed at enabling commercial utilization of space while contributing to scientific advancements.

• These missions represent a shift toward private-sector involvement in space exploration, alongside collaborations with national space agencies like ISRO and ESA.

• Other Applications of Microgravity Research:

• Microgravity research is instrumental in developing solutions for space-related challenges, such as food production and waste management in long-duration space missions.

• It also contributes to Earth-based applications, including advancements in materials science, agriculture, and environmental sustainability.

• For example, studying fluid dynamics in microgravity helps improve fuel efficiency in engines and optimize industrial processes.

Important Points

• International Space Station (ISS):

• The ISS is a collaborative effort between multiple space agencies, including NASA, ESA, Roscosmos, JAXA, and CSA, providing a platform for microgravity research and international cooperation.

• It orbits Earth at an altitude of approximately 408 kilometers and serves as a hub for scientific experiments, technology testing, and space exploration.

• Future Prospects:

• Microgravity research is critical for preparing humans for long-term space exploration, including missions to the Moon, Mars, and beyond.

• Innovations from such research contribute to the development of sustainable living conditions in space and enhance our understanding of fundamental scientific principles.

Q11. Answer: (a) 1956

The correct answer is 1956.

Key Points

• The States Reorganisation Act was passed in 1956, and it implemented the recommendations of the States Reorganisation Commission.

• The Act came into effect on 1st November 1956, reorganizing states largely based on linguistic lines.

• This Act resulted in the creation of major states like Andhra Pradesh, Bombay, Kerala, Madras, and Punjab, among others.

• The States Reorganisation Commission was appointed in 1953 under the chairmanship of Fazal Ali. Other members included H.N. Kunzru and K.M. Panikkar.

• The Act aimed to address the demands for state boundaries to be drawn based on linguistic and cultural identities, ensuring administrative efficiency and harmony.

Additional Information

• Historical Background:

• Post-Independence, there were growing demands for linguistic-based states, particularly after the formation of Andhra Pradesh in 1953, carved out from the Madras Presidency.

• The JVP Committee (Jawaharlal Nehru, Vallabhbhai Patel, and Pattabhi Sitaramayya) initially resisted linguistic states but recommended their formation in specific cases.

• Key Provisions of the States Reorganisation Act:

• The Act abolished the Part A, B, C, and D states classification, replacing it with a uniform state structure.

• It created 14 states and 6 Union Territories, significantly reshaping India's political map.

• Role of States Reorganisation Commission:

• The commission was formed to study the feasibility of linguistic states and recommend reorganization based on administrative, economic, and cultural factors.

• The Fazal Ali Commission submitted its report in 1955, emphasizing linguistic homogeneity for state reorganization while considering administrative convenience.

• Examples of States Reorganized:

• Andhra Pradesh was formed for Telugu-speaking people from the Madras Presidency.

• Bombay State was divided into Maharashtra and Gujarat in 1960 following linguistic demands.

• Kerala was created by merging the Malabar District of Madras with Travancore-Cochin.

Important Points

• Linguistic Reorganization:

• One of the key reasons for reorganization was to address the cultural and linguistic aspirations of people from different regions.

• The formation of states based on linguistic identity aimed to promote unity and reduce regional conflicts.

• Impact:

• The Act reshaped the Indian political map, fostering administrative efficiency.

• It laid the foundation for further state reorganization, such as the creation of Chhattisgarh, Uttarakhand, and Jharkhand in 2000.

• Challenges:

• While linguistic states reduced conflicts initially, it led to new demands for statehood based on ethnicity, culture, and regional identity.

• Examples include the creation of Telangana in 2014 and ongoing demands for Gorkhaland and Vidarbha.

Q12. Answer: (a) 42^(nd) Amendment

The correct answer is 42nd Amendment.

Key Points

• The 42nd Amendment Act of the Indian Constitution, enacted in 1976, is also known as the "Mini-Constitution" due to its extensive modifications to the Constitution.

• This amendment transferred Education from the State List to the Concurrent List, allowing both the Union and State governments to legislate on education matters.

• The aim of this transfer was to ensure uniformity in education policies across the country and improve the quality of education nationwide.

• The 42nd Amendment Act also introduced significant changes in the Preamble, Fundamental Rights, and Directive Principles of State Policy (DPSPs).

• This amendment was passed during the Emergency period under the leadership of then-Prime Minister Indira Gandhi.

Additional Information

• Concurrent List:

• The Concurrent List is one of the three lists in the Seventh Schedule of the Indian Constitution, along with the Union List and State List.

• Subjects in the Concurrent List allow both the Central and State governments to legislate. In case of conflict, the Union law prevails.

• Examples of subjects in the Concurrent List include education, marriage and divorce, bankruptcy, and trade unions.

• 42nd Amendment Act Overview:

• It introduced concepts like the Fundamental Duties under Article 51A and emphasized the Directive Principles of State Policy.

• It also extended the term of the Lok Sabha and State Assemblies from 5 years to 6 years (later reverted by the 44th Amendment).

• The amendment aimed at promoting a socialist, secular, and integrity-driven nation by altering the Preamble.

• Education in India:

• Initially a State subject, education was brought into the Concurrent List to improve uniformity and quality standards across the nation.

• Post the 42nd Amendment, major educational initiatives like the Right to Education Act (RTE), Sarva Shiksha Abhiyan, and National Education Policies were undertaken by the Union Government.

• Other Amendments Related to Education:

• The 86th Amendment Act, 2002, made education a Fundamental Right under Article 21A for children aged 6 to 14 years.

• The 93rd Amendment Act, 2005, allowed reservations for Other Backward Classes (OBCs) in educational institutions.

Important Points

• Concurrent List Subjects:

• Subjects like criminal law, forests, economic and social planning, and education are part of the Concurrent List.

• The inclusion of education in the Concurrent List strengthened policy coordination between the Centre and States.

• Impact of 42nd Amendment:

• This amendment is considered a landmark in Indian constitutional history as it significantly strengthened the role of the Union government.

• It also faced criticism for being passed during the Emergency period, when democratic functioning was heavily restricted.

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Q13. Answer: (b) Disputes between States or between a State and the Union

The correct answer is Disputes between States or between a State and the Union.

Key Points

• Article 131 of the Constitution of India provides for the original jurisdiction of the Supreme Court. This jurisdiction is invoked in disputes between the States or between a State and the Union Government.

• Under this article, the Supreme Court acts as the arbitrator in case of legal disputes or conflicts between governments within India. Hence, this is the correct option.

• Appeals from criminal cases in High Courts fall under the appellate jurisdiction of the Supreme Court, not its original jurisdiction. Hence, this statement is incorrect.

• The enforcement of fundamental rights is under the writ jurisdiction of the Supreme Court (Article 32) and not its original jurisdiction. Hence, this statement is incorrect.

• Election petitions against sitting Members of Parliament are adjudicated by the High Courts and do not fall under the original jurisdiction of the Supreme Court. Hence, this statement is incorrect.

Additional Information

• Original Jurisdiction of the Supreme Court:

• The original jurisdiction of the Supreme Court is defined under Article 131 of the Constitution of India.

• It primarily deals with disputes between the Government of India and one or more States, or between two or more States.

• Examples include disputes over water sharing, territorial boundaries, and constitutional matters.

• This jurisdiction ensures the resolution of inter-governmental conflicts through a single, neutral judicial body.

• Appellate Jurisdiction:

• Under its appellate jurisdiction, the Supreme Court hears appeals against judgments from lower courts, including the High Courts.

• This includes appeals in criminal cases, civil disputes, and constitutional matters.

• The appellate jurisdiction is governed by Articles 132 to 134 of the Constitution.

• Writ Jurisdiction (Article 32):

• The Supreme Court has the authority to issue writs for the enforcement of fundamental rights.

• This jurisdiction is often termed as the "guardian of fundamental rights" and is fundamental to the functioning of the judiciary in India.

• The writs include habeas corpus, mandamus, prohibition, quo warranto, and certiorari.

• Election Petitions:

• Election petitions are filed in the High Courts under the Representation of the People Act, 1951.

• The Supreme Court does not have original jurisdiction in election matters; it can only hear appeals arising from High Court judgments.

Important Points

• Examples of Original Jurisdiction:

• State Water Disputes: Disputes over water sharing between States, such as the Cauvery Water Dispute.

• Boundary Disputes: Conflicts over territorial boundaries between States like Maharashtra and Karnataka.

• Limitations:

• The original jurisdiction does not apply to private individuals or entities.

• It is limited to inter-governmental disputes as defined under Article 131.

Q14. Answer: (b) Mobile phone deposit facility

The correct answer is Mobile phone deposit facility.

Key Points

• The Election Commission of India (ECI) introduced the Mobile Phone Deposit Facility at polling stations in May 2025. This initiative aims to ensure a smooth and distraction-free voting process.

• The facility is designed to provide a secure location for voters to deposit their mobile devices before entering the polling area, aligning with the guidelines prohibiting the use of mobile phones inside polling booths.

• This step was taken to ensure that voters can focus on exercising their voting rights without any external distractions or interruptions caused by mobile phones.

• By implementing this facility, the ECI aims to enhance the voting experience while ensuring the sanctity and confidentiality of the voting process.

• Additionally, it is a move to prevent potential misuse of mobile phones, such as capturing votes or violating the secrecy of the ballot.

Additional Information

• Election Commission of India (ECI):

• The Election Commission of India is an autonomous constitutional authority responsible for administering election processes in India at the national, state, and local levels.

• Established on 25 January 1950, the ECI conducts free and fair elections in accordance with the Indian Constitution.

• It ensures the implementation of Model Code of Conduct and monitors fair voting practices to maintain the integrity of elections.

• Mobile Phone Restrictions at Polling Stations:

• Mobile phones are generally prohibited inside polling booths to maintain the secrecy of the ballot and to avoid distractions or disturbances.

• The mobile phone deposit facility provides a safe place for voters to temporarily keep their phones while casting their votes.

• This initiative addresses concerns regarding the misuse of mobile phones, such as capturing photos of ballots or influencing other voters.

• Other Facilities at Polling Stations:

• Polling stations often provide facilities such as ramps for disabled voters, drinking water, and basic amenities to ensure convenience.

• In recent years, the ECI has also focused on improving voter awareness and providing information through voter facilitation centers.

• Some states have introduced queue management systems and seating arrangements for senior citizens and differently-abled voters.

• Role of Technology in Voting:

• Technological advancements like EVMs (Electronic Voting Machines) and VVPAT (Voter Verifiable Paper Audit Trail) have been introduced to enhance transparency and reliability in the voting process.

• While online voting is not yet implemented in India, the ECI continues to explore technological solutions to make elections more accessible and efficient.

Q15. Answer: (c) Wien's Displacement Law

The correct answer is Wien's Displacement Law.

Key Points

• Wien's Displacement Law explains the relationship between the temperature of a black body and the wavelength at which it emits radiation most strongly.

• It states that the wavelength corresponding to the peak emission of radiation is inversely proportional to the temperature of the black body. Mathematically, $\lambda_{max} = b/T$, where λ_{max} is the peak wavelength, T is the temperature, and b is Wien's constant (approximately 2.897×10^{-3} m·K).

• This law helps us understand the colors emitted by black bodies like stars, including the Sun, based on their surface temperature. For example, hotter stars emit blue light, while cooler stars emit red light.

• The law was formulated by Wilhelm Wien in 1893 and is a fundamental concept in thermodynamics and astrophysics.

• It is widely applied in determining the temperature of celestial objects by analyzing the spectrum of their emitted radiation.

Additional Information

• Hooke's Law:

• Hooke's Law pertains to the elasticity of materials and states that the force needed to extend or compress a spring is proportional to the distance it is stretched or compressed ($F = kx$, where k is the spring constant).

• It is unrelated to black body radiation or temperature.

• Snell's Law:

• Snell's Law describes the refraction of light as it passes from one medium to another, stating that the ratio of the sine of the angles of incidence and refraction is proportional to the refractive indices of the media ($n1 \sin \theta1 = n2 \sin \theta2$).

• This law is used in optics and is not related to the emission of radiation by black bodies.

• Kepler's Laws of Planetary Motion:

• These laws describe the motion of planets around the Sun:

• 1st Law: Planets move in elliptical orbits with the Sun at one focus.

• 2nd Law: A line segment joining a planet and the Sun sweeps out equal areas during equal intervals of time.

• 3rd Law: The square of the orbital period of a planet is proportional to the cube of the semi-major axis of its orbit.

• While these laws are significant in celestial mechanics, they do not explain the colors of black bodies based on their temperature.

• Important Points:

• Wien's Displacement Law is essential for understanding the spectrum of stars and other celestial objects, allowing scientists to

estimate their surface temperatures.

• The Sun, for example, emits radiation most strongly at a wavelength of approximately 500 nm (green light), corresponding to its surface temperature of about 5778 K.

• It is a crucial tool in astrophysics and helps in the study of stellar evolution.

Q16. Answer: (c) Article 74

The correct answer is Article 74.

Key Points

• Article 74 of the Indian Constitution provides for a Council of Ministers headed by the Prime Minister to aid and advise the President of India.

• The President is bound to act according to the advice provided by the Council of Ministers. This ensures a parliamentary form of government.

• The Council of Ministers includes the Prime Minister, Cabinet Ministers, Ministers of State, and Deputy Ministers.

• The provision under Article 74 emphasizes the principle of collective responsibility, ensuring that the Council of Ministers functions as a unified body to support governance.

• It establishes the framework for the executive authority of the Union, providing essential support to the President in discharging constitutional duties.

Additional Information

• Article 75:

• Article 75 deals with the appointment of the Prime Minister and other ministers by the President.

• The Prime Minister is appointed by the President, and other ministers are appointed on the advice of the Prime Minister.

• The salaries and allowances of ministers are decided by the Parliament.

• Article 85:

• Article 85 pertains to the summoning and prorogation of Parliament sessions and the dissolution of the Lok Sabha.

• The President has the authority to summon each House of Parliament and can dissolve the Lok Sabha when required.

• Article 65:

• Article 65 outlines the provision for the Vice President to act as President in case of a vacancy in the office of the President.

• The Vice President serves as the acting President until a new President is elected.

• Constitutional Role of the Council of Ministers:

• The Council of Ministers functions as the executive body of the Union government.

• It is responsible for formulating policies, executing laws, and advising the President.

• Its decisions are based on collective responsibility, ensuring accountability to the Parliament.

Important Points

• Key Characteristics of the Council of Ministers:

• The Council of Ministers is led by the Prime Minister and collectively responsible to the Lok Sabha.

• The ministers are classified into three categories: Cabinet Ministers, Ministers of State, and Deputy Ministers, depending on their rank and responsibilities.

• All decisions taken by the Council of Ministers are collectively binding, reflecting the principle of collective responsibility.

• Relation between President and Council of Ministers:

• The President of India acts in accordance with the advice provided by the Council of Ministers under Article 74.

• This ensures the President's actions align with the parliamentary form of governance.

Q17. Answer: (c) Macaulay’s Minute

The correct answer is Macaulay's Minute.

Key Points

• Macaulay's Minute on Education, written in 1835, was a landmark document that proposed the introduction of English education in India.

• The document was prepared by Thomas Babington Macaulay, a member of the Supreme Council of India, and advocated for the replacement of traditional Indian education systems with an English-based education system.

• It aimed to create a class of Indians who would act as intermediaries between the British rulers and the Indian masses, often referred to as "a class of persons, Indian in blood and colour, but English in taste, in opinions, in morals, and in intellect."

• The policy led to the establishment of English-medium schools and the promotion of English as the medium of instruction for higher education in India.

• This initiative had a lasting impact on Indian education and society, making English a prominent language in India to this day.

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Additional Information

• Regulating Act (1773):

• The Regulating Act of 1773 was the first step towards the centralization of administration in British India, but it had no specific focus on education.

• The act aimed to address corruption in the East India Company and improve governance, particularly in Bengal.

• Pitt's India Act (1784):

• The Pitt's India Act created a dual system of control for British India, dividing power between the East India Company and the British Crown.

• Like the Regulating Act, it had no provisions or policies related to education.

• Charter Act of 1813:

• The Charter Act of 1813 was the first significant legislation to recognize the importance of education in India.

• It allocated a sum of Rs. 1 lakh annually for the promotion of education, marking the beginning of state-sponsored education in India.

• However, it lacked clear direction on the medium of instruction, which was later clarified by Macaulay's Minute.

• Impact of Macaulay's Minute:

• Macaulay's policies led to the establishment of institutions like the University of Calcutta, University of Bombay, and University of Madras in 1857.

• It also laid the foundation for the dominance of English in Indian education, administration, and judiciary.

Important Points

• Background:

• Before Macaulay's Minute, indigenous education systems in India focused on traditional learning in Sanskrit, Persian, and regional languages.

• The British debated whether to promote traditional Indian education or introduce Western-style education.

• Criticism:

• Macaulay's policies were criticized for undermining India's rich educational heritage and prioritizing English over native languages.

• Some argued that the policy created a cultural disconnect among Indians.

Q18. Answer: (c) Iron and steel industry

The correct answer is Iron and Steel Industry.

Key Points

• The Iron and Steel Industry was operational in India at the time of independence and played a significant role in the country's early industrial development.

• The first integrated steel plant in India, Tata Iron and Steel Company (TISCO), was established in 1907 in Jamshedpur, Jharkhand.

• The industry was crucial for the production of essential materials used in infrastructure, transportation, and defense during pre-independence and post-independence periods.

• Other steel plants like the Indian Iron and Steel Company (IISCO), established in 1918 in West Bengal, contributed significantly to India's industrial base.

• At the time of independence in 1947, the Iron and Steel Industry was one of the few industries that were developed and functional, laying the foundation for modern industrial growth in India.

Additional Information

• Aerospace Industry:

• India did not have an operational aerospace industry at the time of independence in 1947. This sector developed later, with the establishment of Hindustan Aeronautics Limited (HAL) in 1940 but became prominent only post-independence.

• HAL was primarily involved in aircraft assembly during its early years, and indigenous development of aerospace technologies gained momentum in the later decades.

• Electronics Industry:

• The electronics industry was not operational in India at the time of independence. It began to develop in the 1960s and became significant with the growth of information technology in the 1980s.

• Post-independence, the government played a crucial role in promoting this sector through initiatives like the establishment of Indian Telephone Industries (ITI) in 1948.

• Automobile Industry:

• The automobile industry in India was in its nascent stage during independence. Companies like Hindustan Motors, established in 1942, were among the early players but had limited production capabilities.

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• Mass production and the expansion of the automobile industry gained traction after independence in the 1950s and 1960s.

• Iron and Steel Industry:

• India's Iron and Steel Industry was one of the few well-established industries at the time of independence. It contributed significantly to the country's industrial base and infrastructure development.

• Key companies like TISCO and IISCO were operational, producing steel for various applications, including construction, transportation, and defense.

• The industry played a pivotal role in supporting India's economic growth during the early years of independence.

Important Points

• Historical Role:

• The Iron and Steel Industry was critical for India's infrastructure development, including railways, bridges, and industrial machinery.

• India's steel production at the time of independence contributed to its self-reliance in industrial materials.

• Post-Independence Growth:

• The industry expanded significantly after independence, with the establishment of new plants like Bhilai Steel Plant, Durgapur Steel Plant, and Rourkela Steel Plant in the 1950s and 1960s.

• These developments were part of India's planned economic strategy to boost heavy industries under the Five-Year Plans.

Q19. Answer: (b) increase production of high-quality seeds

The correct answer is increase production of high-quality seeds.

Key Points

• National Mission on High Yielding Seeds aims to boost agricultural productivity by enhancing the availability of high-quality seeds to farmers.

• The initiative focuses on ensuring that seeds with better yield potential and disease resistance are accessible to farmers, supporting their efforts toward sustainable farming practices.

• The mission addresses the issue of low productivity in Indian agriculture by promoting the use of seeds that are scientifically developed for higher efficiency and adaptability to various climatic conditions.

• It is part of India's larger strategy to achieve self-reliance in agriculture by improving crop yields and reducing dependency on imported seeds.

• By increasing the production of quality seeds, the mission contributes to enhancing food security and supporting the livelihood of farmers. Hence, the correct answer is increase production of high-quality seeds.

Additional Information

• Cold Storage Infrastructure:

• Cold storage facilities are essential for preserving perishable agricultural produce like fruits, vegetables, and dairy products.

• However, the National Mission on High Yielding Seeds does not aim to develop cold storage infrastructure; this is addressed under other agricultural schemes.

• Irrigation Facilities:

• Effective irrigation is critical for improving agricultural productivity, particularly in regions with erratic rainfall.

• While irrigation is vital, the National Mission on High Yielding Seeds does not directly address irrigation facilities; this falls under programs like the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY).

• Organic Farming Practices:

• Organic farming focuses on using natural inputs and avoiding synthetic chemicals to enhance soil health and produce healthier crops.

• Promoting organic farming practices is not the focus of the National Mission on High Yielding Seeds; this is covered under initiatives like the Paramparagat Krishi Vikas Yojana (PKVY).

• Importance of High-Quality Seeds:

• High-quality seeds are scientifically developed to increase yield, improve resistance to diseases, and adapt to diverse climatic conditions.

• They play a crucial role in achieving the goals of the National Mission on High Yielding Seeds, ensuring food security and agricultural sustainability.

Important Points

• Role of Seeds in Agriculture:

• Seeds are the foundation of agriculture; their quality directly impacts crop yield, food security, and farmer income.

• India has been focusing on improving the production of high-yield seeds to ensure the country’s agricultural sustainability.

• Government Schemes Supporting Agriculture:

• Other schemes like PMKSY for irrigation and PKVY for organic farming complement the efforts of the National Mission on High

Yielding Seeds.

• Together, these initiatives contribute to the overall development of the agricultural sector in India.

Q20. Answer: (c) number of persons living per unit area

The correct answer is number of persons living per unit area.

Key Points

• Population density is defined as the number of persons living per unit area, typically measured in persons per square kilometer or square mile.

• It is calculated by dividing the total population of a region by its total land area.

• This metric is used to assess the concentration of people in a specific geographic area and helps in understanding the distribution of population.

• Population density varies significantly across regions depending on factors like geography, economic activity, urbanization, and availability of resources.

• For example, countries like India and China have high population densities in urban areas compared to rural regions, while countries like Canada and Australia have lower overall population densities.

Additional Information

• Formula for Population Density:

• The formula for calculating population density is: Population Density = Total Population / Total Land Area.

• It is usually expressed in people per square kilometer (km²).

• Significance of Population Density:

• It helps in understanding the pressure on resources like land, water, and food in a particular area.

• High population density often indicates urbanization and economic development but can lead to challenges like overcrowding, pollution, and strain on infrastructure.

• Low population density may indicate remote or underdeveloped areas.

• Examples of Population Density:

• Countries with high population density: Bangladesh (approximately 1,265 people per km²) and India (464 people per km² as per 2021 data).

• Countries with low population density: Canada (4 people per km²) and Australia (3 people per km²).

• Factors Influencing Population Density:

• Geographical factors: Fertile plains and river valleys (e.g., Ganges River Basin) often have high population density.

• Economic factors: Industrial and commercial hubs attract higher populations, increasing density.

• Social and cultural factors: Urban areas with better facilities and opportunities have higher densities.

• World's Most Densely Populated Cities:

• Manila, Philippines: Approximately 43,000 people per km².

• Dhaka, Bangladesh: Over 36,000 people per km².

Important Points

• Global Average Population Density: The global average population density is approximately 60 people per km² as of 2021.

• India's Population Density: As per the 2011 Census, India's population density was 382 people per km². It is estimated to have increased due to population growth.

• Urban vs Rural Density: Urban areas like Delhi have a population density exceeding 11,000 people per km², while rural areas have significantly lower densities.

• Importance in Urban Planning: Population density is a critical factor in urban planning, resource allocation, and infrastructure development.

Q21. Answer: (d) Gulveer Singh

The correct answer is Gulveer Singh.

Key Points

• Gulveer Singh, an Indian athlete, achieved a remarkable feat by winning gold medals in both the men's 5000m and 10,000m events at the 2025 Asian Athletics Championships.

• The Asian Athletics Championships is one of the most prestigious events in the athletics domain, attracting top athletes from across Asia.

• Gulveer Singh’s victory in these endurance events highlights his exceptional stamina, speed, and strategic race planning.

• His performance established India’s dominance in middle and long-distance running on the Asian stage.

• Such achievements are significant for Indian athletics, as they boost morale and inspire upcoming athletes to perform on

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international platforms.

Additional Information

• Asian Athletics Championships:

• The championship is a biennial event organized by the Asian Athletics Association.

• It serves as a platform for athletes from Asia to showcase their talent in various track and field events.

• India has consistently performed well in the championship, earning numerous medals in past editions.

• Men's 5000m and 10,000m Events:

• Both races are categorized as long-distance running events.

• The 5000m event requires athletes to complete 12.5 laps on a standard 400m track, emphasizing speed and endurance.

• The 10,000m event is twice as long, requiring 25 laps and demanding exceptional stamina and mental toughness.

• Indian Athletics Achievements:

• India has made significant strides in athletics, with athletes like Neeraj Chopra and Hima Das gaining international recognition.

• Recent accomplishments in middle and long-distance events suggest growing expertise and training facilities in these categories.

• Training and Support for Athletes:

• Indian athletes receive support from organizations such as the Sports Authority of India (SAI) and private sponsors.

• Programs like the Target Olympic Podium Scheme (TOPS) aim to provide world-class facilities and coaching to athletes.

Important Points

• Gulveer Singh:

• Known for his exceptional performance in endurance races, Gulveer Singh has emerged as a prominent athlete in the Indian athletics arena.

• His victories in both the 5000m and 10,000m events at the 2025 Asian Athletics Championships highlight his versatility and determination.

• Other Indian Athletes:

• While Avinash Sable specializes in steeplechase, athletes like Tejaswin Shankar excel in high jump and decathlon.

• Such diversity in talent underscores the growing range of Indian athletic skills on international platforms.

Q22. Answer: (d) Sarkar

The correct answer is Sarkar.

Key Points

• Sher Shah Suri, the founder of the Sur Empire, implemented several administrative reforms to strengthen governance.

• He divided his empire into administrative units called Shiqqs, which were equivalent to Sarkars under the Mughal administration.

• A Sarkar was a larger administrative division during the Mughal period, composed of multiple Parganas.

• Sher Shah ensured that each Sarkar was managed by efficient officers such as Shiqdar (law enforcement officer) and Munsif (judicial officer).

• The administrative structure of Sarkars was designed to provide better revenue collection and law enforcement, serving as the foundation for Mughal governance.

Additional Information

• Sher Shah Suri's Administrative Reforms:

• Sher Shah Suri (1486–1545) was a visionary ruler known for his effective governance and administrative reforms.

• He introduced the Rupiya, a silver coin, which became the precursor to the modern Indian currency.

• He developed an efficient revenue system based on land measurement and improved communication networks by establishing Grand Trunk Road, connecting major cities.

• Mughal Administrative Divisions:

• Under the Mughals, the empire was divided into three main administrative units: Suba, Sarkar, and Pargana.

• A Suba was the largest division and governed by a Subedar, while a Sarkar was managed by a Faujdar and a Pargana was overseen by smaller officers like the Qanungo.

• Comparison of Administrative Units:

• Suba: A province or state under the Mughal empire, the largest administrative unit.

• Sarkar: A division within a Suba, equivalent to the Shiqqs during Sher Shah’s reign.

• Pargana: A smaller administrative unit within a Sarkar, consisting of villages.

• Mandal: This term was used in certain regions but not widely adopted in Mughal administration.

• Legacy of Sher Shah’s Administration:

• Sher Shah’s reforms were later adopted and refined by the Mughals, influencing governance in India for centuries.

• His focus on efficient revenue collection, law enforcement, and infrastructure development laid the groundwork for modern administrative systems.

Important Points

• Shiqqs vs Sarkars:

• Sher Shah’s Shiqqs were equivalent to the Sarkars of the Mughal empire, highlighting continuity in administrative practices.

• The division of the empire into such units ensured better governance, revenue collection, and law enforcement.

• Influence on Mughal Administration:

• The Mughal emperors adopted and expanded Sher Shah’s administrative framework, further dividing Subas into Sarkars and Parganas.

• This hierarchical structure allowed for efficient management and control over vast territories.

Q23. Answer: (a) Ministry of Home Affairs

The correct answer is Ministry of Home Affairs.

Key Points

• The Ministry of Home Affairs (MHA) introduced the technology-driven initiative called e-Zero FIR on 19 May 2025.

• The primary objective of e-Zero FIR is to boost India's cybercrime-fighting capabilities by enabling quick registration of complaints online, without the need for victims to visit police stations.

• This initiative aims to promote digital transparency, accessibility, and efficiency in handling cybercrimes across the country.

• The platform was developed under the Ministry of Home Affairs as part of the broader effort to modernize India's law enforcement systems to tackle cyber threats effectively.

• The e-Zero FIR system ensures that the first information report (FIR) can be filed remotely, offering greater convenience to victims of cybercrimes and reducing procedural delays.

Additional Information

• Ministry of Home Affairs (MHA):

• The MHA is the key ministry responsible for internal security, public administration, and law enforcement in India.

• It oversees various agencies like Central Bureau of Investigation (CBI), National Investigation Agency (NIA), and Intelligence Bureau (IB), which play critical roles in tackling cybercrimes.

• The ministry also implements the National Cyber Crime Reporting Portal (cybercrime.gov.in) to facilitate the online filing of complaints related to cybercrimes.

• Cybercrime Trends in India:

• India has witnessed a significant rise in cybercrime rates, including phishing attacks, ransomware, identity theft, and financial fraud.

• The government has undertaken various initiatives to strengthen cybersecurity and protect citizens from digital threats.

• Functions of e-Zero FIR:

• Allows victims to lodge FIRs online without visiting police stations, ensuring speedy registration of complaints.

• Enhances accountability and transparency in the law enforcement process.

• Reduces procedural barriers for reporting cybercrimes, making it more accessible for individuals across the country.

• Other Cybercrime Initiatives:

• The government launched the Indian Cyber Crime Coordination Centre (I4C) to address the growing challenge of cyber threats.

• The Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) was established by the Ministry of Electronics and Information Technology (MeitY) to promote safe and secure internet usage.

• Important Points:

• The introduction of e-Zero FIR aligns with the government’s Digital India initiative, which emphasizes digital empowerment and modernization of governance systems.

• It reflects the growing need for innovative technologies to counter cyber threats and ensure digital security for citizens.

Q24. Answer: (d) Device Manager

The correct answer is Device Manager.

Key Points

• Device Manager is a system utility in Microsoft Windows that allows users to manage hardware devices installed on their computer.

• It provides information about connected hardware components, their status, and functionality. Users can enable, disable, update, uninstall drivers and troubleshoot hardware devices via Device Manager.

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• The Device Manager can be accessed through the Control Panel by navigating to System and Security, or directly by searching for "Device Manager" in the Start Menu.

• Device Manager is particularly useful for managing peripherals such as printers, keyboards, monitors, network adapters, and external storage devices.

• This tool plays a key role in identifying issues with hardware and provides information on error codes that can help diagnose problems.

Additional Information

• Security and Maintenance:

• It is a section in the Control Panel that provides tools for system updates, troubleshooting, and managing security settings.

• This section primarily focuses on ensuring system stability and security through features such as Windows Defender, firewall settings, and system backups.

• It does not directly allow users to manage hardware devices.

• System and Security:

• This category in the Control Panel encompasses system-related options like power settings, administrative tools, and backup and restore features.

• While it provides a pathway to access Device Manager, it does not directly handle the addition or removal of hardware devices.

• Network and Sharing Center:

• This section is specifically focused on network connections, sharing settings, and troubleshooting network-related issues.

• It is not used for adding, removing, or managing hardware devices.

• Device Manager Features and Applications:

• Device Manager provides details on hardware properties, including driver versions, compatibility, and operational status.

• It includes options to roll back drivers, disable malfunctioning devices, and scan for new hardware changes.

• Users often use Device Manager to troubleshoot issues such as driver conflicts, hardware errors, or missing device drivers.

Important Points

• Accessing Device Manager:

• Device Manager can be accessed via the Control Panel, Start Menu, or by using the "Run" command (Windows Key + R) and typing "devmgmt.msc."

• Error Codes:

• Device Manager displays error codes for devices experiencing issues. These codes can be referenced in the Microsoft Knowledge Base for troubleshooting.

• Windows Compatibility:

• Device Manager is available across all versions of Microsoft Windows, including Windows 7, Windows 8, Windows 10, and Windows 11.

Q25. Answer: (d) Dancing Girl statue from Mohenjo-daro

The correct answer is Dancing Girl statue from Mohenjo-daro.

Key Points

• The Dancing Girl statue is a famous bronze artefact from the Indus Valley Civilisation, specifically from Mohenjo-daro, one of the major urban centres of this ancient civilisation.

• It dates back to approximately 2500 BCE and is considered a masterpiece of Harappan art.

• The statue is about 4 inches tall and depicts a young girl in a confident, dynamic pose, showcasing the advanced metalworking skills of the Harappan people.

• The figure is adorned with minimal jewellery, including a necklace and bangles, highlighting the artistic and cultural aspects of the Indus Valley society.

• The bronze casting technique used is known as the lost-wax method, which demonstrates the technological prowess of the Harappan civilisation.

Additional Information

• Indus Valley Civilisation:

• The Indus Valley Civilisation (IVC) is one of the world’s earliest urban civilisations, dating back to around 3300–1300 BCE.

• It was spread across the northwestern regions of the Indian subcontinent, including parts of modern-day India, Pakistan, and Afghanistan.

• The civilisation is known for its advanced urban planning, including grid-like city layouts, sophisticated drainage systems, and remarkable architecture.

• Other Indus Valley Artefacts:

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• Stone seal of unicorn from Lothal: This artefact is a carved stone seal depicting a unicorn, often interpreted as a mythological or symbolic figure, discovered at Lothal, an important IVC port city. This option is incorrect.

• Priest-King statue from Mohenjo-daro: A small stone sculpture representing a male figure with a beard and an elaborate headdress, thought to represent a religious or political leader. This option is incorrect.

• Painted pottery vase from Dholavira: Dholavira, another significant IVC site, is known for its terracotta pottery with intricate painted designs. However, these are not as iconic as the Dancing Girl statue. This option is incorrect.

• Bronze Casting in IVC:

• The Indus Valley Civilisation is known for its extensive use of bronze and copper for tools, ornaments, and sculptures.

• The lost-wax casting technique, used for the Dancing Girl, involved creating a wax model, encasing it in clay, and then pouring molten metal into the mould after melting the wax.

• Significance of the Dancing Girl:

• The statue represents the cultural sophistication and artistic achievements of the Indus Valley Civilisation.

• It offers insights into the fashion, jewellery, and aesthetics of Harappan society, as well as their expertise in metallurgy.

• The confident posture and intricate detailing highlight the civilisation’s advanced understanding of human anatomy and movement.

Q26. Answer: (d) Deccan Plateau

The correct answer is Deccan Plateau.

Key Points

• The Deccan Plateau is a large triangular plateau in southern India that is bordered by the Western Ghats on the west and the Eastern Ghats on the east.

• It covers eight Indian states: Maharashtra, Karnataka, Telangana, Andhra Pradesh, Tamil Nadu, Kerala, Odisha, and Chhattisgarh.

• The plateau is known for its rich volcanic soil, making it ideal for agriculture, particularly for crops like cotton, sugarcane, and millets.

• The Western Ghats are known for their biodiversity and are a UNESCO World Heritage Site, while the Eastern Ghats are fragmented and less continuous compared to the Western Ghats.

• The Deccan Plateau is separated from the northern plains of India by the Vindhya and Satpura ranges, which contribute to its distinct geographical identity.

Additional Information

• Western Ghats:

• The Western Ghats are a mountain range that runs parallel to the western coast of India, from Gujarat to Kerala.

• They are known for their tropical rainforests and high levels of biodiversity, with many endemic species of flora and fauna.

• The Western Ghats influence the monsoon weather in India and have several important hill stations like Ooty, Munnar, and Mahabaleshwar.

• Major rivers like the Godavari, Krishna, and Kaveri originate from this range.

• Eastern Ghats:

• The Eastern Ghats are a discontinuous range of mountains along the eastern coast of India, stretching from Odisha to Andhra Pradesh and Tamil Nadu.

• Unlike the Western Ghats, the Eastern Ghats are older and have suffered significant erosion.

• They house important rivers such as the Mahanadi, Godavari, Krishna, and Kaveri, which flow eastward into the Bay of Bengal.

• Prominent locations include the Araku Valley, Horsley Hills, and Mahendragiri.

• Geological Features of the Deccan Plateau:

• The Deccan Plateau was formed by volcanic activity that occurred millions of years ago during the Cretaceous period.

• It is primarily composed of basalt rock, which contributes to the region's fertile black soil.

• It is one of the oldest landforms in India, dating back to the Precambrian era.

• Other Plateau Regions in India:

• Shillong Plateau: Located in the northeastern state of Meghalaya, known for its abundant rainfall and biodiversity.

• Chotanagpur Plateau: Found in Jharkhand, Odisha, and Chhattisgarh, rich in mineral resources like coal and iron ore.

• Malwa Plateau: Situated in Madhya Pradesh and Rajasthan, famous for its agriculture and historical significance.

Important Points

• Importance of the Deccan Plateau:

• It plays a vital role in India's agriculture due to its fertile black and red soils.

• The region is rich in minerals such as iron ore, coal, and manganese, contributing to India's industrial development.

• The plateau is home to several historical and cultural landmarks, including forts, temples, and UNESCO World Heritage Sites.

Q27. Answer: (b) 1947

The correct answer is 1947.

Key Points

• The Indian Civil Service (ICS), often called the "Steel Frame of British India," was the premier civil service under British rule.

• After India's independence on 15 August 1947, the Indian Administrative Service (IAS) was introduced to replace the ICS and serve the administrative needs of independent India.

• The transition from ICS to IAS began in 1947, when the newly independent Government of India reorganized the civil services structure.

• The IAS became one of the most important components of India's permanent executive and was later recognized as an All India Service under the constitutional framework.

• Hence, the Indian Civil Service (ICS) was officially replaced by the Indian Administrative Service (IAS) in 1947.

Additional Information

• Indian Civil Service (ICS):

• It was established during British rule and was responsible for administration, revenue collection, and law and order.

• Initially, examinations for ICS were conducted in London, making access difficult for Indians.

• Indian Administrative Service (IAS):

• IAS officers are recruited through the Civil Services Examination conducted by the Union Public Service Commission (UPSC).

• IAS officers serve both the Union Government and State Governments.

• Constitutional Status:

• Article 312 of the Constitution provides for the creation of All India Services.

• The IAS, along with the Indian Police Service (IPS), forms the core of India's All India Services.

• The All India Services Act, 1951 provided the legal framework for the continuation and regulation of services such as the IAS and IPS.

Important Points

• The last batch of ICS officers gradually merged into the administrative system of independent India after 1947.

• Sardar Vallabhbhai Patel strongly supported the continuation of an independent and professional civil service and referred to it as the "Steel Frame of India."

• The IAS remains one of the most prestigious civil services in India and plays a crucial role in policy implementation and governance.

Q28. Answer: (c) Young Bengal Movement

The correct answer is Young Bengal Movement.

Key Points

• Henry Vivian Derozio, a teacher at the Hindu College of Calcutta, was a prominent figure who introduced radical ideas among his students. He encouraged them to question authority and think critically.

• The group of Derozio's students, influenced by his teachings, initiated the Young Bengal Movement, which sought to bring about a societal transformation based on liberal and rational principles.

• The Young Bengal Movement was characterized by its emphasis on freedom of thought, individual liberty, and opposition to outdated customs and superstitions in Indian society.

• The movement primarily consisted of young, educated Indians who were inspired by the ideas of the European Enlightenment and the French Revolution.

• Although the movement was short-lived, it laid the foundation for modern ideas of reform, rationalism, and questioning traditional norms in 19th-century Bengal.

Additional Information

• Henry Vivian Derozio:

• Derozio, of mixed Indian and Portuguese descent, was a poet, teacher, and social reformer born in 1809.

• He joined the Hindu College of Calcutta as a teacher at the young age of 17 and influenced students with his radical views on science, politics, and human rights.

• He was deeply influenced by the ideals of the European Enlightenment, which he imparted to his students.

• Young Bengal Movement:

• The movement emerged during the 1820s and 1830s in Bengal under the inspiration of Derozio.

• Its participants, known as the "Derozians," included young intellectuals and students committed to questioning orthodox practices.

• The group sought reforms in areas such as caste discrimination, the position of women, and superstitious practices.

• Impact of the Movement:

• Although the movement did not lead to immediate large-scale changes, it contributed to the rise of the modern reformist movement in Bengal.

• It inspired later reformers such as Raja Ram Mohan Roy and Iswar Chandra Vidyasagar, who worked on issues like women's education and abolition of sati.

• Comparison with Other Movements:

• Social Service League: Founded by N.M. Joshi, focused on improving the living conditions of laborers and promoting workers' rights in the 20th century.

• Justice Movement: Aimed at securing rights for non-Brahmins in Tamil Nadu in the early 20th century, under leaders like Dr. T.M. Nair and P. Tyagaraja Chetti.

• Servants of India Society: Established by Gopal Krishna Gokhale in 1905, this organization focused on social reform and education rather than radical ideologies.

Important Points

• The Young Bengal Movement can be considered one of the earliest instances of Western influence on Indian intellectual and social life.

• While it did not achieve direct political success, it helped to create a critical, reformist spirit among the educated youth of Bengal.

• The movement's emphasis on rationalism and individual liberty set the stage for the later socio-religious reform movements in India.

Q29. Answer: (d) Only 2 and 4

The correct answer is Only 2 and 4.

Key Points

• Vitamins can be classified into two categories based on their solubility: water-soluble vitamins and fat-soluble vitamins.

• Vitamin B12 and Vitamin C are both water-soluble vitamins. This means they dissolve in water and are not stored in the body for long periods, requiring regular replenishment through diet. Hence, they are correct options.

• Vitamin D is a fat-soluble vitamin, which is stored in the body’s fat tissues and liver. It is not water-soluble, so it is an incorrect choice.

• Vitamin K is also a fat-soluble vitamin, involved in blood clotting and bone health, and is not water-soluble, making it an incorrect choice for this question.

• Thus, only Vitamin B12 and Vitamin C are water-soluble. Hence, the correct answer is Only 2 and 4.

Additional Information

• Water-Soluble Vitamins:

• These include Vitamin C and all B-complex vitamins (such as B1, B2, B3, B5, B6, B7, B9, and B12).

• They are not stored in the body, and excess amounts are excreted in urine, which is why they need to be consumed regularly through diet.

• They play a crucial role in energy production, immune function, and cellular repair.

• Fat-Soluble Vitamins:

• These include Vitamins A, D, E, and K.

• They are stored in the body’s fat tissues and liver, providing a reserve that the body can draw upon when needed.

• These vitamins help maintain vision, bone health, and blood clotting, among other functions.

• Specific Characteristics of the Mentioned Vitamins:

• Vitamin D: Known as the "sunshine vitamin," it helps in calcium absorption and bone health. It is fat-soluble and can be synthesized by the skin upon exposure to sunlight.

• Vitamin B12: Essential for red blood cell formation, DNA synthesis, and neurological function. Found in animal-based foods like meat, dairy, and eggs.

• Vitamin K: Critical for blood clotting and bone metabolism. It is fat-soluble and found in leafy greens and fermented foods.

• Vitamin C: Plays a vital role in collagen synthesis, wound healing, and boosting the immune system. Found in citrus fruits, strawberries, and bell peppers.

• Importance of Solubility:

• The solubility of vitamins determines their absorption, storage, and excretion in the body.

• Water-soluble vitamins require frequent replenishment, while fat-soluble vitamins can be stored for longer periods.

Important Points

• Deficiency of Water-Soluble Vitamins:

• Vitamin C deficiency: Leads to scurvy, characterized by bleeding gums, fatigue, and weak immunity.
• Vitamin B12 deficiency: Can cause megaloblastic anemia, fatigue, and neurological issues.
• Fat-Soluble Vitamin Overdose:
• Excessive intake of fat-soluble vitamins (like A and D) can lead to toxicity since they are stored in the body.

Q30. Answer: (c) Indian Space Research Organisation (ISRO)

The correct answer is Indian Space Research Organisation (ISRO).

Key Points

• Indian Space Research Organisation (ISRO) conducted the CROPS experiment in February 2025 to study plant growth in space under microgravity conditions.
• The experiment aims to understand how plants behave and adapt in a space environment where there is no gravitational pull.
• This is part of ISRO's broader efforts to explore the possibilities of supporting human life on long-duration space missions, such as interplanetary exploration.
• ISRO's focus on space agriculture highlights its efforts in technological innovation and creating sustainable solutions for space missions.
• The CROPS experiment is a significant advancement in the domain of space farming, contributing to the understanding of how food production can be managed during extraterrestrial expeditions.

Additional Information

• Indian Space Research Organisation (ISRO):
• ISRO was established in 1969 and is headquartered in Bengaluru, India.
• It is the premier space agency of India, responsible for the country's space exploration and satellite development programs.
• Notable achievements include the Chandrayaan Missions, Mangalyaan (Mars Orbiter Mission), and the PSLV launch vehicle, which is renowned for its reliability and cost-effectiveness.
• ISRO's focus extends to space science, satellite communication, navigation systems, and interplanetary exploration.
• Plant Growth in Space:
• Studying plant growth in space is crucial for understanding how microgravity affects biological processes.
• Plants play a vital role in space missions as they can provide oxygen, food, and psychological comfort to astronauts.
• Experiments like CROPS help in developing sustainable agricultural practices for long-duration space missions.
• Other Space Agencies:
• NASA: The National Aeronautics and Space Administration (USA) has conducted several plant growth experiments in space, such as the Veggie experiment aboard the International Space Station (ISS).
• ESA: The European Space Agency (Europe) focuses on the MELiSSA project, which studies bio-regenerative life support systems, including plant growth in space.
• JAXA: Japan Aerospace Exploration Agency (Japan) works on space agriculture and conducted experiments on plant seeds aboard the ISS.
• Importance of Space Farming:
• Space farming is essential for sustainable space exploration, especially for missions to Mars or the Moon.
• It contributes to understanding how food production can be managed in extreme environments.
• Developing space farming technologies is crucial for creating self-sustaining life support systems for astronauts.

Important Points

• ISRO’s Recent Missions:
• ISRO successfully launched Chandrayaan-3 in 2023, which achieved a historic lunar landing.
• The Gaganyaan Mission, India's first human spaceflight program, is scheduled for 2024.
• ISRO aims to collaborate with international space agencies for joint research and technology development.
• Space Agriculture Initiatives Globally:
• NASA’s experiments aboard the ISS have focused on growing crops such as lettuce and wheat under LED lighting systems.
• China’s CNSA conducted experiments on growing rice seeds aboard the Tiangong space station.
• Russia has worked on space farming projects aboard the Mir space station and its Soyuz missions.

Q31. Answer: (a) Balochistan

The correct answer is Balochistan.

Key Points

• Balochistan is the largest province in Pakistan by area but has one of the lowest levels of development in terms of infrastructure, education, and healthcare.

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• The region is rich in natural resources, including coal, natural gas, gold, and copper, yet remains economically underdeveloped due to various socio-political and administrative reasons.

• Balochistan has witnessed separatist movements for decades, with demands for greater autonomy or even independence. These movements stem from grievances over resource exploitation and lack of political representation.

• The province has been central to many strategic projects, such as the China-Pakistan Economic Corridor (CPEC), but local populations often claim they do not benefit equitably from these initiatives.

• Security concerns, including insurgency and armed conflicts, have further hindered the region's development and stability.

Additional Information

• Balochistan Province:

• Location: Balochistan is located in the southwestern region of Pakistan, sharing borders with Iran and Afghanistan. It also has a coastline along the Arabian Sea.

• Area: It covers approximately 347,190 square kilometers, making it the largest province in Pakistan by area.

• Population: Despite its size, it is sparsely populated, with a population of around 12 million, according to the 2017 census.

• Natural Resources: The province is rich in resources such as natural gas, coal, gold, copper, and other minerals. The Saindak and Reko Diq projects are notable for copper and gold extraction.

• Economic Potential: The Gwadar Port, part of the China-Pakistan Economic Corridor (CPEC), holds strategic importance for global trade.

• Separatist Movements:

• The Baloch nationalist movement has sought greater control over the province's resources and political autonomy.

• Some factions have demanded complete independence, leading to armed conflicts between the Pakistani state and separatist groups.

• The key grievances include the exploitation of resources by the federal government and lack of investment in local development.

• Security Concerns:

• The province faces issues of insurgency, tribal conflicts, and foreign intervention allegations.

• Several armed groups, such as the Baloch Liberation Army (BLA), operate in the region.

• Security operations by the Pakistani military aim to stabilize the region but have also raised concerns about human rights violations.

• China-Pakistan Economic Corridor (CPEC):

• The Gwadar Port is a flagship project under CPEC, aimed at enhancing connectivity and trade between Pakistan and China.

• Despite the economic potential, locals in Balochistan often complain about the lack of direct benefits from these projects.

• Important Points:

• Punjab: The most populous and economically developed province in Pakistan, with agriculture and industry as key sectors.

• Khyber Pakhtunkhwa: Known for its mountainous terrain and home to the former tribal areas, it plays a key role in Pakistan's counterterrorism efforts.

• Sindh: Contains Pakistan's largest city, Karachi, which serves as the country's financial hub. It is known for its fertile Indus River plains.

Q32. Answer: (a) Balochistan

The correct answer is Balochistan.

Key Points

• Balochistan is the largest province of Pakistan by area, covering approximately 44% of the country's total landmass. It is strategically located, bordering Iran, Afghanistan, and the Arabian Sea.

• The province is known for its rich natural resources, including natural gas, coal, gold, copper, and other minerals. Despite this, Balochistan has faced significant issues related to underdevelopment and poverty.

• For decades, Balochistan has witnessed separatist movements and demands for greater autonomy or even independence. These movements are driven by grievances over the exploitation of natural resources, lack of development, and alleged marginalization by the central government. Hence, the statement is correct.

• Separatist groups in Balochistan argue that the province's resources benefit the rest of Pakistan more than the local population. This has led to frequent tensions and violent conflicts in the region.

• Efforts by the government to address the issues of Balochistan include infrastructure projects under the China-Pakistan Economic Corridor (CPEC). However, concerns about equitable resource distribution and political autonomy remain unresolved.

Additional Information

• Punjab:

• Punjab is Pakistan's most populous province and is often referred to as the country's agricultural heartland.

• It is known for its fertile land and extensive canal irrigation system. The province contributes significantly to Pakistan's economy

through agriculture and industry.

• Unlike Balochistan, Punjab has not witnessed separatist movements but remains politically influential in the country.

• Khyber Pakhtunkhwa (KP):

• Khyber Pakhtunkhwa, located in the northwestern region of Pakistan, shares a border with Afghanistan.

• It has a history of conflict, primarily due to its proximity to the Afghan border and the presence of tribal areas.

• The region has been a focal point in the war on terror, but it does not have the same issues of separatism as Balochistan.

• Sindh:

• Sindh is located in the southeastern region of Pakistan, with its capital in Karachi, the country's economic hub.

• While there are some nationalist movements in Sindh, they are not as prominent or widespread as the separatist movements in Balochistan.

• The region is known for its cultural and historical significance, as well as its contribution to the national economy through ports and industries.

• Important Points:

• Balochistan's population is relatively sparse, with the province being home to about 12 million people, compared to Punjab's population of over 110 million.

• Despite its abundance of resources, Balochistan contributes only a small percentage to Pakistan's GDP due to underdevelopment and lack of industrialization.

• The province plays a critical role in regional geopolitics due to its location and resources. Projects like the Gwadar Port under CPEC aim to enhance its strategic importance.

Q33. Answer: (b) Bhabha Atomic Research Centre

The correct answer is Bhabha Atomic Research Centre.

Key Points

• The Atomic Energy Establishment, set up at Trombay in 1954, was renamed as the Bhabha Atomic Research Centre (BARC) in 1966 in honor of Dr. Homi Jehangir Bhabha, considered the father of India's nuclear program.

• Dr. Bhabha played a pivotal role in establishing the infrastructure for nuclear science and technology in India and was the founding director of the institute.

• Bhabha Atomic Research Centre is India's premier nuclear research facility focusing on atomic energy development, nuclear reactor design, and applications in agriculture, medicine, and industry.

• The center is located in Trombay, Mumbai, Maharashtra, and operates under the Department of Atomic Energy, Government of India.

• The renaming of the establishment was a tribute to Dr. Bhabha's contributions to India's scientific and nuclear advancements.

Additional Information

• Bhabha Atomic Research Centre (BARC):

• BARC conducts advanced research and development activities in nuclear science, engineering, and technology.

• It focuses on nuclear energy production, nuclear medicine, isotope applications, agriculture, and environmental preservation.

• The center is involved in designing nuclear reactors such as Pressurized Heavy Water Reactors (PHWRs) and Fast Breeder Reactors (FBRs).

• BARC also contributes to India's nuclear weapons program and the peaceful use of atomic energy.

• Dr. Homi Jehangir Bhabha:

• Dr. Bhabha was an eminent Indian nuclear physicist and visionary who laid the foundation of India's atomic energy program.

• He was the founding director of the Tata Institute of Fundamental Research (TIFR) and the Atomic Energy Establishment, Trombay (later renamed BARC).

• Dr. Bhabha's vision led to the establishment of institutions such as BARC and TIFR for scientific research in India.

• He was instrumental in planning India's first nuclear reactor and its subsequent advancements in the field of atomic energy.

• Department of Atomic Energy (DAE):

• DAE, formed in 1954, oversees nuclear energy development and research in India.

• It manages all major nuclear research institutions, including Bhabha Atomic Research Centre (BARC), Indira Gandhi Centre for Atomic Research (IGCAR), and others.

• The department ensures the promotion of peaceful applications of nuclear energy in medicine, agriculture, and industry.

• DAE also supervises India's nuclear power plants and contributes to energy security.

• Other Renowned Atomic Centers in India:

• Indira Gandhi Centre for Atomic Research (IGCAR): Established in 1971 in Tamil Nadu, focusing on the development of fast breeder reactor technology.

• Raja Ramanna Centre for Advanced Technology (RRCAT): Located in Indore, specializing in laser technology and accelerator-based research.

• Variable Energy Cyclotron Centre (VECC): Situated in Kolkata, focusing on accelerator-based research and isotope production.

Important Points

• India’s Nuclear Energy Program:

• India follows a three-stage nuclear energy program developed by Dr. Homi Bhabha.

• The stages include Pressurized Heavy Water Reactors (PHWRs), Fast Breeder Reactors (FBRs), and Thorium-based Reactors for long-term energy sustainability.

• India is among the few countries with indigenous nuclear technology and has successfully developed reactors for energy production and research.

• BARC Contributions:

• BARC has developed technologies for nuclear waste management, radiation therapy, and agricultural advancements.

• It has created isotopes for medical diagnostics and treatment, contributing to nuclear medicine.

• The center's research has supported India’s space and defense programs.

Q34. Answer: (c) San Antonio, Texas

The correct answer is San Antonio, Texas.

Key Points

• InCyber Forum is a renowned global cybersecurity conference that gathers experts, policymakers, and industry leaders to discuss pressing issues in cybersecurity, cybercrime, and technological advancements.

• The forum was initially scheduled to take place in San Antonio, Texas, a city known for its thriving tech and cybersecurity sector. Hence, the statement is correct.

• San Antonio is referred to as “Cyber City USA” due to its strong ecosystem supporting cybersecurity education, research, and innovation.

• As of June 2025, the event has been shelved temporarily, but San Antonio remains a significant hub for cybersecurity conferences and initiatives. This statement is correct.

• The choice of San Antonio aligns with its status as home to key institutions such as the National Security Agency (NSA), and the University of Texas at San Antonio, which offers top-tier cybersecurity programs.

Additional Information

• San Antonio, Texas:

• San Antonio is widely recognized for its cybersecurity industry, hosting a range of organizations such as the NSA Texas, Air Force Cyber Command, and various tech startups.

• The city boasts the Cybersecurity Manufacturing Innovation Institute (CyManII), focusing on securing manufacturing systems against cyber threats.

• Home to the University of Texas at San Antonio (UTSA), which ranks among the top institutions in the U.S. for cybersecurity research and education.

• San Antonio has a rich history in cybersecurity, dating back to its involvement with military cyber operations and federal agencies.

• Cybersecurity Conferences:

• Cybersecurity conferences such as the InCyber Forum provide a platform for networking and knowledge sharing among industry leaders, policymakers, and researchers.

• These forums often address topics like cybercrime prevention, advanced threat detection, and the importance of global collaboration in cybersecurity.

• Other prominent cybersecurity events include Black Hat USA, RSA Conference, and DEF CON.

• Importance of Cybersecurity:

• Cybersecurity is crucial for safeguarding sensitive data, preventing unauthorized access, and mitigating cyber-attacks.

• Key sectors impacted by cybersecurity include finance, healthcare, government, and critical infrastructure.

• Emerging technologies like AI, blockchain, and quantum computing are revolutionizing cybersecurity strategies.

• Important Points:

• Cybersecurity education and awareness are critical for building a skilled workforce capable of addressing evolving cyber threats.

• Collaborations between governments, private organizations, and academia play a pivotal role in advancing cybersecurity research and solutions.

• Global initiatives like the European Cybersecurity Month and National Cybersecurity Awareness Month aim to promote cybersecurity awareness worldwide.

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Q35. Answer: (a) National Quantum Mission

The correct answer is National Quantum Mission.

Key Points

• The National Quantum Mission (NQM) was launched by the Indian Government in 2023 to foster advancements in quantum technologies.

• The mission aims to establish four Thematic Hubs (T-Hubs) in leading academic and research institutions across India, focusing on specific aspects of quantum technology such as quantum computing, sensing, communication, and materials.

• The objective of the mission is to position India among the leading nations in quantum research and applications, with a focus on solving complex computational problems, enhancing cybersecurity, and developing cutting-edge quantum devices.

• The mission is critical for fostering innovation, research, and development while enabling collaboration between academia, industry, and government stakeholders.

• It aligns with India's broader goals of becoming a global leader in advanced technologies and ensuring strategic autonomy in emerging fields.

Additional Information

• Quantum Technology:

• Quantum technologies harness the unique properties of quantum physics, such as superposition, entanglement, and quantum tunneling, to perform tasks that are impossible for classical systems.

• Applications include quantum computing for solving complex problems, quantum sensing for highly precise measurements, and quantum communication for secure data transmission.

• Global Leaders in Quantum Research:

• Countries like the United States, China, Canada, and the European Union have heavily invested in quantum research through national programs such as the US National Quantum Initiative and China's Quantum Satellite Experiment.

• India's National Quantum Mission is a step towards competing with these nations and contributing globally to quantum advancements.

• Thematic Hubs (T-Hubs):

• The four thematic hubs established under the mission focus on quantum computing, quantum sensing and metrology, quantum communication, and quantum materials and devices.

• These hubs serve as centers for research, innovation, and training, enabling collaboration between academics, industries, and government organizations.

• Potential Applications:

• Applications include cryptography, secure communications, drug design, materials science, and solving optimization problems in industries like logistics and finance.

• India's quantum mission also has implications for national security and defense, ensuring secure communication channels and advanced sensing capabilities.

• Funding and Scope:

• The mission is supported by significant funding from the Government of India under its commitment to advancing scientific research.

• It is expected to nurture young researchers, generate employment, and create a robust ecosystem for quantum technologies in India.

Q36. Answer: (b) 18 April

The correct answer is 18 April.

Key Points

• Good Friday is observed on the Friday before Easter Sunday and commemorates the crucifixion of Jesus Christ.

• In 2025, Good Friday falls on 18 April, as Easter Sunday is celebrated on 20 April 2025.

• The date of Good Friday is determined based on the Gregorian calendar and depends on the ecclesiastical approximation of the March equinox.

• Good Friday is recognized as a day of mourning in Christianity, and many Christians participate in religious services, prayers, and fasting.

• This day is observed in countries where Christianity is widely practiced, such as India, the United States, United Kingdom, and Australia.

Additional Information

• Significance of Good Friday:

• Good Friday marks the crucifixion and death of Jesus Christ at Calvary Hill.

• It is an integral part of the Holy Week, leading up to Easter Sunday, which celebrates the resurrection of Jesus.

• The term "Good Friday" signifies the redemption and salvation brought to humanity through Jesus' sacrifice.
• Observance of Good Friday:
• Christians attend special church services, including the Stations of the Cross and Passion readings.
• Many churches depict the crucifixion through reenactments and processions.
• Fasting and abstinence are commonly practiced on Good Friday as acts of penance.
• Calculation of Easter and Good Friday:
• The date of Easter Sunday is calculated based on the Paschal Full Moon, which is the first full moon after the March equinox.
• Good Friday is observed two days before Easter Sunday, making it April 18 in 2025.
• Global Observance:
• Good Friday is a public holiday in many countries, including India, Canada, Australia, and the United Kingdom.
• In India, churches organize prayers and sermons, and the day is marked as a solemn occasion by Christian communities.

Important Points

• Historical Context:
• Good Friday commemorates the day Jesus was crucified under the orders of Pontius Pilate, the Roman governor of Judea.
• It is considered a day of grief, but also of hope and redemption, as it leads to the celebration of Jesus' resurrection.
• Religious Practices:
• In Roman Catholic tradition, the Veneration of the Cross is performed, where worshippers kiss the cross as a sign of respect.
• Other Christian denominations hold meditative prayers, hymns, and scripture readings.
• Legal Recognition:
• In many countries, Good Friday is observed as a national holiday, with schools, banks, and offices closed.
• In India, it is a gazetted holiday, and Christian communities organize special services to observe the day.

Q37. Answer: (b) Thirty

The correct answer is Thirty.

Key Points

• The Ajanta Caves, located in the Aurangabad district of Maharashtra, India, are a group of 30 rock-cut Buddhist cave monuments that date back to the 2nd century BCE to about 480 CE.
• Among these, there are 30 caves, including a few that were left incomplete. These include Chaitya-grihas (prayer halls) and Viharas (monastic halls).
• The caves are famous for their exquisite paintings and sculptures, which are considered masterpieces of Buddhist religious art.
• The Ajanta Caves are a UNESCO World Heritage Site, recognized for their historical, cultural, and architectural significance.
• One of the caves, although incomplete, is still counted as part of the total, making the final count of the cave structures as thirty. Hence, the correct answer is "Thirty."

Additional Information

• Historical Context of Ajanta Caves:
• The caves were built in two phases. The first phase occurred during the Satavahana period (2nd century BCE to 1st century CE), while the second phase is associated with the Vakataka dynasty (5th century CE).
• The caves were rediscovered in 1819 by a British officer named John Smith during a tiger-hunting expedition.
• Art and Architecture:
• The paintings in the caves depict scenes from the Jataka tales, which narrate the previous lives of the Buddha.
• The sculptures and architecture reflect a blend of Hinayana (Theravada) and Mahayana Buddhism.
• The caves are renowned for their intricate carvings, including figures of the Buddha in various poses and other elements of Buddhist symbolism.
• UNESCO World Heritage Status:
• The Ajanta Caves were designated as a UNESCO World Heritage Site in 1983.
• They are considered an important landmark in the history of Buddhist religious art.
• Tourism and Preservation:
• The caves are a significant tourist destination, attracting visitors from across the world for their historical and cultural importance.
• Efforts have been made by organizations like ASI (Archaeological Survey of India) to preserve the delicate art and architecture of the caves.

Important Points

• Ajanta Caves vs Ellora Caves:
• While the Ajanta Caves are primarily Buddhist, the Ellora Caves, located nearby, are a mix of Buddhist, Hindu, and Jain

monuments.

• The Ellora Caves date from the 6th to 10th centuries CE, making them slightly more recent than the Ajanta Caves.

• Significance of Jataka Tales:

• The Jataka tales depicted in the Ajanta paintings are an essential source for understanding Buddhist teachings and values.

• These stories highlight virtues like compassion, selflessness, and wisdom, which are central to Buddhist philosophy.

• Preservation Challenges:

• The delicate paintings in the caves are vulnerable to humidity, light, and human interference.

• Efforts are being made to use advanced technology to digitally document and preserve the art for future generations.

Q38. Answer: (c) Maurice and Maralyn

The correct answer is Maurice and Maralyn.

Key Points

• Sophie Elmhirst is a renowned author known for her compelling storytelling and in-depth exploration of human emotions and relationships.

• The book Maurice and Maralyn, written by Sophie Elmhirst, was recognized with the prestigious Nero Book of the Year award in 2025, a significant accolade in the literary world.

• The Nero Book of the Year award is given annually to outstanding works of fiction that demonstrate literary excellence and innovation.

• Maurice and Maralyn stood out for its unique narrative style, emotional depth, and exploration of complex themes like love, loss, and identity.

• This recognition highlights Sophie Elmhirst's contribution to contemporary literature and her ability to connect with readers on a profound level.

Additional Information

• About Sophie Elmhirst:

• Sophie Elmhirst is an acclaimed author and journalist known for her sharp insights and engaging narrative style.

• She has written for various esteemed publications, showcasing her versatility in both fiction and non-fiction.

• Her works often delve into human relationships, societal norms, and the psychological intricacies of her characters.

• Nero Book of the Year Award:

• The Nero Book of the Year award is a prestigious literary accolade, recognizing exceptional works in the field of fiction.

• It is awarded annually to authors who demonstrate innovation, excellence, and creativity in their writing.

• The award serves as a platform to celebrate literary talent and promote high-quality literature to a global audience.

• The Book: Maurice and Maralyn:

• Maurice and Maralyn is a novel that explores themes of love, identity, and the human condition.

• Its intricate plot and well-drawn characters have been praised by critics and readers alike.

• The book's emotional resonance and exploration of universal themes make it a standout work in modern literature.

• Other Notable Works by Sophie Elmhirst:

• In addition to Maurice and Maralyn, Sophie Elmhirst has authored several other acclaimed works of fiction and non-fiction.

• Her writing is known for its depth, sensitivity, and ability to challenge conventional perspectives.

• Important Points:

• The recognition of Maurice and Maralyn by the Nero Book of the Year award underscores the importance of literary excellence in contemporary fiction.

• This achievement highlights the enduring relevance of literature in exploring and understanding the complexities of human life.

Q39. Answer: (d) The CEC can only be removed like a Supreme Court judge by a two-thirds majority in Parliament.

The correct answer is The Chief Election Commissioner (CEC) can only be removed like a Supreme Court judge by a two-thirds majority in Parliament.

Key Points

• Tenure and Removal of Chief Election Commissioner (CEC): The Chief Election Commissioner (CEC) enjoys a secure position under the Constitution. The removal process of the CEC is similar to that of a Supreme Court judge, requiring a two-thirds majority in both Houses of Parliament. This ensures independence and protection from arbitrary removal. Hence, statement 4 is correct.

• Election Commissioners' Removal: Unlike the CEC, the other Election Commissioners do not have the same protection. They can be removed by the President on the recommendation of the CEC. This highlights the relatively greater autonomy of the CEC. Hence, statement 1 is incorrect.

• CEC's Removal Assent: The removal of the CEC does not require the assent of the Chief Justice of India, as it is entirely a

parliamentary process under Article 324 of the Constitution. Hence, statement 2 is incorrect.

• Fixed Tenure: The CEC does not have a fixed tenure of ten years. As per the Election Commission rules, the tenure is typically for six years or until the age of 65, whichever is earlier. Thus, the claim of a fixed ten-year tenure is inaccurate. Hence, statement 3 is incorrect.

• Independence of the Election Commission: The independence of the CEC is critical for maintaining the integrity of elections in India. This is ensured by constitutional provisions and the rigorous removal process.

Additional Information

• Election Commission of India (ECI):

• The Election Commission of India is an independent constitutional authority established under Article 324 of the Indian Constitution. It conducts free and fair elections to the Parliament, State Legislatures, and the offices of President and Vice-President.

• The Commission consists of the Chief Election Commissioner (CEC) and other Election Commissioners. The number of Election Commissioners varies as per the President's discretion.

• Constitutional Provisions for Removal:

• The removal of the Chief Election Commissioner follows the same process as a Supreme Court judge under Article 124(4). This ensures the independence of the CEC and protects them from undue interference.

• Parliament must pass a resolution with a two-thirds majority in both Houses to remove the CEC.

• Tenure of Chief Election Commissioner:

• The CEC serves for a term of six years or until they reach the age of 65 years, whichever is earlier.

• This tenure ensures continuity and stability in the functioning of the Election Commission.

• Role and Responsibilities of the CEC:

• The CEC is responsible for overseeing elections at the national and state levels, ensuring impartiality and transparency.

• The CEC also handles disputes related to elections and the recognition of political parties.

Important Points

• Independence of Election Commission:

• The Election Commission's independence is crucial for democracy. Constitutional safeguards ensure that the CEC and other Election Commissioners are free from political interference.

• The removal process acts as a deterrent against arbitrary dismissal, providing a sense of security to the officeholders.

• Significance of Article 324:

• Article 324 empowers the Election Commission with authority over elections, ensuring free and fair democratic processes.

• This Article forms the foundation for India's electoral system and the Commission's autonomy.

Q40. Answer: (d) About 70%

The correct answer is About 70%.

Key Points

• During the time of India's independence in 1947, the majority of the population was engaged in agriculture and allied activities.

• Approximately 70% of the Indian population depended on agriculture as their primary source of livelihood.

• India was primarily an agrarian economy at the time, with a lack of significant industrialization or diversification in employment sectors.

• Agriculture was considered the backbone of the Indian economy, contributing a substantial portion to the GDP during that period.

• This heavy reliance on agriculture was due to the large rural population and the lack of opportunities in urban areas for industrial and service-sector jobs.

Additional Information

• Agrarian Economy:

• At the time of independence, India's economy was heavily agrarian, with agriculture being the largest source of employment and income.

• Over 70% of the population resided in rural areas, and their primary occupation revolved around farming and related activities.

• Due to the British colonial policies, industrial development was neglected, leaving agriculture as the dominant sector.

• Challenges in Agriculture:

• Indian agriculture faced several challenges, including low productivity, the absence of modern techniques, and fragmented land holdings.

• The dependence on monsoon rains for irrigation made farming highly vulnerable to climatic conditions.

• Peasant exploitation under the Zamindari system further aggravated the condition of farmers.

• Economic Contribution:

• Agriculture contributed around 50% of India's GDP at the time of independence, showcasing its importance in the economy.

• Post-independence, the government focused on reforms such as the abolition of the Zamindari system and the promotion of cooperative farming.

• Present-Day Scenario:

• Currently, the dependence on agriculture has decreased, with less than 50% of the population engaged in agricultural activities.

• Industrialization, urbanization, and the growth of the service sector have diversified employment opportunities over the decades.

Important Points

• Green Revolution:

• The Green Revolution in the 1960s aimed to improve agricultural productivity through modern techniques, fertilizers, and high-yield variety seeds.

• This initiative significantly boosted food grain production, reducing dependence on imports and ensuring food security.

• Rural Employment Schemes:

• The government introduced schemes like Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) to provide employment opportunities in rural areas.

• Such programs help reduce the reliance on agriculture as the sole source of livelihood for rural populations.

Q41. Answer: (a) 160 cm²

Shortcut Trick

Total Surface Area of Cuboid = 2(lb + bh + hl)

=> Surface Area = 2(10 × 5 + 5 × 2 + 2 × 10)

=> Surface Area = 2(50 + 10 + 20)

=> Surface Area = 2 × 80 = 160

Therefore The correct answer is 160 cm².

Alternate Method

l = 10 cm

h = 2 cm

b = 5 cm

Given:

Length (l) = 10 cm

Breadth (b) = 5 cm

Height (h) = 2 cm

Formula Used:

Total Surface Area of a cuboid = 2(lb + bh + hl)

Calculation:

=> Surface Area = 2 × (10 × 5 + 5 × 2 + 2 × 10)

=> Surface Area = 2 × (50 + 10 + 20)

=> Surface Area = 2 × (80)

=> Surface Area = 160 cm²

Therefore The correct answer is 160 cm².

Additional Information

Volume of a Cuboid

The amount of 3D space enclosed by the cuboid. Formula: V = l × b × h

Lateral Surface Area of a Cuboid

The total area of the four side walls, excluding the top and bottom rectangular faces. Formula: LSA = 2h(l + b)

Length of Diagonal of a Cuboid

The length of the longest possible straight line segment connecting two opposite corners inside the cuboid. Formula: d = √(l² + b² + h²)

Q42. Answer: (b) 36°

Shortcut Trick

In the right-angled triangle BDC, the sum of acute angles is 90°, so angle C = 90° − 71° = 19°.

In triangle AEC, the exterior angle at E is angle AEB.

By the Exterior Angle Theorem, exterior angle AEB = angle CAE + angle C.

=> angle AEB = 17° + 19° = 36°.

Therefore The correct answer is 36°.

Alternate Method

Given:

BD perpendicular to AC at D => angle BDC = 90°

angle DBC = 71°

angle CAE = 17°

71°

17°

?

A

C

D

B

E

Calculations:

In triangle BDC, the sum of all interior angles is 180°:

=> angle BDC + angle DBC + angle BCD = 180°

=> 90° + 71° + angle BCD = 180°

=> 161° + angle BCD = 180°

=> angle BCD = 180° − 161° = 19°

Since D lies on line segment AC, the angle angle BCD is the same as angle BCA (or angle ACE).

=> angle ACE = 19°

Now, consider triangle AEC. The side CE is extended to B (since E is a point on BC).

According to the Exterior Angle Theorem, the exterior angle of a triangle is equal to the sum of the two opposite interior angles.

=> Exterior angle AEB = angle CAE + angle ACE

=> angle AEB = 17° + 19° = 36°

Therefore The correct answer is 36°.

Additional Information

Exterior Angle Theorem

The measure of an exterior angle of a triangle is equal to the sum of the measures of its two remote (opposite) interior angles.

Sum of Angles of a Triangle

The sum of all three interior angles in any Euclidean triangle is always exactly 180°.

Right-Angled Triangle Properties

A triangle where one of the interior angles is exactly 90°. In such triangles, the other two acute angles are strictly complementary (they sum to 90°).

Q43. Answer: (a) 0

Shortcut Trick

Expand the expression directly to cancel out the square terms.

=> $6x^2 - 14 - 6x^2 - 21x + 27 = 13$

=> $-21x + 13 = 13$

=> $-21x = 0$

=> $x = 0$

Therefore The correct answer is 0.

Alternate Method

Given:

$2(3x^2 - 7) - 3(2x^2 + 7x - 9) = 13$

Calculation:

=> $(2 \times 3x^2 - 2 \times 7) - (3 \times 2x^2 + 3 \times 7x - 3 \times 9) = 13$

=> $(6x^2 - 14) - (6x^2 + 21x - 27) = 13$

Opening the brackets and distributing the negative sign:

=> $6x^2 - 14 - 6x^2 - 21x + 27 = 13$

Grouping the like terms together:

=> $(6x^2 - 6x^2) - 21x + (-14 + 27) = 13$

=> $0 - 21x + 13 = 13$

=> $-21x = 13 - 13$

=> $-21x = 0$

=> $x = 0$

Therefore The correct answer is 0.

Additional Information

Linear Equation in One Variable

An equation that can be written in the form ax + b = 0, where a and b are constants. It possesses exactly one unique solution.

BODMAS Rule

Used to simplify algebraic expressions safely. Extreme care must be taken while opening brackets preceded by a negative sign, as it inverses the signs of all inner elements.

Degree of an Equation

Though the initial expression contains an x^2 term making it look like a quadratic equation, the highest degree terms cancel out completely, reducing the problem entirely to a degree-1 linear equation.

Q44. Answer: (d) 2/3

Shortcut Trick

Given cot A = √5 => tan A = 1/√5

Convert the given expression to sine and cosine terms:

=> $(1/\sin^2A - 1/\cos^2A) / (1/\sin^2A + 1/\cos^2A) = (\cos^2A - \sin^2A) / (\cos^2A + \sin^2A)$

=> $\cos^2A - \sin^2A = \cos 2A = (1 - \tan^2A) / (1 + \tan^2A)$

=> $\cos 2A = (1 - 1/5) / (1 + 1/5) = (4/5) / (6/5) = 4/6 = 2/3$

Therefore The correct answer is 2/3.

Alternate Method

Given:

cot A = √5

We know that cot A = Base / Perpendicular = √5 / 1

A

A

C

B

Base = √5

Perp = 1

Hypotenuse = √6

Calculations:

=> Let Base = √5 and Perpendicular = 1

=> By Pythagoras theorem, Hypotenuse = $\sqrt{[(\sqrt{5})^2 + 1^2]} = \sqrt{(5 + 1)} = \sqrt{6}$

=> cosec A = Hypotenuse / Perpendicular = √6 / 1 = √6

=> sec A = Hypotenuse / Base = √6 / √5

=> $\text{cosec}^2A = (\sqrt{6})^2 = 6$

=> $\sec^2A = (\sqrt{6} / \sqrt{5})^2 = 6/5$

Substitute these values into the given expression:

=> $(\text{cosec}^2A - \sec^2A) / (\text{cosec}^2A + \sec^2A)$

=> Numerator = 6 − 6/5 = (30 − 6) / 5 = 24/5

=> Denominator = 6 + 6/5 = (30 + 6) / 5 = 36/5

=> Result = (24/5) / (36/5)

=> Result = 24 / 36 = 2/3

Therefore The correct answer is 2/3.

Additional Information

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Trigonometric Identities

Fundamental relations between functions are: $\sin^2\theta + \cos^2\theta = 1$, $\sec^2\theta - \tan^2\theta = 1$, and $\text{cosec}^2\theta - \cot^2\theta = 1$.

Double Angle Formulas

The value of cos 2θ can be represented in multiple forms: $\cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta = (1 - \tan^2\theta) / (1 + \tan^2\theta)$.

Pythagoras Theorem

In any right-angled triangle, the square of the hypotenuse is exactly equal to the sum of the squares of its perpendicular sides: $H^2 = P^2 + B^2$.

Q45. Answer: (d) Rs. 12,880

Shortcut Trick

When investment time is constant, Investment Ratio = Profit Ratio.

Total profit = Rs. 19,500 | Kunal's profit = Rs. 6,300 | Anshuman's profit = Rs. 13,200

Difference in profit = 13200 − 6300 = Rs. 6,900

Investment difference = Total Investment × (Profit Difference ÷ Total Profit)

Investment difference = 36400 × (6900 ÷ 19500) = 36400 × (23 ÷ 65) = Rs. 12,880

Therefore The correct answer is Rs. 12,880.

Alternate Method

Given:

Total investment = Rs. 36,400

Total profit = Rs. 19,500

Kunal's profit share = Rs. 6,300

Formula Used:

In a partnership where the time period is equal, the ratio of investments is exactly equal to the ratio of their profits.

Total Investment = Rs. 36,400

Anshuman (44 parts)

Kunal (21 parts)

Difference = 23 parts (Rs. 12,880)

Profit Ratio = Rs. 13,200 : Rs. 6,300 = 44 : 21

Calculations:

=> Anshuman's profit = Total Profit − Kunal's profit

=> Anshuman's profit = 19500 − 6300 = Rs. 13,200

=> Profit Ratio (Anshuman : Kunal) = 13200 : 6300 = 132 : 63 = 44 : 21

=> Since their investment time duration is the same, Investment Ratio = 44 : 21

=> Let Anshuman's investment be 44x and Kunal's be 21x.

=> Total investment = 44x + 21x = 65x

=> 65x = 36400

=> x = 36400 ÷ 65 = 560

=> Difference in their investments = 44x − 21x = 23x

=> Difference = 23 × 560 = Rs. 12,880

Therefore The correct answer is Rs. 12,880.

Additional Information

Simple Partnership

When partners invest their capital for the same time period, the profit or loss is distributed purely in the ratio of their invested capitals. Profit Ratio = C1 : C2

Compound Partnership

If capitals are invested for different time durations, the equivalent capital is calculated as Capital × Time. The profit is distributed as C1×T1 : C2×T2.

Working vs Sleeping Partner

A working partner manages the business and receives a fixed salary or a certain percentage of the profit before the remaining profit is divided. A sleeping partner only invests capital and receives profit according to their investment ratio.

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Q46. Answer: (a) 800

Shortcut Trick

In a "no profit, no loss" transaction, the absolute loss on one item exactly equals the absolute gain on the other.

Loss on 1st toy = Gain on 2nd toy => 8% of CP1 = 16% of CP2

=> CP1 : CP2 = 16 : 8 = 2 : 1

Total CP ratio parts = 2 + 1 = 3 parts → Rs. 1200

=> 1 part → Rs. 400 => CP1 (2 parts) = 2 × 400 = Rs. 800

Therefore The correct answer is Rs. 800.

Alternate Method

Given:

Total Cost Price of two toy guns = Rs. 1200

Loss on the first toy gun = 8%

Gain on the second toy gun = 16%

Overall transaction result = Neither loss nor gain

CP of Toy 1 (2 parts)

CP2 (1 part)

Total Cost = Rs. 1200 (3 parts)

-8% Loss

+16% Gain

Loss = Gain (8% of CP1 = 16% of CP2)

Calculations:

Let the cost price of the first toy gun be x.

=> The cost price of the second toy gun = (1200 − x)

=> Total loss on first toy = 8% of x = 0.08x

=> Total gain on second toy = 16% of (1200 − x) = 0.16 × (1200 − x)

Since the overall transaction has no loss or gain, total monetary loss equals total monetary gain:

=> 0.08x = 0.16 × (1200 − x)

Dividing both sides by 0.08:

=> x = 2 × (1200 − x)

=> x = 2400 − 2x

=> x + 2x = 2400

=> 3x = 2400

=> x = 2400 ÷ 3 = 800

Therefore The correct answer is Rs. 800.

Additional Information

No Profit No Loss Principle

When a transaction results in neither profit nor loss, the absolute monetary value of the gain on one item strictly balances the absolute monetary loss on the other: CP1 × Loss% = CP2 × Profit%.

Alligation in Profit & Loss

When two items are sold at different profit or loss percentages and combined for an overall percentage result, the alligation cross-difference method immediately provides the ratio of their Cost Prices (never Selling Prices).

Same Selling Price Condition

If two articles are sold at the same Selling Price (instead of same total Cost Price), one at a profit of x% and the other at a loss of x%, the entire transaction always results in an overall loss equal to ($x^2 \div 100$)%.

Q47. Answer: (b) 7

Shortcut Trick

The unit digit of 576499 is 9 (an odd number), so it cannot be divisible by even numbers (6 and 16).

For divisibility by 15, the unit digit must be 0 or 5, so it is not divisible by 15.

By elimination, the number must be divisible by 7.

Verifying, we get 576499 ÷ 7 = 82357.

Therefore The correct answer is 7.

Alternate Method

Given:

Number = 576499

Calculations:

=> Let's check the divisibility by applying standard rules for each given value.

=> For 6: A number must be even to be divisible by 6. Since 576499 ends in 9, it is odd and not divisible by 6.

=> For 15: A number must end in 0 or 5 to be divisible by 5 (and thus 15). Since it ends in 9, it is not divisible by 15.

=> For 16: A number must be even to be divisible by 16. Since 576499 is odd, it is not divisible by 16.

=> For 7: Let us divide the number directly by 7.

=> 576499 ÷ 7 = 82357 with a remainder of 0.

=> Thus, the number is perfectly divisible by 7.

Therefore The correct answer is 7.

Additional Information

Divisibility Rule of 7

Double the last digit of the number and subtract it from the remaining truncated number. Repeat the process until the remaining number is small enough to verify if it is a multiple of 7.

Divisibility Rule of 11

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

Divisibility Rule of 15

To be divisible by 15, a number must be divisible by both 3 (sum of digits is a multiple of 3) and 5 (unit digit is 0 or 5).

Q48. Answer: (d) 24%

Shortcut Trick

Single equivalent discount % for two successive discounts a% and b% = a + b − (a × b) ÷ 100

=> Equivalent Discount % = 5 + 20 − (5 × 20) ÷ 100

=> Equivalent Discount % = 25 − (100 ÷ 100)

=> Equivalent Discount % = 25 − 1 = 24%

Therefore The correct answer is 24%.

Alternate Method

Given:

First discount = 5%

Second discount = 20%

Formula Used:

Selling Price (SP) = Marked Price (MP) × (100 − D1)/100 × (100 − D2)/100

Equivalent Discount % = [(MP − SP) ÷ MP] × 100

MP

100

−5%

95

−20%

SP

76

Equivalent Discount = 100 − 76 = 24%

Calculations:

=> Let the Marked Price (MP) be 100.

=> SP = 100 × (100 − 5)/100 × (100 − 20)/100

=> SP = 100 × 95/100 × 80/100

=> SP = 95 × 4/5

=> SP = 76

=> Total Discount = MP − SP

=> Total Discount = 100 − 76 = 24

=> Equivalent Discount % = (24 ÷ 100) × 100 = 24%

Therefore The correct answer is 24%.

Additional Information

Successive Discount Formula

For two discounts a% and b%, the effective single discount is a + b − (ab ÷ 100)%.

Three Successive Discounts

To find a single discount for a%, b%, and c%, first find the equivalent of a% and b%, and then apply the same formula with c%.

Ratio Method

Write each discount as a fraction to get the ratio of MP to SP. Multiply the individual parts to get the overall MP and SP, then calculate the total discount percentage.

Q49. Answer: (b) Rs. 26,075

Shortcut Trick

Let the principal sum be 100%.

Interest for the 1st year = 20%.

Interest for the 2nd year = 20% + (20% of 20%) = 24%.

Given that 24% of the sum = Rs. 6,258

Total sum (100%) = (6258 ÷ 24) × 100 = Rs. 26,075.

Therefore The correct answer is Rs. 26,075.

Alternate Method

Given:

Rate of interest (R) = 20% per annum

Compound interest for the 2nd year = Rs. 6,258

Formula Used:

Amount after 1st year = P × (1 + R/100)

CI for 2nd year = Amount after 1st year × (R/100)

Start (P)

End of 1st Yr

End of 2nd Yr

1st Yr CI = 0.20 P

2nd Yr CI = 0.24 P

Rs. 6,258

Calculations:

=> Amount after 1st year = P × (1 + 20/100) = 1.2P

=> Interest for the 2nd year = 20% of Amount after 1st year

=> Interest for 2nd year = (20/100) × 1.2P = 0.24P

=> 0.24P = 6258

=> P = 6258 ÷ 0.24

=> P = 625800 ÷ 24 = 26075

Therefore The correct answer is Rs. 26,075.

Additional Information

Compound Interest for a Specific Year

The interest for the n^(th) year alone can be calculated directly using the formula: CI_n = P × (1 + R/100)^(n-1) × (R/100)

Successive Percentage in CI

Compound interest acts as successive percentage increments on the base principal. Overall CI% for 2 years = X + Y + (X × Y)/100, where X and Y are interest rates for the 1st and 2nd years.

Difference between CI and SI

For a fixed period of 2 years, the difference between compound and simple interest on a given principal P is calculated as: D = P × $(R/100)^2$

Q50. Answer: (b) Rs. 528

Shortcut Trick

Effective Rate % = Rate per month × Time in months

Effective Rate % = 4% × 11 = 44%

Simple Interest = 44% of Principal

SI = (44 ÷ 100) × 1200 = 528

Therefore The correct answer is Rs. 528.

Alternate Method

Given:

Principal (P) = Rs. 1,200

Rate of Interest (R) = 4% per month

Time (T) = 11 months

Start

Rs. 1,200

11 Months

• Rs. 528

Interest = 4% × 11 = 44%

Total SI = 44% of Rs. 1,200 = Rs. 528

Formula Used:

Simple Interest (SI) = (P × R × T) ÷ 100

(Note: Since the rate is given per month and time is in months, no unit conversion is required.)

Calculations:

=> SI = (1200 × 4 × 11) ÷ 100

=> SI = 12 × 44

=> SI = 528

Therefore The correct answer is Rs. 528.

Additional Information

Unit Matching in Simple Interest

Ensure the time period matches the interest rate period. If the rate is per month, the time must be calculated in months. If the rate is per annum (yearly), time given in months must be converted to years (Months ÷ 12).

Amount Formula

The total amount (A) after a given time is the sum of the Principal (P) and Simple Interest (SI). The mathematical formula is: A = P + SI = P(1 + RT ÷ 100).

Simple vs Compound Interest

Simple Interest is calculated strictly on the initial principal only. In contrast, Compound Interest is calculated on the initial principal as well as the accumulated interest from the previous periods.

Q51. Answer: (d) M - N = 4

Shortcut Trick

Divisibility rule of 11: Sum of odd place digits − Sum of even place digits = 0, 11, 22...

(N + 9 + 8) − (0 + M + 2) = 11k

N − M + 15 = 11

N − M = −4 => M − N = 4

Therefore The correct answer is M − N = 4.

Alternate Method

Given:

The 6-digit number N09M82 is divisible by 11.

Formula Used:

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

Calculations:

=> Sum of digits at odd places (1st, 3rd, 5th) = N + 9 + 8 = N + 17

=> Sum of digits at even places (2nd, 4th, 6th) = 0 + M + 2 = M + 2

=> Difference = (N + 17) − (M + 2)

=> Difference = N − M + 15

=> Equating the difference to 11 to satisfy single-digit constraints (since N and M are digits from 0 to 9):

=> N − M + 15 = 11

=> N − M = 11 − 15

=> N − M = −4

=> M − N = 4

Therefore The correct answer is M − N = 4.

Additional Information

Divisibility Rule of 3 and 9

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

Divisibility Rule of 4 and 8

A number is divisible by 4 if its last two digits are divisible by 4. It is divisible by 8 if its last three digits are divisible by 8.

Divisibility Rule of 7, 11 and 13 (Block Method)

Form blocks of 3 digits from right to left. If the alternating difference of the sum of these blocks is divisible by 7, 11, or 13, then the number is divisible by that respective divisor.

Q52. Answer: (d) 540

Shortcut Trick

Convert speed into m/s: 36 × (5 ÷ 18) = 10 m/s

Length of the bridge = Speed × Time

Length = 10 × 54 = 540 m

Therefore The correct answer is 540 m.

Alternate Method

Given:

Speed of the bicycle = 36 km/hr

Time taken to cross the bridge = 54 seconds

Formula Used:

Distance = Speed × Time

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

Bridge

Speed = 36 km/hr

Time = 54 s

Distance = ?

Calculations:

=> Speed in m/s = 36 × (5 ÷ 18)

=> Speed = 10 m/s

=> Length of the bridge = Distance covered in 54 seconds

=> Length of the bridge = 10 × 54

=> Length of the bridge = 540 m

Therefore The correct answer is 540 m.

Additional Information

Unit Conversion

To convert speed from km/hr to m/s, multiply the value by 5 ÷ 18. Conversely, to convert from m/s to km/hr, multiply by 18 ÷ 5.

Crossing a Stationary Object

When a vehicle of negligible length (like a man on a bicycle or a pole) crosses a stationary object with length (like a bridge or platform), the total distance covered is exactly equal to the length of the object.

Crossing Two Objects

When an object with its own significant length (like a train) crosses a bridge, the Total distance = Length of the train + Length of the bridge.

Q53. Answer: (d) increase by Rs. 5,044

Shortcut Trick

If Income and Expenditure both increase by the same percentage (50%), Savings will also increase by exactly the same percentage (50%).

Initial Savings = 13% of Rs. 77,600 = Rs. 10,088

Increase in Savings = 50% of Rs. 10,088 = Rs. 5,044

Therefore The correct answer is increase by Rs. 5,044.

Alternate Method

Expenditure (87%)

Sav (13%)

Initial Income = Rs. 77,600 (100%)

New Exp (+50%)

New Sav

New Income (+50%) = Rs. 1,16,400 (150%)

Result: Savings also increase by exactly 50%

Given:

Income = Rs. 77,600

Savings = 13% of Income

Increase in Income = 50%

Increase in Expenditure = 50%

Concept / Formula Used:

Income = Expenditure + Savings

If Income and Expenditure both change by the same percentage, the Savings also change by that exact same percentage.

Calculations:

=> Initial Savings = 13% of 77,600 = (13 ÷ 100) × 77,600 = Rs. 10,088

=> Initial Expenditure = 87% of 77,600 = (87 ÷ 100) × 77,600 = Rs. 67,512

=> New Income = 77,600 × (100 + 50)% = 77,600 × 1.5 = Rs. 1,16,400

=> New Expenditure = 67,512 × (100 + 50)% = 67,512 × 1.5 = Rs. 1,01,268

=> New Savings = New Income − New Expenditure = 1,16,400 − 1,01,268 = Rs. 15,132

=> Increase in Savings = New Savings − Initial Savings = 15,132 − 10,088 = Rs. 5,044

Therefore The correct answer is increase by Rs. 5,044.

Additional Information

Income, Expenditure & Savings

The fundamental equation is: Income = Expenditure + Savings. The percentage change is governed by the base value of each component.

Constant Percentage Rule

If a total quantity is split into two parts, and both parts increase or decrease by the same percentage x%, the total quantity also increases or decreases by exactly x%.

Percentage of a Percentage

When computing overall changes across variables, successive fractions can be multiplied directly. For example, a 50% increase on a 13% base yields an overall increase of 0.5 × 13% = 6.5% of the total base.

Q54. Answer: (d) 72/5

Shortcut Trick

Total work = LCM(24, 12, 9) = 72 units.

Efficiency of A = 72 ÷ 24 = 3 units/day.

Efficiency of (A + K + S) = 72 ÷ 9 = 8 units/day, and (A + K) = 72 ÷ 12 = 6 units/day.

Efficiency of S = 8 − 6 = 2 units/day.

Combined efficiency of A and S = 3 + 2 = 5 units/day, so time = 72/5 days.

Therefore The correct answer is 72/5 days.

Alternate Method

Given:

Time taken by Anjani (A) = 24 days

Time taken by Anjani and Khushbu (A + K) = 12 days

Time taken by Anjani, Khushbu, and Sushmita (A + K + S) = 9 days

Formula Used:

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Total Work = LCM of individual times taken

Efficiency = Total Work ÷ Time taken

Person	Days	Total Work	Efficiency
A	24	72	3
A + K	12	6	
A + K + S	9	8	

Calculations:

=> Efficiency of Sushmita (S) = Efficiency of (A + K + S) − Efficiency of (A + K)

=> Efficiency of S = 8 − 6 = 2 units/day

=> Total Efficiency of Anjani and Sushmita (A + S) = Efficiency of A + Efficiency of S

=> Total Efficiency of A + S = 3 + 2 = 5 units/day

=> Time taken by A + S together = Total Work ÷ Total Efficiency of A + S

=> Time taken = 72 ÷ 5 days

Therefore The correct answer is 72/5 days.

Additional Information

Pipes & Cisterns

Works exactly like Time & Work. Inlet pipes have positive efficiency, and outlet (leak) pipes have negative efficiency.

Alternate Day Work

When individuals work on alternate days, find the total work done in one cycle (e.g., 2 days) and multiply to get close to the total work without exceeding it.

Work & Wages

Wages are distributed in the direct ratio of the total amount of work done by each individual. If the time worked is the same, it is distributed in the ratio of their efficiencies.

Q55. Answer: (b) 37

Shortcut Trick

Multiply the second given condition by 2 to equate the son's age multipliers.

New Condition 2: 5 × Father + 2 × Son = 194

Condition 1: 1 × Father + 2 × Son = 46

Subtract Condition 1 from New Condition 2: 4 × Father = 148 => Father = 37

Therefore The correct answer is 37 years.

Alternate Method

1 F

• 2 S

=

46

5 F

• 2 S

=

194

(Eq 2 × 2)

–

4 F

=

148

F = 37

Given:

=> Father's age = F, Son's age = S

=> F + 2S = 46 ... (i)

=> 2.5F + S = 97 ... (ii)

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Calculations:

=> Multiply equation (ii) by 2:

=> 5F + 2S = 194 ... (iii)

=> Subtract equation (i) from equation (iii):

=> (5F + 2S) − (F + 2S) = 194 − 46

=> 4F = 148

=> F = 148 ÷ 4

=> F = 37

Therefore The correct answer is 37 years.

Additional Information

Linear Equations in Two Variables

When two different conditions are provided for two unknowns, they form a system of linear equations which can be solved simultaneously to find both variables.

Elimination Method

Multiply the equations by appropriate constants to equalise the coefficient of one variable, then subtract one equation from the other to easily find the value of the second variable.

Q56. Answer: (a) 60,000 cm³

Shortcut Trick

Given the ratio of length, breadth, and height = 5 : 4 : 3.

Total parts = 5 + 4 + 3 = 12 parts.

12 parts = 120 cm => 1 part = 10 cm.

Dimensions are: L = 50 cm, B = 40 cm, H = 30 cm.

Volume = 50 × 40 × 30 = 60,000 cm³.

Therefore The correct answer is 60,000 cm³.

Alternate Method

L = 50 cm

H = 30 cm

B = 40 cm

Volume = L × B × H

Given:

Ratio of length (L), breadth (B), and height (H) = 5 : 4 : 3

Sum of L, B, and H = 120 cm

Formula Used:

Volume of a cuboid = L × B × H

Calculation:

=> Let the dimensions be 5x, 4x, and 3x.

=> L + B + H = 120

=> 5x + 4x + 3x = 120

=> 12x = 120

=> x = 120 ÷ 12 = 10

=> Length (L) = 5 × 10 = 50 cm

=> Breadth (B) = 4 × 10 = 40 cm

=> Height (H) = 3 × 10 = 30 cm

=> Volume = 50 × 40 × 30 = 60,000 cm³

Therefore The correct answer is 60,000 cm³.

Additional Information

Total Surface Area of a Cuboid

The total surface area is the sum of the areas of its six faces, calculated as TSA = 2(LB + BH + HL).

Length of the Longest Diagonal

The longest diagonal inside a cuboid is the space diagonal, given by d = √(L² + B² + H²).

Volume of a Cube

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A cube is a special cuboid where L = B = H = a. Its volume is calculated as $V = a^3$.

Q57. Answer: (c) 77.71

Shortcut Trick

Total Time = (455 ÷ 91) + (390 ÷ 78) + (476 ÷ 68) = 5 + 5 + 7 = 17 hr

Total Distance = 455 + 390 + 476 = 1321 km

Average Speed = Total Distance ÷ Total Time

=> Average Speed = 1321 ÷ 17 ≈ 77.71 km/hr

Therefore The correct answer is 77.71 km/hr.

Alternate Method

Given:

D1 = 455 km, S1 = 91 km/hr

D2 = 390 km, S2 = 78 km/hr

D3 = 476 km, S3 = 68 km/hr

Formula Used:

Average Speed = Total Distance ÷ Total Time

Time = Distance ÷ Speed

455 km

390 km

476 km

91 km/hr

78 km/hr

68 km/hr

t1 = 5 hr

t2 = 5 hr

t3 = 7 hr

Total Dist = 1321 km | Total Time = 17 hr

Calculations:

=> Total Distance = 455 + 390 + 476 = 1321 km

=> T1 = 455 ÷ 91 = 5 hr

=> T2 = 390 ÷ 78 = 5 hr

=> T3 = 476 ÷ 68 = 7 hr

=> Total Time = 5 + 5 + 7 = 17 hr

=> Average Speed = 1321 ÷ 17

=> Average Speed = 77.7058... ≈ 77.71 km/hr

Therefore The correct answer is 77.71 km/hr.

Additional Information

Average Speed (Equal Distance)

When two equal distances are covered at speeds x and y, the average speed is 2xy ÷ (x + y).

Average Speed (Equal Time)

When travelling at speeds x and y for equal amounts of time, the average speed is (x + y) ÷ 2.

Relative Speed

When two bodies move in the same direction, relative speed is |x − y|. In opposite directions, it is (x + y).

Q58. Answer: (a) 29 : 57

Shortcut Trick

Compare ratios to 1/2 (50%) by checking if the numerator is greater than half of the denominator.

29 : 57 → Half of 57 is 28.5 → 29 > 28.5 (Ratio is more than 50%)

The ratios 22 : 82, 23 : 75, and 31 : 85 all have numerators that are less than half of their respective denominators (Ratios are less than 50%).

Since only the first ratio crosses the 50% mark, it is visibly the greatest.

Therefore The correct answer is 29 : 57.

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Alternate Method

Given:

The given ratios are 29 : 57, 22 : 82, 23 : 75, and 31 : 85.

Method Used:

Convert each fractional ratio into a decimal equivalent for accurate comparison.

50% Mark

29 : 57

~ 50.8%

22 : 82

~ 26.8%

23 : 75

~ 30.6%

31 : 85

~ 36.4%

Calculations:

=> Option 1 = 29 ÷ 57 ≈ 0.508

=> Option 2 = 22 ÷ 82 ≈ 0.268

=> Option 3 = 23 ÷ 75 ≈ 0.306

=> Option 4 = 31 ÷ 85 ≈ 0.364

=> Comparing the decimal values: 0.508 > 0.364 > 0.306 > 0.268

=> The ratio 29 : 57 clearly yields the highest decimal value among all the given options.

Therefore The correct answer is 29 : 57.

Additional Information

Cross-Multiplication Method

For any two fractions a/b and c/d, if a × d > b × c, then a/b is greater than c/d. This fundamental method directly compares two ratios without involving cumbersome decimal division.

Percentage Approach

Multiplying a fractional ratio by 100 transforms it into a percentage. This approach is exceptionally fast when estimating how a fraction correlates to standard benchmark points such as 25%, 33.3%, 50%, or 75%.

Uniform Numerator-Denominator Difference

If the mathematical difference between the numerator and denominator happens to be uniform across all given proper fractions, the specific fraction containing the highest numeric figures is inherently the greatest one.

Q59. Answer: (a) 42.86%

Shortcut Trick

Let the stated quantity be 100 units and its Cost Price (CP) be 100 units.

Selling Price (SP) after claiming a 50% loss = 100 − 50 = 50 units.

Actual weight given by cheating 65% = 100 − 65 = 35 units => Actual CP = 35 units.

Profit = SP − Actual CP = 50 − 35 = 15 units.

Profit % = (15 ÷ 35) × 100 = (3 ÷ 7) × 100 ≈ 42.86%.

Therefore The correct answer is 42.86%.

Alternate Method

Given:

Claimed loss percentage = 50%

Weight reduction by cheating = 65%

Formula Used:

Actual Profit % = (True SP − True CP) ÷ True CP × 100

Cheats 65% Weight

Actual CP

35

Selling Price

50

Claimed CP

100

Profit

Loss 50%

Profit % = (50 − 35) ÷ 35 × 100 = 42.86%

Calculations:

=> Let the true Cost Price of 1000g of wheat be Rs. 1000.

=> Claimed Selling Price for 1000g (50% loss) = 1000 − (50% of 1000) = Rs. 500.

=> Actual weight given by cheating 65% = 1000 − (65% of 1000) = 350g.

=> True Cost Price for the 350g given to the customer = Rs. 350.

=> The vendor charges Rs. 500 (SP) for goods worth Rs. 350 (CP).

=> Profit earned = 500 − 350 = Rs. 150.

=> Profit % = (150 ÷ 350) × 100 = (3 ÷ 7) × 100.

=> Profit % = 300 ÷ 7 ≈ 42.857% ≈ 42.86%.

Therefore The correct answer is 42.86%.

Additional Information

Dishonest Dealer Concept

When a dealer claims to sell goods at a designated loss or profit but uses false weight, the true profit/loss is always calculated over the actual quantity of goods handed over (Actual CP).

Successive Percentage Method (Ratio Method)

Net effect can be calculated using compound ratio. Price ratio (CP : SP) = 100 : 50. Weight ratio (Actual : Claimed) = 35 : 100. Multiplying ratios gives overall Actual CP : SP = 35 : 50, revealing a 15-unit profit over a 35-unit cost.

Profit and Loss Basics

Profit occurs when Selling Price > Cost Price. Profit % is always calculated on the base of Cost Price unless explicitly stated otherwise: Profit % = (SP − CP) ÷ CP × 100.

Q60. Answer: (b) Rs. 1,170

Shortcut Trick

Since the time period is the same for all, the profit ratio is equal to the investment ratio.

Ratio of P : Q : R = 12 : 82 : 38 (Total = 132 parts)

Difference in ratio parts of Q and R = 82 − 38 = 44 parts

Required difference = (44 ÷ 132) × Total Profit

Required difference = (1 ÷ 3) × 3510 = Rs. 1,170

Therefore The correct answer is Rs. 1,170.

Alternate Method

Given:

Ratio of investments of P, Q, and R = 12 : 82 : 38

Total profit earned at the end of the year = Rs. 3,510

Formula Used:

Profit Share prop. to Investment (when time is constant)

Value of a share = (Ratio part of share ÷ Sum of all ratio parts) × Total Profit

Total Profit = Rs. 3,510 (132 parts)

12

P

82 parts

Q

38 parts

R

Diff = 82 − 38 = 44 parts

Calculations:

=> Sum of all profit ratio parts = 12 + 82 + 38 = 132

=> Difference in ratio parts of Q and R = 82 − 38 = 44

=> Difference in their shares = (Difference in ratio parts ÷ Total ratio parts) × Total Profit

=> Difference in amount = (44 ÷ 132) × 3,510

=> Difference in amount = (1 ÷ 3) × 3,510

=> Difference in amount = Rs. 1,170

Therefore The correct answer is Rs. 1,170.

Additional Information

Simple Partnership

When all partners invest their capital for the same time period, the profit is distributed exactly in the ratio of their invested capitals. Formula: Profit Ratio = C1 : C2 : C3.

Compound Partnership

When partners invest different amounts for different time periods, the profit ratio is the product of capital and time. Formula: Profit Ratio = C1×T1 : C2×T2 : C3×T3.

Working and Sleeping Partners

A working partner actively manages the business and receives a fixed salary or a certain percentage of the total profit. The remaining profit is divided among all partners (including the working partner) in the ratio of their investments.

Q61. Answer: (c) 30.3%

Shortcut Trick

For successive discounts of a% and b%, the equivalent single discount is given by:

Equivalent Discount = a + b − (a × b) ÷ 100

Here, a = 15 and b = 18

Equivalent Discount = 15 + 18 − (15 × 18) ÷ 100

Equivalent Discount = 33 − 2.7 = 30.3%

Therefore The correct answer is 30.3%.

Alternate Method

100

MP

85

After 1st Disc.

69.7

Final SP

−15%

−18%

Net Discount = 30.3%

Given:

First discount (D1) = 15%

Second discount (D2) = 18%

Calculations:

=> Let the Marked Price (MP) = 100

=> Selling Price after 1st discount = 100 − (15% of 100)

=> Price = 100 − 15 = 85

=> Selling Price after 2nd discount = 85 − (18% of 85)

=> Price = 85 − 15.3 = 69.7

=> Total discount amount = MP − Final SP

=> Total discount = 100 − 69.7 = 30.3

=> Equivalent discount percentage = (30.3 ÷ 100) × 100 = 30.3%

Therefore The correct answer is 30.3%.

Additional Information

Selling Price Formula

SP = MP × (100 − D%) ÷ 100, where D% is the discount percentage.

Three Successive Discounts

For successive discounts of a%, b%, and c%, first find the equivalent single discount of a% and b%, then use the result with c%.

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Single vs Successive Discounts

A single discount equal to the sum of successive discounts is always more beneficial to the customer than the successive discounts.

Q62. Answer: (b) 23625

Shortcut Trick

The given prices are in the ratio 3 : 5 : 7, which forms an Arithmetic Progression (constant gap of 2).

For items in an Arithmetic Progression, the average is exactly equal to the middle term.

Therefore, the average represents exactly 5 units.

Given, 5 units = Rs. 16875 => 1 unit = Rs. 3375.

The costliest item corresponds to 7 units = 7 × 3375 = Rs. 23625.

Therefore The correct answer is Rs. 23625.

Alternate Method

Given:

Average price of 3 items of furniture = Rs. 16875

Ratio of their prices = 3 : 5 : 7

3 units

5 units

7 units

Average: 5 units = Rs. 16875

Costliest = ?

Calculations:

Let the individual prices of the three items be 3x, 5x, and 7x respectively.

=> Total price of the items = Average price × Number of items

=> Total price = 16875 × 3 = 50625

=> 3x + 5x + 7x = 50625

=> 15x = 50625

=> x = 50625 ÷ 15 = 3375

The price of the costliest item corresponds to the largest ratio part, which is 7x.

=> 7x = 7 × 3375 = 23625

Therefore The correct answer is Rs. 23625.

Additional Information

Average of Terms in Arithmetic Progression (AP)

If a set of numbers forms an Arithmetic Progression (having a constant difference between consecutive terms), their average is always equal to the middle term (for an odd number of terms) or the exact average of the first and last terms.

Total Sum Formula

The foundational rule of averages is: Total Sum = Average × Number of Observations. This directly connects average-based constraints to standard ratio calculations.

Dividing a Quantity in a Given Ratio

To divide a total quantity Q in the ratio a : b : c, the value of a specific part (like the largest part, c) is calculated as (c ÷ (a + b + c)) × Q.

Q63. Answer: (d) 36.25

Shortcut Trick

Using the squaring trick for numbers ending in 5: 65 × 65 = 4225.

65% of 65 = 4225 ÷ 100 = 42.25

2/5 of 15 = 2 × 3 = 6

Required Difference = 42.25 − 6 = 36.25

Therefore The correct answer is 36.25.

Alternate Method

Given:

First Value = 65% of 65

Second Value = 2/5 of 15

Calculation:

=> First Value = (65 / 100) × 65

=> First Value = 4225 / 100

=> First Value = 42.25

=> Second Value = (2 / 5) × 15

=> Second Value = 2 × 3

=> Second Value = 6

=> Difference = First Value − Second Value

=> Difference = 42.25 − 6 = 36.25

Therefore The correct answer is 36.25.

Additional Information

BODMAS Rule

Always solve 'Of' (which implies multiplication) before standard division or multiplication in any mathematical expression.

Percentage Rule

x% of y can be calculated as (x ÷ 100) × y. Due to commutativity, x% of y is always equal to y% of x.

Squares Ending in 5 Shortcut

To square a number ending in 5 like $(n5)^2$, the result always ends in 25 and the leading digits are n × (n + 1). For 65^2, n = 6, so 6 × 7 = 42. Thus, $65^2 = 4225$.

Q64. Answer: (c) 102

Shortcut Trick

Ratio of the two numbers = 5 : 1.

Let the numbers be 5x and 1x.

Product = 5x × 1x = $5x^2 = 1445$

$x^2 = 289$ => x = 17

Sum of the numbers = 5x + 1x = 6x = 6 × 17 = 102

Therefore The correct answer is 102.

Alternate Method

Given:

Product of two positive numbers = 1445.

The first number is five times the second number.

1st No (5x)

5x

2nd No (x)

x

Product = 5x × x = $5x^2 = 1445$

$x^2 = 289$ → x = 17

Sum = 6x = 102

Calculations:

=> Let the second number be x.

=> Since the first number is 5 times the second, first number = 5x.

=> Product of the numbers = 5x × x = $5x^2$

=> $5x^2 = 1445$

=> $x^2 = 1445 \div 5$

=> $x^2 = 289$

=> x = √289 = 17 (since the numbers are given as positive)

=> First number = 5 × 17 = 85

=> Second number = 17

=> Sum of the two numbers = 85 + 17 = 102

Therefore The correct answer is 102.

Additional Information

Multiplication of Ratios

When solving problems involving the product of ratios, always introduce a common multiplier variable (e.g., x). For a ratio a : b, the product is (ax) × (bx) = abx², not simply abx.

Perfect Squares

Memorising perfect squares up to 30 helps to significantly speed up calculations. For example, instantly knowing that √289 = 17 saves valuable time during quantitative exams.

Algebraic Operations

If a number is n times another number, they can be directly written as nx and x. Their sum will naturally be (n + 1)x and their difference will be (n − 1)x.

Q65. Answer: (c) 6.34

Shortcut Trick

By comparing the powers of the same base directly from the given equation:

=> (Power of x) × z = (Power of y) × 3

=> 0.44 × z = 0.93 × 3

=> 0.44z = 2.79

=> z = 2.79 ÷ 0.44 ≈ 6.34

Therefore The correct answer is 6.34.

Alternate Method

Given:

x = 76^(0.44)

y = 76^(0.93)

x^z = y³

Formula Used:

(a^m)ⁿ = a^(m × n)

If a^m = aⁿ, then m = n (for same base greater than 0)

Calculations:

=> Substitute the values of x and y in the equation x^z = y³

=> (76^(0.44))^z = (76^(0.93))³

=> 76^(0.44 × z) = 76^(0.93 × 3)

=> 76^(0.44z) = 76^(2.79)

=> Since the bases are equal, we can equate the exponents directly:

=> 0.44z = 2.79

=> z = 2.79 ÷ 0.44

=> z = 279 ÷ 44

=> z ≈ 6.3409

Therefore The correct answer is 6.34.

Additional Information

Product Rule of Exponents

When multiplying expressions with the same base, add their exponents: a^m × aⁿ = a^(m + n).

Quotient Rule of Exponents

When dividing expressions with the same base, subtract their exponents: a^m ÷ aⁿ = a^(m − n).

Power of a Power Rule

When raising a power to another power, multiply the exponents: (a^m)ⁿ = a^(m × n).

Zero Exponent Rule

Any non-zero base raised to the power of zero is equal to one: a^0 = 1.

Q66. Answer: (c) 2 74/131 days

Shortcut Trick

Total work = LCM of 21, 16, and 2 = 336 units.

Efficiency of A = 336 ÷ 21 = 16, Efficiency of B = 336 ÷ 16 = 21.

Combined efficiency of A, B, and C = 336 ÷ 2 = 168.

Efficiency of C = 168 − (16 + 21) = 131 units/day.

Time taken by C = Total Work ÷ Efficiency of C = 336 ÷ 131 = 2 ^(74)/131 days.

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Therefore The correct answer is 2 ^(74)/131 days.

Alternate Method

Given:

Time taken by A = 21 days

Time taken by B = 16 days

Time taken by A, B, and C together = 2 days

Concept Used:

Total Work = LCM of given days

Efficiency = Total Work ÷ Number of Days

Person	Days	Total Work	Efficiency
A	21	336	16
B	16	21	
A + B + C	2	168	

Calculation:

=> Efficiency of A = 16 units/day

=> Efficiency of B = 21 units/day

=> Combined efficiency of A, B, and C = 168 units/day

=> Efficiency of C = Total efficiency − (Efficiency of A + Efficiency of B)

=> Efficiency of C = 168 − (16 + 21) = 168 − 37 = 131 units/day

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

=> Time taken by C alone = 336 ÷ 131 = 2 ^(74)/131 days

Therefore The correct answer is 2 ^(74)/131 days.

Additional Information

Pipes & Cisterns

Works exactly like Time & Work, but filling pipes have positive efficiency and emptying pipes have negative efficiency.

Work & Wages

Wages are distributed in direct proportion to the amount of work done. If time is constant, wages are distributed in the ratio of their individual efficiencies.

Alternate Day Work

When persons work one by one on alternate days, calculate the total work done in a complete cycle (e.g., 2 days for 2 people) and multiply to approach the total work target.

Q67. Answer: (a) 3,183

Shortcut Trick

Since the ratio parts 3, 5, and 7 form an arithmetic progression, their average is exactly the middle term.

=> Average = 5 units

=> 5 units = Rs. 5,305

=> 1 unit = 5,305 ÷ 5 = Rs. 1,061

=> Price of the cheapest item (3 units) = 3 × 1,061 = Rs. 3,183

Therefore The correct answer is Rs. 3,183.

Alternate Method

Given:

Average price of three items = Rs. 5,305

Ratio of their prices = 3 : 5 : 7

Formula Used:

Total Value = Average × Number of items

Value of a part = (Ratio part ÷ Sum of all ratio parts) × Total Value

Item 1 (3x)

Item 2 (5x)

Item 3 (7x)

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Cheapest

Average = Rs. 5,305 → Total = Rs. 15,915 (15x)

Calculations:

=> Total price of the 3 items = 5,305 × 3 = Rs. 15,915

=> Let the prices of the three items be 3x, 5x, and 7x respectively.

=> Sum of their prices = 3x + 5x + 7x = 15x

=> 15x = 15,915

=> x = 15,915 ÷ 15 = 1,061

=> The price of the cheapest item = 3x = 3 × 1,061 = Rs. 3,183

Therefore The correct answer is Rs. 3,183.

Additional Information

Average of Quantities

The average is calculated as the sum of all observations divided by the total number of observations. (Average = Sum ÷ Number).

Proportional Division

When a given quantity is distributed among entities in a ratio a : b : c, the share of the first entity is determined by (a ÷ (a + b + c)) × Total Quantity.

Arithmetic Progression and Averages

If numerical values are given in an arithmetic sequence with a constant gap (like 3x, 5x, 7x), their exact average is always represented by the middle term.

Q68. Answer: (b) 90, 42

Shortcut Trick

We can solve this quickly by checking the given options.

Checking Option 2, the sum of the numbers is 90 + 42 = 132.

The L.C.M. of 90 and 42 can be found by prime factorization: $90 = 2 \times 3^2 \times 5$ and $42 = 2 \times 3 \times 7$.

L.C.M. = $2 \times 3^2 \times 5 \times 7 = 630$. This perfectly satisfies both given conditions.

Other options contain prime numbers (83, 37) or smaller factors (44) which clearly fail the L.C.M. condition.

Therefore The correct answer is 90, 42.

Alternate Method

Given:

Sum of two numbers = 132

L.C.M. of the numbers = 630

Formula Used:

Let the numbers be a and b, and their H.C.F. be h.

Let a = hx and b = hy, where x and y are co-prime numbers.

Sum = hx + hy = h(x + y) and L.C.M. = hxy

Calculations:

=> Sum = h(x + y) = 132

=> L.C.M. = hxy = 630

=> The H.C.F. (h) must completely divide both the sum and the L.C.M.

=> Prime factors of 132 = $2^2 \times 3 \times 11$

=> Prime factors of 630 = $2 \times 3^2 \times 5 \times 7$

=> H.C.F. (132, 630) = $2 \times 3 = 6$

=> Taking h = 6, we substitute the value back into our equations:

=> 6(x + y) = 132 => x + y = 22

=> 6xy = 630 => xy = 105

=> We need to find two co-prime numbers whose sum is 22 and product is 105.

=> The factors of 105 are (1, 105), (3, 35), (5, 21), and (7, 15).

=> Checking the sums: 7 + 15 = 22. Thus, x = 15 and y = 7.

=> The numbers are 6 × 15 = 90 and 6 × 7 = 42.

Therefore The correct answer is 90, 42.

Additional Information

H.C.F. and L.C.M. Relationship

For any two numbers a and b, the product of the numbers is identically equal to the product of their H.C.F. and L.C.M. Formula: a × b = H.C.F. × L.C.M.

Co-prime Numbers

Two numbers are defined as co-prime if their Highest Common Factor (H.C.F.) is exactly 1. The L.C.M. of two co-prime numbers is always equal to their direct product.

H.C.F. of Fractions

The H.C.F. of fractions is easily given by the fundamental formula: H.C.F. of Numerators ÷ L.C.M. of Denominators.

Q69. Answer: (d) 93^(−34)

Shortcut Trick

Using exponent rules for the same base: a^m ÷ a^n = a^(m−n) and a^m × a^n = a^(m+n).

Solve directly by combining the exponents from left to right:

=> 93^(−6 − 16 + (−12))

=> 93^(−34)

Therefore The correct answer is 93^(−34).

Alternate Method

Given:

Expression: 93^(−6) ÷ 93^(16) × 93^(−12)

Formula Used:

1. a^m ÷ a^n = a^(m−n)

2. a^m × a^n = a^(m+n)

Calculation:

According to the BODMAS rule, division and multiplication have the same priority, so we proceed systematically from left to right.

=> (93^(−6) ÷ 93^(16)) × 93^(−12)

=> 93^(−6 − 16) × 93^(−12)

=> 93^(−22) × 93^(−12)

Now, applying the multiplication rule:

=> 93^(−22 + (−12))

=> 93^(−34)

Therefore The correct answer is 93^(−34).

Additional Information

Product Rule of Exponents

When multiplying two expressions with the same base, keep the base the same and add the exponents: a^m × a^n = a^(m+n).

Quotient Rule of Exponents

When dividing two expressions with the same base, keep the base the same and subtract the exponent of the denominator from the numerator: a^m ÷ a^n = a^(m−n).

Power of a Power Rule

To raise a power to another power, keep the base the same and multiply the exponents: $(a^m)^n$ = a^(m×n).

Negative Exponent Rule

A negative exponent indicates the reciprocal of the base raised to the positive exponent: a^(−n) = 1 ÷ a^n.

Q70. Answer: (a) 12.8

Shortcut Trick

To find the LCM of decimals, equalize the number of decimal places.

12.8 becomes 12.800, and 0.004 remains 0.004 (both have 3 decimal places).

Find the LCM of the numbers without decimals: 12800 and 4.

Since 12800 is a direct multiple of 4, their LCM is 12800.

Place the decimal point back 3 places from the right to get 12.800 = 12.8.

Therefore The correct answer is 12.8.

Alternate Method

Given:

Numbers: 12.8 and 0.004

Formula Used:

LCM of fractions = (LCM of Numerators) ÷ (HCF of Denominators)

Calculations:

=> First, convert the given decimals into fractions in their lowest terms.

=> 12.8 = 128/10 = 64/5

=> 0.004 = 4/1000 = 1/250

=> Now, find the LCM of the fractions 64/5 and 1/250.

=> LCM of numerators (64 and 1) = 64

=> HCF of denominators (5 and 250) = 5

=> LCM of the given fractions = 64 ÷ 5 = 12.8

Therefore The correct answer is 12.8.

Additional Information

HCF of Fractions

HCF = (HCF of Numerators) ÷ (LCM of Denominators). Always reduce the fractions to their simplest form before applying the formula to avoid calculation errors.

Product Rule for Two Numbers

For any two given numbers a and b, LCM × HCF = a × b. Note that this specific relation is strictly valid for exactly two numbers and does not apply to three or more numbers.

Decimal to Fraction Conversion

Remove the decimal point and place 10, 100, 1000, etc., in the denominator based on the number of digits after the decimal point, then simplify the fraction to the lowest possible term.

Q71. Answer: (b) 24

Given Number- 937612548,

1 is added to each even digit and 1 is subtracted from each odd digit in the number

The sum of all the odd digits in the new number = 7 + 3 + 5 + 9

= 24.

Hence, the correct answer is "Option 2"

Q72. Answer: (b) S

A, B, C, D, Q, R and S are sitting around a circular table, facing the centre of the table.

• Only one person sits between Q and S, when counted from the right of Q.

• Only one person sits between S and C.

• Only one person sits between Q and R.

• Only two people sit between A and C.

• Only one person sits between B and R

The Final Arrangement,

Hence, the correct answer is "Option 2"

Q73. Answer: (a) PJFB

The logic followed here is:

Hence, the correct answer is "Option 1"

Q74. Answer: (d) BSJ 225

The logic followed here is:

Hence, the correct answer is "Option 4"

Q75. Answer: (c) Three

Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order.

• Only A is kept above F.

• Only C is kept between F and D.

• Only B is kept below E

The Final Arrangement is,

A

F
C
D
G
E
B

Hence, the correct answer is "Option 3"

Q76. Answer: (a) 7

'PART' is coded as '2467'

'AIDS' is coded as '1573'

The code for 'A' is 7.

Hence, the correct answer is "Option 1"

Q77. Answer: (a) Two

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

Required Conditions: Odd number - Symbol - Not an even number.

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

Hence, the correct answer is "Option 1"

Q78. Answer: (d) 2

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

Required Conditions: Another Number - Number - Symbol.

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

Hence, the correct answer is "Option 4"

Q79. Answer: (d) 16

Total students = 97

Step 1: Find Hansa's position from the left

Hansa is 46th from the right.

Position from left = 97 − 46 + 1

= 52

So Hansa is 52nd from the left.

Step 2: Neeti's position from the left

Given = 35th from the left

Step 3: People between them

= |52 − 35| − 1

= 17 − 1

= 16

Final Answer: 16 people

Q80. Answer: (c) WBL

The logic followed here is:

Hence, the correct answer is "Option 3"

Q81. Answer: (d) 73

Gaurav rank from the top = 29th

Gaurav rank from the bottom = 45th

Total number of students = rank from the top + rank from the bottom - 1

(29 + 45) - 1 = 74 - 1 = 73

Hence, the correct answer is "Option 4".

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Q82. Answer: (b) Son's wife's father

According to the given conditions, the family tree will be:

Hence, the correct answer is "Option 2"

Q83. Answer: (a) SVZ

The logic followed here is:

Hence, the correct answer is "Option 1"

Q84. Answer: (a) LC - IN

The logic followed here is:

Hence, the correct answer is "Option 1"

Q85. Answer: (a) NK 10

The logic followed here is:

Hence, the correct answer is "Option 1"

Q86. Answer: (d) YW 36

The logic followed here is,

Hence, the correct answer is "Option 4"

Q87. Answer: (c) 72, 288

Logic: (First Number * 4 = Second Number)

The logic follows here,

Hence, the correct answer is "Option 3"

Q88. Answer: (b) 31

Given; 6 + 3 ÷ 48 − 4 × 25 = ?

Here, we use the BODMAS table given below:

After Interchanged:

6 × 3 - 48 ÷ 4 + 25 = ?

6 × 3 -12 + 25 = ?

18 - 12 + 25 = ?

6 + 25 = ?

31.

Hence, the correct answer is "Option 2"

Q89. Answer: (b) 6

• ‘HIKE’ is coded as ‘4627’

• ‘SACK’ is coded as ‘1365’

• The code for ‘K’ is 6.

Hence, the correct answer is "Option 2."

Q90. Answer: (d) 9 km towards north

• Hashini starts from Point Y and drives 16 km towards north.

• She then takes a left turn, drives 5 km.

• She then turns left and drives 25 km.

• She takes a final left turn, drives 5 km and stops at Point Z.

The Final Diagram,

Hence, the correct answer is "Option 4"

Q91. Answer: (a) Both conclusions I and II follow.

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

Conclusions:

(I) No flat is an apartment. - True (No villa is an apartment, and all flat is an apartment. Hence, it is true).

(II) No apartment is a villa. - True (No villa is an apartment, and all flat is an apartment. Hence, it is true).

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Both conclusions, I and II, follow.

Hence, the correct answer is "Option 1"

Q92. Answer: (a) 8

Given Number: 9283745

1 is added to each even digit and 2 is subtracted from each odd digit

Sum of the digits that are second from the left and second from the right is 5 + 3 = 8.

Hence, the correct answer is "Option 1"

Q93. Answer: (c) Only conclusion (I) follows.

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

Conclusions:

(I): Some bugs are cows. - True (All pins are bugs.All pins are cows.Some bugs are cows is true)

(II): All cows are pins.- True (All pins are bugs.All pins are cows .All cows are pins may be it possible but not definite Hence, it is false)

Only conclusion (I) follows.

Hence, the correct answer is "Option 3"

Q94. Answer: (b) ZFAG

The logic followed here is:

Hence, the correct answer is "Option 2"

Q95. Answer: (c) 36

Given: 7 B 5 D 48 A 4 C 13 = ?

'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '−',

7 × 5 − 48 ÷ 4 + 13 = ?

Here, we use the BODMAS table given below:

7 × 5 − 48 ÷ 4 + 13 = ?

7 × 5 − 12 + 13 = ?

35 + 13 − 12 = ?

48 − 12 = ?

36.

Hence, the correct answer is "Option 3"

Q96. Answer: (d) Northeast

• Town N is to the north of Town M.

• Town O is to the east of Town N.

• Town P is to the north of Town O.

• Town Q is to the east of Town P.

• Town R is to the east of Town Q

The Final Diagram,

Hence, the correct answer is "Option 4"

Q97. Answer: (c) 222

The logic follows here,

Hence, the correct answer is "Option 3"

Q98. Answer: (c) 713

The logic follows here,

Hence, the correct answer is "Option 3"

Q99. Answer: (b) 97

The logic follows here,

Hence, the correct answer is "Option 2"

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Q100. Answer: (b) T

Given :Seven people, A, B, C, T, U, V and W are sitting in a row, facing north.

- No one sits to the left of V.
- Only four people sit between V and B.
- Only three people sit to the right of C.
- A sits to the immediate left of W.
- T is not an immediate neighbour of C.

The Final Arrangement is,

T sits at the rightmost end of the line.

Hence, the correct answer is "Option 2"

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