RRB NTPC (UG) CBT-I Official Paper (Held On: 07 Aug, 2025 Shift 1) (Previous Year Paper)

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

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GENERAL AWARENESS

Q1. In which of the following regions in India are Tropical Evergreen Forests found?

(a) Punjab
(b) Sunderbans
(c) Western Ghats
(d) Rajasthan

Q2. As of March 14, 2024, which of the following is the world's tallest statue?

(a) Tathagata Tsal, Sikkim
(b) Statue of Unity, Gujarat
(c) Thiruvalluvar Statue, Kanyakumari
(d) Adiyogi Shiva Statue, Coimbatore

Q3. What was a major focus of the 61st Constitutional Amendment?

(a) Introduction of Anti-Defection Law
(b) Reduction of voting age from 21 to 18 years
(c) Reservation of seats for women in Panchayats
(d) Abolition of Privy Purses for former rulers

Q4. The term 'Sangam' refers to which of the following?

(a) A Tamil dynasty
(b) A literary assembly of Tamil scholars
(c) A type of Tamil poetry
(d) South Indian religious texts

Q5. Which international organisation supports globalisation and free trade?

(a) WHO
(b) WTO
(c) UNESCO
(d) IMF

Q6. The desktop background is also known as:

(a) wallpaper
(b) icon
(c) file
(d) menu

Q7. Which Indian state hosted the 38^(th) National Games in 2025?

(a) Odisha
(b) Uttarakhand
(c) Bihar

(d) Madhya Pradesh

Q8. What can happen if rocks are not weathered in the context of the movement of Earth's materials?

(a) Mass movement would be more frequent
(b) Soil fertility would improve
(c) Erosion would be insignificant
(d) Erosion would increase

Q9. Which of the following Acts aims to prevent money laundering in India?

(a) SEBI
(b) FEMA
(c) PMLA
(d) FCRA

Q10. Which sweetener, first used in 1879, has received FDA approval for use in fruit juice beverages?

(a) Aspartame
(b) Sucralose
(c) Saccharin
(d) Neotame

Q11. Which event marked the pivot moment in the extremist and moderate struggle during the Indian freedom struggle?

(a) Jallianwala Bagh Massacre
(b) Champaran Satyagraha
(c) Surat Split
(d) Partition of Bengal

Q12. Which of the following best describes the public sector's role in the Indian economy during 1947–1991?

(a) Dominant in core and heavy industries
(b) Only limited to agriculture
(c) Minimal presence
(d) Focussed only on foreign trade

Q13. According to Ibn Battuta, a Moroccan traveller to India during the Delhi Sultanate, the method of postal system in which the royal horses were used to transfer packages, is called:

(a) Dawa
(b) Uluq
(c) Mansabdari
(d) Ikat

Q14. How many small states of present-day Odisha were integrated into the Indian Union at the time of Partition?

(a) 26
(b) 42
(c) 34
(d) 15

Q15. Which programme aims to ensure access to safe and adequate drinking water through tap connections by 2024?

(a) Jal Jeevan Mission
(b) Jal Kranti Abhiyan
(c) PM-KUSUM
(d) Atal Bhujal Yojana

Q16. The distribution of population in India is:

(a) uniform across all regions
(b) more in desert areas
(c) denser in hilly regions

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(d) uneven, with variations across regions

Q17. Which acid is used in non-ionic detergent reactions to improve cleaning qualities and thicken detergents?

(a) Stearic acid
(b) Barbituric acid
(c) Propanoic acid
(d) Oxalic acid

Q18. In April 2025, which Indian cricketer was named for Wisden Leading Cricketers in the World 2024 who scored 1659 runs across formats in 2024?

(a) Harmanpreet Kaur
(b) Smriti Mandhana
(c) Jemimah Rodrigues
(d) Harleen Deol

Q19. Which State Government launched India's first ferret research facility in February 2025?

(a) Punjab
(b) Rajasthan
(c) Delhi
(d) Haryana

Q20. The US Army contingent that participated in Exercise YUDH ABHYAS held in September 2024 belonged to which of the following divisions?

(a) 82^(nd) Airborne Division
(b) 11^(th) Airborne Division
(c) 1^(st)Infantry Division
(d) 101^(st)Airborne Division

Q21. Which state became the leading beneficiary of the Green Revolution in India?

(a) Bihar
(b) Assam
(c) Punjab
(d) Odisha

Q22. Which of the following elements is classified as an actinoid group element?

(a) Thorium
(b) Ytterbium
(c) Lanthanum
(d) Cerium

Q23. Which department has notified rules for the use of radar equipment to measure vehicle speed under the Legal Metrology (General) Rules, 2011?

(a) Department of Consumer Affairs
(b) Ministry of Electronics and Information Technology
(c) Ministry of Road Transport and Highways
(d) Ministry of Home Affairs

Q24. Which of the following is the easternmost range of the Himalayas?

(a) Zanskar
(b) Purvanchal Range
(c) Dhauladhar
(d) Pir Panjal

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Q25. The Bhimbetka rock shelters, known for prehistoric cave paintings, are located in which of the following states of India?

(a) Madhya Pradesh
(b) Uttar Pradesh
(c) Rajasthan
(d) Gujarat

Q26. Protection of environment and wildlife is mentioned in which Article of the Indian Constitution?

(a) Article 48A
(b) Article 48
(c) Article 47
(d) Article 49

Q27. Which of the following operating systems is NOT typically used on desktop or laptop computers?

(a) Windows
(b) Android
(c) Linux
(d) macOS

Q28. A single narrative detailing one of Buddha's former existences is known by which of the following names?

(a) Vinaya
(b) Jataka
(c) Tripitaka
(d) Sutra

Q29. What legal document allowed Princely States to join either India or Pakistan after independence?

(a) Instrument of Accession
(b) Standstill Agreement
(c) Treaty of Accession
(d) Pact of Unity

Q30. To which of the following is the Council of Ministers of a state in India collectively responsible?

(a) President of India
(b) Supreme Court
(c) State Legislative Assembly
(d) Governor of the State

Q31. Which region of India is most suitable for tea cultivation due to its climate and soil?

(a) Western Rajasthan
(b) Deccan Plateau
(c) Assam and North Bengal
(d) Punjab and Haryana

Q32. What is the name of the programme that supports AI-based learning in government schools?

(a) Smart EduTech
(b) Vidya Connect
(c) FLN-AXL
(d) Digital India Learning

Q33. Which of the following best describes 'intergenerational equity'?

(a) Fair allocation of resources among various income groups
(b) Fair use of resources to ensure availability for future generations
(c) Fair distribution of resources among present-day nations
(d) Equal economic opportunities for all age-based population groups

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Q34. The indigenous CAR-T therapy has shown maximum efficacy against B-ALL and which other blood cancer?

(a) Non-Hodgkin Lymphoma
(b) Hodgkin Lymphoma
(c) Chronic Myeloid Leukaemia
(d) Multiple Myeloma

Q35. At the Global Production Awards held on 20 May 2025 during the Cannes Film Festival, which city was honoured with the Best City of Film Award?

(a) Dublin
(b) Cardiff
(c) Edinburgh
(d) Belfast

Q36. On 19 February 2025, which state's cabinet approved the Bhoo Kanoon (Land Law Amendment Bill) to regulate the purchase and sale of agricultural, horticultural and residential land by non-residents?

(a) Jammu and Kashmir
(b) Arunachal Pradesh
(c) Himachal Pradesh
(d) Uttarakhand

Q37. Who among the following was appointed as a Deputy Governor of the Reserve Bank of India (RBI) in May 2025?

(a) Dr. Rakesh Mohan
(b) Dr. Anshula Kant
(c) Dr. Poonam Gupta
(d) Dr. Urjit Patel

Q38. What is the projected annual growth rate of India-UK bilateral trade under the new Free Trade Agreement (FTA)?

(a) 20%
(b) 10%
(c) 15%
(d) 12%

Q39. Who is the highest law officer in a state?

(a) Legal Advisor
(b) Attorney General
(c) Law Secretary
(d) Advocate General

Q40. Who among the following launched the Ayushman Vay Vandana Card in Delhi in April 2025, along with Delhi Chief Minister Rekha Gupta?

(a) Pinarayi Vijayan
(b) Vinai Kumar Saxena
(c) JP Nadda
(d) Hardeep Singh Puri

MATHEMATICS

Q41. A number, when increased by 100%, gives 2820. The number is:

(a) 705
(b) 2820
(c) 1410
(d) 4230

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Q42. The cost of 8 pens and 10 pencils is Rs. 132. If the cost of a pen decreases by Rs. 2 and the cost of a pencil increases by Rs. 7, then the cost of 17 pens and 6 pencils is Rs. 136. What is the original cost of 12 pens and 9 pencils?

(a) Rs. 138
(b) Rs. 143
(c) Rs. 136
(d) Rs. 135

Q43. In triangle ABC, BD ? AC at D and angle DBC = 16°. E is a point on BC such that angle CAE = 51°. What is the measure of angle AEB?

(a) 135°
(b) 139°
(c) 113°
(d) 125°

Q44. Rs. 75,400 were divided among A, B and C, such that 3 times the share of A = 9 times the share of B = 4 times the share of C. Find the share of A.

(a) Rs. 36,127
(b) Rs. 36,192
(c) Rs. 36,032
(d) Rs. 36,236

Q45. Which of the following numbers divides 774359327?

(a) 7
(b) 12
(c) 2
(d) 16

Q46. Which of the following numbers divides 545714151?

(a) 10
(b) 6
(c) 7
(d) 3

Q47. A sector is formed by a circular arc with a radius of 9 cm, subtending an 18° angle at the centre. What is its perimeter?

(Use π = 3.14) (Rounded up to two decimal places.)

(a) 22.46 cm
(b) 24.14 cm
(c) 20.83 cm
(d) 18.38 cm

Q48. In an election between two candidates, 85% of the registered voters cast their vote and 4% of the votes polled were found invalid. The winning candidate got 65% of the valid votes and won the election by a margin of 2142 votes. How many voters were registered?

(a) 8747
(b) 8750
(c) 8751
(d) 8752

Q49. If the third proportional of 16 and 56 be x, then what is the value of x?

(a) 196
(b) 195
(c) 198
(d) 193

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Q50. Priya can do a certain piece of work in 26 days. Priya and Varsha can together do the same work in 13 days, and Priya, Varsha and Nisha can do the same work together in 10 days. In how many days can Priya and Nisha do the same work together?

(a) 71/4
(b) 65/4
(c) 56/6
(d) 73/5

Q51. Arjun and Malaika have to travel from Delhi to Kanpur in their respective cars. Arjun is driving at 138 km/hr while Malaika is driving at 92 km/hr. Find the time taken by Malaika to reach Kanpur if Arjun takes 8 hours.

(a) 13 hours
(b) 12 hours
(c) 4 hours
(d) 7 hours

Q52. A trader claims to sell flour at a profit of 47%, but also dishonestly uses a weight which is 8% less than what is mentioned on it. Find the total percentage of profit earned by the trader. (Round off the answer to the nearest whole number.)

(a) 60%
(b) 55%
(c) 61%
(d) 65%

Q53. If 3 times Mary’s present age is 20 years more than 5 times Diya's present age, and 2 times Diya's present age is 2 years less than Mary's present age, then what is the difference (in years) between the ages of Mary and Dia?

(a) 11
(b) 12
(c) 16
(d) 15

Q54. Find a single discount equivalent to successive discounts of 20%, 25% and 15%.

(a) 49%
(b) 42%
(c) 46%
(d) 44%

Q55. The number of prime numbers lying between 331 and 345, both included, is:

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

Q56. Varun bought some erasers at the rate of Rs. 150/dozen. He sold them for Rs. 18 each. His profit percentage is _____%.

(a) 48
(b) 46
(c) 44
(d) 42

Q57. The LCM of the numbers 15.4 and 0.006 is:

(a) 0.462
(b) 462
(c) 46.2
(d) 4.62

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Q58. If $(\sin\theta+\cos\theta)/(\sin\theta-4\cos\theta)=11$, then the value of $((13\sin^2\theta+3\cos^2\theta-3))/(\cos^2\theta)$ is:

(a) 15
(b) (1 9)/2
(c) 405/2
(d) 471/2

Q59. Find the circumference (in m) of the largest circle that can be drawn completely inside a rectangle whose dimensions are given as 14 m and 116 m.

(Take π=22/7.)

(a) 47
(b) 44
(c) 36
(d) 37

Q60. What sum of money (in Rs.) will amount to Rs. 2,400 at 4% per annum simple interest in 5 years?

(a) Rs. 12,000
(b) Rs. 2,050
(c) Rs. 2,000
(d) Rs. 1,950

Q61. Find the value of $62^3 \div 62^2 \times 62^{(-13)}$.

(a) 62^(−18)
(b) 62^(−26)
(c) 62^(−23)
(d) 62^(−12)

Q62. A jacket is marked at Rs. 4,000. During a festive sale, it is given two successive discounts of 32% and 22%. What is the final price after both discounts, and what is the effective percentage discount?

(a) Rs. 1,840 ; 54%
(b) Rs. 2,352.2 ; 44.23%
(c) Rs. 1,820 ; 49%
(d) Rs. 2,121.6 ; 46.96%

Q63. The average runs scored by a batsman in 23 matches is 41. In the next 10 matches, the batsman scored an average of 16 runs. Find his average runs scored (rounded off to two decimal places) in all the 33 matches.

(a) 34.42
(b) 33.42
(c) 35.42
(d) 32.42

Q64. In covering a distance of 150 km, Pranay takes 2 hours more than Aman. If Pranay doubles his speed, then he would take 3 hours less than Aman. Pranay's speed is:

(a) 6 km/hr
(b) 11 km/hr
(c) 15 km/hr
(d) 20 km/hr

Q65. The value of √169+√0.0144-√5.76 is _____.

(a) 10.72
(b) 15.09
(c) 15.76
(d) 9.35

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Q66. Find the simple interest (in Rs.) on Rs. 4,000 at 6.75% per annum rate of interest deposited on 25 February 2024 and withdrawn on 26 April 2024.

(a) Rs. 44
(b) Rs. 43
(c) Rs. 45
(d) Rs. 46

Q67. Sanjana, Kartik and Deepa invested Rs. 1,050, Rs. 1,320 and Rs. 1,730, respectively to start a business. If the profit at the end of the year is Rs. 1,230, what is Deepa's share of the profit?

(a) Rs. 516
(b) Rs. 519
(c) Rs. 517
(d) Rs. 520

Q68. A can lay railway track between two given stations in 22 days and B can do the same job in 11 days. With the help of C, they did the job in 5 days only. Then, C alone can do the job in

(a) 155/7 days
(b) 215/7 days
(c) 165/7 days
(d) 125/7 days

Q69. Simplify:

3[(7over3)x^2 - 27x + 14] - 7(x^2 + 8x - 11)

(a) −137x − 119
(b) 137x − 119
(c) −137x + 119
(d) 137x + 119

Q70. What is the median of the following data?

76, 35, 42, 49, 95, 21, 68, 41, 20, 27, 17

(a) 42
(b) 41.5
(c) 41
(d) 40.5

GENERAL INTELLIGENCE AND REASONING

Q71. If 2 is added to each odd digit and 1 is subtracted from each even digit in the number 8354671, then how many digits will appear more than once in the new number thus formed?

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

Q72. In the following triads, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one which follows the same logic.

NEST - ESNT - TSEN

GONE - ONGE - ENOG

(a) LIES - IELS - SEIL
(b) MAST - AMST - TASM
(c) COPE - OPCE - OPEC
(d) SING - SNIG - GNIS

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Q73. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

ICV 16 LGS 5 OKP -6 ROM -17 ?

(a) SJD -21
(b) UHT -21
(c) USJ -28
(d) JUD -20

Q74. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left) ? > @ ^ @ \ ? + $ 6 7 \ 1 & @ 1 4 2 2 % 9 (Right)

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

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

Q75. 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 conclusion(s) logically follow(s) from the statements.

Statements:

All teas are bins.

No tea is a sock.

Conclusions:

(I): Some socks are bins.

(II): All bins are socks.

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

Q76. Satish starts from Point Y and drives 19 km towards west. He then takes a right turn, drives 10 km. He then turns right and drives 11 km. He takes a final right turn, drives 10 km and stops at Point Z. How far (shortest distance) and towards which direction should he drive in order to reach Point Y again? (All turns are 90° turns only unless specified.)

(a) 7 km towards south
(b) 5 km towards north
(c) 6 km towards west
(d) 8 km towards east

Q77. 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) HLF
(b) MQK
(c) KOI
(d) FJC

Q78. T is the daughter of A. A is married to M. M is the son of K. K is married to J. J is the father of D. D is the brother of N. G is the son of N. How is K related to T?

(a) Father's mother
(b) Mother's brother
(c) Father's father

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(d) Mother's father

Q79. In a certain code language, ‘like his attitude’ is coded as ‘nt yg fr’ and ‘his first salary’ is coded as ‘kt lo yg’. How is ‘his’ coded in the given language?

(a) yg
(b) fr
(c) kt
(d) nt

Q80. In a row of people all facing north, Rikshit is 31^(st) from the right end and Palak is 32^(nd) from the right end. The number of people between Palak and Rikshit is same as the number of people between Palak and Huma. If Huma is 10^(th) from the left end of the row, how many people are there in the row?

(a) 43
(b) 41
(c) 44
(d) 42

Q81. 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?

46 A 2 C 21 D 8 B 3 = ?

(a) 33
(b) 20
(c) 26
(d) 41

Q82. This question is based on the five, three-digit numbers given below.

(Left) 324 523 643 136 441 (Right)

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

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

If 3 is added to the first digit of every number, in how many numbers will the first digit be exactly divisible by the second digit?

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

Q83. Seven boxes, A, B, C, D, M, N and O, are kept one over the other but not necessarily in the same order.

No box is kept above B. Only three boxes are kept between B and N. Only one box is kept between D and A. Only C is kept below O. A is kept immediately above N. Only four boxes are kept between D and C. How many boxes are kept below M?

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

Q84. In a certain code language, ‘GALE’ is coded as ‘7513’ and ‘FLEA’ is coded as ‘5197’. What is the code for ‘F’ in that language?

(a) 1
(b) 9
(c) 5
(d) 7

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Q85. Seven people, A, B, C, T, U, V and W are sitting in a row, facing north. Only two people sit to the right of C. Only two people sit between C and U. Only two people sit between A and V. V sits to the immediate left of C. T sits to the immediate right of W. Who sits at third position from the left end of the line?

(a) T
(b) U
(c) A
(d) B

Q86. Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statement(s).

Statements:

All Cabbages are Peas.

No Peas are Broccolis.

Conclusions:

I: No Broccolis are Cabbages.

II: Some Broccolis are Cabbages.

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

Q87. What should come in place of the question mark (?) in the given series?

779 780 784 793 809 ?

(a) 831
(b) 837
(c) 834
(d) 841

Q88. Select the triad that follows the same pattern as that followed by the two triads given below. Both triads follow the same pattern.

GN-JQ-MP

DK-GN-JM

(a) JQ-MT-PR
(b) JQ-MT-PS
(c) IQ-NT-PR
(d) IQ-MT-PR

Q89. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

FJN 45, DHL 40, BFJ 35, ZDH 30, XBF 25, ?

(a) VZD 20
(b) VUD 20
(c) VZE 20
(d) UZD 20

Q90. If 2 is added to each odd digit and 3 is subtracted from each even digit in the number 7843651, how many digits will appear more than once in the new number thus formed?

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

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Q91. 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) HDK
(b) FBJ
(c) MIP
(d) JFM

Q92. In the following triads, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one which follows the same logic.

RACK - AKCR - KCAR

LOAD - ODAL - DAOL

(a) ABLE - BALE - EBLA
(b) NAPS - NPAS - SPAN
(c) ITEM - TMEI - METI
(d) FLAT - LFAT - TLAF

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

456 457 455 456 454 455 453 ?

(a) 454
(b) 453
(c) 456
(d) 455

Q94. A, B, C, D, E, F and G are sitting around a circular table facing the centre. B sits second to the right of C. E sits third to the left of B. D is the immediate neighbour of G and A. F sits second to the left of G. How many people sit between A and B when counted from the left of A?

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

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

6 9 15 24 36 ?

(a) 51
(b) 41
(c) 75
(d) 52

Q96. All 105 students in a class are standing in a row facing north. Ravi is 49^(th) from the right end while Shruti is 38^(th) from the left end. How many people stand between Ravi and Shruti?

(a) 19
(b) 17
(c) 16
(d) 18

Q97. 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) PN−QO
(b) QO−RP
(c) LJ−MK
(d) US−UV

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Q98. In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. Select the pair in which the numbers are related in the same way as are the numbers of the following pairs.

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

52, 81

72, 101

(a) 84, 107
(b) 75, 104
(c) 79, 102
(d) 53, 76

Q99. Mr. Oxi starts from Point A and drives 9 km towards the south. He then takes a right turn and drives 3 km, then turns right and drives 15 km. He then takes a right turn and drives 11 km. He takes a final right turn, drives 6 km and stops at Point P. How far (shortest distance) and in which direction should he drive in order to reach Point A again? (All turns are 90-degree turns only unless specified.)

(a) 8 km to the west
(b) 7 km to the east
(c) 8 km to the south
(d) 8 km to the east

Q100. If 1 is added for each even digit and 1 is subtracted from each odd digit of the number 56218643, how many digits are repeated more than once in the new number thus formed?

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

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (c) Western Ghats

The correct answer is Western Ghats.

Key Points

• Tropical Evergreen Forests are predominantly found in regions with high rainfall and temperatures, such as the Western Ghats, Andaman and Nicobar Islands, and parts of the northeastern states of India.

• The Western Ghats, a UNESCO World Heritage Site, is one of the eight "hottest hotspots" of biological diversity in the world and is home to lush evergreen forests.

• These forests receive an annual rainfall of over 200 cm and maintain a high level of humidity, facilitating the growth of dense

vegetation.

• They are characterized by a multilayered canopy with a wide variety of flora and fauna, including species like mahogany, rosewood, and rubber trees.

• The Western Ghats are crucial for ecological balance, as they are the source of many rivers and play a significant role in carbon sequestration and climate regulation.

Additional Information

• Tropical Evergreen Forests:

• These forests remain green throughout the year due to continuous leaf shedding and regeneration.

• They are found in areas with a warm and humid climate, with temperatures ranging between 24°C to 27°C.

• Major trees include ebony, rubber, mahogany, and rosewood, which often grow up to 60 meters in height.

• They are rich in biodiversity and house animals like elephants, tigers, leopards, and birds like hornbills.

• Western Ghats:

• Stretching parallel to the western coast of India, the Western Ghats cover states like Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu.

• It is a biodiversity hotspot, home to endemic species and a variety of ecosystems, including tropical evergreen forests, montane forests, and grasslands.

• The region contributes significantly to India's monsoon system and acts as a watershed for many rivers like the Godavari, Krishna, and Kaveri.

• UNESCO World Heritage Site:

• The Western Ghats were designated as a UNESCO World Heritage Site in 2012 for their exceptional natural beauty and ecological significance.

• It includes 39 protected areas, such as national parks, wildlife sanctuaries, and reserve forests.

• Climate Regulation:

• The dense forests of the Western Ghats play a critical role in regulating the regional and global climate by acting as a significant carbon sink.

• They help in maintaining groundwater levels and preventing soil erosion, ensuring sustainable livelihoods for local communities.

Q2. Answer: (b) Statue of Unity, Gujarat

The correct answer is Statue of Unity, Gujarat.

Key Points

• The Statue of Unity, located in Gujarat, India, is the world's tallest statue, standing at a height of 182 meters (597 feet).

• It was unveiled on October 31, 2018, in honor of Sardar Vallabhbhai Patel, the first Deputy Prime Minister and Home Minister of India.

• The statue is situated on the banks of the Narmada River near the Sardar Sarovar Dam in Kevadia.

• Designed by Indian sculptor Ram V. Sutar, the statue is made of bronze-clad reinforced concrete.

• The project was completed at a cost of approximately Rs. 2,989 crore and aims to promote tourism and educate visitors about Sardar Patel's contributions to India's unity.

Additional Information

• Other Tall Statues in India:

• Tathagata Tsal in Sikkim: A statue of Lord Buddha standing at 41 meters.

• Thiruvalluvar Statue in Kanyakumari: Dedicated to Tamil poet Thiruvalluvar, standing at 40.6 meters.

• Adiyogi Shiva Statue in Coimbatore: A 34-meter tall statue of Lord Shiva promoting yoga and spirituality.

• Global Tall Statues: The Spring Temple Buddha in China was previously the tallest statue in the world at 128 meters before being surpassed by the Statue of Unity.

• Engineering Marvel: The Statue of Unity is designed to withstand wind speeds of up to 180 km/h and earthquakes measuring up to 6.5 on the Richter scale.

• Tourism Impact: The Statue of Unity has become a major tourist attraction, drawing millions of visitors annually and boosting the local economy.

• Cultural Significance: Sardar Patel is remembered as the "Iron Man of India" for his role in unifying the country post-independence, making the statue a symbol of national integration.

Q3. Answer: (b) Reduction of voting age from 21 to 18 years

The correct answer is Reduction of voting age from 21 to 18 years.

Key Points

• The 61st Constitutional Amendment Act of 1988 reduced the minimum voting age in India from 21 years to 18 years.

• This amendment applied to both the Lok Sabha and State Legislative Assembly elections.

• The purpose of the amendment was to increase the participation of younger citizens in the democratic process of the country.

• By enabling individuals aged 18 and above to vote, the amendment aimed to provide representation to a larger section of the population, especially the youth.

• The 61st Amendment reflects India's commitment to empowering its youth as active participants in decision-making and governance.

Additional Information

• Constitutional Amendments:

• Constitutional amendments are changes made to the Indian Constitution to address evolving societal, political, and legal needs.

• They are introduced as bills in Parliament and require a special majority for approval.

• Voting in India:

• Voting is a fundamental aspect of a democracy, allowing citizens to choose their representatives.

• In India, voting is governed by the Representation of the People Act, 1951.

• Other Important Constitutional Amendments:

• 42nd Amendment (1976): Known as the "Mini Constitution," it brought major changes like adding the words "Socialist" and "Secular" to the Preamble.

• 73rd Amendment (1992): Introduced the Panchayati Raj system to strengthen local governance.

• Demographics of Youth in India:

• India has one of the largest youth populations globally, making their participation in elections critical to shaping the nation’s future.

• The reduced voting age allowed approximately 35 million new voters to participate in the democratic process during its initial implementation.

Q4. Answer: (b) A literary assembly of Tamil scholars

The correct answer is A literary assembly of Tamil scholars.

Key Points

• The term 'Sangam' refers to an assembly of Tamil scholars and poets who gathered to create and refine Tamil literature during ancient times.

• This tradition is believed to have taken place in three historical periods, referred to as the First, Second, and Third Sangams.

• The Sangam literature primarily consists of poetry and prose that dealt with themes like love (Akam), heroism (Puram), ethics, and morals.

• The Sangam period (approximately 300 BCE to 300 CE) is a significant part of Tamil history and culture, marking the golden age of Tamil literature.

• Texts like Tolkappiyam, Akananuru, and Purananuru are prominent works of Sangam literature and provide insights into the socio-political and economic conditions of that era.

Additional Information

• Sangam Literature: It is one of the oldest known collections of Tamil literary works and provides detailed information about ancient Tamil society, culture, and values.

• First Sangam: Held in the now-submerged city of Madurai, it is considered mythical, with no surviving works.

• Second Sangam: Believed to have been held in Kapadapuram, only fragments of its literature survive.

• Third Sangam: Conducted in the city of Madurai, it produced many of the Tamil literary works that survive to this day.

• Impact on Modern Tamil: The rich linguistic and literary traditions of Sangam literature have significantly influenced the development of modern Tamil language and culture.

Q5. Answer: (b) WTO

The correct answer is WTO.

Key Points

• The World Trade Organization (WTO) is an international body that regulates and promotes global trade between nations.

• It was established on 1 January 1995, replacing the General Agreement on Tariffs and Trade (GATT).

• The WTO aims to ensure free, fair, and predictable trade by eliminating barriers like tariffs, quotas, and subsidies.

• It provides a platform for negotiating trade agreements, resolving trade disputes, and monitoring trade policies of member countries.

• As of 2023, the WTO has 164 member countries, representing over 98% of global trade.

Additional Information

• Globalization: It refers to the process by which businesses and organizations develop international influence or operate on a global scale, often facilitated by free trade and investment.

• Free Trade: A policy where goods and services move across borders without government-imposed restrictions like tariffs, quotas, or subsidies.

• Trade Dispute Resolution: The WTO provides a mechanism for resolving trade conflicts between countries, ensuring that trade flows smoothly.

• Most-Favored-Nation Principle: A foundational WTO rule that ensures all members receive equal trade advantages, preventing discrimination.

• Trade Agreements: WTO facilitates negotiations on multilateral trade agreements to reduce trade barriers and enhance economic cooperation globally.

Q6. Answer: (a) wallpaper

The correct answer is Wallpaper.

Key Points

• The desktop background is commonly referred to as Wallpaper, which is an image or pattern displayed on the computer screen behind icons and open windows.

• Wallpapers can be customized according to user preferences and are supported by most operating systems, including Windows, macOS, and Linux.

• The term “wallpaper” originates from the idea of decorating a virtual space similar to physical wallpaper used in homes.

• Wallpapers can be static images or dynamic (moving) wallpapers, depending on the system capabilities and software used.

• Users can select wallpapers from the system's default options or upload their own images to personalize the desktop environment.

Additional Information

• Icon: Icons are small graphical representations of programs, files, or functions on a computer desktop, used to facilitate easy access.

• Menu: Menus are graphical elements or lists that provide access to various commands or options within a software or operating system.

• File: Files are digital containers that store data, such as text documents, images, videos, or software applications.

• Dynamic Wallpapers: These are animated or interactive wallpapers that change over time or react to user interactions.

• Desktop Environment: The desktop environment is the graphical interface through which users interact with their operating system, including elements like wallpapers, icons, menus, and taskbars.

Q7. Answer: (b) Uttarakhand

The correct answer is Uttarakhand.

Key Points

• Uttarakhand is set to host the 38th National Games in 2025, becoming the second Himalayan state after Himachal Pradesh to organize this prestigious event.

• The announcement was made by the Indian Olympic Association (IOA) and received significant support from the Uttarakhand government.

• National Games are a multi-sport event conducted every four years, showcasing athletes from across the country competing in various disciplines.

• Uttarakhand aims to upgrade its sports infrastructure and facilities to meet international standards for hosting such large-scale events.

• Several cities across the state, including Dehradun, Haridwar, and Haldwani, are expected to host competitions during the games.

Additional Information

• Indian Olympic Association (IOA): The apex body responsible for promoting Olympic sports in India and organizing events such as the National Games.

• National Games: A flagship sporting event in India, held every four years, providing a platform for athletes to showcase their talents and qualify for international competitions.

• Sports Development in Uttarakhand: The state has initiated various programs to encourage sports participation and improve infrastructure for athletes.

• Himalayan States: States located in the Himalayan region, such as Uttarakhand and Himachal Pradesh, are increasingly being recognized for their potential to host large-scale events due to their scenic locations and growing infrastructure.

• Impact on Tourism: Hosting the National Games is expected to boost tourism in Uttarakhand, attracting visitors to its picturesque landscapes and cultural heritage.

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Q8. Answer: (c) Erosion would be insignificant

The correct answer is Erosion would be insignificant.

Key Points

• Weathering is the breakdown of rocks into smaller particles, which contributes to erosion processes. Without weathering, erosion would be insignificant as there would be fewer loose materials to transport.

• Rocks that are not weathered remain intact, reducing the availability of sediments that can be moved by agents of erosion such as water, wind, and ice.

• Weathering creates soil and sediment, which are critical for erosion processes to occur. A lack of weathering would disrupt the dynamic movement of Earth's materials.

• Erosion depends on the presence of weathered particles for transport. Without weathering, landscapes would remain largely static, and Earth's surface would lack significant changes over time.

Additional Information

• Weathering: The process of breaking down rocks physically (mechanical weathering) or chemically (chemical weathering), which is essential for soil formation and sediment production.

• Erosion: The process of transporting weathered materials (soil, rock, and sediment) by natural agents such as water, wind, ice, or gravity.

• Mass Movement: The downward movement of rock and soil due to gravity. Weathered material is often a precursor to mass movements like landslides.

• Soil Formation: Weathering contributes to the creation of fertile soil, providing essential minerals and organic matter for plant growth.

• Earth's Material Cycle: Weathering and erosion are interconnected processes that drive the continuous cycle of material movement and landscape evolution on Earth's surface.

Q9. Answer: (c) PMLA

The correct answer is Prevention of Money Laundering Act (PMLA).

Key Points

• The Prevention of Money Laundering Act (PMLA), 2002, was enacted by the Government of India to combat money laundering activities.

• It came into force on 1st July 2005 and aims to prevent and control money laundering while confiscating and seizing property involved in such activities.

• The Act empowers authorities such as the Enforcement Directorate (ED) to investigate and prosecute cases related to money laundering.

• PMLA mandates that reporting entities such as banks, financial institutions, and intermediaries maintain records of transactions and verify the identity of clients.

• The Act also ensures compliance with international standards set by the Financial Action Task Force (FATF), a global watchdog for combating money laundering and terrorist financing.

Additional Information

• Money Laundering:

• Money laundering refers to the process of disguising illicit funds to make them appear legitimate.

• It typically involves three stages: placement, layering, and integration.

• Placement refers to introducing illegal money into the financial system, layering involves obscuring the origin of funds, and integration completes the laundering process by embedding the funds into the legitimate economy.

• Enforcement Directorate (ED):

• The ED is the key agency under PMLA responsible for investigating and prosecuting money laundering cases.

• It has the authority to attach, confiscate properties, and take legal action against offenders.

• FATF:

• The Financial Action Task Force is an intergovernmental organization established in 1989 to combat money laundering, terrorism financing, and other related threats.

• India is a member of FATF and complies with its recommendations to enhance global efforts against financial crimes.

• Associated Legislations:

• FEMA: Foreign Exchange Management Act regulates foreign exchange transactions but does not address money laundering.

• SEBI: Securities and Exchange Board of India oversees capital markets but is not directly related to money laundering prevention.

• FCRA: Foreign Contribution Regulation Act regulates foreign contributions but does not cover money laundering.

Q10. Answer: (c) Saccharin

The correct answer is Saccharin.

Key Points

• Saccharin was discovered in 1879 by chemists Constantin Fahlberg and Ira Remsen.

• It is one of the oldest artificial sweeteners and has been widely used in food and beverages.

• The U.S. Food and Drug Administration (FDA) has approved saccharin for use in fruit juice beverages and other food products.

• Saccharin is calorie-free and approximately 200–700 times sweeter than sugar, making it a popular choice for low-calorie diets.

• It is commonly used in diet sodas, chewing gums, and other sugar-free products as a sweetening agent.

Additional Information

• Artificial Sweeteners: These are chemical or natural compounds used to sweeten food and beverages without the calories of sugar.

• FDA Approval Process: The FDA evaluates artificial sweeteners for safety through rigorous testing before approving their use in food products.

• Other Popular Artificial Sweeteners: Aspartame, sucralose, and neotame are other FDA-approved sweeteners used in various foods and drinks.

• Health Concerns: While saccharin was once linked to cancer risk, subsequent studies and regulatory reviews concluded that it is safe for consumption.

• Calorie-Free Benefits: Artificial sweeteners like saccharin are helpful for individuals managing diabetes or following low-calorie diets.

Q11. Answer: (c) Surat Split

The correct answer is Surat Split.

Key Points

• The Surat Split occurred in 1907 during the Indian National Congress session held in Surat.

• It marked a significant division between the Moderates and Extremists within the Indian National Congress.

• The Moderates, led by leaders like Gopal Krishna Gokhale, advocated constitutional methods of protest, while the Extremists, led by Bal Gangadhar Tilak, demanded more radical measures for achieving independence.

• The split weakened the Indian National Congress and delayed the united struggle for independence for several years.

• The growing ideological differences, particularly over the Swadeshi Movement and boycott of British goods, were the primary reasons behind the split.

Additional Information

• Moderates vs. Extremists:

• Moderates believed in petitioning the British government for reforms and relied on peaceful negotiations.

• Extremists advocated direct action, including boycotts, protests, and promoting Swaraj (self-rule).

• Swadeshi Movement:

• Initiated as a response to the Partition of Bengal (1905), it promoted the use of Indian-made goods and boycott of British products.

• It became a cornerstone of Extremist ideology during the freedom struggle.

• Partition of Bengal:

• Announced in 1905 by Lord Curzon, it divided Bengal into East Bengal and West Bengal, allegedly for administrative efficiency.

• The move was widely opposed as it was perceived to be a strategy to divide Hindus and Muslims.

• Impact of Surat Split:

• The division within the Congress weakened the nationalist movement for some years.

• Unity was restored later during the Lucknow Pact of 1916, when Moderates and Extremists reunited to fight British rule.

Q12. Answer: (a) Dominant in core and heavy industries

The correct answer is Dominant in core and heavy industries.

Key Points

• The public sector played a pivotal role in India's economic development between 1947 and 1991, focusing on core and heavy industries.

• Key industries such as steel, coal, power generation, oil, and infrastructure were nationalized and spearheaded by the government.

• The public sector acted as a driver for industrialization under India's socialist-inspired economic policies.

• The government aimed to reduce dependency on foreign imports and build self-reliance by establishing public sector enterprises

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in critical areas.

Additional Information

• Option 2: Only limited to agriculture: The public sector was not limited to agriculture during this period. While agriculture was central to the economy, the public sector focused heavily on industrialization and infrastructure development. The Green Revolution of the 1960s was significant, but it was not the sole focus of the government.

• Option 3: Minimal presence: This is incorrect, as the public sector had a substantial presence during 1947–1991. The government controlled major industries, monopolized sectors like telecommunications and railways, and established public enterprises such as Steel Authority of India Limited (SAIL) and Bharat Heavy Electricals Limited (BHEL).

• Option 4: Focused only on foreign trade: While foreign trade was an important policy area, it was not the primary focus of the public sector. India's economic strategy emphasized self-reliance, import substitution, and industrial development rather than relying on foreign trade.

• Socialist Economic Policies: India adopted a mixed economy approach, combining elements of socialism and capitalism. The Industrial Policy Resolution of 1956 laid the foundation for government control over key industries and sectors.

• Five-Year Plans: India's government implemented central planning through Five-Year Plans, with an emphasis on public sector investments in infrastructure, education, and health.

• Economic Reforms: The period ended with the 1991 economic liberalization, which shifted the focus from a state-led economy to market-driven policies, reducing the public sector's dominance.

Q13. Answer: (b) Uluq

The correct answer is Uluq.

Key Points

• The term Uluq refers to the postal system in the Delhi Sultanate era where royal horses were used to transfer messages and packages.

• This system was designed for fast and efficient communication across the vast territories of the Sultanate.

• The Sultanate maintained a well-structured postal system that relied on horsemen and relay stations to ensure timely delivery.

• According to Ibn Battuta, a Moroccan traveler, this system played a significant role in the administration and governance of the Delhi Sultanate.

• The efficient communication network symbolized the centralized power and administrative control of the Sultanate rulers.

Additional Information

• Ibn Battuta

• He was a Moroccan traveler and scholar who visited India during the reign of Muhammad bin Tughlaq.

• He recorded detailed accounts of his travels in his book, "Rihla" (The Journey).

• His observations provide valuable insights into the administration, culture, and society of medieval India.

• Postal Systems in History

• Historical postal systems often utilized relay stations and animals such as horses or camels to ensure communication across long distances.

• Examples include the Persian Empire's "Royal Road" postal system and the Mongol Empire's "Yam" network.

• Delhi Sultanate Administration

• The Sultanate relied on a centralized bureaucracy to manage its vast territories.

• Efficient communication networks like Uluq were vital for maintaining control and implementing policies.

• Mansabdari System

• It was a military-cum-administrative system introduced by Akbar in the Mughal Empire, distinct from the postal systems of the Sultanate.

• It categorized officers based on their rank (mansab) and responsibilities.

• Ikat System

• Ikat refers to a traditional textile dyeing technique and has no connection to postal systems.

Q14. Answer: (a) 26

The correct answer is 26.

Key Points

• A total of 26 small princely states of Odisha were integrated into the Indian Union during the period following Partition in 1947.

• The integration of these states was part of the larger effort led by Sardar Vallabhbhai Patel, the first Deputy Prime Minister and Home Minister of India.

• These princely states included regions such as Kalahandi, Bolangir, Mayurbhanj, and others, which were merged into Odisha.

• The process was facilitated by the Instrument of Accession signed by rulers of princely states, agreeing to become part of India.

• This integration strengthened administrative and political cohesion in Odisha and the rest of India post-independence.

Additional Information

• Princely States in India: At the time of independence, India had over 560 princely states ruled by local monarchs under British suzerainty.

• Instrument of Accession: A legal document that allowed princely states to join India or Pakistan after Partition.

• Sardar Vallabhbhai Patel's Role: Patel, known as the "Iron Man of India," played a key role in unifying princely states into the Indian Union.

• Odisha's Historical Context: Odisha was historically a fragmented region with multiple small princely states before its integration into the Union of India.

• Mayurbhanj: One of the largest princely states of Odisha, known for its significant contribution to the cultural and administrative consolidation of the region.

Q15. Answer: (a) Jal Jeevan Mission

The correct answer is Jal Jeevan Mission.

Key Points

• Jal Jeevan Mission (JJM) was launched by the Government of India in August 2019 to ensure safe and adequate drinking water through tap connections to all households in rural India by 2024.

• It is implemented by the Ministry of Jal Shakti under the Department of Drinking Water and Sanitation.

• The mission focuses on a community-based approach to water management, emphasizing decentralized planning and execution.

• JJM aims to provide 55 litres of potable water per person per day to every rural household.

• The program also promotes water conservation, source sustainability, and greywater management in rural areas.

Additional Information

• Water Scarcity in India: India faces acute water scarcity due to unsustainable water management practices, over-extraction of groundwater, and pollution of water sources.

• Atal Bhujal Yojana: A separate scheme aimed at groundwater management in priority areas of the country to enhance water sustainability.

• Jal Kranti Abhiyan: Launched in 2015 by the Ministry of Water Resources to create awareness about water conservation and management.

• PM-KUSUM: Focuses on solar energy deployment in agriculture to promote sustainable irrigation practices.

• Greywater Management: Jal Jeevan Mission emphasizes recycling and reusing greywater (wastewater from kitchen and bathrooms) for irrigation and other purposes to reduce water wastage.

Q16. Answer: (d) uneven, with variations across regions

The correct answer is uneven, with variations across regions.

Key Points

• The population distribution in India is highly uneven, influenced by geographical, climatic, and economic factors.

• Regions like the Indo-Gangetic plains have high population density due to fertile land, favorable climate, and better economic opportunities.

• Desert areas (e.g., Rajasthan) and hilly regions (e.g., Himalayan states) have lower population density due to harsh living conditions and limited resources.

• Urban areas experience higher population density due to industrialization, employment opportunities, and better infrastructure.

• Rural regions may have lower density, except in agriculturally prosperous areas where resources support larger communities.

Additional Information

• Population Density: It is defined as the number of people living per unit area, typically per square kilometer.

• Indo-Gangetic Plains: A region that accounts for one of the world's highest population densities due to its agricultural productivity and favorable climate.

• Urbanization in India: Rapid urbanization has led to higher population density in cities such as Mumbai, Delhi, and Bengaluru, driven by economic activities.

• Impact of Geography: Geographical features like deserts, mountains, and forests often limit population growth due to restricted accessibility and resources.

• Demographic Variations: Factors such as literacy rates, employment opportunities, and migration patterns contribute to uneven population distribution across the country.

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Q17. Answer: (a) Stearic acid

The correct answer is Stearic acid.

Key Points

• Stearic acid is a fatty acid commonly used in the manufacturing of detergents, soaps, and cosmetics.

• It helps in improving cleaning qualities by enhancing the emulsification process in non-ionic detergents.

• Stearic acid acts as a thickening agent, giving detergents a desired viscosity and texture.

• Its presence in detergents ensures better stability and foaming properties during cleaning applications.

• Non-ionic detergents with stearic acid are often preferred for their effectiveness in removing grease and oily stains.

Additional Information

• Non-ionic detergents: These are detergents that do not carry any charge in their hydrophilic part, making them effective for cleaning delicate surfaces.

• Emulsification: The process of mixing oil and water to create a stable mixture, which is enhanced by compounds like stearic acid in detergents.

• Fatty acids in detergents: Fatty acids like stearic acid serve as surfactants, which lower the surface tension of water and improve cleaning efficiency.

• Viscosity control: Stearic acid contributes to the formulation of detergents by providing a thicker consistency, which is beneficial for ease of application.

• Environmental impact: Stearic acid is biodegradable, making it an environmentally friendly choice in detergent formulations compared to synthetic chemicals.

Q18. Answer: (b) Smriti Mandhana

The correct answer is Smriti Mandhana.

Key Points

• Smriti Mandhana was named Wisden Leading Cricketer in the World 2024 for her exceptional performance across formats.

• In the year 2024, she scored a remarkable 1659 runs in international cricket across formats.

• Her performance included centuries and match-winning innings in both ODIs and T20Is, showcasing her consistency and adaptability.

• She became the second Indian woman, after Mithali Raj, to earn this prestigious recognition by Wisden.

• The award celebrates her contribution to Indian cricket and her impact on the global stage as one of the finest batters in women's cricket.

Additional Information

• Wisden Cricketer of the Year: An annual award given by the Wisden Cricketers' Almanack to recognize outstanding cricketing performances globally.

• Smriti Mandhana's Career Highlights: She is known for her elegant left-handed batting style and has been a key player for India in international cricket since her debut in 2013.

• Women’s Cricket Growth: In recent years, women’s cricket has gained significant popularity, with players like Mandhana playing a pivotal role in its development.

• Achievements in 2024: Apart from her runs, Mandhana contributed significantly to India's victories in major series and tournaments in 2024.

• Wisden Leading Cricketer: This title is separate from the Wisden Five Cricketers of the Year and focuses on the best player globally for a specific year.

Q19. Answer: (d) Haryana

The correct answer is Haryana.

Key Points

• Haryana became the first state in India to launch a dedicated ferret research facility in February 2025.

• The research facility aims to focus on ferret-based biomedical research, including studies on infectious diseases and vaccine development.

• This initiative is significant as ferrets are widely used in scientific research due to their physiological similarities to humans, particularly in respiratory studies.

• The facility is expected to promote advanced research collaborations between academic institutions, healthcare industries, and government bodies.

• Haryana’s investment in this facility aligns with its commitment to boosting cutting-edge scientific and medical research.

Additional Information

• Ferrets in Research: Ferrets are commonly used in studies related to influenza, SARS-CoV-2, and other respiratory diseases

due to their lung physiology being similar to humans.

• Biomedical Research: This type of research focuses on understanding the mechanisms of diseases to develop diagnostic tools, treatments, and preventive measures like vaccines.

• Significance of Dedicated Facilities: Establishing specialized research centers ensures focused studies, better infrastructure, and collaboration opportunities for scientific breakthroughs.

• Haryana's Research Initiatives: Haryana has been investing in innovation-driven sectors like biotechnology, healthcare, and scientific research to enhance its role in India's development as a research hub.

• Global Context: Dedicated research on animals like ferrets is conducted worldwide to address pandemics, improve human health, and support the development of life-saving interventions.

Q20. Answer: (b) 11^(th) Airborne Division

The correct answer is 11th Airborne Division.

Key Points

• The US Army contingent that participated in Exercise YUDH ABHYAS in September 2024 was from the 11th Airborne Division.

• The 11th Airborne Division is a specialized light infantry division of the US Army known for its rapid deployment capability and expertise in Arctic and cold-weather operations.

• Exercise YUDH ABHYAS is an annual bilateral military exercise conducted between the Indian Army and the US Army to enhance interoperability and defense cooperation.

• The 2024 edition of Exercise YUDH ABHYAS focused on counter-terrorism operations, humanitarian assistance, and disaster relief missions.

• This exercise was held in Alaska, USA, emphasizing high-altitude and extreme weather conditions, where the 11th Airborne Division is particularly adept.

Additional Information

• Exercise YUDH ABHYAS

• It is a flagship bilateral exercise aimed at enhancing military cooperation between India and the United States.

• The exercise alternates annually between India and the United States, with previous editions held in locations like Uttarakhand (India) and Washington (USA).

• It focuses on joint military training in areas such as peacekeeping operations, humanitarian missions, and counter-terrorism strategies.

• The exercise highlights the importance of interoperability and mutual understanding between the two armies.

• 11th Airborne Division

• Nicknamed the "Arctic Angels," the 11th Airborne Division is stationed in Alaska and specializes in operations in extreme cold and mountainous terrains.

• The division was reactivated in 2022 as part of the US Army's strategic pivot to the Arctic region.

• It is equipped with advanced technology and training to conduct rapid deployment and high-altitude warfare.

• India-US Defense Cooperation

• The India-US defense partnership is a key pillar of the strategic relationship between the two countries.

• Both nations have signed foundational agreements such as LEMOA (Logistics Exchange Memorandum of Agreement) and COMCASA (Communications Compatibility and Security Agreement).

• Joint exercises like YUDH ABHYAS, MALABAR, and TIGER TRIUMPH showcase the growing defense ties between the two nations.

• Arctic Training and Strategic Importance

• The Arctic region has gained strategic importance due to its vast untapped resources and emerging shipping routes.

• Military training in Arctic conditions prepares forces for extreme weather operations, which are critical in global security scenarios.

• The 11th Airborne Division's expertise in Arctic warfare highlights the US Army's focus on the region's geostrategic significance.

Q21. Answer: (c) Punjab

The correct answer is Punjab.

Key Points

• Punjab emerged as the leading beneficiary of the Green Revolution in India due to its fertile plains and abundant water resources from rivers like the Satluj and Beas.

• The Green Revolution, introduced in the 1960s, brought high-yield variety (HYV) seeds, chemical fertilizers, and advanced irrigation techniques to the region.

• Punjab became the largest contributor of wheat and rice to India's central food grain procurement system, ensuring food security

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for the nation.

• Efficient use of irrigation infrastructure, particularly canal systems and tube wells, played a significant role in making Punjab the agricultural hub of India.

• The state's farmers quickly adopted modern farming techniques, making Punjab a model state for agricultural productivity during the Green Revolution.

Additional Information

• Green Revolution: A period during the 1960s-70s marked by the introduction of high-yield crop varieties, chemical fertilizers, and modern agricultural technologies in India to boost food production.

• High-Yield Variety (HYV) Seeds: These seeds were genetically developed to increase productivity and were a key component of the Green Revolution.

• Impact on Punjab: The state saw increased mechanization of agriculture, use of tractors, and adoption of pesticides, but also faced issues like soil degradation and overuse of groundwater.

• Challenges: While Punjab flourished agriculturally, the Green Revolution also led to ecological concerns, such as reduced soil fertility and water table depletion, which remain critical issues today.

• Legacy: Punjab's success during the Green Revolution not only ensured food security for India but also highlighted the potential of modern farming techniques, which were later adopted in other parts of the country.

Q22. Answer: (a) Thorium

The correct answer is Thorium.

Key Points

• Thorium (Th) is a chemical element with atomic number 90 and is part of the actinoid series, which includes elements 89 to 103.

• Actinoids, including thorium, are found in the f-block of the periodic table and are known for their radioactive properties.

• Thorium is a naturally occurring, slightly radioactive metal and is primarily used as a nuclear fuel in thorium reactors.

• Among the actinoids, thorium is one of the most abundant and has potential applications in advanced nuclear energy systems.

• Thorium is distinct from lanthanides like ytterbium, lanthanum, and cerium, which belong to the f-block but are part of the lanthanoid series.

Additional Information

• Actinoid Series:

• The actinoid series consists of 15 elements ranging from actinium (Ac) to lawrencium (Lr).

• These elements are characterized by the filling of the 5f subshell in their electron configurations.

• All actinoids are radioactive, with some like thorium and uranium occurring naturally, while others are synthetic.

• Thorium Applications:

• Thorium is used in molten salt reactors and as a fertile material in nuclear energy production.

• Its abundance and low waste production make it a promising alternative to uranium in sustainable nuclear energy.

• Difference Between Lanthanoids and Actinoids:

• Lanthanoids (elements 57–71) are less radioactive compared to actinoids.

• Actinoids have a greater tendency to form complexes and exhibit variable oxidation states.

• Ytterbium, Lanthanum, and Cerium:

• These elements belong to the lanthanoid series, not the actinoid series.

• Lanthanoids are known for their magnetic and luminescent properties and are widely used in electronic devices and catalysts.

Q23. Answer: (a) Department of Consumer Affairs

The correct answer is Department of Consumer Affairs.

Key Points

• The Department of Consumer Affairs operates under the Ministry of Consumer Affairs, Food, and Public Distribution in India.

• It is responsible for formulating laws and policies for consumer protection, including the Legal Metrology Act, 2009.

• The Legal Metrology (General) Rules, 2011, regulate the use of measuring instruments, including radar equipment for speed detection.

• The department has notified rules for the usage of radar-based speed measurement equipment to ensure accuracy and standardization.

• These rules aim to maintain uniformity and reliability in speed enforcement mechanisms across the country.

Additional Information

• Legal Metrology Act, 2009: This act governs the standards of weights and measures in India and ensures accuracy in trade and commerce.

• Radar Speed Measurement: Radar equipment uses electromagnetic waves to measure the speed of moving vehicles, commonly used for traffic law enforcement.

• Consumer Protection: The Department of Consumer Affairs also oversees consumer rights, product standards, and grievance redressal mechanisms.

• Role of Legal Metrology: Legal Metrology ensures the accuracy of measuring instruments, protecting both consumers and businesses from unfair practices.

• Calibration of Instruments: The notified rules emphasize the need for periodic calibration and certification of radar equipment to ensure measurement precision.

Q24. Answer: (b) Purvanchal Range

The correct answer is Purvanchal Range.

Key Points

• The Purvanchal Range is the easternmost extension of the Himalayas in India.

• It includes hills like the Patkai, Naga, Mizo, and Manipur hills located in the northeastern region of India.

• The range runs along the eastern boundary of Arunachal Pradesh, Nagaland, Manipur, Mizoram, and Tripura.

• The Purvanchal Range is known for its dense forests, rich biodiversity, and unique ethnic communities.

• It is geologically younger compared to the western ranges of the Himalayas and is composed primarily of sedimentary rocks.

Additional Information

• Himalayan Ranges:

• The Himalayas are divided into three main ranges: the Greater Himalayas (Himadri), the Lesser Himalayas (Himachal), and the Outer Himalayas (Shivaliks).

• The Purvanchal Range is part of the Lesser Himalayas and forms the easternmost extension of the mountain system.

• Patkai Hills:

• Located in Arunachal Pradesh and Nagaland, the Patkai Hills are part of the Purvanchal Range and serve as a natural boundary between India and Myanmar.

• Naga Hills:

• These hills are situated in Nagaland and are known for their unique tribal culture and biodiversity.

• Biodiversity:

• The Purvanchal Range is home to diverse flora and fauna, including many endemic species due to its tropical and subtropical climate.

• Strategic Importance:

• The range plays a significant role in India's northeastern connectivity and serves as a strategic frontier with neighboring countries like Myanmar and China.

Q25. Answer: (a) Madhya Pradesh

The correct answer is Madhya Pradesh.

Key Points

• The Bhimbetka rock shelters are located in the Raisen district of Madhya Pradesh, near the foothills of the Vindhya range.

• These shelters are a UNESCO World Heritage Site and are known for their prehistoric cave paintings and archaeological significance.

• The rock shelters provide evidence of human habitation dating back to the Paleolithic and Mesolithic periods.

• They feature over 500 caves with paintings depicting everyday life, hunting scenes, and animals, some of which are believed to be over 30,000 years old.

• Bhimbetka is an important archaeological site that showcases the cultural evolution of humans from early hunter-gatherers to settled agricultural communities.

Additional Information

• Rock Art: The paintings found at Bhimbetka are categorized into various styles, including linear drawings and detailed figurative depictions, reflecting changes in artistic techniques over time.

• UNESCO Recognition: Bhimbetka was declared a UNESCO World Heritage Site in 2003 for its exceptional universal value in understanding prehistoric human life.

• Discovery: The site was first discovered in 1957 by Indian archaeologist Dr. V. S. Wakankar, who recognized its importance in studying early human culture.

• Geological Context: The rock formations at Bhimbetka are part of the Vindhyan sandstone and display natural shelters and cavities formed by erosion over millions of years.

• Significance: Bhimbetka provides insights into early human art, rituals, and adaptation to environmental changes, making it a key

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site for anthropological and archaeological studies.

Q26. Answer: (a) Article 48A

The correct answer is Article 48A.

Key Points

• Article 48A was added to the Indian Constitution through the 42nd Amendment Act of 1976.

• It is part of the Directive Principles of State Policy (DPSP) under Part IV of the Constitution.

• The article directs the State to protect and improve the environment and to safeguard forests and wildlife.

• It emphasizes the State's responsibility in promoting ecological balance and environmental sustainability.

• Article 48A complements Article 51A(g), which highlights the fundamental duty of citizens to protect the environment.

Additional Information

• Directive Principles of State Policy (DPSP):

• DPSPs are non-justiciable guidelines for the State to frame policies aimed at socio-economic welfare.

• They are inspired by the Irish Constitution and aim to establish a welfare state.

• 42nd Amendment Act, 1976:

• Known as the "mini-Constitution," it introduced significant changes, including the addition of Article 48A.

• It emphasized environmental protection and aimed to strengthen the Directive Principles.

• Article 51A(g):

• Part of the Fundamental Duties introduced by the 42nd Amendment Act.

• It mandates citizens to protect and improve the natural environment, including forests, lakes, rivers, and wildlife.

• Environment Protection Laws in India:

• The Wildlife Protection Act, 1972 and the Environment Protection Act, 1986 are key legislations for environmental conservation.

• India is also a signatory to several international treaties like the Convention on Biological Diversity and Ramsar Convention.

Q27. Answer: (b) Android

The correct answer is Android.

Key Points

• Android is primarily designed for mobile devices such as smartphones and tablets, making it less common on desktop or laptop computers.

• It is a mobile operating system developed by Google, based on a modified version of Linux.

• While Android can be used on laptops through emulators or specialized devices, it is not a standard operating system for desktops or laptops.

• Operating systems commonly used on desktops and laptops include Windows, macOS, and Linux, which are optimized for larger screens and multitasking.

Additional Information

• Windows: A widely-used operating system developed by Microsoft, suitable for personal computers, workstations, and servers.

• macOS: Developed by Apple, it is the exclusive operating system for Macintosh computers, offering high performance and integration with Apple devices.

• Linux: An open-source operating system known for its flexibility, security, and use in both personal computers and servers.

• Android’s Use Case: Although primarily developed for mobile devices, Android is also used in embedded systems, smart TVs, and IoT devices.

• Emulators: Tools like BlueStacks and Android Studio allow users to run Android apps on desktops, but they do not replace traditional desktop operating systems.

Q28. Answer: (b) Jataka

The correct answer is Jataka.

Key Points

• The Jataka tales are a collection of stories that recount the former lives of Gautama Buddha, including his incarnations as animals, humans, and divine beings.

• These narratives illustrate moral lessons and ethical principles, often emphasizing virtues such as compassion, generosity, and wisdom.

• Jataka stories are part of the Pali Canon (Tipitaka), specifically within the Khuddaka Nikaya of the Sutta Pitaka, making them an integral part of Buddhist literature.

• There are approximately 547 Jataka tales, each showcasing a unique aspect of Buddha's journey toward enlightenment.

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• These tales are widely popular in Buddhist traditions and have influenced art, literature, and folklore across Asia.

Additional Information

• Vinaya: Refers to the monastic code and rules of discipline for Buddhist monks and nuns. It forms part of the Tipitaka, the sacred Buddhist scriptures.

• Tripitaka: The "Three Baskets," comprising the Vinaya Pitaka (discipline), Sutta Pitaka (teachings), and Abhidhamma Pitaka (philosophy), which are the foundational texts of Theravada Buddhism.

• Sutra: A term used for Buddhist discourses or teachings, often delivered by Buddha or his disciples; they are central to Mahayana and other Buddhist traditions.

• Jataka Art: Jataka tales have been depicted in ancient Indian art, particularly in murals and carvings at sites like Ajanta and Sanchi, symbolizing the spread of Buddhist teachings through visual storytelling.

• Buddhist Literature: The Jataka tales, along with other Buddhist texts, have played a crucial role in preserving the history and ethical framework of Buddhism across centuries.

Q29. Answer: (a) Instrument of Accession

The correct answer is Instrument of Accession.

Key Points

• The Instrument of Accession was a legal document introduced by the British Government to allow princely states to join either India or Pakistan after independence in 1947.

• Under the provisions of the Indian Independence Act of 1947, princely states were given the choice to accede to either of the two dominions or remain independent.

• The Instrument of Accession granted the dominion (India or Pakistan) control over specific subjects like defense, foreign affairs, and communications while allowing states to retain autonomy in internal matters.

• Notable examples include the accession of Jammu and Kashmir to India on October 26, 1947, facilitated by the signing of the Instrument of Accession by Maharaja Hari Singh.

• This instrument played a crucial role in shaping the political boundaries of modern-day India and Pakistan.

Additional Information

• Indian Independence Act 1947:

• It marked the end of British rule in India and resulted in the creation of two dominions—India and Pakistan.

• Princely states were given the autonomy to decide their future—join India, Pakistan, or remain independent.

• Standstill Agreement:

• This agreement was signed between the dominions and princely states to maintain the status quo in administrative arrangements until a decision on accession was made.

• It provided temporary stability during the transitional phase post-independence.

• Jammu and Kashmir Accession:

• Maharaja Hari Singh of Jammu and Kashmir signed the Instrument of Accession with India during the 1947-1948 conflict.

• The decision was influenced by Pakistan-backed tribal invasions in the region.

• Role of Lord Mountbatten:

• As the last Viceroy of India, Lord Mountbatten played a key role in facilitating the accession of princely states to either dominion.

• He advised rulers on the strategic and practical implications of their decisions.

• Legacy of the Instrument:

• It laid the foundation for the integration of princely states into the Indian Union.

• The process was completed through additional measures like the States Reorganization Act, 1956.

Q30. Answer: (c) State Legislative Assembly

The correct answer is State Legislative Assembly

Key Points

• The Chief Minister is the executive head of a state in India and is primarily responsible for the implementation of laws, policies, and decisions in the state.

• He/She is directly accountable to the State Legislative Assembly, which acts as the constitutional head.

• The Chief Minister advises the Governor on various matters, including the appointment of ministers, legislative sessions, and other state-related issues.

• All executive decisions of the state government are taken in the name of the Governor, but the Chief Minister holds the real authority in the state.

• The Chief Minister is responsible for maintaining coordination between the Governor and the State Legislative Assembly to ensure smooth governance.

Additional Information

• Governor of the State:

• The Governor is the constitutional head of the state and exercises powers as per the advice of the Council of Ministers led by the Chief Minister.

• The Governor appoints the Chief Minister and other ministers based on majority support in the State Legislative Assembly.

• State Legislative Assembly:

• This is the legislative body in the states of India where the Chief Minister and other ministers are members.

• The Chief Minister is responsible for ensuring that the policies introduced in the Assembly are passed and implemented.

• Article 164 of the Indian Constitution:

• It lays down provisions related to the appointment of the Chief Minister and other ministers in a state.

• The Chief Minister is appointed by the Governor, and the Council of Ministers holds office during the Governor's pleasure.

• Role of the Chief Minister:

• He/She leads the Council of Ministers, formulates policies, and oversees their implementation across the state.

• The Chief Minister plays a crucial role in financial matters by presenting the state budget in the Assembly.

• Difference between Governor and Chief Minister:

• The Governor is a nominal head of the state, while the Chief Minister is the real executive authority.

• The Chief Minister is elected by the majority party or coalition in the Legislative Assembly, while the Governor is appointed by the President of India.

Q31. Answer: (c) Assam and North Bengal

The correct answer is Assam and North Bengal.

Key Points

• Assam and North Bengal have a humid and subtropical climate, which is ideal for tea cultivation.

• The region receives high rainfall, typically between 200 cm to 400 cm annually, supporting the growth of tea plants.

• The soil in Assam and North Bengal is rich in nutrients and has good drainage properties, essential for tea production.

• Tea plants require temperatures ranging between 20°C to 30°C, a condition met in these regions throughout the year.

• These areas are home to some of the largest tea estates in India, contributing significantly to the country's tea production and export.

Additional Information

• Tea Cultivation: Tea plants are typically grown in regions with altitudes ranging from sea level to 2,000 meters.

• Soil Requirements: Tea plants thrive in acidic soils (pH 4.5 to 5.5) that are rich in organic matter.

• Rainfall Importance: Consistent rainfall ensures proper hydration for tea plants, but excessive waterlogging can harm the roots.

• Major Tea-Producing States: Assam, West Bengal (especially Darjeeling), Tamil Nadu, and Kerala are the leading tea-producing states in India.

• Economic Significance: India is the second-largest tea producer globally, and tea contributes significantly to the country's agricultural export earnings.

Q32. Answer: (c) FLN-AXL

The correct answer is FLN-AXL.

Key Points

• FLN-AXL is an AI-based learning program initiated to enhance foundational literacy and numeracy (FLN) skills in government schools across India.

• The program aligns with the goals of the National Education Policy (NEP) 2020, which emphasizes improving basic education and leveraging technology in learning.

• FLN-AXL integrates artificial intelligence tools to personalize learning experiences, making them engaging and effective for young learners.

• This initiative aims to address gaps in foundational literacy and numeracy, which are critical for the overall development and future learning of students.

• It is implemented in collaboration with state governments, ensuring scalability and adaptation to local languages and contexts.

Additional Information

• Foundational Literacy and Numeracy (FLN):

• FLN refers to the ability of children to read with comprehension and perform basic mathematical operations.

• It is a key focus area under the National Education Policy (NEP) 2020, which aims to ensure that all children achieve FLN by Grade 3.

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• National Education Policy (NEP) 2020:

• The NEP 2020 emphasizes the use of technology in education, including AI, to improve teaching and learning outcomes.

• It aims to transform the Indian education system by 2030, focusing on equity, quality, and accessibility.

• Artificial Intelligence in Education:

• AI is increasingly being used to personalize learning, provide real-time feedback, and adapt content to the needs of individual students.

• AI-based tools can analyze learning patterns and recommend areas of improvement, enhancing the overall efficacy of education.

• Government Initiatives in Education:

• The Government of India has launched several programs, such as Samagra Shiksha and Digital India, to improve access to quality education.

• These initiatives focus on integrating technology and modern teaching methods in schools.

• Role of Technology in Foundational Learning:

• Technology helps bridge learning gaps by providing interactive and engaging content for students.

• It enables teachers to track progress and customize teaching strategies according to individual learning needs.

Q33. Answer: (b) Fair use of resources to ensure availability for future generations

The correct answer is Fair use of resources to ensure availability for future generations.

Key Points

• Intergenerational equity refers to the concept of fairness in resource use between current and future generations.

• It emphasizes the importance of sustainable development to ensure that future generations have access to essential resources.

• This principle is widely recognized in international environmental policies, including the Brundtland Report (1987).

• It aims to reduce environmental degradation and overexploitation by promoting long-term resource management.

• Intergenerational equity is a foundational concept in global efforts to combat climate change, biodiversity loss, and resource depletion.

Additional Information

• Sustainable Development: A development approach that meets the needs of the present without compromising the ability of future generations to meet their own needs.

• Brundtland Report: Published by the United Nations in 1987, it introduced the concept of sustainable development and intergenerational equity.

• Climate Change: A critical area where intergenerational equity is applied, as current emissions impact future generations.

• Biodiversity Conservation: Protecting ecosystems ensures that future generations inherit a biologically rich and diverse planet.

• Global Frameworks: Policies like the Paris Agreement and the UN Sustainable Development Goals incorporate intergenerational equity principles.

Q34. Answer: (a) Non-Hodgkin Lymphoma

The correct answer is Non-Hodgkin Lymphoma.

Key Points

• CAR-T therapy (Chimeric Antigen Receptor T-cell therapy) is an advanced form of immunotherapy where T-cells are genetically engineered to attack specific cancer cells.

• The indigenous CAR-T therapy developed in India has shown maximum efficacy in treating B-cell Acute Lymphoblastic Leukemia (B-ALL) and Non-Hodgkin Lymphoma (NHL).

• Non-Hodgkin Lymphoma is a diverse group of blood cancers that originate in the lymphatic system, often characterized by the uncontrolled growth of lymphocytes.

• Clinical trials have demonstrated significant success rates of CAR-T therapy in relapsed or refractory cases of Non-Hodgkin Lymphoma and B-ALL.

• The therapy is a critical breakthrough, offering hope to patients who do not respond to conventional treatments like chemotherapy or radiation.

Additional Information

• Non-Hodgkin Lymphoma (NHL):

• NHL includes various subtypes, such as Diffuse Large B-Cell Lymphoma (DLBCL) and Follicular Lymphoma.

• It is often associated with symptoms like swollen lymph nodes, fever, night sweats, and weight loss.

• Risk factors for NHL include weakened immune systems, certain infections (e.g., HIV, Epstein-Barr virus), and exposure to chemicals.

• CAR-T Therapy Mechanism:

• In CAR-T therapy, a patient's T-cells are harvested, genetically modified to express chimeric antigen receptors, and reinfused into the patient.
• The modified T-cells target and destroy cancer cells expressing specific antigens, such as CD19 in B-ALL and NHL.
• Advantages of CAR-T Therapy:
• Highly effective in treating relapsed or refractory hematological malignancies.
• Provides a personalized approach to cancer treatment with durable remissions in many cases.
• Challenges and Limitations:
• CAR-T therapy is expensive and requires specialized infrastructure for production and administration.
• Potential side effects include cytokine release syndrome (CRS) and neurotoxicity, which require careful management.
• Indigenous Development in India:
• The development of indigenous CAR-T therapy in India is significant for reducing costs and improving accessibility for patients.
• It represents a milestone in the country's efforts to advance cancer treatment and biotechnology.

Q35. Answer: (d) Belfast

The correct answer is Belfast.

Key Points

• Belfast was awarded the Best City of Film Award at the Global Production Awards held during the Cannes Film Festival on 20 May 2025.
• The award recognizes Belfast's contributions to the global film industry, including its infrastructure, talent pool, and support for filmmakers.
• Belfast has a rich cinematic heritage, with internationally acclaimed productions such as "Game of Thrones" filmed in the region.
• The city is home to state-of-the-art film studios such as Titanic Studios, which have hosted major global productions.
• Belfast's recognition underlines its growing status as a prominent hub for film production on the global stage.

Additional Information

• Global Production Awards: These awards celebrate excellence in film production across the globe, recognizing cities, studios, and individuals contributing to the industry.
• Cannes Film Festival: One of the most prestigious film festivals globally, held annually in Cannes, France, celebrating cinematic achievements.
• Game of Thrones: The globally popular TV series filmed extensively in Northern Ireland, including Belfast, boosting the region's reputation in the film industry.
• Titanic Studios: A world-class film studio in Belfast, known for hosting major productions, contributing significantly to the city's cinematic footprint.
• Belfast's Film Industry: The city has invested heavily in film production infrastructure, attracting filmmakers and fostering local talent to establish itself as a global production hub.

Q36. Answer: (d) Uttarakhand

The correct answer is Uttarakhand.

Key Points

• On 19 February 2025, the Uttarakhand state cabinet approved the Bhoo Kanoon (Land Law Amendment Bill) to regulate the purchase and sale of land by non-residents.
• This decision aims to ensure that the agricultural, horticultural, and residential lands in Uttarakhand remain accessible primarily to local residents.
• The amendment introduces stricter guidelines to curb the misuse of land acquisition by non-residents and to preserve the state's ecological balance.
• The bill is also intended to protect the interests of local farmers and promote sustainable development in the region.
• This move aligns with the state's objective of preventing large-scale land acquisition by external entities, which could lead to socio-economic challenges for residents.

Additional Information

• Bhoo Kanoon (Land Laws)
• The term "Bhoo Kanoon" refers to laws related to the regulation and management of land.
• Such laws are implemented to ensure sustainable land use, prevent illegal land acquisitions, and protect the rights of local residents.
• Amendments to land laws are often introduced to address emerging challenges such as urbanization, ecological concerns, and socio-economic disparities.
• Uttarakhand's Land Challenges

• Uttarakhand, being a Himalayan state, faces unique challenges related to land management, including erosion, deforestation, and urbanization.

• Unregulated land acquisition by non-residents has been a growing concern, leading to potential exploitation of natural resources.

• Preservation of Agricultural Land

• Preserving agricultural and horticultural lands is critical for ensuring food security and sustaining the livelihoods of farmers in the region.

• Land laws often include provisions to prevent the conversion of farmland into non-agricultural uses.

• Sustainable Development Goals (SDGs)

• The regulation of land acquisition aligns with global Sustainable Development Goals, particularly SDG 11 (Sustainable Cities and Communities) and SDG 15 (Life on Land).

• These goals emphasize the need for sustainable land use and environmental conservation.

Q37. Answer: (c) Dr. Poonam Gupta

The correct answer is Dr. Poonam Gupta.

Key Points

• Dr. Poonam Gupta was appointed as a Deputy Governor of the Reserve Bank of India (RBI) in May 2025.

• She has extensive experience in economic policy formulation and previously held significant positions at the World Bank and NCAER (National Council of Applied Economic Research).

• Dr. Gupta specializes in macroeconomics, international trade, and development economics, making her appointment pivotal for RBI's policy and research initiatives.

• Her role as Deputy Governor includes overseeing monetary policy, financial stability, and economic research within the RBI.

• Dr. Gupta's appointment reflects RBI's focus on strengthening its leadership with globally acclaimed economists.

Additional Information

• Reserve Bank of India (RBI)

• The RBI is India's central banking institution, established on April 1, 1935, under the Reserve Bank of India Act.

• It is responsible for regulating the Indian monetary policy, issuing currency, and maintaining financial stability.

• The RBI has four deputy governors, each overseeing key functions such as financial markets, banking regulation, and monetary policy.

• Deputy Governor's Role

• A Deputy Governor of RBI plays a crucial role in formulating policies related to banking regulation, financial inclusion, and economic research.

• They are part of the Monetary Policy Committee (MPC), which decides India's monetary policy framework.

• National Council of Applied Economic Research (NCAER)

• NCAER is one of India’s premier economic policy research institutions, focusing on empirical research and data analysis.

• It conducts studies on economic growth, infrastructure, and trade, contributing to policy-making processes.

• World Bank

• The World Bank is an international financial institution providing funding and expertise to developing countries for development projects.

• Dr. Poonam Gupta previously contributed significantly to the World Bank's research on trade and development.

Q38. Answer: (c) 15%

The correct answer is 0.15.

Key Points

• The projected annual growth rate of India-UK bilateral trade under the new Free Trade Agreement (FTA) is estimated to be 0.15 (15%), showcasing significant economic potential.

• The India-UK FTA aims to enhance trade and investment ties, reducing tariffs and boosting market access for goods and services.

• India is the UK’s second-largest source of investment, and the FTA is expected to further strengthen this relationship.

• Both countries are focusing on sectors like pharmaceuticals, technology, automotive, textiles, and financial services for mutual benefits.

• The agreement aligns with the UK’s post-Brexit strategy to forge stronger trade partnerships outside the European Union.

Additional Information

• Free Trade Agreement (FTA):

• An FTA is a pact between two or more nations to reduce barriers to imports and exports, such as tariffs, quotas, and restrictions.

• FTAs facilitate increased trade and economic integration between the participating countries.
• They often include provisions for intellectual property rights, labor standards, and environmental protection.
• India-UK Trade Relationship:
• The UK is one of India's largest trade partners, with bilateral trade amounting to billions annually.
• Key exports from India include textiles, pharmaceuticals, software, and automotive components.
• The UK exports machinery, chemicals, and financial services to India.
• Post-Brexit Opportunities:
• The UK is prioritizing FTAs with non-EU countries to diversify its trade portfolio post-Brexit.
• India offers a large and growing market for UK businesses, particularly in sectors like technology and healthcare.
• Economic Impact:
• The FTA is expected to create jobs, increase investments, and enhance consumer choice in both countries.
• Strategic sectors like renewable energy and infrastructure development stand to benefit significantly.

Q39. Answer: (d) Advocate General

The correct answer is Advocate General.

Key Points

• The Advocate General is the highest law officer in a state, as per Article 165 of the Indian Constitution.
• He/she is appointed by the Governor of the State and must be qualified to be appointed as a judge of a High Court.
• The Advocate General provides legal advice to the state government and represents the state in legal proceedings.
• He/she has the right to participate in proceedings of the state legislature but cannot vote.
• The office of the Advocate General is analogous to the Attorney General of India at the national level.

Additional Information

• Attorney General of India:
• The Attorney General is the highest law officer at the national level, appointed by the President of India.
• He/she advises the Union Government and represents it in legal matters.
• Qualifications for Advocate General:
• Must be a citizen of India.
• Should have been an advocate for at least 10 years or a judicial officer for at least 10 years.
• Functions of Advocate General:
• Provides legal counsel to the state government on constitutional and legal matters.
• Represents the state in cases before the High Court and Supreme Court.
• Difference Between Advocate General and Attorney General:
• The Advocate General operates at the state level, while the Attorney General operates at the national level.
• Both are responsible for legal advisories but differ in jurisdiction.

Q40. Answer: (d) Hardeep Singh Puri

The correct answer is Hardeep Singh Puri.

Key Points

• Hardeep Singh Puri is the Union Minister for Housing and Urban Affairs and has actively contributed to various government initiatives.
• He launched the Ayushman Vay Vandana Card in Delhi in April 2025, alongside Delhi Chief Minister Rekha Gupta.
• The initiative focuses on providing benefits to senior citizens, ensuring their access to healthcare and social security.
• This launch aligns with the government's efforts to enhance welfare schemes for elderly citizens under the Ayushman Bharat framework.
• Hardeep Singh Puri has been instrumental in policy-making and implementation of urban development and welfare projects across India.

Additional Information

• Ayushman Bharat: A flagship health insurance scheme aimed at providing financial protection for healthcare expenses to low-income families.
• Senior Citizen Welfare Initiatives: Ayushman Vay Vandana Card is part of India's broader efforts to provide healthcare access and social security to the elderly.
• Hardeep Singh Puri's Role: As a Union Minister, he has been involved in urban development, housing, and welfare schemes targeting multiple demographic groups.

• Collaboration with State Governments: The launch in Delhi highlights effective coordination between the central government and state leadership to implement welfare programs.

• Ayushman Bharat Framework: The initiative further strengthens the healthcare infrastructure in India, ensuring universal health coverage for vulnerable sections of society.

Q41. Answer: (c) 1410

Shortcut Trick

Increasing a number by 100% makes it 200% of its original base value.

200% of the number = 2820

100% of the number = 2820 ÷ 2

Original Number = 1410

Therefore The correct answer is 1410.

Alternate Method

Given:

A number when increased by 100% gives 2820.

Original (100%)

• Increase (100%)

Total = 200% → 2820

? = 1410

Calculations:

Let the original number be x.

=> x + 100% of x = 2820

=> x + x = 2820

=> 2x = 2820

=> x = 2820 ÷ 2

=> x = 1410

Therefore The correct answer is 1410.

Additional Information

Percentage Increase

When a value increases by R%, the new value is (100 + R)% of the original base value.

Percentage Decrease

When a value decreases by R%, the new value is (100 − R)% of the original base value.

Successive Percentage Change

If a number is subjected to two successive changes of A% and B%, the net percentage change is given by (A + B + A × B ÷ 100)%.

Q42. Answer: (a) Rs. 138

Shortcut Trick

Let original pen cost = x and pencil cost = y.

8x + 10y = 132 => 4x + 5y = 66 => 24x + 30y = 396

17(x − 2) + 6(y + 7) = 136 => 17x + 6y = 128 => 85x + 30y = 640

Subtracting both: 61x = 244 => x = 4. Then 4(4) + 5y = 66 => y = 10.

Required cost of 12 pens and 9 pencils = 12(4) + 9(10) = 48 + 90 = 138.

Therefore The correct answer is Rs. 138.

Alternate Method

Given:

Cost of 8 pens and 10 pencils = Rs. 132

Cost of 17 pens (rate decreased by Rs. 2) and 6 pencils (rate increased by Rs. 7) = Rs. 136

Case 1: Original Cost

8 Pens (x) + 10 Pencils (y) = Rs. 132

Case 2: Changed Cost

17 (x − 2) + 6 (y + 7) = Rs. 136

Calculation:

=> Let the original cost of a pen be Rs. x and a pencil be Rs. y.

=> 8x + 10y = 132

=> 4x + 5y = 66 --- (Equation 1)

=> Cost of a pen decreases by Rs. 2, new cost = (x − 2)

=> Cost of a pencil increases by Rs. 7, new cost = (y + 7)

=> 17(x − 2) + 6(y + 7) = 136

=> 17x − 34 + 6y + 42 = 136

=> 17x + 6y + 8 = 136

=> 17x + 6y = 128 --- (Equation 2)

=> Multiply Equation 1 by 6 and Equation 2 by 5 to eliminate y:

=> (4x + 5y) × 6 = 66 × 6 => 24x + 30y = 396

=> (17x + 6y) × 5 = 128 × 5 => 85x + 30y = 640

=> Subtracting the two equations:

=> (85x + 30y) − (24x + 30y) = 640 − 396

=> 61x = 244

=> x = 244 ÷ 61 = 4

=> Substitute x = 4 into Equation 1:

=> 4(4) + 5y = 66

=> 16 + 5y = 66

=> 5y = 50 => y = 10

=> The original cost of a pen is Rs. 4 and a pencil is Rs. 10.

=> Cost of 12 pens and 9 pencils = 12x + 9y

=> 12(4) + 9(10) = 48 + 90 = 138

Therefore The correct answer is Rs. 138.

Additional Information

Linear Equations in Two Variables

A system of two linear equations (ax + by = c) can be easily solved using substitution, elimination, or cross-multiplication methods depending on the coefficients.

Elimination Method

This method involves multiplying the equations by suitable non-zero constants to make the coefficients of one variable mathematically equal, and then adding or subtracting the equations to eliminate that variable.

Q43. Answer: (d) 125°

Shortcut Trick

In right-angled triangle BDC, the sum of the acute angles is exactly 90°.

=> angle C = 90° − angle DBC = 90° − 16° = 74°

By the Exterior Angle Theorem on triangle AEC, the exterior angle equals the sum of the remote interior angles.

=> angle AEB = angle CAE + angle C

=> angle AEB = 51° + 74° = 125°

Therefore The correct answer is 125°.

Alternate Method

16°

74°

51°

125°

A

B

C

D

E

Given:

=> BD perpendicular to AC at D in triangle ABC, which means angle BDC = 90°.

=> angle DBC = 16°

=> angle CAE = 51°

Step 1: Calculate angle C using triangle BDC

=> The sum of angles in any triangle is 180°.

=> In right-angled triangle BDC: angle BDC + angle DBC + angle C = 180°

=> 90° + 16° + angle C = 180°

=> 106° + angle C = 180°

=> angle C = 180° − 106° = 74°

Step 2: Find angle AEB using triangle AEC

=> Since E is a point on BC, the line segment extends from C through E to B.

=> This makes angle AEB an exterior angle to triangle AEC at vertex E.

=> According to the exterior angle theorem: angle AEB = angle CAE + angle C

=> angle AEB = 51° + 74°

=> angle AEB = 125°

Therefore The correct answer is 125°.

Additional Information

Exterior Angle Theorem

The measure of an exterior angle of a triangle is perfectly equal to the sum of the measures of its two remote interior angles. (Formula: angle Ext = angle A + angle B)

Triangle Angle Sum Property

The sum of all three interior angles in any standard triangle in Euclidean geometry is always exactly 180°.

Altitudes & Right Triangles

An altitude is a line drawn from a vertex meeting the opposite side at exactly 90°. It splits the main triangle into smaller right-angled triangles, enabling quick angle evaluations since the remaining two acute angles must sum to 90°.

Q44. Answer: (b) Rs. 36,192

Shortcut Trick

Given, 3 × A = 9 × B = 4 × C.

To find the direct ratio, take the LCM of the coefficients 3, 9, and 4, which is 36.

Ratio of A : B : C = (36 ÷ 3) : (36 ÷ 9) : (36 ÷ 4) = 12 : 4 : 9.

Total ratio parts = 12 + 4 + 9 = 25 parts.

Value of 1 part = Rs. 75,400 ÷ 25 = Rs. 3,016.

Share of A = 12 parts = 12 × 3,016 = Rs. 36,192.

Therefore The correct answer is Rs. 36,192.

Alternate Method

Given:

Total amount to be divided = Rs. 75,400

Condition for division: 3 × A = 9 × B = 4 × C

Formula Used:

If xA = yB = zC, then the direct ratio A : B : C = 1/x : 1/y : 1/z

A (12 Parts)

B (4 Parts)

C (9 Parts)

?

Total = 25 Parts = Rs. 75,400

Proportional Division

Calculations:

=> Let 3A = 9B = 4C = k

=> A = k/3, B = k/9, C = k/4

=> Ratio of A : B : C = 1/3 : 1/9 : 1/4

=> To convert fractions to integers, multiply the ratio by the LCM of denominators (3, 9, 4), which is 36.

=> A : B : C = (1/3 × 36) : (1/9 × 36) : (1/4 × 36)

=> A : B : C = 12 : 4 : 9

=> Let the respective shares be 12x, 4x, and 9x.

=> Total sum = 12x + 4x + 9x = 25x

=> 25x = 75400

=> x = 75400 ÷ 25

=> x = 3016

=> Share of A = 12x = 12 × 3016

=> Share of A = 36192

Therefore The correct answer is Rs. 36,192.

Additional Information

Inverse Ratio

If two quantities are in the ratio a : b, their inverse ratio is formed by swapping the terms and is written as 1/a : 1/b or b : a.

Compound Ratio

When two or more ratios are multiplied together term by term, the resultant ratio is called a compound ratio. For a : b and c : d, it is ac : bd.

Duplicate Ratio

The compound ratio of two identical ratios is termed the duplicate ratio. For a given ratio a : b, its duplicate ratio is expressed as a^2 : b^2.

Q45. Answer: (a) 7

Shortcut Trick

The given number to be divided is 774359327.

Its unit digit is 7, which means the given number is an odd number.

An odd number can never be exactly divided by an even number.

Among the given options, 12, 2, and 16 are even numbers.

By elimination, 7 is the only possible odd number that can divide it.

Therefore The correct answer is 7.

Alternate Method

Given:

The number to be divided is 774359327.

Calculation:

=> Let us check the divisibility by the given options one by one.

=> Option 3 (2): A number is divisible by 2 if its last digit is even. Since 7 is an odd digit, the number is not divisible by 2.

=> Option 4 (16): A number divisible by 16 must also be divisible by all factors of 16, including 2. Hence, 774359327 is not divisible by 16.

=> Option 2 (12): A number divisible by 12 must be divisible by 3 and 4. Since it is not divisible by 2, it cannot be divisible by 4. Hence, it is not divisible by 12.

=> Option 1 (7): Let us perform direct division to verify.

=> 774359327 ÷ 7 = 110622761

=> Since the remainder is 0, the number is completely divisible by 7.

Therefore The correct answer is 7.

Additional Information

Divisibility Rule for 2, 4, 8 and 16

A number is divisible by 2^n if the number formed by its last n digits is divisible by 2^n. For 2, check the last digit; for 4, check the last two digits.

Divisibility Rule for Composite Numbers

To check if a number is divisible by a composite number (like 12), split it into co-prime factors (such as 3 and 4). The number must be divisible by both co-prime factors.

Divisibility Rule for 7

Double the last digit of the number and subtract it from the remaining truncated number. If the obtained result is divisible by 7, the original number is also divisible by 7.

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Q46. Answer: (d) 3

Shortcut Trick

Apply the divisibility rule of 3 directly by checking the sum of the digits.

Sum of digits = 5 + 4 + 5 + 7 + 1 + 4 + 1 + 5 + 1 = 33

Since 33 is exactly divisible by 3, the entire number 545714151 is also divisible by 3.

Therefore The correct answer is 3.

Alternate Method

Given:

Number = 545714151

Concept Used:

Test the number against the standard divisibility rules for the given options.

Calculations:

=> Checking Option 1 (10): A number is divisible by 10 only if its unit digit is 0. The given unit digit is 1 → Not divisible by 10.

=> Checking Option 2 (6): A number is divisible by 6 if it is divisible by both 2 and 3. Since the unit digit is 1 (an odd number), it is not divisible by 2 → Not divisible by 6.

=> Checking Option 3 (7): Dividing 545714151 directly by 7 yields 77959164 with a remainder of 3 → Not divisible by 7.

=> Checking Option 4 (3): A number is divisible by 3 if the sum of its digits is a multiple of 3.

=> Sum of digits = 5 + 4 + 5 + 7 + 1 + 4 + 1 + 5 + 1 = 33

=> Since 33 ÷ 3 = 11 (remainder 0), the number is perfectly divisible by 3.

Therefore The correct answer is 3.

Additional Information

Divisibility Rule of 9

A number is divisible by 9 if the sum of its digits is a multiple of 9.

Divisibility Rule of 4

A number is divisible by 4 if the number formed by its last two digits is divisible by 4.

Divisibility Rule of 11

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

Q47. Answer: (c) 20.83 cm

Shortcut Trick

Perimeter of a sector = Arc length + 2 × Radius = (θ ÷ 360°) × 2πr + 2r

=> Perimeter = (18 ÷ 360) × 2 × 3.14 × 9 + 2 × 9

=> Perimeter = (1 ÷ 20) × 56.52 + 18

=> Perimeter = 2.826 + 18 = 20.826 cm

Rounding to two decimal places, we get 20.83 cm.

Therefore The correct answer is 20.83 cm.

Alternate Method

Given:

Radius (r) = 9 cm

Angle subtended at the centre (θ) = 18°

Value of π = 3.14

O9 cm9 cm18°Arc (l)Perimeter of Sector= 2r + l= 2 × Radius + Arc length

Formula Used:

Arc length (l) = (θ ÷ 360°) × 2πr

Perimeter of Sector = 2r + l

Calculations:

=> Arc length (l) = (18 ÷ 360) × 2 × 3.14 × 9

=> l = (1 ÷ 20) × 56.52

=> l = 2.826 cm

=> Perimeter of Sector = (2 × 9) + 2.826

=> Perimeter of Sector = 18 + 2.826 = 20.826 cm

=> Rounded up to two decimal places = 20.83 cm

Therefore The correct answer is 20.83 cm.

Additional Information

Area of a Sector

Formula: Area = (θ ÷ 360°) × πr² or (1 ÷ 2) × l × r. It represents the region enclosed by two radii and the arc.

Area of a Segment

Formula: Area of Sector − Area of Triangle formed by the radii and the corresponding chord. This gives the region bounded by a chord and its arc.

Perimeter of a Semicircle

Formula: πr + 2r. A semicircle is a special sector where the central angle is exactly 180°.

Q48. Answer: (b) 8750

Shortcut Trick

Let total registered voters be N.

Valid votes = N × (85/100) × (96/100) = N × (17/20) × (24/25)

Winning margin = (65% − 35%) of valid votes = 30% = 3/10 of valid votes.

Equation: N × (17/20) × (24/25) × (3/10) = 2142

=> N × 1224 ÷ 5000 = 2142 => N = (2142 × 5000) ÷ 1224 = 8750

Therefore The correct answer is 8750 voters.

Alternate Method

Given:

Registered voters who cast their vote = 85%

Invalid votes = 4% of polled votes

Winner gets 65% of valid votes

Winning margin = 2142 votes

Formula Used:

Margin = Winner's Votes − Loser's Votes

Valid Votes = Polled Votes − Invalid Votes

Registered Voters (100x)Did Not Vote (15x)Polled Votes (85x)Invalid (3.4x)Valid (81.6x)Loser: 35%Winner: 65%

Calculations:

Let the total registered voters be 100x.

=> Votes polled = 85% of 100x = 85x

=> Invalid votes = 4% of 85x = 3.4x

=> Valid votes = 85x − 3.4x = 81.6x

=> Winner's votes = 65% of 81.6x = 53.04x

=> Loser's votes = (100% − 65%) of 81.6x = 35% of 81.6x = 28.56x

=> Margin of victory = Winner's votes − Loser's votes = 53.04x − 28.56x = 24.48x

According to the question, winning margin is 2142 votes.

=> 24.48x = 2142

=> x = 2142 ÷ 24.48 = 87.5

=> Total registered voters = 100x = 100 × 87.5 = 8750

Therefore The correct answer is 8750 voters.

Additional Information

Election Percentage Breakdown

In election questions, always track the shifting base: Total Voters → Polled Votes → Valid Votes. The percentages at each step apply to the remaining base from the previous step.

Winning Margin Rule

When there are only two candidates, the winning margin percentage is always the difference between the winner's share and the loser's share. Margin % = Winner % − Loser %.

Successive Multiplying Factor

Use successive multiplication to find the final value quickly. Valid Votes = Total Voters × (Polled %) × (Valid %). Avoid calculating intermediate discrete values.

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Q49. Answer: (a) 196

Shortcut Trick

For any two numbers 'a' and 'b', their third proportional 'c' is directly given by the formula $c = b^2 \div a$.

Here, the given numbers are a = 16 and b = 56.

Third proportional (x) = $56^2 \div 16$

$x = (56 \times 56) \div 16 = 3136 \div 16 = 196$

Therefore The correct answer is 196.

Alternate Method

Given:

First number = 16

Second number = 56

Formula Used:

When three numbers a, b, and c are in continued proportion, then a : b :: b : c

16

:

56

::

56

:

x

16 ÷ 56

56 ÷ x

Concept of Continued Proportion

16 × x = 56 × 56

Calculations:

Let the third proportional be x.

=> 16 / 56 = 56 / x

=> 16 × x = 56 × 56

=> x = (56 × 56) ÷ 16

=> x = 3136 ÷ 16

=> x = 196

Therefore The correct answer is 196.

Additional Information

Mean Proportional

For any two numbers 'a' and 'b', the mean proportional 'x' is defined such that a : x :: x : b, which gives the formula $x = \sqrt{(ab)}$.

Fourth Proportional

For three numbers 'a', 'b', and 'c', the fourth proportional 'x' satisfies the ratio a : b :: c : x, resulting in the calculation x = (b × c) ÷ a.

First Proportional

If 'x' is the first proportional to 'a' and 'b', it is written as x : a :: a : b, yielding the direct relation $x = a^2 \div b$.

Compound Ratio

The compound ratio of two individual ratios (a : b) and (c : d) is calculated by multiplying the respective antecedents and consequents to get (ac : bd).

Q50. Answer: (b) 65/4

Shortcut Trick

Let total work = LCM(26, 13, 10) = 130 units.

Efficiencies: Priya = 5, Priya + Varsha = 10, Priya + Varsha + Nisha = 13 units/day.

Nisha's efficiency = Combined (Priya + Varsha + Nisha) − (Priya + Varsha) = 13 − 10 = 3 units/day.

Combined efficiency of Priya + Nisha = 5 + 3 = 8 units/day.

Time for Priya + Nisha = Total Work ÷ combined efficiency = 130 ÷ 8 = 65/4 days.

Therefore The correct answer is 65/4 days.

Alternate Method

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Given:

Time taken by Priya = 26 days

Time taken by Priya and Varsha = 13 days

Time taken by Priya, Varsha and Nisha = 10 days

Formula Used:

Total Work = Time × Efficiency

Calculation:

=> Let Total Work be the LCM of 26, 13 and 10.

Person	Days	Total Work	Efficiency
Priya	26	130	5
Priya + Varsha	13	10	
Priya + Varsha + Nisha	10	13	

=> Efficiency of Nisha = Efficiency of (Priya + Varsha + Nisha) − Efficiency of (Priya + Varsha)

=> Nisha's efficiency = 13 − 10 = 3 units/day

=> Combined efficiency of Priya and Nisha = 5 + 3 = 8 units/day

=> Time taken by Priya and Nisha = Total Work ÷ Combined efficiency

=> Time taken = 130 ÷ 8 = 65/4 days

Therefore The correct answer is 65/4 days.

Additional Information

Pipes & Cisterns

Works exactly like Time & Work. Inlet pipes have positive efficiency, and outlet pipes (leaks) have negative efficiency.

Work & Wages

Wages are distributed in the ratio of the work done. If all individuals work for the same number of days, wages are distributed in the ratio of their efficiencies.

Alternate Day Work

When individuals work on alternate days, calculate the work done in a complete cycle (e.g., 2 days for 2 people) and determine how many cycles are needed to reach the total work.

Q51. Answer: (b) 12 hours

Shortcut Trick

Ratio of speeds of Arjun and Malaika = 138 : 92 = 3 : 2

Since the distance is constant, the time taken is inversely proportional to the speed.

Ratio of time taken by Arjun and Malaika = 2 : 3

Time taken by Arjun (2 units) = 8 hours => 1 unit = 4 hours.

Time taken by Malaika (3 units) = 3 × 4 = 12 hours.

Therefore The correct answer is 12 hours.

Alternate Method

Delhi

Kanpur

Total Distance (D) is Constant

Arjun

138 km/hr | 8 hrs

Malaika

92 km/hr | T hrs

Given:

Speed of Arjun (S1) = 138 km/hr

Time taken by Arjun (T1) = 8 hours

Speed of Malaika (S2) = 92 km/hr

Formula Used:

Distance = Speed × Time

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When Distance is constant, S1 × T1 = S2 × T2

Calculations:

=> Total Distance = 138 × 8 = 1104 km

Let the time taken by Malaika be T2.

=> T2 = Distance ÷ Speed of Malaika

=> T2 = 1104 ÷ 92

=> T2 = 12 hours

Therefore The correct answer is 12 hours.

Additional Information

Relative Speed

When two bodies move in the same direction, Relative Speed = S1 − S2. When moving in opposite directions, Relative Speed = S1 + S2.

Average Speed

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

Proportionality in Speed, Time and Distance

If Distance is constant, Speed is inversely proportional to Time (S1 ÷ S2 = T2 ÷ T1). If Time is constant, Distance is directly proportional to Speed.

Q52. Answer: (a) 60%

Shortcut Trick

Let the standard cost price of 100 units of weight be 100.

Actual Cost Price (due to 8% less weight) = 100 − 8 = 92.

Selling Price (at 47% claimed profit) = 100 + 47 = 147.

Profit = 147 − 92 = 55.

Profit % = (55 ÷ 92) × 100 = 59.78% ≈ 60%.

Therefore The correct answer is 60%.

Alternate Method

Given:

Claimed profit percentage = 47%

Underweight used by the trader = 8% less than the actual weight

CP = 92Actual WeightBase = 100SP = 147Claimed GainTotal Profit = 147 − 92 = 55Profit % = (55 ÷ 92) × 100 ≈ 60%

Calculations:

=> Let the true cost price (CP) of 100 g of flour be 100 units.

=> The trader claims a profit of 47%, so the Selling Price (SP) for 100 g = 100 + (47 × 100 ÷ 100) = 147 units.

=> However, he dishonestly gives a weight which is 8% less, so the actual weight given = 100 − 8 = 92 g.

=> The actual Cost Price (CP) for the 92 g of flour given to the customer = 92 units.

=> Total Profit earned = Selling Price − Actual Cost Price

=> Total Profit = 147 − 92 = 55 units.

=> Overall Profit Percentage = (Total Profit ÷ Actual Cost Price) × 100

=> Profit Percentage = (55 ÷ 92) × 100

=> Profit Percentage = 5500 ÷ 92 = 59.7826%

=> Rounding off to the nearest whole number, the profit percentage is 60%.

Therefore The correct answer is 60%.

Additional Information

Dishonest Dealer Concept

When a dealer claims to sell goods at x% profit but uses y% less weight, the overall Actual Profit % is given directly by the formula: [(x + y) ÷ (100 − y)] × 100.

Marked Price and Profit Relation

Selling Price (SP) is always calculated based on Markup or Profit over Cost Price (CP) using: SP = CP × [(100 + Profit %) ÷ 100].

Successive Changes Rule

When two successive factors impact the total value by a% and b%, the effective percentage change is calculated using: a + b + (a × b ÷ 100)%.

Q53. Answer: (c) 16

Shortcut Trick

Let Mary's age = M and Diya's age = D.

Given: 3M − 5D = 20 and M − 2D = 2

Solving simultaneously: (3M − 5D) − 3(M − 2D) = 20 − 3(2)

This directly gives D = 14, and substituting yields M = 2 × 14 + 2 = 30.

Age difference = 30 − 14 = 16 years.

Therefore The correct answer is 16 years.

Alternate Method

Given:

=> 3 × Mary's age = 5 × Diya's age + 20

=> 2 × Diya's age = Mary's age − 2

Calculations:

Let Mary's present age be M and Diya's present age be D.

=> 3M = 5D + 20 → (Equation 1)

=> 2D = M − 2

=> M = 2D + 2 → (Equation 2)

Substitute the value of M from Equation 2 into Equation 1:

=> 3(2D + 2) = 5D + 20

=> 6D + 6 = 5D + 20

=> 6D − 5D = 20 − 6

=> D = 14 years

Now, substitute D = 14 back into Equation 2:

=> M = 2 × 14 + 2

=> M = 28 + 2 = 30 years

Mary's Age (M = 30)

Diya's Age (D = 14)

Difference = 16 years

The difference between their ages:

=> M − D = 30 − 14 = 16 years

Therefore The correct answer is 16 years.

Additional Information

Problems on Ages

If the present age is x, then the age 'n' years ago was (x − n) and the age 'n' years from now will be (x + n).

Ratio of Ages

If the ratio of the present ages of A and B is a : b, their ages can be assumed as ax and bx. After n years, the new age ratio becomes (ax + n) ÷ (bx + n).

Linear Equations in Two Variables

A system of two linear equations like a1x + b1y = c1 and a2x + b2y = c2 can be efficiently solved using algebraic techniques such as substitution or elimination.

Q54. Answer: (a) 49%

Shortcut Trick

Convert the given discount percentages into fraction multipliers: 20% = 4/5, 25% = 3/4, and 15% = 17/20.

Find the combined multiplier: (4/5) × (3/4) × (17/20) = 51/100.

This means the Final Selling Price is 51% of the Marked Price.

Equivalent Discount = 100% − 51% = 49%.

Therefore The correct answer is 49%.

Alternate Method

Given:

Three successive discounts of 20%, 25%, and 15%.

Formula Used:

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Selling Price (SP) = Marked Price (MP) × (100 − D1)/100 × (100 − D2)/100 × ...

Discount % = [(MP − SP) / MP] × 100

100

MP

80

60

51

SP

− 20%

− 25%

− 15%

Total Discount = 49%

Calculations:

=> Let the Marked Price (MP) = 100.

=> Price after 1^(st) discount of 20% = 100 − 20 = 80

=> Price after 2^(nd) discount of 25% = 80 − (25% of 80) = 80 − 20 = 60

=> Price after 3^(rd) discount of 15% = 60 − (15% of 60) = 60 − 9 = 51

=> Final Selling Price (SP) = 51

=> Total Equivalent Discount = MP − SP = 100 − 51 = 49

=> Since the base MP is 100, the equivalent discount % = 49%.

Therefore The correct answer is 49%.

Additional Information

Successive Discount Formula

For two successive discounts of a% and b%, the equivalent single discount can be directly calculated using the formula: [a + b − (a × b) / 100]%.

Marked Price (MP) vs Selling Price (SP)

Discount is always calculated on the Marked Price (or list price) of the item. Profit or loss, on the other hand, is always calculated on the Cost Price (CP).

Buy X Get Y Free Offers

In promotional offers, the effective discount percentage is calculated as: [Free Items ÷ Total Items] × 100.

Q55. Answer: (d) 2

Shortcut Trick

List possible prime candidates by avoiding even numbers and multiples of 5: 331, 333, 337, 339, 341, 343.

Eliminate multiples of 3 (sum of digits is divisible by 3): 333 and 339 are removed.

Check the remaining against primes up to √345 ≈ 18 (7, 11, 13, 17).

341 = 11 × 31 and 343 = 7 × 49, so both are not prime.

The remaining numbers 331 and 337 are prime, giving a total of 2 numbers.

Therefore The correct answer is 2 prime numbers.

Alternate Method

Given:

The range of numbers is from 331 to 345 (both included).

Method to find prime numbers:

A number is prime if it is greater than 1 and has no divisors other than 1 and itself.

=> Total numbers in the range: 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345.

=> Eliminate all even numbers: 331, 333, 335, 337, 339, 341, 343, 345.

=> Eliminate multiples of 5 (ending in 5): 331, 333, 337, 339, 341, 343.

=> Eliminate multiples of 3 (sum of digits ÷ 3): 333 (sum = 9) and 339 (sum = 15).

=> Remaining candidates: 331, 337, 341, 343.

=> Check divisibility by other primes (7, 11, 13, 17) up to √345 ≈ 18:

=> 341 ÷ 11 = 31 (Not prime)

=> 343 ÷ 7 = 49 (Not prime)

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=> 331 and 337 are not divisible by any prime ≤ 18, so they are prime numbers.

=> Total number of prime numbers = 2.

Therefore The correct answer is 2 prime numbers.

Additional Information

Prime Numbers

A prime number is a positive integer greater than 1 that has exactly two distinct divisors: 1 and itself.

Primality Test Shortcut

To check if a number N is prime, we only need to test its divisibility by all prime numbers less than or equal to √N.

Co-prime Numbers

Two numbers are said to be co-prime or mutually prime if their Highest Common Factor (HCF) is 1. They do not necessarily have to be prime numbers.

Twin Primes

Twin primes are a pair of prime numbers that have a difference of 2 (e.g., 11 and 13, or 41 and 43).

Q56. Answer: (c) 44

Shortcut Trick

CP of 1 eraser = Rs. 150 ÷ 12 = Rs. 12.5

SP of 1 eraser = Rs. 18

Ratio of CP to SP = 12.5 : 18 = 25 : 36

Profit in ratio = 36 − 25 = 11 parts

Profit % = (11 ÷ 25) × 100 = 44%

Therefore The correct answer is 44%.

Alternate Method

Given:

Cost price of 1 dozen (12) erasers = Rs. 150

Selling price of 1 eraser = Rs. 18

Formula Used:

Profit = SP − CP

Profit % = (Profit ÷ CP) × 100

CP = Rs. 12.5

(150 ÷ 12)

SP = Rs. 18

• Rs. 5.5

Profit

Profit % = (5.5 ÷ 12.5) × 100 = 44%

Calculations:

=> CP of 1 eraser = 150 ÷ 12 = Rs. 12.5

=> Profit = 18 − 12.5 = Rs. 5.5

=> Profit % = (5.5 ÷ 12.5) × 100

=> Profit % = (55 ÷ 125) × 100

=> Profit % = (11 ÷ 25) × 100 = 11 × 4 = 44%

Therefore The correct answer is 44%.

Additional Information

Marked Price & Discount

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

Successive Discount

When two successive discounts of a% and b% are given, the effective discount % = a + b − (a × b ÷ 100).

Dishonest Dealer

If a dealer professes to sell goods at CP but uses false weight, Profit % = (True Weight − False Weight) ÷ False Weight × 100.

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Q57. Answer: (c) 46.2

Shortcut Trick

Convert the decimals to fractions in their lowest terms: 15.4 = 154/10 = 77/5 and 0.006 = 6/1000 = 3/500.

Apply the fraction formula: LCM = (LCM of Numerators) ÷ (HCF of Denominators).

LCM of (77, 3) = 231.

HCF of (5, 500) = 5.

Required LCM = 231 ÷ 5 = 46.2.

Therefore The correct answer is 46.2.

Alternate Method

Given:

The numbers are 15.4 and 0.006.

Method Used:

To find the LCM of decimals, make the number of decimal places equal, remove the decimals to form integers, find their LCM, and then place the decimal point back at the same position.

Calculations:

=> The maximum number of decimal places in the given values is 3 (in 0.006).

=> Convert 15.4 into 3 decimal places: 15.400

=> Treat both numbers as integers by removing the decimal points: 15400 and 6.

=> Find the LCM of 15400 and 6.

=> 15400 = 2 × 7700

=> 6 = 2 × 3

=> LCM(15400, 6) = 2 × 7700 × 3 = 46200

=> Since we shifted the decimal by 3 places, place the decimal point 3 places from the right in the result.

=> Required LCM = 46200 ÷ 1000 = 46.2

Therefore The correct answer is 46.2.

Additional Information

HCF of Fractions

HCF = (HCF of Numerators) ÷ (LCM of Denominators). It is critical to always convert the given fractions to their simplest forms before applying this rule.

Relation between HCF and LCM

For any two numbers 'a' and 'b', the product of the numbers is equal to the product of their HCF and LCM. That is: a × b = HCF(a, b) × LCM(a, b).

Co-prime Numbers

If two numbers share no common factors other than 1, they are called co-prime numbers. For co-prime numbers, their LCM is directly equal to their product.

Q58. Answer: (c) 405/2

Shortcut Trick

Divide the given equation (sin θ + cos θ) / (sin θ − 4 cos θ) = 11 by cos θ.

=> (tan θ + 1) / (tan θ − 4) = 11 => 10 tan θ = 45 => tan θ = 9/2

Given expression: (13 $\sin^2\theta$ + 3 $\cos^2\theta$ − 3) / $\cos^2\theta$

=> 13 $\tan^2\theta$ + 3 − 3 $\sec^2\theta$ = 13 $\tan^2\theta$ + 3 − 3(1 + $\tan^2\theta$) = 10 $\tan^2\theta$

=> 10 × $(9/2)^2$ = 10 × (81/4) = 405/2

Therefore The correct answer is 405/2.

Alternate Method

Given:

(sin θ + cos θ) / (sin θ − 4 cos θ) = 11

Formula Used:

$\sin^2\theta + \cos^2\theta = 1$

$\tan\theta = \sin\theta / \cos\theta$

Calculations:

=> sin θ + cos θ = 11(sin θ − 4 cos θ)

=> sin θ + cos θ = 11 sin θ − 44 cos θ

=> 45 cos θ = 10 sin θ

=> sin θ / cos θ = 45 / 10

=> tan θ = 9/2

Now, solve the required expression:

=> (13 $\sin^2\theta$ + 3 $\cos^2\theta$ − 3) / $\cos^2\theta$

Substitute 3 = 3($\sin^2\theta$ + $\cos^2\theta$):

=> [13 $\sin^2\theta$ + 3 $\cos^2\theta$ − 3($\sin^2\theta$ + $\cos^2\theta$)] / $\cos^2\theta$

=> (13 $\sin^2\theta$ + 3 $\cos^2\theta$ − 3 $\sin^2\theta$ − 3 $\cos^2\theta$) / $\cos^2\theta$

=> 10 $\sin^2\theta$ / $\cos^2\theta$

=> 10 $\tan^2\theta$

=> 10 × $(9/2)^2$

=> 10 × 81 / 4

=> 810 / 4 = 405 / 2

Therefore The correct answer is 405/2.

Additional Information

Pythagorean Identities

The fundamental trigonometric identity relating sine and cosine is: $\sin^2\theta + \cos^2\theta = 1$.

Tangent and Secant Relation

By dividing the basic Pythagorean identity by $\cos^2\theta$, we obtain another standard identity: $1 + \tan^2\theta = \sec^2\theta$.

Cotangent and Cosecant Relation

By dividing the basic Pythagorean identity by $\sin^2\theta$, we obtain the third standard identity: $1 + \cot^2\theta = \text{cosec}^2\theta$.

Q59. Answer: (b) 44

Shortcut Trick

The diameter of the largest circle inscribed in a rectangle equals its shorter side (breadth).

Diameter (d) = 14 m

Circumference = π × d

Circumference = (22 ÷ 7) × 14 = 44 m

Therefore The correct answer is 44 m.

Alternate Method

Length = 116 mBreadth = 14 md = 14 m

Given:

Length of the rectangle (l) = 116 m

Breadth of the rectangle (b) = 14 m

Concept Used:

The largest circle that can be drawn completely inside a rectangle is limited by the shorter side of the rectangle. Hence, the diameter of the circle will be exactly equal to the breadth of the rectangle.

Diameter (d) = 14 m

Radius (r) = d ÷ 2 = 14 ÷ 2 = 7 m

Formula Used:

Circumference of a circle = 2 × π × r

Calculation:

=> Circumference = 2 × (22 ÷ 7) × 7

=> Circumference = 2 × 22

=> Circumference = 44 m

Therefore The correct answer is 44 m.

Additional Information

Area of Inscribed Circle

The area of the largest circle inscribed in a rectangle of dimensions l × b (where b is the shorter side) is given by the formula π × $(b \div 2)^2$.

Circumcircle of a Rectangle

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A circle drawn passing through all four vertices of a rectangle is called its circumcircle. The diameter of this circumcircle is exactly equal to the diagonal of the rectangle: $d = \sqrt{(l^2 + b^2)}$.

Largest Square in a Circle

The diagonal of the largest square that can be inscribed in a given circle is equal to the diameter of the circle. The side of this square is $d \div \sqrt{2}$.

Q60. Answer: (c) Rs. 2,000

Shortcut Trick

Effective interest rate for 5 years = 4% × 5 = 20%.

Total amount in percentage = 100% (Principal) + 20% (Interest) = 120%.

Given that 120% of the principal corresponds to Rs. 2,400.

Principal (100%) = (2400 ÷ 120) × 100 = 20 × 100 = 2000.

Therefore The correct answer is Rs. 2,000.

Alternate Method

P = ?

Year 0

A = Rs. 2400

Year 5

• SI (4% × 5 = 20%)

Amount = P + 20% of P = 120% of P

Given:

Amount (A) = Rs. 2,400

Rate of Interest (R) = 4% p.a.

Time (T) = 5 years

Formula Used:

Amount = Principal × [1 + (R × T) ÷ 100]

Calculations:

=> 2400 = P × [1 + (4 × 5) ÷ 100]

=> 2400 = P × [1 + 20 ÷ 100]

=> 2400 = P × [1 + 1/5]

=> 2400 = P × (6/5)

=> P = (2400 × 5) ÷ 6

=> P = 400 × 5

=> P = 2000

Therefore The correct answer is Rs. 2,000.

Additional Information

Simple Interest (SI) Formula

The general formula to calculate simple interest is SI = (P × R × T) ÷ 100, where P is the principal, R is the rate per annum, and T is the time in years.

Effective Rate of Interest

In simple interest, the effective interest rate over a given period is directly proportional to time and is calculated as R × T. The total amount returned becomes (100 + R × T)% of the principal.

Relation between Amount and Principal

Amount (A) is the total sum returned at the end of the time period. The formula is A = P + SI = P × [1 + (R × T) ÷ 100].

Q61. Answer: (d) 62^(−12)

Shortcut Trick

As per BODMAS rule, division and multiplication are evaluated from left to right.

Combine terms directly using laws of exponents: $a^m \div a^n = a^{(m - n)}$ and $a^m \times a^n = a^{(m + n)}$

Expression = $62^{(3 - 2)} \times 62^{(-13)}$

Expression = $62^1 \times 62^{(-13)} = 62^{(1 - 13)}$

Therefore The correct answer is $62^{(-12)}$.

Alternate Method

Given:

$62^3 \div 62^2 \times 62^{(-13)}$

Formula Used:

$a^m \div a^n = a^{(m - n)}$

$a^m \times a^n = a^{(m + n)}$

Calculations:

=> According to the order of operations, evaluate division first (from left to right):

=> $62^3 \div 62^2 = 62^{(3 - 2)}$

=> $62^{(3 - 2)} = 62^1$

=> Now multiply the obtained result by the remaining term:

=> $62^1 \times 62^{(-13)} = 62^{(1 + (-13))}$

=> $62^{(1 - 13)} = 62^{(-12)}$

Therefore The correct answer is $62^{(-12)}$.

Additional Information

Product Rule

When multiplying two expressions with the same base, the exponents are added: $a^m \times a^n = a^{(m + n)}$.

Quotient Rule

When dividing two expressions with the same base, the exponents are subtracted: $a^m \div a^n = a^{(m - n)}$.

Negative Exponent

A negative exponent represents the reciprocal of the base raised to a positive exponent: $a^{(-n)} = 1 \div a^n$.

Order of Operations (BODMAS)

In the absence of brackets, Division and Multiplication have the same level of precedence and are always solved sequentially from left to right.

Q62. Answer: (d) Rs. 2,121.6 ; 46.96%

Shortcut Trick

Successive discount formula: $D = x + y - (x \times y) \div 100$

Effective Discount = $32 + 22 - (32 \times 22) \div 100 = 54 - 7.04 = 46.96\%$

Final Price = Marked Price × (100 − Effective Discount) ÷ 100

Final Price = $4000 \times (100 - 46.96) \div 100 = 4000 \times 0.5304 = \text{Rs. } 2121.6$

Therefore The correct answer is Rs. 2121.6 ; 46.96%.

Alternate Method

Given:

Marked Price (MP) = Rs. 4,000

First discount (d1) = 32%

Second discount (d2) = 22%

Formula Used:

Effective Discount % = d1 + d2 − (d1 × d2) ÷ 100

Selling Price (SP) = MP × (100 − Effective Discount) ÷ 100

Rs. 4000

Marked Price

Rs. 2720

Rs. 2121.6

Selling Price

−32%

−22%

Effective Discount = 46.96%

Calculations:

=> Effective Discount = 32 + 22 − (32 × 22) ÷ 100

=> Effective Discount = 54 − 7.04 = 46.96%

=> Selling Price = 4000 × (100 − 46.96) ÷ 100

=> Selling Price = 4000 × 0.5304

=> Selling Price = Rs. 2121.6

Therefore The correct answer is Rs. 2121.6 ; 46.96%.

Additional Information

Successive Discounts Formula

For two successive discounts of x% and y%, the single equivalent discount is calculated as: D = x + y − (x × y) ÷ 100.

Marked Price vs Cost Price Relation

The relationship between Cost Price (CP) and Marked Price (MP) for a given Profit (P%) and Discount (D%) is: MP ÷ CP = (100 + P) ÷ (100 − D).

Discount Percentage

A discount is always calculated over the Marked Price. Formula: Discount % = (Discount ÷ MP) × 100.

Q63. Answer: (b) 33.42

Shortcut Trick

Using the Net Deviation Method and assuming the base average as 41:

Deviation for the next 10 matches = 16 − 41 = −25

Total deviation for 10 matches = 10 × (−25) = −250

Net change in average = −250 ÷ 33 ≈ −7.575

Combined average = 41 − 7.575 = 33.425 ≈ 33.42 runs

Therefore The correct answer is 33.42 runs.

Alternate Method

23 MatchesAverage: 41 runs10 MatchesAvg: 16 runsTotal 33 MatchesCombined Average = ?

Given:

Average runs scored in the first 23 matches = 41

Average runs scored in the next 10 matches = 16

Formula Used:

Combined Average = (Total Value of Group 1 + Total Value of Group 2) ÷ (Total Number of Matches)

Calculations:

=> Total runs in the first 23 matches = 23 × 41 = 943 runs

=> Total runs in the next 10 matches = 10 × 16 = 160 runs

=> Total runs in all 33 matches = 943 + 160 = 1103 runs

=> Combined Average = 1103 ÷ 33

=> Combined Average = 33.4242... runs

=> Rounding off to two decimal places, we get 33.42 runs.

Therefore The correct answer is 33.42 runs.

Additional Information

Weighted Average

Used to find the combined average of multiple groups directly: A_w = (n1x1 + n2x2) ÷ (n1 + n2).

Net Deviation Method

Instead of calculating large totals, assume a base average and calculate the net positive or negative deviation for each group, then divide it evenly over the total count to adjust the base.

Average Speed

If two equal distances are covered at speeds a and b, the Average Speed is given by (2ab) ÷ (a + b).

Q64. Answer: (c) 15 km/hr

Shortcut Trick

Pranay's speed ratio (Original : New) = 1 : 2 => Time ratio = 2 : 1.

Difference in time ratio = 2 − 1 = 1 unit.

Actual time difference = (Aman's time + 2) − (Aman's time − 3) = 5 hours.

=> 1 unit = 5 hours => Original time = 10 hours => Speed = 150 ÷ 10 = 15 km/hr.

Therefore The correct answer is 15 km/hr.

Alternate Method

Given:

Total distance = 150 km

Pranay's original time = Aman's time + 2 hours
Pranay's time at double speed = Aman's time − 3 hours
Formula Used:
Speed = Distance ÷ Time
When Distance is constant, Speed prop. to 1 / Time
Start
End
Distance = 150 km
Speed = P
Time = t
Speed = 2P
Time = t − 5
Calculations:
=> Let original time taken by Pranay be T hours.
=> When Pranay's speed is doubled, his time becomes half = T / 2 hours.
=> Difference in Pranay's time = T − T / 2 = T / 2 hours.
=> From the given conditions, the actual difference in his time is also the difference between his times relative to Aman.
=> Time difference = (Aman's time + 2) − (Aman's time − 3) = 5 hours.
=> Therefore, T / 2 = 5 => T = 10 hours.
=> Pranay's original speed = Distance ÷ T
=> Pranay's original speed = 150 ÷ 10 = 15 km/hr.
Therefore The correct answer is 15 km/hr.
Additional Information
Inverse Proportionality
When distance is constant, speed and time are inversely proportional. S1 × T1 = S2 × T2.
Average Speed
If equal distances are covered at speeds S1 and S2, the average speed is (2 × S1 × S2) ÷ (S1 + S2).
Relative Speed
For two objects moving in the same direction, Relative Speed = |S1 − S2|. For opposite directions, Relative Speed = S1 + S2.

Q65. Answer: (a) 10.72

Shortcut Trick
√169 = 13
√0.0144 = 0.12 (since $12^2 = 144$, 4 decimal places inside the root become 2 outside)
√5.76 = 2.4 (since $24^2 = 576$, 2 decimal places inside the root become 1 outside)
=> 13 + 0.12 − 2.4 = 13.12 − 2.4 = 10.72
Therefore The correct answer is 10.72.
Alternate Method
Given:
Expression: √169 + √0.0144 − √5.76
Calculation:
Convert the decimals into fractions to easily calculate their square roots:
=> √0.0144 = √(144 ÷ 10000) = 12 ÷ 100 = 0.12
=> √5.76 = √(576 ÷ 100) = 24 ÷ 10 = 2.4
=> √169 = 13
Now, substitute the exact values back into the given expression:
=> 13 + 0.12 − 2.4
=> 13.12 − 2.4
=> 10.72
Therefore The correct answer is 10.72.
Additional Information
Square Root of Decimals

When calculating the square root of a decimal number, count the number of decimal places. The resulting square root will have exactly half that number of decimal places.

BODMAS Rule

Follow the order of operations: Brackets, Orders (powers and roots), Division, Multiplication, Addition, and Subtraction. Always calculate roots before proceeding with addition or subtraction.

Common Perfect Squares

Memorizing perfect squares up to 30 (such as $12^2 = 144$, $24^2 = 576$) significantly reduces calculation time in simplification questions.

Q66. Answer: (c) Rs. 45

Shortcut Trick

Total days between 25 Feb and 26 Apr 2024 = 4 (Feb) + 31 (Mar) + 26 (Apr) = 61 days.

Since 2024 is a leap year, time in years = 61 ÷ 366 = 1/6 year.

SI = (P × R × T) ÷ 100

SI = (4000 × 6.75 × 1) ÷ (100 × 6) = 270 ÷ 6 = 45.

Therefore The correct answer is Rs. 45.

Alternate Method

Given:

Principal (P) = Rs. 4,000

Rate of Interest (R) = 6.75% per annum

Date of deposit = 25 February 2024

Date of withdrawal = 26 April 2024

Formula Used:

Simple Interest (SI) = (P × R × T) ÷ 100

25 Feb 2024

P = Rs. 4000

26 Apr 2024

SI = ?

T = 61 days

R = 6.75% p.a.

SI = Rs. 45

Calculations:

=> Year 2024 is a leap year (divisible by 4), so February has 29 days.

=> Number of days in February (excluding deposit date) = 29 − 25 = 4 days

=> Number of days in March = 31 days

=> Number of days in April (including withdrawal date) = 26 days

=> Total time (T) in days = 4 + 31 + 26 = 61 days

=> Total days in leap year = 366

=> Time in years (T) = 61 ÷ 366 = 1/6 year

=> SI = (4000 × 6.75 × 1/6) ÷ 100

=> SI = (40 × 6.75) ÷ 6

=> SI = 270 ÷ 6

=> SI = 45

Therefore The correct answer is Rs. 45.

Additional Information

Leap Year Calculation

A year is a leap year if it is perfectly divisible by 4. Century years must be divisible by 400. In leap years, February has 29 days and the total number of days in the year is 366.

Counting Days for Interest

When calculating interest between two dates, typically the day of deposit is excluded but the day of withdrawal is included. This ensures the exact number of days is counted accurately.

Simple vs Compound Interest

Simple Interest is calculated uniformly on the initial principal amount throughout the period, whereas Compound Interest calculates

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interest on both the principal and the accumulated interest from previous periods.

Q67. Answer: (b) Rs. 519

Shortcut Trick

Profit ratio = Ratio of investments (since the time period is constant).

Profit Ratio = 1050 : 1320 : 1730 = 105 : 132 : 173

Total ratio parts = 105 + 132 + 173 = 410 parts

Deepa's share = (173 ÷ 410) × 1230 = 173 × 3

Therefore The correct answer is Rs. 519.

Alternate Method

Given:

Investment by Sanjana = Rs. 1,050

Investment by Kartik = Rs. 1,320

Investment by Deepa = Rs. 1,730

Total profit at the end of the year = Rs. 1,230

Formula Used:

Profit Ratio = (Capital1 × Time1) : (Capital2 × Time2) : (Capital3 × Time3)

Partnership Investment & Profit Ratio

Rs. 1050

105

Sanjana

Rs. 1320

132

Kartik

Rs. 1730

173

Deepa

Total Profit = Rs. 1230 → Total Ratio Parts = 410

Calculation:

=> Since the time period is equal (1 year) for all partners, the profit is distributed in the ratio of their capitals.

=> Profit Ratio (Sanjana : Kartik : Deepa) = 1050 : 1320 : 1730

=> Simplifying the ratio by dividing by 10, we get: 105 : 132 : 173

=> Sum of all ratio parts = 105 + 132 + 173 = 410 units

=> Total profit = 410 units = Rs. 1,230

=> 1 unit = 1230 ÷ 410 = Rs. 3

=> Deepa's share = 173 units = 173 × 3 = Rs. 519

Therefore The correct answer is Rs. 519.

Additional Information

Simple Partnership

When all the partners invest their capital for the same period of time, the profit or loss is distributed purely in the ratio of their invested capital.

Compound Partnership

When the partners invest their capital for different time periods, the final profit or loss ratio is calculated as the product of their capital and the respective time period (C1T1 : C2T2 : C3T3).

Working vs Sleeping Partner

A working partner manages the business and receives a specific salary or a fixed percentage of the profit before the remaining profit is divided. A sleeping partner only invests capital and shares the profit strictly based on their investment ratio.

Q68. Answer: (a) 155/7 days

Shortcut Trick

Total Work = LCM(22, 11, 5) = 110 units.

Efficiency of A = 110 ÷ 22 = 5, B = 110 ÷ 11 = 10.

Efficiency of (A + B + C) = 110 ÷ 5 = 22.

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Efficiency of C = 22 − (5 + 10) = 7 units/day.

Time taken by C alone = 110 ÷ 7 = 15^5/7 days.

Therefore The correct answer is 15^5/7 days.

Alternate Method

Given:

=> Time taken by A = 22 days

=> Time taken by B = 11 days

=> Time taken by A, B, and C together = 5 days

Formula Used:

=> Total Work = Time × Efficiency

Calculations:

=> Let Total Work be LCM(22, 11, 5) = 110 units

Person	Days	Total Work	Efficiency
A	22	110	110 ÷ 22 = 5
B	11	110 ÷ 11 = 10	
A + B + C	5	110 ÷ 5 = 22	

=> Combined efficiency of A, B, and C = 22 units/day

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

=> Efficiency of C = 22 − (5 + 10) = 7 units/day

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

=> Time taken by C alone = 110 ÷ 7 = 15^5/7 days

Therefore The correct answer is 15^5/7 days.

Additional Information

Work and Wages Relation

Wages are always distributed in direct proportion to the amount of work done by each individual. If they work for the same total duration, wages are distributed in the direct ratio of their efficiencies.

Pipes and Cisterns

The core mathematical concept is identical to Time and Work. A pipe filling a tank functions with a positive efficiency, while a leak or an emptying pipe operates with a negative efficiency.

Alternate Day Work

When individuals perform work on alternate days, the work is calculated in cycles (e.g., a 2-day cycle for 2 people) and the total time is determined by evaluating the total number of full cycles plus the days required to complete the remaining work.

Q69. Answer: (c) −137x + 119

Shortcut Trick

Observe the x^2 coefficients: 3 × (7/3) = 7 and −7 × 1 = −7. They cancel each other out.

Now, compute the remaining terms directly:

x coefficient: 3 × (−27) − 7 × 8 = −81 − 56 = −137

Constant term: 3 × 14 − 7 × (−11) = 42 + 77 = 119

Combining them, we get −137x + 119.

Therefore The correct answer is −137x + 119.

Alternate Method

Given:

$3((7/3)x^2 - 27x + 14) - 7(x^2 + 8x - 11)$

Calculations:

=> Expand the brackets by multiplying the outer constants with each term inside.

=> $[3 \times (7/3)x^2 - 3 \times 27x + 3 \times 14] - [7 \times x^2 + 7 \times 8x - 7 \times 11]$

=> $[7x^2 - 81x + 42] - [7x^2 + 56x - 77]$

=> $7x^2 - 81x + 42 - 7x^2 - 56x + 77$

=> Combine the like terms (x^2, x, and constants):

=> $(7x^2 - 7x^2) + (-81x - 56x) + (42 + 77)$

=> 0 − 137x + 119

=> −137x + 119

Therefore The correct answer is −137x + 119.

Additional Information

BODMAS Rule

When simplifying mathematical expressions, always follow the BODMAS sequence: Brackets, Orders (powers/roots), Division, Multiplication, Addition, and Subtraction.

Combining Like Terms

In algebra, like terms have the same variables raised to the same powers. They can be combined by adding or subtracting their numerical coefficients.

Distributive Property

This property states that multiplying a single term by two or more terms inside a set of brackets yields the same result as multiplying the single term by each of the terms inside separately: a(b + c) = ab + ac.

Q70. Answer: (c) 41

Shortcut Trick

Arrange the given data numbers in ascending order.

Sorted data: 17, 20, 21, 27, 35, 41, 42, 49, 68, 76, 95

For an odd number of terms (n = 11), the median is exactly the middle term.

Middle term = (11 + 1) ÷ 2 = 6^(th) term, which is 41.

Therefore The correct answer is 41.

Alternate Method

Given:

Data set: 76, 35, 42, 49, 95, 21, 68, 41, 20, 27, 17

Total number of observations (n) = 11

Formula Used:

If n is odd, Median = Value of the [(n + 1) ÷ 2]^(th) observation

Sorted Data Array

17

20

21

27

35

41

42

49

68

76

95

Median = 6th Term

Calculations:

=> First, arrange the given data in ascending order.

=> 17, 20, 21, 27, 35, 41, 42, 49, 68, 76, 95

=> Here, n = 11 (which is an odd number)

=> Median = [(11 + 1) ÷ 2]^(th) term

=> Median = [12 ÷ 2]^(th) term

=> Median = 6^(th) term

=> The 6^(th) term in the arranged data is 41.

Therefore The correct answer is 41.

Additional Information

Median for Even Number of Terms

If the number of observations (n) is even, the median is the average of the (n ÷ 2)^(th) and [(n ÷ 2) + 1]^(th) terms.

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Empirical Relationship

The relationship between Mean, Median, and Mode is given by: Mode = 3 × Median − 2 × Mean.

Mean

Mean is the average of all observations, calculated as the sum of all observations divided by the total number of observations.

Q71. Answer: (d) Three

Given number: 8354671

According to the question,

Number given	8	3	5	4	6	7	1
Odd digit → (+2) Even digit → (-1)	(-1)	(+2)	(+2)	(-1)	(-1)	(+2)	(+2)
Resultant number	7	5	7	3	5	9	3

So, number of digits that appeared more than once in the new number thus formed → 7, 5 and 3 = Three

Hence, "Option 4" is the correct answer.

Q72. Answer: (a) LIES - IELS - SEIL

The logic followed here is:

NEST - ESNT - TSEN

And,

GONE - ONGE - ENOG

Similarly,

Option 1) LIES - IELS - SEIL

Hence, "Option 1" is the correct answer.

Q73. Answer: (c) USJ -28

The logic followed here is:

Hence, "Option 3" is the correct answer.

Q74. Answer: (b) Two

Given series: (Left) ? > @ ^ @ \ ? + $ 6 7 \ 1 & @ 1 4 2 2 % 9 (Right)

According to the question,

Required condition: Symbol - Number - Another Number

(Left) ? > @ ^ @ \ ? + $ 6 7 \ 1 & @ 1 4 2 2 % 9 (Right)

Thus, there are two such numbers which are immediately preceded by a symbol and also immediately followed by another number.

Hence, "Option 2" is the correct answer.

Q75. Answer: (d) Neither conclusion (I) nor (II) follows.

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

Conclusions:

I. Some socks are bins → Does not follow (As all teas are bins and no tea is a sock. So, it is possible but not definitely true)

II. All bins are socks → Does not follow (As all teas are bins and no tea is a sock. So, it is possible but not definitely true)

Therefore Here, Neither conclusion (I) nor (II) follows.

Hence, the correct answer is "Option 4".

Q76. Answer: (d) 8 km towards east

Given:

Satish starts from Point Y and drives 19 km towards west.

He then takes a right turn, drives 10 km.

He then turns right and drives 11 km.

He takes a final right turn, drives 10 km and stops at Point Z.

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Thus, Satish should drive 8 km (19 km - 11 km) in the east direction in order to reach Point Y again.
Hence, the correct answer is "Option 4".

Q77. Answer: (d) FJC

The logic followed here is:
Option 1) HLF
Option 2) MQK
Option 3) KOI
Option 4) FJC
Thus, odd letter-cluster is FJC.
Hence, "Option 4" is the correct answer.

Q78. Answer: (a) Father's mother

Given:
1) T is the daughter of A.
2) A is married to M.
3) M is the son of K.
4) K is married to J.
5) J is the father of D.
6) D is the brother of N.
7) G is the son of N.
Thus, K is T's father's mother.
Hence, the correct answer is "Option 1"

Q79. Answer: (a) yg

According to the question:

Thus, the code for ‘his’ is 'yg'.
Hence, "Option 1" is the correct answer.

Q80. Answer: (d) 42

Given: A row of people all facing north
According to the question:
Rikshit rank from the right end → 31st
Palak rank from the right end. → 32nd
Huma's rank from the left end. → 10th
Number of people between Palak and Rikshit = Palak rank from the right end - Rikshit rank from the right end - 1
= 32 - 31 - 1
= 0 people.
As it is given that Number of people between Palak and Rikshit = Number of people between Palak and Huma
Therefore Number of people between Palak and Huma is also 0, Huma and Palak must be adjacent.
Huma's position from the right end = Palak's rank from the right end + 1
= 32 + 1
= 33rd from the right.
Total persons = Huma's rank from the left end + Huma's rank from the right end - 1
= 10 + 33 - 1 → 42
Thus, there are 42 people in the row.
Hence, "Option 4" is the correct answer.

Q81. Answer: (b) 20

Decoding signs:

Sign	A	B	C	D
Stands For	÷	×	•	•

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Given: 46 A 2 C 21 D 8 B 3 = ?

46 A 2 C 21 D 8 B 3 = ? => 46 ÷ 2 + 21 - 8 × 3 = ?

=> 46 ÷ 2 + 21 - 8 × 3 = ?

=> 23 + 21 - 8 × 3 = ?

=> 23 + 21 - 24 = ?

=> 44 - 24 = ?

=> 20 = ?

Hence, "Option 2" is the correct answer.

Q82. Answer: (d) 2

Given: (Left) 324 523 643 136 441 (Right)

According to the question:

Given numbers	324	523	643	136	441
3 is added to the first digit of every number	+3	+3	+3	+3	+3
Resultant numbers	624	823	943	436	741
If the first digit be exactly divided by the second digit of that number	6 ÷ 2	8 ÷ 2	9 ÷ 4	4 ÷ 3	7 ÷ 4
Required answer	Divisible	Divisible	Not divisible	Not divisible	Not divisible

Thus, according to the final arrangement, in two number will the first digit be exactly divisible by the second digit.

Hence, "Option 4" is the correct answer.

Q83. Answer: (b) Four

Given: Seven boxes, A, B, C, D, M, N and O, are kept one over the other but not necessarily in the same order.

1) No box is kept above B.

2) Only three boxes are kept between B and N.

Boxes
B
N

3) A is kept immediately above N.

4) Only four boxes are kept between D and C.

Boxes
B
D/C
A
N

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D/C

6) Only C is kept below O.

7) Only one box is kept between D and A.

The only remaining box is M will be positioned at the only position left.

Boxes
B
D
M
A
N
O
C

Thus, there are four boxes kept below M.

Hence, the correct answer is "Option 2".

Q84. Answer: (b) 9

According to the question:

Thus, the code for ‘F’ is '9'.

Hence, "Option 2" is the correct answer.

Q85. Answer: (d) B

Given: Seven people, A, B, C, T, U, V and W are sitting in a row, facing north.

1) Only two people sit to the right of C.

2) Only two people sit between C and U.

3) V sits to the immediate left of C.

4) Only two people sit between A and V.

6) T sits to the immediate right of W.

The only remaining person is B who will be positioned at the only position left.

Thus, B sits at third position from the left end of the line.

Hence, the correct answer is "Option 4".

Q86. Answer: (a) Only conclusion (I) follows.

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

Conclusions:

I. No Broccolis are Cabbages → Follow (As all Cabbages are Peas and no Peas are Broccolis. As whole cabbages comes in peas which cannot be broccolis, therefore it is true.)

II. Some Broccolis are Cabbages → Does not follow (As all Cabbages are Peas and no Peas are Broccolis. So, it is possible but not definitely true)

Therefore Here, Only conclusion (I) follows.

Hence, the correct answer is "Option 1".

Q87. Answer: (c) 834

The logic followed here is:

Hence, "Option 3" is the correct answer.

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Q88. Answer: (b) JQ-MT-PS

The logic followed here is:
GN-JQ-MP
And,
DK-GN-JM
Similarly,
Option 2) JQ-MT-PS

Hence, "Option 2" is the correct answer.

Q89. Answer: (a) VZD 20

The logic followed here is:

Hence, "Option 1" is the correct answer.

Q90. Answer: (b) Two

Given number: 7843651
According to the question,

Number given	7	8	4	3	6	5	1
Odd digit → (+2) Even digit → (-3)	(+2)	(-3)	(-3)	(+2)	(-3)	(+2)	(+2)
Resultant number	9	5	1	5	3	7	3

So, number of digits that appeared more than once in the new number thus formed → 5 and 3 = Two
Hence, "Option 2" is the correct answer.

Q91. Answer: (b) FBJ

The logic followed here is:
Option 1) HDK
Option 2) FBJ
Option 3) MIP
Option 4) JFM
Thus, odd letter-cluster is FBJ.
Hence, "Option 2" is the correct answer.

Q92. Answer: (c) ITEM - TMEI - METI

The logic followed here is:
RACK - AKCR - KCAR
And,
LOAD - ODAL - DAOL
Similarly,
Option 3) ITEM - TMEI - METI

Hence, "Option 3" is the correct answer.

Q93. Answer: (a) 454

The logic followed here is:

Hence, "Option 1" is the correct answer.

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Q94. Answer: (b) Two

Given: A, B, C, D, E, F and G are sitting around a circular table facing the centre.

1) B sits second to the right of C.

2) E sits third to the left of B.

3) D is the immediate neighbour of G and A.

4) F sits second to the left of G.

Thus, two people sit between A and B when counted from the left of A.

Hence, the correct answer is "Option 2".

Q95. Answer: (a) 51

The logic followed here is:

Hence, "Option 1" is the correct answer.

Q96. Answer: (d) 18

Given: All 105 students in a class are standing in a row facing north.

Ravi's rank from the right end → 49th

Shruti rank from the left end → 38th

Number of people between = Total students - (Ravi's rank from right + Shruti's rank from left)

= 105 - (49 + 38)

= 105 - 87

= 18

Thus, there are 18 people standing between Ravi and Shruti.

Hence, "Option 4" is the correct answer.

Q97. Answer: (d) US−UV

The logic followed here is:

Option 1) PN - QO

Option 2) QO - RP

Option 3) LJ - MK

Option (4): US → UV

Thus, odd letter-cluster pair is: US−UV.

Hence, "Option 4" is the correct answer.

Q98. Answer: (b) 75, 104

The logic followed here is:

52, 81 → 52 + 29 = 81

And,

72, 101 → 72 + 29 = 101

Similarly,

Option 2) 75, 104 → 75 + 29 = 104

Hence, "Option 2" is the correct answer.

Q99. Answer: (a) 8 km to the west

Given:

Mr. Oxi starts from Point A and drives 9 km towards the south.

He then takes a right turn and drives 3 km, then turns right and drives 15 km.

He then takes a right turn and drives 11 km.

He takes a final right turn, drives 6 km and stops at Point P.

Thus, Mr. Oxi should drive 8 km (11 km - 3 km) in the west direction in order to reach Point A again.

Hence, the correct answer is "Option 1".

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Q100. Answer: (c) One

Given number: 56218643

According to the question,

Number given	**5**	**6**	**2**	**1**	**8**	**6**	**4**	**3**
Odd digit → (-1) Even digit → (+1)	(-1)	(+1)	(+1)	(-1)	(+1)	(+1)	(+1)	(-1)
Resultant number	4	7	3	0	9	7	5	2

So, number of digits that appeared more than once in the new number thus formed → 7 = One

Hence, "Option 3" is the correct answer.

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