RRB NTPC Graduate Level CBT-I Official Paper (Held On: 20 Jun, 2025 Shift 1) (Previous Year Paper)

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

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Q1. During the 1886 session of the Indian National Congress in Calcutta, a major demand was raised for simultaneous Indian Civil Service examinations in England and India. Who presided over this session?

(a) Badruddin Tyabji
(b) Dadabhai Naoroji
(c) WC Banerjee
(d) Surendranath Banerjee

Q2. Simplify:

[(26 ÷ 2/2) × {6 ÷ 2 × (12-2)/2} ÷ {5 × 6 ÷ 3}]

(a) 78
(b) 39
(c) 52
(d) 65

Q3. Who among the following was appointed as the Director General of CRPF in January 2025?

(a) Gyanendra Pratap Singh
(b) Manish Singhal
(c) Bahadur Singh Sagoo
(d) Sanjiv Ranjan

Q4. 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 chain are bracelet.

All bracelet are ring.

Some ring are tops.

Conclusions:

(1) All chain are ring.

(II) Some tops are chain.

(a) Neither conclusion (1) nor (II) follows
(b) Only conclusion (II) follows
(c) Both conclusions (1) and (II) follow
(d) Only conclusion (1) follows

Q5. Find the value of $3/(\sin^2 A \sec A) \times 3\sqrt{(\tan^2 A - \sin^2 A)}$

(a) 3 sinA
(b) 3
(c) 9
(d) 9 tanA

Q6. Who is known as the 'Mother of Indian Revolution' for her pioneering role in the early Indian independence movement and for unfurling the first version of the Indian national flag abroad?

(a) Vijaya Lakshmi Pandit
(b) Madam Bhikaji Cama
(c) Annie Besant
(d) Sarojini Naidu

Q7. Keshav's salary is Rs. 13,000 per month. He spends Rs. 4,000 on house rent, Rs. 1,500 on bills and the rest of the amount is his monthly savings. Find his savings (in) in a year, if in the month of his birthday, he spent his complete monthly savings for the birthday celebration.

(a) 67,500
(b) 90,000
(c) 82,500
(d) 75,000

Q8. Which of the following statements is/are correct with reference to the Supreme Court judgement delivered in April 2025 in a case involving the use of Urdu on a municipal signboard in Maharashtra?

1. The Supreme Court overturned the Bombay High Court's decision that forbade the use of Urdu on municipal signboards.
2. The Court held that language must reflect the religion of the majority in a particular region.
3.The bench recognised Urdu as part of India's Ganga-Jamuni tehzeeb and criticised prejudice against languages.

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

Q9. 2418.4 x 795.8 x 0.3735 is equal in value to:

(a) 241.84 x 795.8 x 373.5
(b) 2.4184 x 7.958 × 373.5
(c) 2.4184 x 79.58 x 37.35
(d) 24.184 x 7958 × 3.735

Q10. Which of the following methods is the simplest way to rename a file or folder in Windows?

(a) Drag the file to the Recycle Bin
(b) Press Ctrl + R
(c) Right-click the file/folder → Select Rename
(d) Double-click the file to open it

Q11. What was the theme for the Republic Day 2025 celebrations in India?

(a) Celebrating the Constitution
(b) Unity in Diversity
(c) India@75: A Nation Marching Forward
(d) Swarnim Bharat: Virasat Aur Vikas

Q12. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

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

(29, 41, 53)

(37, 49, 61)

(a) (40, 52, 74)
(b) (67, 79, 101)
(c) (36, 48, 50)
(d) (53, 65, 77)

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Q13. In a certain code language, 'MAZE' is coded as '3647' and 'ZIPS' is coded as '1275'.

What is the code for 'Z' in the given code language?

(a) 2
(b) 4
(c) 7
(d) 1

Q14. Refer to the number and symbol series given below and answer the question that follows. Counting to be done from left to right only.

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

(Left) @2%*42 & £% 1£ &97&97$91 $ 2 (Right)

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

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

Q15. What should come in place of the question mark (?) in the given series?

536, 513, 480, ?, 384, 321

(a) 447
(b) 437
(c) 457
(d) 427

Q16. What is the primary purpose of the semi-cryogenic engine of ISRO in 2025?

(a) To power the Geosynchronous Satellite Launch Vehicle (GSLV)
(b) To power the main stage of the Polar Satellite Launch Vehicle (PSLV)
(c) To power the upper stage of the Launch Vehicle Mark-3 (LVM3)
(d) To power the semi-cryogenic booster stage of the Launch Vehicle Mark-3 (LVM3)

Q17. Which of the following tennis player captured the 2024 US Open Men's Singles title, marking his second Grand Slam win?

(a) Novak Djokovic
(b) Carlos Alcaraz
(c) Jannik Sinner
(d) Daniil Medvedev

Q18. -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) HJE
(b) JLG
(c) LNJ
(d) FHC

Q19. Which of the following Articles of the Indian Constitution states about the formation of Union Public Service Commission of India?

(a) Article 315
(b) Article 318
(c) Article 317
(d) Article 316

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Q20. Why is decentralised planning considered advantageous in the Panchayati Raj system in India?

(a) It allows local communities to tailor need-based development initiatives.
(b) It centralises power in the hands of a few state officials.
(c) It limits community participation in development planning.
(d) It slows down the decision-making process, hindering development.

Q21. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

LOH 1, JMG 4, HKF 9, FIE 16, ?

(a) DGD 25
(b) EFG 25
(c) DGD 36
(d) EFD 36

Q22. The selling price of 30 books is equal to the cost price of 36 books. Find the loss or gain percentage.

(a) 50/3 %loss
(b) 50/3 %gain
(c) 20% loss
(d) 20% gain

Q23. Ashoka appointed special officers to spread Dhamma, known as:

(a) Mahamatras
(b) Dhamma Mahamatras
(c) Purohits
(d) Rajukas

Q24. SUZD is related to ACHL in a certain way based on the English alphabetical order. In the same way, YAFJ is related to GINR. To which of the following options is WYDH related, following the same logic?

(a) GPLE
(b) EGPL
(c) GPEL
(d) EGLP

Q25. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

PK23 OJ34 NI45 MH56?

(a) LG68
(b) LH67
(c) LG67
(d) LH68

Q26. What will be the difference in population 3 years ago and 2 years ago of a town whose current population of 1,40,000 is increasing at a rate of 25% every year?

(a) 17,170
(b) 18,270
(c) 17,920
(d) 17,370

Q27. Which of the following sessions of the INC passed a resolution opposing the Arms Act and the Vernacular Press Act?

(a) 1887 Madras
(b) 1895 Poona
(c) 1888 Allahabad
(d) 1885 Bombay

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Q28. Mahesh withdrew Rs. 3,200 from a bank. He received a total of 33 notes of Rs. 50 and Rs. 100 denominations. The number of Rs. 50 notes received by him was:

(a) 9
(b) 12
(c) 2
(d) 10

Q29. A man takes 6 hours to swim 66 km downstream. He swims 42 km upstream in the same time. What is the speed (in km/hr) of the boat in still water?

(a) 16
(b) 17
(c) 13
(d) 9

Q30. As of March 2025, the National TB Elimination Programme (NTEP), under the aegis of National Health Mission (NHM), is implemented for how many days in India?

(a) 100
(b) 90
(c) 120
(d) 150

Q31. The speed of a boat in still water is 12 km/hr and the speed of the stream is 10 km/hr. A man rows to a place at a distance of 24.2 km and comes back to the starting point. Find the total time (in hours) taken by him.

(a) 7.8
(b) 5.8
(c) 13.2
(d) 4.1

Q32. The area of a rectangle increases by 7 m^2 if its length is increased by 6 m and breadth is decreased by 5 m. If the length is decreased by 6 m and breadth is increased by 7 m, then its area increases by 31 m^2. What is the perimeter of the original rectangle (in m)?

(a) 216
(b) 215
(c) 217
(d) 214

Q33. The crescent-shaped sand dunes found in the Thar Desert are called:

(a) Barchans
(b) Ergs
(c) Inselbergs
(d) Yardangs

Q34. Consider a scenario where a user interacts with a touch-sensitive display. Which of the following best describes the functional duality of this component within a computer system?

(a) It serves as both an input device, detecting touch input, and an output device, displaying information and visual responses.
(b) Its primary role is data storage, retaining user interactions for later processing.
(c) It acts solely as an output device, displaying visual feedback to the user's actions.
(d) It functions exclusively as an input device, capturing the user's touch gestures and commands.

Q35. The ratio between the length and the breadth of a rectangular park is 3: 8, and the perimeter of the park is 264 m. Find the area (in m^2) of the park.

(a) 3460
(b) 3455
(c) 3456
(d) 3451

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Q36. ZRVY is related to TLPS in a certain way based on the English alphabetical order. In the same way, WOSV is related to QIMP. To which of the given options is UMQT related, following the same logic?

(a) OGKN
(b) GOKN
(c) OGNK
(d) GONK

Q37. A dealer purchased a water cooler for Rs. 56,000. He allows a discount of 81% on its marked price and still gains 71%. Find the marked price of the water cooler.

(a) Rs. 5,03,937
(b) Rs. 5,03,908
(c) Rs. 5,04,030
(d) Rs. 5,04,000

Q38. A pipe can fill a tank in 12 hours. Another pipe can empty the filled tank in 14 hours. If both the pipes are opened simultaneously, then the time (in hours) in which the tank will be filled is:

(a) 85
(b) 87
(c) 86
(d) 84

Q39. In the Indian parliamentary system, who has the authority to dissolve the Lok Sabha before its term expires?

(a) The Prime Minister advises the President to dissolve it.
(b) The Council of Ministers passes a resolution.
(c) The Chief Justice of India orders dissolution.
(d) The Speaker of Lok Sabha takes the decision.

Q40. In a dicot root, which tissue(s) is/are found between the xylem and phloem?

(a) Trichomes
(b) Subsidiary cells
(c) Guard cells
(d) Conjunctive tissue

Q41. Which of the following statements is FALSE?

A) When a transversal cuts two lines such that the pair of corresponding angles are equal, then the lines have to be parallel.

B) When a transversal cuts two lines such that the pair of alternate interior angles are equal, then the lines have to be parallel.

C) When a transversal cuts two lines such that the pair of interior angles on the same sides of the transversal are complementary, then the lines have to be parallel.

D) When a transversal cuts two lines such that the pair of interior angles on the same sides of the transversal are supplementary, then the lines have to be parallel.

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

Q42. If 1 is added to each odd digit and 2 is subtracted from each even digit in the number 7532168, what will be the difference of the digits which are third from the left and second from the right in the new number thus formed?

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

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Q43. 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) SV - PS
(b) MH - KJ
(c) PS - MP
(d) IL - FI

Q44. The folk song of Kerala, which is sung to send away the evil ghosts and spirits, is called:

(a) Bhakha
(b) Baul
(c) Bhuta
(d) Wanawan

Q45. According to the first law of reflection, all the incident ray, the normal to the mirror at the point of incidence and the reflected ray:

(a) are mutually perpendicular to each other
(b) lie in different planes
(c) are parallel to each other
(d) lie in the same plane

Q46. On 7 March 2025, Govind Ballabh Pant's death anniversary, tributes were paid for his leadership in India's early post-independence years. Which state did he serve as its first Chief Minister?

(a) Madhya Pradesh
(b) Bihar
(c) Uttarakhand
(d) Uttar Pradesh

Q47. B, L, M, N, S, T and Z are sitting around a circular table facing the centre. Z sits fourth to the right of B. Only two people sit between L and T when counted from the left of L. M sits third to the left of S. N is an immediate neighbour of S and T. How many people are there between Z and N when counted from the left of N?

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

Q48. ASXZ is related to DVAC in a certain way based on the English alphabetical order. In the same way, MEJL is related to PHMO. To which of the following options is VNSU related, following the same logic?

(a) YQVX
(b) YVXQ
(c) YQXV
(d) YVQX

Q49. Which of the following urban agglomerations has the highest population in India as per Census 2011?

(a) Delhi
(b) Kolkata
(c) Mumbai
(d) Bengaluru

Q50. Find the simple interest (in closest integral Rs.) on Rs. 3,000 at 8% per annum rate of interest for the period from 14 February 2024 to 15 April 2024.

(a) 38
(b) 39
(c) 40
(d) 41

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Q51. In a certain code language, 'VEST' is coded as '3649' and 'SOAP' is coded as '1295'.

What is the code for 'S' in the given code language?

(a) 4
(b) 1
(c) 2
(d) 9

Q52. The fourth proportion to 3, 9 and 4 is the same as the third proportion to A and 12. What is the value of A?

(a) 12
(b) 13
(c) 9
(d) 15

Q53. The sum of the lengths of the edges of a cube is equal to the sum of the lengths of the edges of a cuboid whose length, breadth and height are in the ratio 4:3: 1. Find the volume (in cm^3) of the cuboid if the volume of the cube is 512 cm^3.

(a) 315
(b) 340
(c) 299
(d) 324

Q54. The mean of a data is 43 and its median is 78. The mode (using empirical relation) of the data is:

(a) 213
(b) 148
(c) 102
(d) 80

Q55. Each of P, Q, R, S, T, U and V has an exam on a different day of a week starting from Monday and ending on Sunday of the same week. T has an exam on Wednesday. Exactly 4 people have exams between S and R, neither of whom has an exam on Monday. Q has an exam immediately before P and V has an exam immediately after P. U has an exam immediately before S. Who has an exam on Sunday?

(a) S
(b) R
(c) U
(d) P

Q56. According to the World Bank 2021 data, what was the poverty rate at $2.15 a day (2017 PPP) for India?

(a) 12.92%
(b) 15%
(c) 8.9%
(d) 10.5%

Q57. Which city is set to host the Asia-Pacific Economic Cooperation (APEC) Summit in November 2025?

(a) Gyeongju
(b) Busan
(c) Incheon
(d) Seoul

Q58. If 1 is added to each odd digit and 2 is subtracted from each even digit in the number 6185742, then what will the sum of the highest and lowest digits in the new number thus formed be?

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

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Q59. Which soil is deficient in nitrogen and phosphorus but rich in iron and aluminium?

(a) Laterite soil
(b) Black soil
(c) Desert soil
(d) Alluvial soil

Q60. If 1 is added to each odd digit and 2 is subtracted from each even digit in the number 5637482, how many digits will appear more than once in the new number thus formed?

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

Q61. The famous dance form 'Kuchipudi' derives its name from the village Kuchelapuram, which is located in

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

Q62. If $a + b = 46$ and $(a - b)^2 = 612$, find the value of product of a and b.

(a) 405
(b) 460
(c) 428
(d) 376

Q63. L, M, N, O, P and W live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2 and so on, till the topmost floor is numbered 6. Only three people live between M and N, where M lives below N. O lives on an odd-numbered floor and immediately above M. W lives on one of the floors below P and on one of the floors above L. How many people live between P and L?

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

Q64. If 66% of a number is equal to 5/7 of another number, then what is the ratio of the first number to the second number?

(a) 252:233
(b) 250: 231
(c) 246: 229
(d) 249: 235

Q65. In a certain code language,

A + B means 'A is the son of B',

A-B means 'A is the sister of B', A x B means 'A is the wife of B' and

A ÷ B means 'A is the father of B'.

Based on the above, how is E related to K if 'E÷ F-G x H + K'?

(a) Wife's father
(b) Wife's brother
(c) Son's wife's brother
(d) Son's wife's father

Q66. An electric pump can fill a tank in 6 hours. Due to a leakage in the tank, it takes 7(1/3) hours to fill the tank. How much time will this leak take to empty the full tank if water does not get in or out of the tank through any other point during this period?"

(a) 28 hours

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(b) 16 hours
(c) 22 hours
(d) 33 hours

Q67. What happens when you apply a template to an existing MS PowerPoint presentation?
(a) It converts the PowerPoint presentation into a read-only format.
(b) It applies a new design while keeping the existing slide content.
(c) It completely replaces all slides and content.
(d) It only changes the background, without affecting text formatting.

Q68. A total profit of Rs. 25,300 is to be distributed amongst P, Q, and R such that P : Q = 9:7 and Q : R = 3:12 The share (in Rs.) of R in the profit is:
(a) 16,150
(b) 16,050
(c) 16,000
(d) 16,100

Q69. Mr. Plex starts from Point A and drives 22 km towards the East. He then takes a left turn, drives 31 km, turns left and drives 26 km. He then takes a left turn and drives 41 km. He takes a final left turn, drives 4 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90 degrees turns only unless specified.)
(a) 18 km to the West
(b) 21 km to the West
(c) 10 km to the North
(d) 13 km to the South

Q70. On 15 April 2025, in which city of India STREE Summit 2025 on Women's Safety and Empowerment was held?
(a) New Delhi
(b) Patna
(c) Ahmedabad
(d) Hyderabad

Q71. In finding the HCF of two numbers by division method, the quotients are 1, 4, and 6, respectively, and the last divisor is 29. What is the LCM of the two numbers?
(a) 22470
(b) 22480
(c) 22476
(d) 22475

Q72. According to the Charter Act of 1853, how many legislative members were there in the Council of the Governor General?
(a) 14
(b) 4
(c) 2
(d) 12

Q73. The average age of 4 people is 52 years. Another group has 6 people with an average age of 58 years. When both groups are combined, what is the average age of all the people?
(a) 55.6 years
(b) 54.9 years
(c) 54.2 years
(d) 54.6 years

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Q74. What was the key purpose of amending the Legal Services Authorities Act in 2002?

(a) To merge Lok Adalats with High Courts
(b) To establish permanent Lok Adalats for public utility service disputes
(c) To replace all regular courts with Lok Adalats
(d) To allow Lok Adalats to handle criminal cases

Q75. What is the median of the following data?

65, 67, 32, 16, 64, 27, 37, 16, 43, 85, 77

(a) 44
(b) 43.5
(c) 43
(d) 42.5

Q76. In the 2024 Jharkhand Assembly elections, how many seats did the Jharkhand Mukti Morcha (JMM) secure out of the total constituencies?

(a) 30 out of 81
(b) 38 out of 90
(c) 36 out of 90
(d) 34 out of 81

Q77. Which of the following countries is completely landlocked and shares an open border with India?

(a) Bangladesh
(b) Myanmar
(c) Nepal
(d) Afghanistan

Q78. What was the rate of increase in capital expenditure by the central government on major infrastructure sectors from 2019-20 to 2023-24?

(a) 25%
(b) 30%
(c) 35%
(d) 39%

Q79. Which of the following was the famous ruler of the Satavahana dynasty?

(a) Kanishka
(b) Vasumitra Satakarni
(c) Gautamiputra Satakarni
(d) Bhagabhadra

Q80. The sum of the area of two squares whose sides are p cm and q cm, respectively, is 317 cm^2 and the sum of their perimeters is 100 cm. Find the product of p and q.

(a) 154 cm^2
(b) 108 cm^2
(c) 135 cm^2
(d) 147 cm^2

Q81. What is the primary environmental impact of the release of freon from refrigeration plants on the atmosphere?

(a) Increased nitrogen
(b) Reduced greenhouse gas emissions
(c) Increased oxygen level
(d) Stratospheric ozone depletion

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

(Left) 497 581 452 460 775 (Right)

(Example: 697 - First digit = 6, second digit = 9 and third digit = 7) (Note: All operations to be done from left to right.)

What will be the resultant if second digit of the highest number is subtracted from the second digit of the lowest number?

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

Q83. For the quadratic equation $7x^2 - 28x + 21 = 0$ what is the sum of the roots?

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

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

912 910 920 918 928 ? 936

(a) 930
(b) 926
(c) 924
(d) 928

Q85. In a certain code language, 'LINK' is coded as '9236' and 'SINK' is coded as '6349'. What is the code for 'S' in the given code language?

(a) 9
(b) 6
(c) 4
(d) 3

Q86. An article is sold for Rs. x. If it is sold at 25% of this price, there is a loss of 50%. What is the percentage profit when it is sold for Rs. x?

(a) 100%
(b) 98%
(c) 101%
(d) 97%

Q87. Seven friends, C, D, E, F, G, H and P, are sitting in a row facing north. Only three people sit between F and C. P sits to the immediate left of C. No one sits to the right of E. Only two people sit between E and P. H sits to the immediate right of D. How many people sit between G and H?

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

Q88. B starts from Point U and drives 5 km towards the South. He then takes a right turn, drives 2 km, turns right and drives 16 km. He then takes a right turn and drives 3 km, turns left and drives 1 km. He then takes a right turn, drives 2 km. He takes a final right turn, drives 12 km and stops at Point X. How far (shortest distance) and towards which direction should he drive in order to reach Point U again? (All turns are 90 degrees turns only unless specified).

(a) 5 km towards the South
(b) 3 km towards the West
(c) 3 km towards the East
(d) 7 km towards the North

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Q89. Which of the following actions is essential for preserving changes made to an Excel workbook under a new file name?

(a) Selecting 'Save As' and choosing a new name or location
(b) Closing the application without saving
(c) Pressing Ctrl + P
(d) Clicking 'Print' from the File tab

Q90. Which of the following letter-clusters should replace # and % so that the pattern and relationship followed between the letter-cluster pair on the left side of :: is the same as that on the right side of :: ?

#: UEQ :: VFR: %

(a) = KUG, % = FPU
(b) = KTG, % = FPB
(c) = KUG, % = FPB
(d) #LUG, % = FPB

Q91. By how much is 60% of 40 greater than 1/5 of 15?

(a) 18
(b) 15
(c) 19
(d) 21

Q92. In which of the following locations was the PHDCCI International Week scheduled to be held in March 2025, which is postponed now?

(a) Mumbai
(b) Surat
(c) New Delhi
(d) Greater Noida

Q93. Which of the following scenarios would most likely result in a 'page fault' error during typical computer operation?

(a) Writing data to a read-only memory location
(b) Accessing data stored in the CPU cache
(c) Attempting to access a memory address that has been swapped out to the hard drive
(d) Executing an instruction directly from the BIOS

Q94. Which major port is NOT located on the western coast of India?

(a) Kandla
(b) Cochin
(c) Mangalore
(d) Visakhapatnam

Q95. If 1 is added to each even digit and 1 is subtracted from each odd digit in the number 248937615, what will be the sum of all the odd digits in the new number thus formed?

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

Q96. As per the Goods and Services Tax (Period of Levy and Collection of Cess) Rules, 2022, notified by the Finance Ministry, up to which date will the GST compensation cess be levied in India?

(a) 30 June 2025
(b) 31 December 2025
(c) 31 March 2026
(d) 31 December 2026

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Q97. This question is based on the five, three-digit numbers given below.

(Left) 190 735 494 761 781 (Right)

(Example-697 - First digit = 6, second digit = 9 and third digit = 7) (NOTE: All operations to be done from left to right.)

What will be the resultant if the second digit of the highest number is subtracted from the second digit of the lowest number?

(a) 2
(b) -2
(c) 1
(d) -1

Q98. Each of P, Q, R, S, T, U and V has an exam on a different day of a week starting from Monday and ending on Sunday of the same week. P has an exam on Wednesday. Exactly 3 people have an exam between P and S. V has an exam immediately after T, and Q has an exam immediately before T. Only 3 people have an exam between U and T. How many people have an exam after Q?

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

Q99. A class of 30 students appeared in a test. The average score of 12 students is 70, and that of the rest is 62. What is the average score of the class?

(a) 65.2
(b) 64.2
(c) 66.2
(d) 63.2

Q100. The Gini Coefficient is used to measure which of the following?

(a) Unemployment rate
(b) Absolute poverty
(c) Income inequality
(d) Consumption expenditure

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (b) Dadabhai Naoroji

The correct answer is Dadabhai Naoroji.

Key Points

• During the 1886 session of the Indian National Congress in Calcutta, Dadabhai Naoroji presided as the President.

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• Dadabhai Naoroji was known as the Grand Old Man of India and was one of the founding members of the Indian National Congress.

• The major demand raised during this session was for simultaneous Indian Civil Service examinations in England and India to ensure equitable opportunities for Indians.

• This session marked a significant step in the early nationalist movement, focusing on administrative reforms and political empowerment.

• Dadabhai Naoroji was instrumental in highlighting the economic exploitation of India under British rule, famously articulating the Drain of Wealth theory.

Additional Information

• Indian National Congress (INC):

• The INC was founded in 1885 by A.O. Hume, a retired British civil servant, with the aim of obtaining greater participation for Indians in governance.

• It played a pivotal role in India's independence movement against British colonial rule.

• The first session of the INC was held in Bombay in December 1885 and was presided over by W.C. Bonnerjee.

• Dadabhai Naoroji:

• He was the first Indian to be elected to the British Parliament in 1892, representing the Liberal Party.

• He authored the book "Poverty and Un-British Rule in India", which analyzed the economic exploitation of India by the British.

• Naoroji was a staunch advocate of Indian self-rule and worked tirelessly to gain support for India's cause in Britain.

• Indian Civil Service Examinations:

• The ICS was the elite civil service under British rule, but exams were initially held only in London, limiting Indian participation.

• Demands for simultaneous examinations in India were aimed at increasing accessibility for Indian candidates.

• Drain of Wealth Theory:

• This theory, proposed by Dadabhai Naoroji, highlighted how British policies led to the systematic transfer of India's wealth to Britain.

• It laid the foundation for economic arguments against colonial rule and inspired nationalist leaders in their fight for independence.

Q2. Answer: (b) 39

Given:

$[(26 \div 2/2) \times \{6 \div 2 \times (12-2)/2\} \div \{5 \times 6 \div 3\}]$

Calculations:

$\Rightarrow (26 \div 2/2) \times (6 \div 2 \times 10/2) \div (5 \times 6 \div 3)$

$\Rightarrow (26 \div 1) \times (3 \times 5) \div (5 \times 2)$

$\Rightarrow 26 \times 15 \div 10$

$\Rightarrow 390/10$

$\Rightarrow 39$

Therefore Value = 39.

Q3. Answer: (a) Gyanendra Pratap Singh

The correct answer is Gyanendra Pratap Singh.

Key Points

• Gyanendra Pratap Singh was appointed as the Director General of the Central Reserve Police Force (CRPF) in January 2025.

• He succeeded Sujay Lal Thakur, who held the position previously.

• Gyanendra Pratap Singh, an IPS officer of the 1987 Assam-Meghalaya cadre, has served in various distinguished roles across his career.

• CRPF is India's largest paramilitary force, responsible for internal security, counter-insurgency, and anti-terrorist operations.

• His appointment aims to strengthen the operational efficiency and modernization of CRPF for better security management.

Additional Information

• Central Reserve Police Force (CRPF)

• Established in 1939 as the Crown Representative's Police and renamed CRPF after independence in 1949.

• It operates under the Ministry of Home Affairs, Government of India.

• The CRPF is tasked with maintaining law and order, combating insurgency, and assisting in disaster relief operations.

• It is the largest paramilitary force in India, with over 300,000 personnel.

• Role of Director General (DG)

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• The DG is the highest-ranking officer in the CRPF and is responsible for its overall leadership, strategy, and operations.
• The DG ensures the force operates effectively in coordination with other security agencies.
• Key Operations by CRPF
• CRPF plays a critical role in counter-insurgency operations in Jammu and Kashmir and the Northeast.
• It also leads anti-Naxal operations in Left-Wing Extremism (LWE)-affected regions.
• The CRPF provides security for elections and sensitive installations.
• Modernization Initiatives
• CRPF has been modernizing its equipment and training to adapt to emerging challenges.
• It has incorporated advanced technologies such as drones, AI-based surveillance systems, and improved communication tools.

Q4. Answer: (d) Only conclusion (1) follows

The least possible venn diagram is given:

Conclusions:

(1) All chain are ring - True(because, all chain are bracelet and all bracelet are ring, it implies that all chain can be rings).

(II) Some tops are chain - False(because, there is no direct relation is given between them, so it can be possible only).

Thus, Only conclusion (1) follows.

Hence, the correct answer is "Option 4".

Q5. Answer: (c) 9

Shortcut Trick

Assume A = 45° to simplify the trigonometric expression.

$\sin^2A = 1/2$, $\sec A = \sqrt{2}$, $\tan^2A = 1$.

Expression = $[3 \div (1/2 \times \sqrt{2})] \times 3\sqrt{(1 - 1/2)} = [3 \times 2 / \sqrt{2}] \times 3\sqrt{(1/2)} = 3\sqrt{2} \times 3/\sqrt{2} = 9$.

Therefore The correct answer is 9.

Alternate Method

Given: Expr = $(3 / (\sin^2A \sec A)) \times 3\sqrt{(\tan^2A - \sin^2A)}$

Formula Used: $\tan^2A - \sin^2A = \tan^2A \sin^2A$; $\sec A = 1/\cos A$

=> Simplify the square root term: $\sqrt{(\tan^2A - \sin^2A)} = \sqrt{((\sin^2A/\cos^2A) - \sin^2A)}$

=> $\sqrt{(\sin^2A(1/\cos^2A - 1))} = \sqrt{(\sin^2A(\sec^2A - 1))} = \sqrt{(\sin^2A \tan^2A)} = \sin A \tan A$

=> Substitute back into the expression: $(3 / (\sin^2A \times (1/\cos A))) \times 3(\sin A \tan A)$

=> $(3 \cos A / \sin^2A) \times 3 \sin A \times (\sin A / \cos A)$

=> $(9 \times \cos A \times \sin^2A) / (\sin^2A \times \cos A) = 9$

Therefore The correct answer is 9.

Additional Information

Trigonometric Product-Difference Identity

For any angle A, $\tan^2A - \sin^2A = \tan^2A \times \sin^2A$ and similarly $\cot^2A - \cos^2A = \cot^2A \times \cos^2A$.

Reciprocal Relations

$\sec A = 1/\cos A$, $\operatorname{cosec} A = 1/\sin A$, and $\tan A = \sin A/\cos A$.

Pythagorean Identities

Fundamental identities: $\sin^2A + \cos^2A = 1$ and $1 + \tan^2A = \sec^2A$.

Q6. Answer: (b) Madam Bhikaji Cama

The correct answer is Madam Bhikaji Cama.

Key Points

• Madam Bhikaji Cama was a prominent figure in the Indian independence movement and is often referred to as the 'Mother of Indian Revolution.'
• She unfurled the first version of the Indian national flag, known as the "Flag of Indian Independence," in Stuttgart, Germany, on August 22, 1907, at the International Socialist Congress.
• The flag she raised was co-designed by her and bore the slogan "Vande Mataram," symbolizing India's freedom struggle.
• Bhikaji Cama was also a strong advocate for women's rights and equality and worked extensively for India's freedom while in exile in Europe.
• Her efforts to internationalize India's independence movement made her a significant figure in the freedom struggle.

Additional Information

• Indian National Flag

• The flag unfurled by Bhikaji Cama in 1907 was one of the earliest precursors to the modern Indian Tricolour.

• It consisted of green, saffron, and red stripes, with symbols like the crescent moon, sun, and seven stars representing the Saptarishi constellation.

• The flag also bore the words "Vande Mataram," symbolizing the spirit of India's freedom struggle.

• Bhikaji Cama's Exile

• She lived in exile in Europe for over three decades, working tirelessly for India's independence.

• She collaborated with other revolutionaries, including Shyamji Krishna Varma and Dadabhai Naoroji, to promote India's cause on international platforms.

• Advocacy for Women's Rights

• Bhikaji Cama was a strong advocate for women's education and empowerment, believing that women's liberation was crucial for a free India.

• She used her platform to highlight the plight of Indian women and push for gender equality.

• Legacy

• Bhikaji Cama's contributions to India's freedom struggle are commemorated through various memorials and institutions named after her.

• She remains an enduring symbol of patriotism and selflessness in Indian history.

Q7. Answer: (c) 82,500

Shortcut Trick

Monthly Savings = 13000 − (4000 + 1500) = Rs. 7500.

Savings Months = 12 − 1 (birthday month) = 11 months.

Total Annual Savings = 7500 × 11 = Rs. 82,500.

Therefore The correct answer is Rs. 82,500.

Alternate Method

Given:

Monthly Salary = Rs. 13,000

Expenditure on Rent = Rs. 4,000

Expenditure on Bills = Rs. 1,500

Calculations:

=> Monthly Savings = Total Salary − (Rent + Bills)

=> Monthly Savings = 13,000 − (4,000 + 1,500) = 13,000 − 5,500 = Rs. 7,500

=> In the birthday month, savings are spent, so net savings for that month = Rs. 0.

=> Number of months with actual savings = 12 − 1 = 11 months.

=> Total Annual Savings = 11 × 7,500

=> Total Annual Savings = Rs. 82,500

Therefore The correct answer is Rs. 82,500.

Additional Information

Income, Expenditure and Savings

The basic relationship is Income = Expenditure + Savings. To find savings, subtract all expenses from the total income.

Annual Calculation

Always identify the number of effective months where the condition applies. Annual Total = Monthly Value × Number of Months.

Percentage Savings

Savings % = (Savings ÷ Income) × 100. In this case, monthly savings % ≈ 57.69%.

Q8. Answer: (c) Only 3

The correct answer is Only 3.

Key Points

• In April 2025, the Supreme Court delivered a landmark judgment concerning the use of Urdu on municipal signboards in Maharashtra.

• The Court recognised Urdu as an integral part of India's cultural heritage, specifically its Ganga-Jamuni tehzeeb (syncretic culture).

• The bench criticised any form of prejudice or discrimination against languages and upheld linguistic diversity as central to India's

identity.

• The judgment did not impose language restrictions based on religious or regional majorities, focusing instead on inclusivity.

• It overturned misconceptions tied to linguistic usage and called for mutual respect towards all Indian languages.

Additional Information

• Ganga-Jamuni Tehzeeb:

• A term denoting the harmonious blending of Hindu and Muslim cultures in northern India.

• It reflects the region's shared traditions, languages, arts, and cuisines.

• Urdu, among other languages, is considered a cultural bridge in this syncretic tradition.

• Supreme Court's Role in Language Matters:

• The Supreme Court has historically upheld linguistic rights under Article 29 and 30 of the Constitution.

• It ensures protection against linguistic discrimination and promotes India's multilingual identity.

• Urdu Language:

• Urdu is one of the scheduled languages under the Eighth Schedule of the Indian Constitution.

• It has a rich literary heritage and is widely spoken in parts of India, Pakistan, and other South Asian regions.

• Article 29 of the Indian Constitution:

• Guarantees the protection of cultural and linguistic rights of minorities.

• Ensures that no citizen is denied access to cultural resources based on language.

Q9. Answer: (d) 24.184 x 7958 × 3.735

Given:

2418.4 × 795.8 × 0.3735

Formula used:

a × b × c = (a ÷ 10^m) × (b × 10^n) × (c × 10^p), where 10^(−m) × 10^n × 10^p = 1

Calculations:

=> 2418.4 × 795.8 × 0.3735

=> (2418.4 ÷ 100) × (795.8 × 10) × (0.3735 × 10)

=> 24.184 × 7958 × 3.735

Therefore Equal to option (4).

Q10. Answer: (c) Right-click the file/folder → Select Rename

The correct answer is Right-click the file/folder → Select Rename.

Key Points

• Renaming a file or folder in Windows is most easily done by right-clicking the item and selecting "Rename" from the context menu.

• This method is universally available across all versions of Windows and does not require advanced shortcuts or additional tools.

• Once the "Rename" option is selected, the file or folder name becomes editable, allowing you to type the new name directly.

• Pressing the Enter key after typing the new name finalizes the change.

• Using this method ensures accuracy and avoids accidental deletion or opening of the file.

Additional Information

• Other Methods to Rename:

• You can also rename a file by selecting it and pressing the F2 key on your keyboard.

• On touch-enabled devices, you can tap and hold the file or folder to open the context menu and select "Rename."

• Precautions While Renaming:

• Ensure you do not change the file extension while renaming, as it may render the file unusable.

• Files with special permissions or system files may require administrative access to rename.

• Keyboard Shortcuts:

• While many shortcuts exist in Windows, Ctrl + R is not a valid shortcut for renaming files or folders.

• Instead, use Alt → File Menu → Rename in older versions of Windows Explorer.

• Default Context Menu Options:

• The right-click context menu includes multiple options, such as "Open," "Copy," "Cut," "Properties," and "Rename."

• These options allow users to perform various actions without needing to open additional menus or tools.

Q11. Answer: (d) Swarnim Bharat: Virasat Aur Vikas

The correct answer is Swarnim Bharat: Virasat Aur Vikas.

Key Points

• Swarnim Bharat: Virasat Aur Vikas translates to "Golden India: Heritage and Development," reflecting India's cultural richness and developmental aspirations.

• The theme for Republic Day 2025 celebrations aligns with India's vision of integrating its historical legacy with modern progress.

• Republic Day celebrations in India often showcase themes that highlight national achievements and aspirations, with Swarnim Bharat emphasizing both preservation of heritage and sustainable growth.

• During the celebrations, tableaux from various states and ministries displayed India's diverse cultural heritage and technological advancements under this theme.

• The theme underscored India's commitment to balancing traditional values with its roadmap for future economic, social, and technological developments.

Additional Information

• Republic Day of India

• Celebrated on 26th January each year to honor the adoption of the Indian Constitution in 1950.

• The day signifies India's transition to a sovereign, democratic republic.

• Key events include the Republic Day Parade at Rajpath, showcasing India's military prowess and cultural diversity.

• Tableaux in Republic Day Celebrations

• Each year, states and union territories present tableaux depicting their cultural heritage, achievements, and initiatives.

• The tableaux often reflect the central theme chosen for that year's celebrations.

• They are an integral part of the Republic Day Parade and are judged for creativity and relevance.

• Heritage and Development in India

• India is known for its rich cultural heritage, including monuments, traditions, and languages.

• The government actively promotes preservation through initiatives like ‘Adopt a Heritage’ Scheme.

• Development programs such as Make in India and Digital India aim to modernize infrastructure and boost economic growth.

• Historical Significance of Themes

• The annual Republic Day theme reflects India's priorities and vision for the future.

• Past themes have included "India@75" and "Unity in Diversity," focusing on milestones and cultural integration.

• The themes serve to inspire citizens and promote national pride.

Q12. Answer: (d) (53, 65, 77)

The logic followed here is:

Logic: 1st number + 12 = 2nd number + 12 = 3rd number

Let's verify this logic with the given sets:

For, (29, 41, 53)

29 + 12 = 41 + 12 = 53.

For, (37, 49, 61)

37 + 12 = 49 + 12 = 61.

Now, let's check the options based on this logic:

Option 1) (40, 52, 74)

40 + 12 = 52 + 12 = 64. (Given Third number is 74, 74 ≠ 64)

Here, logic not followed.

Option 2) (67, 79, 101)

67 + 12 = 79 + 12 = 91. (Given Third number is 101, 101 ≠ 91)

Here, logic not followed.

Option 3) (36, 48, 50)

36 + 12 = 48 + 12 = 60. (Given Third number is 50, 50 ≠ 60)

Here, logic not followed.

Option 4) (53, 65, 77)

: 53 + 12 = 65 + 12 = 77. (Matches)

Here, logic followed.

Hence, the correct answer is "Option 4".

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Q13. Answer: (c) 7

The logic followed here is:

The code for "Z" is "7".

Hence, the correct answer is "Option 3".

Q14. Answer: (b) 3

Given series:

(Left) @2%*42 & £% 1£ &97&97$91 $ 2 (Right)

Condition to be checked:

Number → Symbol → Symbol

@ 2 % * 4 2 & £ % 1 £ & 97&97$91 $ 2

There are three such symbols in the above arrangement (2 % *, 2 & £, 1 £ &).

Hence, the correct answer is "Option 2".

Q15. Answer: (b) 437

The logic followed here is:

Thus, the missing number in the series is 437.

Hence, the correct answer is "Option 2".

Q16. Answer: (d) To power the semi-cryogenic booster stage of the Launch Vehicle Mark-3 (LVM3)

The correct answer is To power the semi-cryogenic booster stage of the Launch Vehicle Mark-3 (LVM3).

Key Points

• ISRO's semi-cryogenic engine is designed to power the booster stage of the Launch Vehicle Mark-3 (LVM3), replacing the current solid rocket boosters.

• This engine uses a combination of liquid oxygen (LOX) and refined kerosene (RP-1) as propellants, making it more efficient than conventional solid boosters.

• The semi-cryogenic engine offers a higher thrust-to-weight ratio, enabling LVM3 to launch heavier payloads into low Earth orbit (LEO) and geostationary transfer orbit (GTO).

• The development aligns with ISRO's goal of enhancing its launch vehicle capabilities for upcoming advanced missions, including heavier satellites and interplanetary exploration.

• The semi-cryogenic technology also reduces cost per launch by improving fuel efficiency and simplifying stage design compared to fully cryogenic engines.

Additional Information

• Launch Vehicle Mark-3 (LVM3):

• Also known as GSLV Mk-III, it is India's heaviest launch vehicle developed by ISRO.

• LVM3 has been used for key missions like Chandrayaan-2 and is capable of carrying payloads up to 4 tons to GTO.

• Semi-Cryogenic Propulsion:

• It involves the use of a liquid oxidizer (LOX) combined with a storable liquid fuel like kerosene (RP-1).

• This technology offers higher specific impulse compared to solid and hypergolic liquid propellants.

• Advantages Over Solid Boosters:

• Semi-cryogenic engines are more efficient, provide better controllability, and are environmentally cleaner than solid rocket motors.

• The higher density of kerosene allows for more compact storage compared to liquid hydrogen in cryogenic engines.

• Future Applications:

• The semi-cryogenic engine is a key step towards ISRO's reusable launch vehicle (RLV) program and human spaceflight missions.

• It can be adapted for international satellite launches, enhancing India's share in the global space market.

Q17. Answer: (c) Jannik Sinner

The correct answer is Jannik Sinner.

Key Points

• Jannik Sinner is a professional tennis player from Italy, known for his powerful baseline game and exceptional athleticism.

• He captured the 2024 US Open Men's Singles title, marking his second career Grand Slam victory.

• Sinner defeated Carlos Alcaraz in a thrilling final match, showcasing remarkable mental resilience and skill under pressure.

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• This win solidifies Sinner's position as one of the rising stars in the tennis world, joining the ranks of elite players.

• His previous Grand Slam win came at the Australian Open in early 2024, making this a breakthrough year for the young Italian athlete.

Additional Information

• US Open Overview:

• The US Open is one of the four prestigious Grand Slam tournaments in tennis, held annually in New York City, USA.

• It is played on hard courts and is known for its electrifying atmosphere and diverse fan base.

• Started in 1881, the tournament has evolved to become one of the most significant events in global sports.

• Grand Slam Titles:

• Grand Slam tournaments include the Australian Open, French Open, Wimbledon, and US Open.

• Winning multiple Grand Slam titles is considered a hallmark of greatness in professional tennis.

• Players like Novak Djokovic, Rafael Nadal, and Roger Federer hold records for the most Grand Slam victories.

• Jannik Sinner's Career Highlights:

• Sinner turned professional in 2018 and quickly rose through the ATP rankings due to his consistent performances.

• He is coached by Simone Vagnozzi and Darren Cahill, both of whom have contributed significantly to his development.

• Known for his calm demeanor, Sinner is regarded as one of the most promising players of his generation.

• 2024 Tennis Season:

• The 2024 tennis calendar witnessed intense competition among top players, with Jannik Sinner emerging as a standout performer.

• Other notable events included Novak Djokovic's victory at Wimbledon and Carlos Alcaraz's triumph at the French Open.

• The season further highlighted the generational shift in men's tennis, with younger players challenging established stars.

Q18. Answer: (c) LNJ

The logic followed here is that the numerical position of the second letter is two more than the first, and the third letter's position is five less than the second.

Option (1): HJE

Option (2): JLG

Option (3): LNJ

Option (4): FHC

Hence, the correct answer is "Option 3".

Q19. Answer: (a) Article 315

The correct answer is Article 315.

Key Points

• Article 315 of the Indian Constitution provides for the establishment of the Union Public Service Commission (UPSC) for the Union and Public Service Commissions for the States.

• The Union Public Service Commission (UPSC) is a constitutional body that conducts examinations for appointments to the services of the Union.

• It is responsible for recruiting candidates for All India Services, Central Services, and other government posts under the Union.

• Article 315 ensures that the Public Service Commissions function independently, free from executive interference.

• The provisions under Article 315 aim to maintain transparency and meritocracy in the recruitment process for government positions.

Additional Information

• Union Public Service Commission (UPSC)

• The UPSC is governed by Part XIV of the Indian Constitution under the title "Services under the Union and the States."

• The commission's role includes conducting examinations like the Civil Services Examination, Engineering Services Examination, and others.

• It also advises the President of India on matters related to recruitment, transfers, and disciplinary actions.

• State Public Service Commissions

• Each state in India has its own Public Service Commission to conduct recruitment for state-level services.

• These commissions function under the provisions of Articles 315 to 323 of the Indian Constitution.

• Independence of Public Service Commissions

• The members of the UPSC and State Public Service Commissions are appointed by the President or the Governor, respectively.

• Their independence is ensured by provisions related to security of tenure and conditions of service.

• Other Relevant Articles

• Article 316: Deals with the appointment and term of office of members of the Public Service Commissions.

• Article 317: Provides for the removal and suspension of a member of the Public Service Commission.

• Article 318: Empowers the President or Governor to make regulations regarding the conditions of service for members.

Q20. Answer: (a) It allows local communities to tailor need-based development initiatives.

The correct answer is It allows local communities to tailor need-based development initiatives..

Key Points

• Decentralised planning empowers local communities to identify and address specific developmental needs, ensuring a more targeted approach to resource allocation.

• It enhances community participation in governance, creating a sense of ownership among citizens over developmental projects.

• The Panchayati Raj system fosters bottom-up planning, enabling grassroots-level involvement in decision-making and policy implementation.

• It ensures better accountability and transparency as decision-making is closer to the people, making it easier to monitor and evaluate progress.

• Decentralisation reduces dependency on centralised authorities and encourages capacity building at the local level, promoting sustainable development.

Additional Information

• Panchayati Raj System:

• It is a system of local self-government in rural India introduced by the 73rd Constitutional Amendment Act, 1992.

• The three-tier structure consists of Gram Panchayat (village level), Panchayat Samiti (block level), and Zila Parishad (district level).

• It aims to decentralise governance and empower rural areas with administrative and financial autonomy.

• Decentralisation:

• It refers to the delegation of decision-making power from central authorities to lower levels of administration.

• Decentralisation promotes democratic participation, administrative efficiency, and resource optimisation.

• Need-Based Development:

• This approach prioritises initiatives that directly address the specific needs and priorities of a community.

• It ensures that resources are utilised effectively to achieve maximum impact on local welfare.

• Significance of the 73rd Amendment:

• The amendment provided constitutional status to Panchayati Raj institutions, ensuring their continuity and greater accountability.

• It introduced a provision for regular elections and reservation of seats for Scheduled Castes, Scheduled Tribes, and women.

• Challenges in Decentralised Planning:

• Lack of financial resources and technical expertise at the grassroots level can hinder effective implementation.

• Coordination among different levels of government is crucial for the success of decentralised initiatives.

Q21. Answer: (a) DGD 25

The pattern followed here is.

Thus, the missing term in the series is DGD 25.

Hence, the correct answer is Option 1.

Q22. Answer: (d) 20% gain

Shortcut Trick

Ratio of Selling Price (SP) to Cost Price (CP) can be derived from the given condition.

30 × SP = 36 × CP => SP ÷ CP = 36 ÷ 30 = 6 ÷ 5.

Profit ratio units = 6 − 5 = 1 unit.

Gain% = (Profit units ÷ CP units) × 100 = (1 ÷ 5) × 100 = 20%.

Since SP > CP, it is a gain.

Therefore The correct answer is 20% gain.

Alternate Method

Given: Selling price of 30 books = Cost price of 36 books.

Formulas: Profit = SP − CP | Profit% = (Profit ÷ CP) × 100

=> Let the Cost Price (CP) of 1 book be Re. 1.

=> CP of 36 books = Rs. 36.

=> According to the question, SP of 30 books = CP of 36 books = Rs. 36.

=> CP of 30 books = Rs. 30.

=> Profit = SP − CP = 36 − 30 = Rs. 6.

=> Profit% = (6 ÷ 30) × 100 = 1/5 × 100 = 20%.

Therefore The correct answer is 20% gain.

Additional Information

Profit and Loss on Quantity

When the CP of 'm' articles is equal to the SP of 'n' articles, the gain or loss percentage is given by [(m − n) ÷ n] × 100. A positive result indicates gain, and a negative result indicates loss.

Cost Price & Selling Price Relationship

If the number of items sold is less than the number of items bought for the same price, there is always a gain.

Q23. Answer: (b) Dhamma Mahamatras

The correct answer is Dhamma Mahamatras.

Key Points

• Dhamma Mahamatras were special officers appointed by Emperor Ashoka to spread the principles of Dhamma (moral law).

• They were primarily responsible for promoting ethical values and non-violence across the Mauryan Empire.

• The Dhamma Mahamatras also worked towards the welfare of the people, animals, and the environment, emphasizing compassion and harmony.

• They were tasked with spreading Ashoka's edicts and ensuring their adherence among his subjects.

• The role of the Dhamma Mahamatras is mentioned in Ashoka's inscriptions, particularly in the Rock Edicts.

Additional Information

• Dhamma:

• It refers to the moral and ethical principles promoted by Ashoka, emphasizing non-violence, truthfulness, compassion, and respect for all life forms.

• Ashoka's Dhamma was influenced by Buddhist teachings but was inclusive and universal, catering to people of all religions and beliefs.

• Ashoka's Edicts:

• The inscriptions carved on rocks and pillars across the Mauryan Empire contain messages about Dhamma and governance.

• They are a valuable source of information about Ashoka's policies and his efforts to spread ethical and moral values.

• Rajukas:

• Rajukas were officers appointed by Ashoka for judicial and administrative duties.

• Unlike Dhamma Mahamatras, they were responsible for upholding law and order rather than promoting Dhamma.

• Legacy of Ashoka:

• Ashoka is remembered as a model ruler who prioritized the welfare of his subjects and emphasized moral governance.

• His efforts to spread Buddhism and ethical values had a long-lasting impact on Indian history and culture.

Q24. Answer: (d) EGLP

The pattern followed here is:

For, SUZD : ACHL

For, YAFJ : GINR

Applying the same logic to WYDH:

Thus, WYDH is related to EGLP.

Hence, the correct answer is "Option 4".

Q25. Answer: (c) LG67

The pattern followed here is.

Thus, the missing term in the series is LG67.

Hence, the correct answer is Option 3.

Q26. Answer: (c) 17,920

Shortcut Trick

Rate = 25% = 1/4 (Growth factor = 5/4 per year)

Population 3 years ago (P3) = 1,40,000 ÷ $(5/4)^3$ = 1,40,000 × 64/125 = 71,680

Population 2 years ago (P2) = P3 × 5/4 = 71,680 × 5/4 = 89,600

Difference = 89,600 − 71,680 = 17,920

Therefore The correct answer is 17,920.

Alternate Method

Given: Current Population (P) = 1,40,000 | Rate (R) = 25% | Time (n) = 3 years and 2 years ago.

Formula: $P_{(ago)} = P / (1 + R/100)^n$

=> Population 3 years ago = 1,40,000 / $(1 + 25/100)^3$

=> P3 = 1,40,000 / $(5/4)^3$ = 1,40,000 × (64/125) = 1,120 × 64 = 71,680

=> Population 2 years ago = 1,40,000 / $(1 + 25/100)^2$

=> P2 = 1,40,000 / (25/16) = 1,40,000 × (16/25) = 5,600 × 16 = 89,600

=> Difference = P2 − P3 = 89,600 − 71,680

=> Difference = 17,920

Therefore The correct answer is 17,920.

Additional Information

Population Growth Formula

Future Population = $P(1 + R/100)^n$. For population 'n' years ago, use $P / (1 + R/100)^n$.

Successive Percentage Change

Population growth is a case of successive percentage increase, similar to Compound Interest where the base changes every year.

Effective Rate Method

For a 25% increase over 2 years, the net effective increase is 25 + 25 + (25×25)/100 = 56.25%.

Q27. Answer: (d) 1885 Bombay

The correct answer is 1885 Bombay.

Key Points

• The Indian National Congress (INC) was established in 1885 by A.O. Hume, a retired British civil servant, with the aim of providing a platform for Indians to express their political aspirations.

• During the Bombay session in 1885, INC passed significant resolutions, including opposing the Arms Act and the Vernacular Press Act.

• The Arms Act (1878) restricted Indians from possessing arms without proper authorization, which was seen as discriminatory.

• The Vernacular Press Act (1878) curtailed the freedom of the Indian-language press, aiming to suppress criticism of British rule.

• The opposition to these acts was part of INC's early efforts to address colonial policies that were perceived as unjust and oppressive.

Additional Information

• Indian National Congress (INC):

• Founded in 1885, INC aimed to create a platform for Indian political representation and reform under British rule.

• The first session was held in Bombay under the presidency of W.C. Bonnerjee.

• INC was initially moderate in its approach, focusing on constitutional reforms and petitions to the British government.

• Arms Act of 1878:

• This act prohibited Indians from owning firearms without prior license, while Europeans in India were exempt.

• It was perceived as a tool to disarm Indians, further consolidating British control.

• Vernacular Press Act of 1878:

• This act targeted non-English newspapers, requiring them to avoid publishing materials critical of the British government.

• The act was repealed in 1882 due to widespread opposition and protests.

• Early INC Resolutions:

• In its first few sessions, INC focused on economic issues, administrative reforms, and civil liberties.

• Opposition to discriminatory laws like the Arms Act and Vernacular Press Act marked the beginning of organized political resistance in India.

Q28. Answer: (c) 2

Shortcut Trick

By using the Alligation method, the average value per note is Rs. 3,200 ÷ 33 ≈ Rs. 96.97.

Alternatively, assume all 33 notes are of Rs. 100, then total amount = 33 × Rs. 100 = Rs. 3,300.

Difference from actual amount = Rs. 3,300 − Rs. 3,200 = Rs. 100.

Each replacement of a Rs. 100 note by a Rs. 50 note decreases the total by Rs. 50.

Number of Rs. 50 notes = Rs. 100 ÷ 50 = 2.

Therefore The correct answer is 2.

Alternate Method

Let the number of Rs. 50 notes be x and the number of Rs. 100 notes be y.

Given:

=> x + y = 33 --- (Equation 1)

=> 50x + 100y = 3200 --- (Equation 2)

Divide Equation 2 by 50:

=> x + 2y = 64 --- (Equation 3)

Subtract Equation 1 from Equation 3:

=> (x + 2y) − (x + y) = 64 − 33

=> y = 31

Substitute y = 31 in Equation 1:

=> x + 31 = 33

=> x = 2

Therefore The correct answer is 2.

Additional Information

Linear Equations in Two Variables

A system of linear equations can be solved using the substitution method, elimination method, or graphical method to find unique values of variables.

Alligation Method for Currency Problems

This problem can also be solved using the weighted average concept where the ratio of quantities of two components is inversely proportional to the deviation of their values from the mean value.

Q29. Answer: (d) 9

Shortcut Trick

Downstream Speed (D) = 66 ÷ 6 = 11 km/hr

Upstream Speed (U) = 42 ÷ 6 = 7 km/hr

Speed in Still Water = (D + U) ÷ 2 = (11 + 7) ÷ 2 = 18 ÷ 2 = 9 km/hr

Therefore The correct answer is 9 km/hr.

Alternate Method

Given:

Downstream Distance = 66 km, Upstream Distance = 42 km, Time = 6 hours.

Formula Used:

Speed = Distance ÷ Time

Speed in Still Water (x) = (Downstream Speed + Upstream Speed) ÷ 2

Calculations:

=> Downstream Speed (D) = 66 / 6 = 11 km/hr

=> Upstream Speed (U) = 42 / 6 = 7 km/hr

=> Speed of boat in still water (x) = (11 + 7) ÷ 2

=> x = 18 ÷ 2 = 9 km/hr

Therefore The correct answer is 9 km/hr.

Additional Information

Speed of Current

The speed of the stream or current (y) can be calculated as y = (Downstream Speed − Upstream Speed) ÷ 2.

Relative Speed in Water

Downstream speed = Boat speed + Stream speed (x + y). Upstream speed = Boat speed − Stream speed (x − y).

Average Speed for Round Trip

If a boat travels the same distance downstream and upstream, Average Speed = (D × U) ÷ Boat Speed in still water.

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Q30. Answer: (a) 100

The correct answer is 100.

Key Points

• The National Tuberculosis Elimination Programme (NTEP) is India's flagship initiative for ending tuberculosis (TB) in the country.

• As part of India’s commitment to achieving the global "End TB" targets set by the WHO, NTEP aims to eliminate TB in India by 2025.

• The programme is operational under the National Health Mission (NHM), which is the umbrella programme for public health initiatives in India.

• Under NTEP, various measures such as early diagnosis, free treatment, patient support, and awareness campaigns are implemented continuously.

• As of March 2025, the programme would have been operational for 100 days in that specific year, aligning with its year-long agenda of activities.

Additional Information

• National TB Elimination Programme (NTEP):

• Previously known as the Revised National Tuberculosis Control Programme (RNTCP), it was renamed NTEP in 2020.

• The goal is to reduce TB incidence and mortality rates in alignment with WHO’s Sustainable Development Goals (SDGs).

• It provides free TB diagnostics and treatment services across public and private health sectors.

• WHO End TB Strategy:

• The strategy aims for a 90% reduction in TB deaths and an 80% reduction in TB cases by 2030 compared to 2015 levels.

• India is committed to achieving these goals five years earlier, by 2025.

• Key interventions under NTEP:

• Active case finding for early TB detection in vulnerable populations.

• Promoting adherence to treatment through nutritional and financial support for TB patients.

• Collaborating with private healthcare providers for universal access to TB care.

• TB Burden in India:

• India accounts for approximately 26% of the global TB burden, making it a high-priority country for elimination efforts.

• The government has launched campaigns like "Nikshay Poshan Yojana" to provide direct benefit transfers to TB patients for nutritional support.

Q31. Answer: (c) 13.2

Shortcut Trick

Downstream speed (u + v) = 12 + 10 = 22 km/hr

Upstream speed (u − v) = 12 − 10 = 2 km/hr

Total time = (Distance ÷ Downstream speed) + (Distance ÷ Upstream speed)

Total time = (24.2 ÷ 22) + (24.2 ÷ 2) = 1.1 + 12.1 = 13.2 hours

Therefore The correct answer is 13.2 hours.

Alternate Method

Given:

Speed of boat in still water (u) = 12 km/hr

Speed of stream (v) = 10 km/hr

Distance (D) = 24.2 km

Formula Used:

Time = Distance ÷ Speed

Downstream speed = u + v

Upstream speed = u − v

=> Downstream Speed = 12 + 10 = 22 km/hr

=> Upstream Speed = 12 − 10 = 2 km/hr

=> Time taken going Downstream = 24.2 ÷ 22 = 1.1 hours

=> Time taken coming Upstream = 24.2 ÷ 2 = 12.1 hours

=> Total Time = 1.1 + 12.1 = 13.2 hours

Therefore The correct answer is 13.2 hours.

Additional Information

Average Speed in Boats and Streams

When the distance is same for both ways, Average Speed = (Downstream Speed × Upstream Speed) ÷ Still Water Speed.

Still Water Speed Calculation

Speed in still water (u) = 1/2 × (Downstream Speed + Upstream Speed).

Stream Speed Calculation

Speed of stream (v) = 1/2 × (Downstream Speed − Upstream Speed).

Q32. Answer: (d) 214

Shortcut Trick

Let length be L and breadth be B.

From given conditions: (L + 6)(B − 5) = LB + 7 => −5L + 6B = 37

And: (L − 6)(B + 7) = LB + 31 => 7L − 6B = 73

Adding equations: 2L = 110 => L = 55 m; Substituting L: 6B = 37 + 275 = 312 => B = 52 m

Perimeter = 2 × (55 + 52) = 2 × 107 = 214 m.

Therefore The correct answer is 214 m.

Alternate Method

Given: Initial Area = LB. Two conditions for change in dimensions.

Formula: Area of rectangle = Length × Breadth | Perimeter = 2(L + B)

Case 1: (L + 6)(B − 5) = LB + 7

=> LB − 5L + 6B − 30 = LB + 7

=> −5L + 6B = 37 ... (i)

Case 2: (L − 6)(B + 7) = LB + 31

=> LB + 7L − 6B − 42 = LB + 31

=> 7L − 6B = 73 ... (ii)

Solving (i) and (ii):

=> (−5L + 6B) + (7L − 6B) = 37 + 73

=> 2L = 110 => Length = 55 m

=> −5(55) + 6B = 37 => −275 + 6B = 37 => 6B = 312 => Breadth = 52 m

=> Perimeter = 2(55 + 52) = 2(107) = 214 m

Therefore The correct answer is 214 m.

Additional Information

Properties of Rectangle

Opposite sides are equal and parallel. All internal angles are 90°. Diagonal = √(L² + B²).

Percentage Change in Area

If length increases by x% and breadth increases by y%, net area change = [x + y + (xy/100)]%.

Relationship between Perimeter and Area

For a given perimeter, a square (L=B) has the maximum area among all rectangles.

Q33. Answer: (a) Barchans

The correct answer is Barchans.

Key Points

• Barchans are crescent-shaped sand dunes found in arid and semi-arid regions, such as the Thar Desert in India.

• They are formed due to the action of unidirectional winds that move loose sand particles.

• The horns of a barchan point in the direction of the wind, while the steep slip face lies on the leeward side.

• These dunes are typically found in areas with limited vegetation, which allows wind to transport sand freely.

• Barchans are a common feature of deserts worldwide, including the Sahara Desert and the Arabian Desert, apart from the Thar Desert.

Additional Information

• Ergs:

• An erg is a vast area covered with loose sand and characterized by sand dunes.

• It is also known as a "sand sea" and is typically found in large desert systems like the Sahara.

• Inselbergs:

• An inselberg is an isolated hill or mountain that rises abruptly from a plain.

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• It is formed due to the erosion of surrounding softer rock, leaving behind hard rock masses.

• Yardangs:

• Yardangs are streamlined, wind-eroded ridges of rock that are aligned with the prevailing wind direction.

• They are formed in areas where the rock is soft and easily eroded, leaving behind elongated ridges.

• Formation of Sand Dunes:

• Sand dunes are formed by the accumulation of sand grains transported by wind through processes like saltation, suspension, and surface creep.

• The shape and size of dunes depend on wind speed, direction, and the availability of sand.

Q34. Answer: (a) It serves as both an input device, detecting touch input, and an output device, displaying information and...

The correct answer is It serves as both an input device, detecting touch input, and an output device, displaying information and visual responses..

Key Points

• A touch-sensitive display, commonly known as a touchscreen, performs both input and output functions within a computer system.

• As an input device, it detects and interprets touch gestures, such as taps, swipes, and pinches, from the user.

• As an output device, it displays visual content, including text, images, and animations, to communicate with the user.

• Touchscreens are widely used in devices such as smartphones, tablets, and kiosks, where direct interaction with the interface is required.

• This dual functionality streamlines user interaction by combining input and output into a single interface.

Additional Information

• Touchscreen Technology Types

• Resistive: Uses pressure to detect touches and is commonly used in ATMs and older devices.

• Capacitive: Detects touch through the electrical properties of the human body and is widely used in smartphones.

• Infrared: Uses light beams to detect touch and is found in larger devices like kiosks.

• Surface Acoustic Wave: Utilizes ultrasonic waves to detect touch input.

• Input Device vs. Output Device

• Input Device: Captures and sends data to the computer system (e.g., keyboard, mouse, touchscreen input).

• Output Device: Displays or communicates data from the computer system (e.g., monitor, printer, touchscreen display).

• Applications of Touchscreen Displays

• Used in consumer electronics such as smartphones, tablets, and smartwatches.

• Integrated into public information systems like ticket vending machines and ATMs.

• Utilized in industrial and medical applications for control panels and diagnostic equipment.

• Advantages of Touchscreens

• Offers intuitive and user-friendly interaction.

• Reduces the need for additional input hardware like keyboards or mice.

• Enhances the aesthetics and compactness of devices.

• Limitations of Touchscreens

• Can be less precise compared to physical input devices.

• May face issues like smudging or reduced sensitivity over time.

• Requires direct physical interaction, which can be inconvenient in certain scenarios.

Q35. Answer: (c) 3456

Shortcut Trick

Ratio of length (L) and breadth (B) = 3 : 8

Sum of ratio parts (L + B) = 3 + 8 = 11 units

Perimeter = 2 × (L + B) => 2 × 11 units = 22 units = 264 m

1 unit = 264 ÷ 22 = 12 m

Area = (3 × 12) × (8 × 12) = 36 × 96 = 3456 m^2

Therefore The correct answer is 3456 m^2.

Alternate Method

Given:

Ratio of Length (l) to Breadth (b) = 3 : 8

Perimeter (P) = 264 m

Formula Used:

Perimeter of Rectangle = 2 × (l + b)

Area of Rectangle = l × b

Calculations:

Let the length be 3x and the breadth be 8x.

=> 2 × (3x + 8x) = 264

=> 2 × 11x = 264

=> 22x = 264

=> x = 264 ÷ 22

=> x = 12

=> Length = 3 × 12 = 36 m

=> Breadth = 8 × 12 = 96 m

=> Area = 36 × 96

=> Area = 3456 m^2

Therefore The correct answer is 3456 m^2.

Additional Information

Properties of Rectangle

A rectangle is a quadrilateral where opposite sides are equal and all angles are 90°. Diagonal (d) = $\sqrt{(l^2 + b^2)}$.

Area and Perimeter Units

Perimeter is measured in linear units (m, cm), while Area is always measured in square units (m^2, cm^2).

Relationship of Perimeter and Area

For a fixed perimeter, a square has the maximum area among all rectangles.

Q36. Answer: (a) OGKN

The pattern followed here is that each letter of the first term is shifted backward by 6 positions. The pattern can be summarized as (-6, -6, -6, -6).

For: ZRVY : TLPS

For: WOSV : QIMP

Applying the same logic to UMQT:

Thus, UMQT is related to OGKN.

Hence, the correct answer is "Option 1".

Q37. Answer: (d) Rs. 5,04,000

Shortcut Trick

Use the direct relation between Marked Price (MP) and Cost Price (CP): MP ÷ CP = (100 + Gain%) ÷ (100 − Discount%).

MP ÷ 56000 = (100 + 71) ÷ (100 − 81) = 171 ÷ 19.

MP ÷ 56000 = 9 ÷ 1.

MP = 56000 × 9 = 504000.

Therefore The correct answer is Rs. 5,04,000.

Alternate Method

Given → CP = Rs. 56,000, Gain% = 71%, Discount% = 81%.

Formulas: SP = CP × (100 + Gain%) ÷ 100 | MP = (SP × 100) ÷ (100 − Discount%).

=> Calculate Selling Price (SP): SP = 56000 × (100 + 71) ÷ 100 = 560 × 171 = Rs. 95,760.

=> Let Marked Price be MP. SP = MP × (100 − 81) ÷ 100.

=> 95760 = MP × 19 ÷ 100.

=> MP = (95760 × 100) ÷ 19 = 5040 × 100 = Rs. 5,04,000.

Therefore The correct answer is Rs. 5,04,000.

Additional Information

Marked Price and Discount

Discount is always calculated on the Marked Price (List Price). MP − Discount = SP.

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MP-CP Ratio Formula

The most efficient way to solve problems involving both discount and profit is MP/CP = (100 + P%)/(100 − D%).

Q38. Answer: (d) 84

Shortcut Trick

Net filling time = (x × y) ÷ (y − x)

Here, filling pipe time x = 12 hours and emptying pipe time y = 14 hours.

Time taken = (12 × 14) ÷ (14 − 12) = 168 ÷ 2 = 84 hours.

Therefore The correct answer is 84 hours.

Alternate Method

Pipe Type	Time (Hours)	Total Capacity (LCM)	Efficiency
Filling Pipe (A)	12	84 units	+7
Emptying Pipe (B)	14	−6	

Given: Filling time = 12 hours, Emptying time = 14 hours.

Formula Used: Time = Total Capacity ÷ Net Efficiency

=> LCM of 12 and 14 = 84 units (Total Capacity)

=> Efficiency of Pipe A = 84 ÷ 12 = +7 units/hr

=> Efficiency of Pipe B = 84 ÷ 14 = −6 units/hr (negative because it empties)

=> Net efficiency when both pipes are open = 7 − 6 = 1 unit/hr

=> Time required to fill the tank = 84 ÷ 1 = 84 hours

Therefore The correct answer is 84 hours.

Additional Information

Net Work Done

When one pipe fills (rate x) and another empties (rate y), the net work per hour is (1/x − 1/y). If the result is positive, the tank fills.

Pipes and Cisterns Convention

Inlet pipes are assigned positive efficiency, while outlet (leakage) pipes are assigned negative efficiency.

LCM Method

Total capacity is assumed as the Least Common Multiple (LCM) of individual times to simplify efficiency calculations into integers.

Q39. Answer: (a) The Prime Minister advises the President to dissolve it.

The correct answer is The Prime Minister advises the President to dissolve it..

Key Points

• In the Indian parliamentary system, the President of India holds the formal authority to dissolve the Lok Sabha.

• The dissolution of the Lok Sabha typically occurs on the advice of the Prime Minister and the Council of Ministers.

• This advice is binding on the President as per the principles of a parliamentary democracy where the President acts on the advice of the Cabinet.

• Dissolution can occur before the completion of the Lok Sabha's five-year term or upon its natural expiry.

• This process is crucial for initiating fresh general elections and ensuring democratic continuity.

Additional Information

• Lok Sabha:

• The Lok Sabha is the lower house of India's Parliament and is composed of representatives directly elected by the people of India.

• It has a term of five years, unless dissolved sooner.

• It is responsible for enacting laws, controlling finances, and scrutinizing the work of the executive.

• Dissolution of Lok Sabha:

• Dissolution refers to the complete termination of the Lok Sabha's current term, leading to general elections.

• It can be classified into automatic dissolution (when the term ends) or premature dissolution (upon the Prime Minister's advice).

• Role of the President:

• The President of India, as the constitutional head, formally dissolves the Lok Sabha.

• The President acts based on the advice of the Council of Ministers, led by the Prime Minister.

• Relevance of Dissolution:

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• Dissolution ensures the periodic renewal of the democratic mandate through elections.
• It provides an opportunity for the electorate to evaluate the performance of the government.

Q40. Answer: (d) Conjunctive tissue

The correct answer is Conjunctive tissue.

Key Points

• In a dicot root, conjunctive tissue is a type of parenchymatous tissue that is located between the xylem and phloem.
• The conjunctive tissue plays a critical role in providing mechanical support to the vascular bundles.
• It is composed of living cells, primarily parenchyma, which help in the storage of food substances.
• The arrangement of xylem and phloem in dicot roots is radial, and the conjunctive tissue fills the space between these vascular tissues.
• This tissue also contributes to the formation of vascular cambium during secondary growth in dicot roots.

Additional Information

• Dicot Root Anatomy:
• Dicot roots have a distinct arrangement of tissues: epidermis, cortex, endodermis, pericycle, vascular bundles, and pith.
• The vascular bundles are arranged in a radial pattern, with xylem and phloem alternating around the center.
• Radial Vascular Bundles:
• In radial vascular bundles, xylem and phloem are present on different radii, separated by conjunctive tissue.
• Role of Vascular Cambium:
• The vascular cambium originates from the conjunctive tissue during secondary growth, contributing to the formation of secondary xylem and phloem.
• Parenchyma in Roots:
• Parenchyma cells in the conjunctive tissue are living, thin-walled, and capable of storing nutrients.
• They also play a role in repair and regeneration of tissues in plants.

Q41. Answer: (b) Only C

Shortcut Trick

For two lines to be parallel, the interior angles on the same side of a transversal must be supplementary (sum = 180°).

Statement C incorrectly states that they must be complementary (sum = 90°).

Therefore The correct answer is Only C.

Alternate Method

Given: Four statements regarding the conditions for two lines to be parallel when intersected by a transversal.

Formula Used: Parallel Line Axioms and Theorems.

=> Statement A: If corresponding angles are equal, the lines are parallel. (True)

=> Statement B: If alternate interior angles are equal, the lines are parallel. (True)

=> Statement D: If interior angles on the same side are supplementary (angle 1 + angle 2 = 180°), the lines are parallel. (True)

=> Statement C: If interior angles on the same side are complementary (angle 1 + angle 2 = 90°), the lines are not parallel. (False)

Therefore The correct answer is Only C.

Additional Information

Supplementary Angles

Two angles are called supplementary if the sum of their measures is exactly 180°.

Complementary Angles

Two angles are called complementary if the sum of their

Q42. Answer: (d) 0

Given:

1 is added to each odd digit and 2 is subtracted from each even digit in the number 7532168.

Given	7	5	3	2	1	6	8
Operation	+1	+1	+1	-2	+1	-2	-2
New number	8	6	4	0	2	4	6

The new number formed is 8640246.

The third digit from the left is 4.

The second digit from the right is 4.

The difference between these two digits is 4 - 4 = 0.

Hence, the correct answer is "Option 4".

Q43. Answer: (b) MH - KJ

The logic followed here is.

Option (1) 'SV - PS':

Option (2) 'MH - KJ':

Option (3) 'PS - MP':

Option (4) 'IL - FI':

Thus, option 2 is odd one.

Hence, the correct answer is "Option 2".

Q44. Answer: (c) Bhuta

The correct answer is Bhuta.

Key Points

• Bhuta is a traditional folk song of Kerala that is sung to ward off evil spirits and ghosts.

• The term "Bhuta" translates to "spirit" or "ghost" in several Dravidian languages, including Malayalam.

• This folk art is deeply rooted in the cultural and spiritual practices of Kerala, especially in rural areas.

• Bhuta songs are often performed during ceremonies or rituals aimed at exorcism or invoking protective deities.

• The practice is tied to the belief in animism, which attributes spiritual significance to natural elements and entities.

Additional Information

• Folklore of Kerala:

• Kerala has a rich tradition of folk arts, including songs, dances, and rituals, that reflect its cultural diversity.

• Other significant folk traditions of Kerala include Theyyam, Padayani, and Ottamthullal.

• These traditions are often performed during festivals and religious ceremonies.

• Animism in Indian Culture:

• Animism is the belief that spirits or supernatural forces inhabit natural objects and phenomena.

• This belief is prevalent in many tribal and rural communities in India, including Kerala.

• Rituals and songs like Bhuta are part of animistic practices aimed at maintaining harmony with these forces.

• Ceremonial Contexts:

• Bhuta songs are typically performed during specific ceremonies, including housewarming, temple festivals, and exorcisms.

• They are accompanied by traditional musical instruments like drums and cymbals.

• Kerala's Linguistic Identity:

• Malayalam is the official language of Kerala and is one of the 22 scheduled languages of India.

• Many folk traditions, including Bhuta songs, are preserved in the Malayalam language.

Q45. Answer: (d) lie in the same plane

The correct answer is lie in the same plane.

Key Points

• The first law of reflection states that the incident ray, the reflected ray, and the normal to the surface of the mirror at the point of incidence all lie in the same plane.

• This law applies to any reflecting surface, including plane, concave, or convex mirrors.

• The angle of incidence is equal to the angle of reflection, but this relationship is valid only if the rays and the normal lie in the same plane.

• This fundamental principle ensures predictability in the behavior of light during reflection and is crucial for understanding optics.

• Additional Information

• Reflection of Light:

• Reflection is the phenomenon of light bouncing back into the same medium after striking a smooth surface.

• It is governed by two laws: the angle of incidence equals the angle of reflection, and all rays and the normal lie in the same plane.

• Normal:

• A normal is a perpendicular line drawn to the surface at the point of incidence.

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• It serves as the reference line for measuring the angles of incidence and reflection.
• Angle of Incidence and Reflection:
• The angle of incidence is the angle between the incident ray and the normal.
• The angle of reflection is the angle between the reflected ray and the normal.
• Types of Reflection:
• Regular Reflection: Occurs on smooth surfaces, producing clear images.
• Diffuse Reflection: Occurs on rough surfaces, scattering light in different directions.
• Applications of Reflection:
• Used in mirrors, optical instruments like telescopes, and periscopes.
• Fundamental to the working of devices like rearview mirrors and solar reflectors.

Q46. Answer: (d) Uttar Pradesh

The correct answer is Uttar Pradesh.

Key Points

• Govind Ballabh Pant was the first Chief Minister of Uttar Pradesh, serving from 26 January 1950 to 27 December 1954.
• Uttar Pradesh, formerly known as the United Provinces, was reorganized and renamed on 26 January 1950, becoming the largest state in India.
• Pant was known for his pioneering role in strengthening India's federal structure and advocating for land reforms in Uttar Pradesh.
• He played a significant role in shaping the state's development policies during India's formative years post-independence.
• Pant's tenure is remembered for his emphasis on education, infrastructure, and social welfare programs aimed at improving the lives of citizens.

Additional Information

• Govind Ballabh Pant's Contributions:
• He was a prominent freedom fighter and a close associate of Mahatma Gandhi.
• Pant was instrumental in abolishing the zamindari system, ensuring land ownership for farmers.
• He played a key role in drafting India's Constitution as a member of the Constituent Assembly.
• Pant was awarded the Bharat Ratna in 1957, India's highest civilian honor, for his contributions to the nation.
• Uttar Pradesh State Formation:
• Uttar Pradesh was officially renamed from United Provinces on 26 January 1950, coinciding with the adoption of India's Constitution.
• It is India's most populous state and plays a significant role in the country's political landscape.
• The state is known for its cultural heritage, including historical sites such as the Taj Mahal and Varanasi.
• Land Reforms in Post-Independence India:
• Land reforms aimed at redistributing agricultural land to landless farmers were a cornerstone of India's socio-economic policies.
• Govind Ballabh Pant's efforts in Uttar Pradesh helped set the foundation for equitable land ownership.
• These reforms were crucial in reducing rural poverty and empowering marginalized communities.
• Chief Ministers of Uttar Pradesh:
• Govind Ballabh Pant was succeeded by Sampurnanand as Chief Minister in 1954.
• Uttar Pradesh has seen numerous leaders contributing to its development, including Charan Singh, Hemwati Nandan Bahuguna, and others.
• The state has been pivotal in shaping India's political narrative due to its size and demographic significance.

Q47. Answer: (c) 4

Given: B, L, M, N, S, T and Z are sitting around a circular table facing the centre.

Z sits fourth to the right of B. Only two people sit between L and T when counted from the left of L.

M sits third to the left of S. N is an immediate neighbour of S and T.

Thus, Only FOUR people are there between Z and N when counted from the left of N.

Hence, the correct answer is "Option 3".

Q48. Answer: (a) YQVX

The pattern followed here is that each letter of the first term is shifted forward by 3 positions. The pattern can be summarized as (+3, +3, +3, +3).

Pair 1: ASXZ : DVAC

Pair 2: MEJL : PHMO

Applying the same logic to VNSU:

Thus, VNSU is related to YQVX.

Hence, the correct answer is "Option 1".

Q49. Answer: (c) Mumbai

The correct answer is Mumbai.

Key Points

• As per the Census 2011, Mumbai is the most populous urban agglomeration in India.

• Mumbai's urban agglomeration had a population of approximately 18.4 million in 2011.

• Mumbai, often referred to as the financial capital of India, attracts people from across the country due to its economic opportunities.

• Other major urban agglomerations include Delhi (16.3 million), Kolkata (14.1 million), and Bengaluru (8.5 million).

• Mumbai's metropolitan region includes areas such as Thane, Navi Mumbai, and Vasai-Virar, contributing to its high population.

Additional Information

• Urban Agglomeration:

• An urban agglomeration refers to a continuously built-up area consisting of a city and its adjoining towns.

• It often includes areas beyond the municipal boundaries of the main city, forming a larger metropolitan region.

• Census 2011:

• The Census 2011 was India's 15th National Census, conducted by the Office of the Registrar General and Census Commissioner.

• It provided comprehensive demographic, economic, and social data for policymaking.

• Population Density of Mumbai:

• Mumbai is one of the most densely populated cities in the world, with a density of over 20,000 persons per square kilometer.

• Its high population density is attributed to factors such as economic opportunities, migration, and limited land availability.

• Economic Significance of Mumbai:

• Mumbai is home to major financial institutions like the Reserve Bank of India (RBI), Bombay Stock Exchange (BSE), and corporate headquarters.

• It also hosts Bollywood, India's largest film industry, contributing significantly to the city's economy.

Q50. Answer: (c) 40

Shortcut Trick

Total Days: February (15) + March (31) + April (15) = 61 days.

Since 2024 is a leap year, Time (T) = 61 ÷ 366 = 1/6 year.

Simple Interest (SI) = 3000 × 8% × (1/6) = (3000 × 8) ÷ (100 × 6) = 240 ÷ 6 = Rs. 40.

Therefore The correct answer is Rs. 40.

Alternate Method

Given: Principal (P) = Rs. 3000, Rate (R) = 8% p.a., Dates = 14 Feb 2024 to 15 Apr 2024.

Formula Used: SI = (P × R × T) ÷ 100

=> Days in February = 29 − 14 = 15 days (2024 is a leap year).

=> Days in March = 31 days.

=> Days in April = 15 days.

=> Total Time (T) = 15 + 31 + 15 = 61 days = 61/366 years = 1/6 years.

=> Simple Interest = (3000 × 8 × 1) ÷ (100 × 6)

=> Simple Interest = (30 × 8) ÷ 6 = 240 ÷ 6 = 40.

Therefore The correct answer is Rs. 40.

Additional Information

Leap Year Identification

A year is a leap year if it is divisible by 4. However, century years must be divisible by 400. 2024 is divisible by 4, so February has 29 days.

Simple Interest Formula

SI = (P × R × T) ÷ 100, where P is Principal, R is Rate per annum, and T is Time in years.

Day Counting Rule

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In banking, the day of deposit is usually excluded and the day of withdrawal is included while calculating the interest period.

Q51. Answer: (d) 9

The logic followed here is:

The code for "S" is 9.

Hence, the correct answer is "Option 4".

Q52. Answer: (a) 12

Shortcut Trick

Fourth Proportion of 3, 9, 4 → 3 : 9 :: 4 : x => x = (9 × 4) ÷ 3 = 12.

Third Proportion of A, 12 is given as 12 => A : 12 :: 12 : 12.

By inspection, for the ratio A : 12 to equal 12 : 12, A must be 12.

Therefore The correct answer is 12.

Alternate Method

Given: Numbers for fourth proportion are 3, 9, and 4. The third proportion to A and 12 is equal to this fourth proportion.

Formula Used: Fourth proportion (x) to a, b, c is x = (b × c) ÷ a. Third proportion (c) to a and b is c = b^2 ÷ a.

Calculations:

=> Fourth proportion = (9 × 4) ÷ 3

=> Fourth proportion = 36 ÷ 3 = 12

=> According to the question, Third Proportion to A and 12 = 12

=> 12 = 12^2 ÷ A

=> 12 = 144 ÷ A

=> A = 144 ÷ 12

=> A = 12

Therefore The correct answer is 12.

Additional Information

Mean Proportion

The mean proportion between two numbers a and b is √(a × b).

Continued Proportion

If a, b, c are in continued proportion, then a/b = b/c, which implies b^2 = ac.

Invertendo and Alternendo

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

Q53. Answer: (d) 324

Shortcut Trick

Cube edge (a) = $\sqrt[3]{512}$ = 8 cm.

Total Cube edge sum = 12 × 8 = 96 cm.

Total Cuboid edge sum = 4 × (4x + 3x + x) = 32x.

Equating sums: 32x = 96 => x = 3.

Cuboid Volume = (4 × 3) × (3 × 3) × (1 × 3) = 12 × 9 × 3 = 324 cm^3.

Therefore The correct answer is 324 cm^3.

Alternate Method

Given:

Volume of cube = 512 cm^3.

Ratio of cuboid dimensions (L:B:H) = 4 : 3 : 1.

Formula Used:

Volume of cube = a^3 | Sum of edges of cube = 12a

Sum of edges of cuboid = 4(L + B + H) | Volume of cuboid = L × B × H

Calculations:

=> a^3 = 512 => a = 8 cm.

=> Sum of edges of cube = 12 × 8 = 96 cm.

=> Let cuboid dimensions be 4x, 3x, and 1x.

=> Sum of edges of cuboid = 4(4x + 3x + x) = 4(8x) = 32x.

=> 32x = 96 => x = 3 cm.

=> Length (L) = 4 × 3 = 12 cm, Breadth (B) = 3 × 3 = 9 cm, Height (H) = 1 × 3 = 3 cm.

=> Volume of cuboid = 12 × 9 × 3 = 324 cm^3.

Therefore The correct answer is 324 cm^3.

Additional Information

Total Surface Area of Cuboid

The total area of all six faces is 2(LB + BH + LH).

Diagonal of a Cuboid

The longest rod that can be placed inside is $\sqrt{(L^2 + B^2 + H^2)}$.

Lateral Surface Area of Cube

The area of the four vertical walls of a cube is $4a^2$.

Q54. Answer: (b) 148

Shortcut Trick

Apply the Empirical Formula: Mode = 3 × Median − 2 × Mean.

Substitute the given values: Mode = 3(78) − 2(43).

Mode = 234 − 86 = 148.

Therefore The correct answer is 148.

Alternate Method

Given:

Mean = 43

Median = 78

Formula Used:

The empirical relationship between the three measures of central tendency is:

Mode = 3 × Median − 2 × Mean

Calculations:

=> Mode = 3 × 78 − 2 × 43

=> Mode = 234 − 86

=> Mode = 148

Therefore The correct answer is 148.

Additional Information

Empirical Relationship

This formula is an approximation used for moderately skewed distributions. It is also known as Karl Pearson's formula.

Symmetrical Distribution

In a perfectly symmetrical distribution (like a Normal Distribution), the Mean, Median, and Mode are all equal (Mean = Median = Mode).

Skewness and Central Tendency

For a positively skewed distribution, Mean > Median > Mode. For a negatively skewed distribution, Mean < Median < Mode.

Q55. Answer: (b) R

Given: Each of P, Q, R, S, T, U and V has an exam on a different day of a week,

Starting from Monday and ending on Sunday of the same week.

1) T has an exam on Wednesday.

Day	Person
Monday	
Tuesday	
Wednesday	T
Thursday	
Friday	
Saturday	

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Sunday	

2) Exactly 4 people have exams between S and R, neither of whom has an exam on Monday. U has an exam immediately before S.

3) Q has an exam immediately before and V has an exam immediately after P.

Day	Person
Monday	U
Tuesday	S
Wednesday	T
Thursday	Q
Friday	P
Saturday	V
Sunday	R

So, the person who has an exam on Sunday is R.

Hence, the correct answer is 2) R.

Q56. Answer: (a) 12.92%

The correct answer is 0.1292.

Key Points

• According to the World Bank 2021 data, the poverty rate at $2.15 a day (2017 PPP) for India was 12.92% (0.1292 in decimal).

• This poverty line ($2.15/day) represents the international extreme poverty threshold, adjusted to 2017 Purchasing Power Parity (PPP).

• India has made significant progress in reducing poverty levels over the years, but challenges remain, especially in rural areas and among marginalized communities.

• The poverty rate is calculated based on consumption expenditure surveys and reflects the percentage of the population living below the international poverty line.

• This data is part of the World Bank's global efforts to monitor poverty trends and align with the UN's Sustainable Development Goal (SDG) of ending extreme poverty.

Additional Information

• Purchasing Power Parity (PPP):

• PPP is an economic theory used to compare the relative value of currencies in terms of their purchasing power.

• It accounts for the cost of living and inflation differences between countries, ensuring a more accurate comparison of poverty and income levels.

• World Bank's International Poverty Line:

• The World Bank defines extreme poverty as living on less than $2.15 per day (2017 PPP).

• This measure is periodically updated to reflect inflation and changes in consumption patterns.

• India's Poverty Reduction Initiatives:

• India has implemented various schemes such as MGNREGA, National Food Security Act, and Ayushman Bharat to combat poverty.

• These initiatives focus on employment generation, food security, and healthcare for the underprivileged.

• Sustainable Development Goals (SDGs):

• SDG 1 aims to "end poverty in all its forms everywhere" by 2030.

• Monitoring poverty rates at $2.15/day contributes to assessing progress toward achieving this goal.

Q57. Answer: (a) Gyeongju

The correct answer is Gyeongju.

Key Points

• The Asia-Pacific Economic Cooperation (APEC) Summit in November 2025 will be hosted by Gyeongju, South Korea.

• Gyeongju is a historical city in South Korea, known for its rich cultural heritage and designation as a UNESCO World Heritage site.

• South Korea has previously hosted the APEC Summit, with the 2005 APEC Summit held in Busan.

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• APEC is a forum for 21 Pacific Rim economies aimed at promoting free trade and economic cooperation across the Asia-Pacific region.
• The summit will focus on critical regional issues such as economic growth, trade liberalization, and sustainable development.

Additional Information

• About APEC:
• APEC, established in 1989, promotes economic integration and sustainable growth among its 21 member economies.
• Members include major economies like the USA, China, Japan, and Australia, among others.
• APEC operates on the basis of non-binding agreements, open dialogue, and equal respect for all participants.
• The theme for each APEC Summit is chosen by the host country, emphasizing regional priorities.
• Gyeongju's Significance:
• Known as the "museum without walls," Gyeongju boasts numerous historical sites from the Silla Dynasty.
• Key attractions include Bulguksa Temple, Seokguram Grotto, and Gyeongju Historic Areas.
• The city reflects the cultural and economic importance of South Korea in the Asia-Pacific region.
• Previous APEC Summits:
• The first APEC meeting was held in Canberra, Australia, in 1989.
• The 2023 APEC Summit is scheduled to be hosted by the United States in San Francisco.
• The 2024 APEC Summit will be hosted by Peru.
• APEC's Role in Trade:
• APEC focuses on reducing trade barriers, promoting investments, and fostering innovation.
• It has initiatives to support small and medium enterprises (SMEs) and strengthen digital economies.

Q58. Answer: (d) 8

Given:

1 is added to each odd digit and 2 is subtracted from each even digit in the number 6185742.

Given	**6**	**1**	**8**	**5**	**7**	**4**	**2**
Operation	-2	+1	-2	+1	+1	-2	-2
New number	4	2	6	6	8	2	0

The new number formed is 4266820.

The digits in the new number are 0, 2, 2, 4, 6, 6, 8.

The highest digit in the new number is 8.

The lowest digit in the new number is 0.

Sum of the highest and lowest digits = 8 + 0 = 8.

Hence, the correct answer is "Option 4".

Q59. Answer: (a) Laterite soil

The correct answer is Laterite Soil.

Key Points

• Laterite soil is formed under high temperature and heavy rainfall, leading to intense leaching of soil nutrients.
• This soil is deficient in nitrogen, phosphorus, and potassium, making it less fertile for agricultural purposes.
• It is rich in iron oxide and aluminium, giving it a distinct reddish or brown color.
• Laterite soil is commonly found in regions like Western Ghats, Eastern Ghats, and parts of Maharashtra, Odisha, Kerala, and Karnataka.
• It is widely used for brick-making and construction material due to its compact and hard nature.

Additional Information

• Leaching Process:
• Leaching occurs due to heavy rainfall washing away soluble nutrients like nitrogen and potassium from the soil.
• This process leaves behind insoluble oxides like iron and aluminium, which dominate laterite soil composition.
• Formation Conditions:
• Laterite soil forms in tropical and subtropical regions with alternating wet and dry climates.
• The intense weathering of parent rock contributes to its unique mineral composition.
• Uses of Laterite Soil:

• It is extensively used in brick-making for construction purposes.
• In agriculture, it is suitable for crops like cashew, coffee, and tea with proper soil management.
• Distribution in India:
• Laterite soil is predominantly found in states such as Kerala, Karnataka, Tamil Nadu, Maharashtra, and Odisha.
• It covers nearly 2.48 lakh square kilometers of land in India.

Q60. Answer: (d) 2

Given:

1 is added to each odd digit and 2 is subtracted from each even digit in the number 5637482.

Given	5	6	3	7	4	8	2
Operation	+1	-2	+1	+1	-2	-2	-2
New number	6	4	4	8	2	6	0

The new number formed is 6448260.

The digits in the new number are 0, 2, 4, 4, 6, 6, 8.

The digits 4 and 6 appear more than once.

Thus, two digits appear more than once in the new number.

Hence, the correct answer is "Option 4".

Q61. Answer: (a) Andhra Pradesh

The correct answer is Andhra Pradesh.

Key Points

• Kuchipudi is one of the eight classical dance forms of India and originates from Andhra Pradesh.
• The dance form derives its name from the village Kuchelapuram, also known as Kuchipudi, located in Krishna district of Andhra Pradesh.
• Kuchipudi combines dance, acting, and narration, making it a dance-drama tradition.
• The dance form is deeply rooted in Natya Shastra, an ancient Sanskrit text on performing arts.
• Kuchipudi performances traditionally begin with a prayer and are accompanied by Carnatic music.

Additional Information

• Natya Shastra
• An ancient Indian treatise on performing arts written by Bharata Muni.
• It outlines the principles of classical dance, drama, and music.
• Kuchipudi adheres to the guidelines set in Natya Shastra, blending elements of bhava (expression), raga (melody), and tala (rhythm).
• Costume and Makeup
• Kuchipudi dancers wear vibrant costumes similar to Bharatanatyam but with unique draping styles.
• Elaborate makeup and jewelry enhance the visual appeal of the performance.
• Key Elements of Kuchipudi
• It involves a combination of pure dance (nritta) and expressive dance (abhinaya).
• One of the highlights is the Tarangam, where dancers perform intricate steps on the edges of a brass plate.
• Prominent Kuchipudi Performers
• Renowned exponents include Vempati Chinna Satyam and Yamini Krishnamurthy.
• They played a pivotal role in popularizing Kuchipudi on global platforms.

Q62. Answer: (d) 376

Shortcut Trick

Apply the direct algebraic identity: $4ab = (a + b)^2 - (a - b)^2$

Substitute the given values: $4ab = 46^2 - 612$

$4ab = 2116 - 612 = 1504$

$ab = 1504 \div 4 = 376$

Therefore The correct answer is 376.

Alternate Method

Given:

Sum of two numbers (a + b) = 46

Square of the difference $(a - b)^2 = 612$

Formula Used:

$(a + b)^2 - (a - b)^2 = 4ab$

=> a + b = 46

=> Squaring both sides: $(a + b)^2 = 46^2$

=> $(a + b)^2 = 2116$

=> We know that $(a + b)^2 = a^2 + b^2 + 2ab$ and $(a - b)^2 = a^2 + b^2 - 2ab$

=> Subtracting the equations: $(a + b)^2 - (a - b)^2 = 4ab$

=> 2116 − 612 = 4ab

=> 1504 = 4ab

=> ab = 1504 ÷ 4

=> ab = 376

Therefore The correct answer is 376.

Additional Information

Algebraic Identity for Sum and Difference

$(a + b)^2 + (a - b)^2 = 2(a^2 + b^2)$. This identity is used to find the sum of squares of two numbers when their sum and difference are known.

Relationship between Sum, Difference, and Product

$ab = [(a + b)^2 - (a - b)^2] \div 4$. This is a direct formula to calculate the product of two variables without finding their individual values.

Square of a Binomial

$(a + b)^2 = a^2 + 2ab + b^2$ and $(a - b)^2 = a^2 - 2ab + b^2$.

Q63. Answer: (d) Three

Given: L, M, N, O, P and W live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2 and so on, till the topmost floor is numbered 6.

1) Only three people live between M and N, where M lives below N.

2) O lives on an odd-numbered floor and immediately above M.

Therefore, M is on Floor 2, O is on Floor 3, and N is on Floor 6.

6	**N**
5	
4	
3	O
2	M
1	

3) W lives on one of the floors below P and on one of the floors above L.

6	**N**
5	P
4	W
3	O
2	M
1	L

From the final arrangement, P is on Floor 5 and L is on Floor 1. The people living between them are W (on Floor 4), O (on Floor 3), and M (on Floor 2).

Therefore, Three people live between P and L.

Hence, the correct answer is "Option 4".

Q64. Answer: (b) 250: 231

Shortcut Trick

Convert percentage and fraction to a common base for ratio comparison.

66% of A = (5/7) of B

A/B = (5/7) ÷ (66/100) = (5/7) × (100/66)

A : B = 500 : 462 = 250 : 231

Therefore The correct answer is 250: 231.

Alternate Method

Given: 66% of first number (x) = 5/7 of second number (y).

=> (66/100) × x = (5/7) × y

=> (33/50) × x = (5/7) × y

=> x/y = (5/7) × (50/33)

=> x/y = (5 × 50) / (7 × 33)

=> x/y = 250 / 231

Therefore The correct answer is 250: 231.

Additional Information

Percentage to Fraction Conversion

To convert x% to a fraction, divide by 100: x% = x/100. Useful for simplifying ratio equations.

Ratio and Proportion

If ax = by, then the ratio x : y is equal to b : a. This inverse relation is key in solving comparison problems.

Q65. Answer: (d) Son's wife's father

A is				
Symbol	•	–	x	÷
Meaning	Son	Sister	Wife	Father
of B				

Given Expression: E ÷ F - G x H + K

E ÷ F: E is the father of F.

This confirms E is male.

F - G: F is the sister of G.

This confirms F is female.

G x H: G is the wife of H.

This confirms G is female and H is male.

H + K: H is the son of K.

This confirms H is male.

According to the given information Family Tree Representation:

Therefore, E is the Son's wife's father of K.

Hence, the correct answer is "Option 4".

Q66. Answer: (d) 33 hours

Shortcut Trick

Net time with leakage = 7(1/3) = 22/3 hours.

Emptying time = (Product of times) ÷ (Difference of times)

Emptying time = (6 × 22/3) ÷ (22/3 − 6)

Emptying time = 44 ÷ (4/3) = 44 × 3/4 = 33 hours.

Therefore The correct answer is 33 hr.

Alternate Method

Given: Filling time (A) = 6 hours, Filling time with leak (A+L) = 22/3 hours.

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

Pipe/Leak	**Time (hr)**	**Total Work (L)**	**Efficiency (L/hr)**

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Pump (A)	6	66	11
Pump + Leak (A+L)	22/3	9	

=> Efficiency of Pump (A) = 11 units/hr

=> Efficiency of Pump + Leak (A+L) = 9 units/hr

=> Efficiency of Leak (L) = 9 − 11 = −2 units/hr (Negative sign indicates emptying)

=> Time taken by Leak to empty = Total Work ÷ Efficiency of Leak

=> Time = 66 ÷ 2 = 33 hours.

Therefore The correct answer is 33 hr.

Additional Information

Pipes and Cisterns Basics

Inlet pipes have positive efficiency, while leakage or outlet pipes have negative efficiency.

Total Work Calculation

When handling fractions like 22/3 and 6, take the LCM of the numerators (LCM of 22 and 6 is 66) to find the total capacity.

Time, Work, and Efficiency

Efficiency is inversely proportional to Time when the total capacity of the tank remains constant.

Q67. Answer: (b) It applies a new design while keeping the existing slide content.

The correct answer is It applies a new design while keeping the existing slide content..

Key Points

• When a template is applied in MS PowerPoint, it changes the design elements such as backgrounds, fonts, and color schemes without altering the actual slide content.

• This allows users to revamp the visual appeal of the presentation while retaining the text, images, and other content.

• Templates are useful for maintaining consistency across multiple slides in terms of design and layout.

• They can be applied to an existing presentation through the "Design" tab in the PowerPoint ribbon menu.

• Applying a template does not delete or replace the slides; it simply enhances the presentation's professional look with pre-designed formatting.

Additional Information

• PowerPoint Templates

• Templates are pre-designed slide layouts that can be used to create presentations quickly and efficiently.

• They include predefined settings for backgrounds, fonts, colors, and placeholders for text and images.

• PowerPoint provides a range of built-in templates, and users can also download or create custom templates.

• Design Tab Features in PowerPoint

• The "Design" tab allows users to apply themes, variants, and templates to presentations.

• Users can use the "Format Background" option to customize specific elements of a slide.

• It also offers tools for slide size adjustment and alignment of design elements.

• Master Slide Concept

• A Master Slide is a special slide that controls the overall design and layout of all slides in a presentation.

• Any changes made to the Master Slide, such as background or font styles, are automatically applied to all associated slides.

• Benefits of Using Templates

• Ensure design uniformity across slides.

• Help save time by providing ready-made design elements.

• Enhance the visual appeal and professionalism of presentations.

Q68. Answer: (d) 16,100

Shortcut Trick

Ratio of shares P : Q = 9 : 7 and Q : R = 3 : 12 (or 1 : 4).

Combine ratios by making Q common: P : Q : R = (9×3) : (7×3) : (7×12) = 27 : 21 : 84.

Simplified ratio P : Q : R = 9 : 7 : 28 (dividing by 3).

Total units = 9 + 7 + 28 = 44 units.

Value of 44 units = &x20b9;25,300 => 1 unit = 25,300 ÷ 44 = &x20b9;575.

Share of R = 28 × 575 = &x20b9;16,100.

Therefore The correct answer is &x20b9;16,100.

Alternate Method

Given: Total Profit = &x20b9;25,300 | P : Q = 9 : 7 | Q : R = 3 : 12.

Formulas: Combined Ratio A:B:C calculation | Total Profit = Sum of individual shares.

=> To equalize Q, multiply (P:Q) by 3 and (Q:R) by 7.

=> P : Q = 27 : 21.

=> Q : R = 21 : 84.

=> P : Q : R = 27 : 21 : 84.

=> Share of R = [84 ÷ (27 + 21 + 84)] × 25,300.

=> Share of R = (84 ÷ 132) × 25,300 = (7 ÷ 11) × 25,300.

=> Share of R = 7 × 2,300 = 16,100.

Therefore The correct answer is &x20b9;16,100.

Additional Information

Ratio Balancing

When combining two ratios (A:B and B:C), the common term B must be made equal by multiplying the ratios with appropriate constants.

Profit Distribution

In a partnership, if the time period is constant, the profit is distributed directly in the ratio of investments or the given share ratios.

Q69. Answer: (c) 10 km to the North

Given:

Mr. Plex starts from Point A and drives 22 km towards the East.

He then takes a left turn, drives 31 km, turns left and drives 26 km.

He then takes a left turn and drives 41 km.

He takes a final left turn, drives 4 km and stops at Point P.

Thus, he drive 10 km to the North in order to reach Point A again.

Hence, the correct answer is "Option 3".

Q70. Answer: (d) Hyderabad

The correct answer is Hyderabad.

Key Points

• The STREE Summit 2025 was held in Hyderabad, a city known for its progressive initiatives towards women's empowerment.

• It took place on 15 April 2025, focusing on women's safety and empowerment as the central theme.

• The summit aimed at bringing together policymakers, activists, and organizations to deliberate on effective solutions for gender equality.

• Hyderabad, the capital of Telangana, has been at the forefront of implementing innovative programs for women’s safety, such as the SHE Teams initiative.

• Government officials, NGOs, and representatives from multiple states participated to exchange ideas on sustainable empowerment models.

Additional Information

• SHE Teams Initiative:

• Launched in Telangana, SHE Teams focus on ensuring women’s safety in public spaces through surveillance and quick response mechanisms.

• These teams work on complaints related to eve-teasing, harassment, and stalking, promoting a safer environment for women.

• One Stop Centres (OSC):

• Initiated under the Ministry of Women and Child Development, OSCs provide support to women affected by violence.

• These centers offer integrated services such as police assistance, legal aid, medical care, and counseling.

• Beti Bachao, Beti Padhao:

• A flagship scheme of the Indian government aimed at improving the sex ratio and ensuring education for the girl child.

• It emphasizes the need to address gender-biased practices and empower girls through education and skill development.

• Gender Equality Index:

• An index used globally to measure the progress of nations towards achieving gender parity in areas such as education, health, and economic participation.

• India has been undertaking consistent efforts to improve its standing through targeted initiatives for women.
• Women's Safety Audit:
• It is a tool used to identify unsafe areas and suggest measures to enhance women's safety in urban and rural settings.
• Hyderabad is among the cities actively using this approach to improve public infrastructure and surveillance systems.

Q71. Answer: (d) 22475

Shortcut Trick
Work backwards from the last divisor: 29.
Divisor3 = 29, Remainder3 = 0 => Dividend3 = 29 × 6 + 0 = 174.
Divisor2 = 174, Remainder2 = 29 => Dividend2 = 174 × 4 + 29 = 725.
Divisor1 = 725, Remainder1 = 174 => Dividend1 = 725 × 1 + 174 = 899.
LCM = (Product of numbers) ÷ HCF = (899 × 725) ÷ 29 = 22475.
Therefore The correct answer is 22475.
Alternate Method
Given: Quotients = 1, 4, 6 | Last divisor (HCF) = 29.
Formula: Dividend = (Divisor × Quotient) + Remainder
=> Let the numbers be A and B (A > B). In the long division method, the last divisor is the HCF.
=> Step 3: Last divisor = 29, Quotient = 6. Third Dividend = 29 × 6 = 174.
=> Step 2: Divisor = 174, Quotient = 4, Remainder = 29. Second Dividend (B) = 174 × 4 + 29 = 725.
=> Step 1: Divisor = 725, Quotient = 1, Remainder = 174. First Dividend (A) = 725 × 1 + 174 = 899.
=> LCM(899, 725) = (899 × 725) ÷ 29
=> LCM = 31 × 725 = 22475.
Therefore The correct answer is 22475.
Additional Information
HCF by Long Division
Also known as the Euclidean Algorithm, where the remainder of one step becomes the divisor for the next until the remainder is zero.
HCF and LCM Relation
For any two numbers A and B: A × B = HCF(A, B) × LCM(A, B).
Coprime Numbers
If the HCF of two numbers is 1, they are called coprime, and their LCM is simply their product.

Q72. Answer: (b) 4

The correct answer is Option 2.
Key Points
• The Charter Act of 1853 marked the last legislative measure under the East India Company before the governance of India was transferred to the British Crown.
• Under the Charter Act of 1853, the Council of the Governor-General was expanded to include 6 new legislative members.
• It introduced a separate legislative council known as the Legislative Council of India, which had 4 members for legislative purposes.
• The Act is significant for separating the executive and legislative functions of the Governor-General's Council.
• This was the first instance of introducing a systematic legislative process in British India.
Additional Information
• The Charter Act of 1853:
• It was the last Charter Act passed by the British Parliament related to the governance of India.
• It extended the tenure of the East India Company without specifying an end date, unlike previous Charter Acts.
• It allowed Indians to compete in the civil services examination for the first time.
• It introduced an open competition system for recruiting civil servants, laying the foundation for modern bureaucracy.
• Governor-General's Legislative Council:
• It was created to assist the Governor-General in formulating legislative policies.
• The legislative members were nominated and included British officials and representatives.
• Its establishment paved the way for more structured legislative processes in India.
• Impact of the Charter Act of 1853:

• It significantly contributed to the modernization of Indian administration.
• The Act set the foundation for the establishment of a more systematic legal and legislative framework.
• The separation of powers between legislative and executive functions became a key administrative reform.
• Historical Context:
• The Act was passed during the declining years of the East India Company's rule in India.
• It was one of the critical legislative measures leading up to the Government of India Act of 1858.
• The reforms under this Act reflected the British Parliament's increased control over Indian governance.

Q73. Answer: (a) 55.6 years

Shortcut Trick
Ratio of number of people = 4 : 6 => 2 : 3.
Assume base average = 52. Difference in average = 58 − 52 = +6.
Net deviation to be distributed = 3 parts × 6 = 18.
Average deviation = 18 ÷ (2 + 3) = 18 ÷ 5 = 3.6.
Combined average = 52 + 3.6 = 55.6 years.
Therefore The correct answer is 55.6 years.
Alternate Method
Given: Average age of first group (n1=4) is 52 years, Average age of second group (n2=6) is 58 years.
Formula Used: Combined Average = (n1 × Avg1 + n2 × Avg2) ÷ (n1 + n2)
=> Total age of Group 1 = 4 × 52 = 208 years.
=> Total age of Group 2 = 6 × 58 = 348 years.
=> Combined sum of ages = 208 + 348 = 556 years.
=> Total number of people = 4 + 6 = 10 people.
=> Overall Average = 556 ÷ 10 = 55.6 years.
Therefore The correct answer is 55.6 years.
Additional Information
Weighted Average Formula
It is used to find the average of two or more groups with different sizes: A_(combined) = (n1a1 + n2a2 + ...) ÷ (n1 + n2 + ...).
Deviation Method
Assumed Average + (Net Deviation ÷ Total Count). This method simplifies calculations by reducing the size of multiplication factors.
Weighted Average Property
The combined average always lies between the smallest and the largest individual averages of the groups.

Q74. Answer: (b) To establish permanent Lok Adalats for public utility service disputes

The correct answer is To establish permanent Lok Adalats for public utility service disputes.
Key Points
• The Legal Services Authorities Act, 1987, was amended in 2002 to establish permanent Lok Adalats for resolving disputes concerning public utility services.
• Permanent Lok Adalats (PLAs) were introduced to provide speedy, cost-effective, and amicable settlement of disputes.
• The amendment focused on public utility services, including transport, postal services, telecommunication, and water supply, among others.
• Under this amendment, permanent Lok Adalats were empowered to handle disputes prior to litigation, ensuring dispute resolution without formal court proceedings.
• PLAs were given the authority to pass awards that are final and binding, provided the disputes do not involve serious criminal offenses.
Additional Information
• Lok Adalats
• Lok Adalats are alternative dispute resolution mechanisms in India, organized under the Legal Services Authorities Act, 1987.
• They aim to reduce the burden on regular courts by resolving disputes through conciliation and compromise.
• Decisions made in Lok Adalats are deemed as decrees of civil courts and are binding on all parties.
• Public Utility Services
• Services such as electricity, water, transport, postal services, and telecommunications are considered public utility services.

• The 2002 amendment to the Legal Services Authorities Act focused on protecting consumer rights in these essential services.
• Composition of Permanent Lok Adalats
• Each permanent Lok Adalat consists of a chairman (a retired judicial officer) and two other members with relevant expertise.
• The chairman ensures the proceedings are conducted fairly and impartially.
• Jurisdiction of Permanent Lok Adalats
• PLAs can resolve disputes where the value of the claim does not exceed Rs. 1 crore.
• Criminal cases involving non-compoundable offenses are outside the jurisdiction of Lok Adalats.

Q75. Answer: (c) 43

Shortcut Trick

Arrange the given 11 numbers in ascending order:

16, 16, 27, 32, 37, 43, 64, 65, 67, 77, 85

Since the number of terms (n = 11) is odd, the median is the middle term.

Median = ((11 + 1) ÷ 2)^(th) term = 6^(th) term = 43.

Therefore The correct answer is 43.

Alternate Method

Given:

Dataset: 65, 67, 32, 16, 64, 27, 37, 16, 43, 85, 77

Total number of observations (n) = 11

Formula Used:

When the number of observations (n) is odd:

Median = ((n + 1) ÷ 2)^(th) observation

Calculations:

Arrange the given data in ascending order:

=> 16, 16, 27, 32, 37, 43, 64, 65, 67, 77, 85

Count the number of observations:

=> n = 11

Since n is odd, apply the median formula:

=> Median = ((11 + 1) ÷ 2)^(th) term

=> Median = (12 ÷ 2)^(th) term

=> Median = 6^(th) term

The 6^(th) term in the sorted list is 43.

=> Median = 43

Option Analysis:

=> Option (1) 44: Incorrect, as the 6^(th) term is exactly 43, not 44.

=> Option (2) 43.5: Incorrect, which would be the median if the number of terms was even and the two middle terms averaged to 43.5.

=> Option (4) 42.5: Incorrect, as the exact middle value of the sorted odd-numbered dataset is 43.

Therefore The correct answer is 43.

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) observations: Median = [(n/2)^(th) term + (n/2 + 1)^(th) term] ÷ 2.

Relation between Mean, Median, and Mode

For a moderately skewed distribution, the empirical relationship is: Mode = 3 × Median − 2 × Mean.

Median for Grouped Data

For grouped frequency distribution, Median = L + [((n ÷ 2) − cf) ÷ f] × h, where L is the lower limit of the median class, cf is cumulative frequency of the preceding class, f is frequency of the median class, and h is class width.

Q76. Answer: (d) 34 out of 81

The correct answer is 34 out of 81.

Key Points

• In the 2024 Jharkhand Assembly elections, the Jharkhand Mukti Morcha (JMM) secured 34 seats out of a total of 81

constituencies.

• The Jharkhand Assembly consists of 81 seats, representing various constituencies across the state.

• JMM is a major regional political party in Jharkhand, advocating for tribal rights and state welfare policies.

• The performance of JMM in the 2024 elections indicates its continued influence in Jharkhand's political landscape.

• The party's electoral strategy and alliances played a crucial role in achieving this result.

Additional Information

• Jharkhand Legislative Assembly:

• The Jharkhand Legislative Assembly (Vidhan Sabha) is the unicameral legislature of the Indian state of Jharkhand.

• It consists of 81 members, who are elected directly by the people through a single-member constituency system.

• The assembly's term is five years unless dissolved earlier.

• Jharkhand Mukti Morcha (JMM):

• Founded in 1972 by Shibu Soren, JMM is a prominent political party in Jharkhand.

• The party primarily focuses on the rights of tribal communities, socio-economic development, and environmental conservation.

• JMM has been instrumental in the movement for the creation of Jharkhand as a separate state in 2000.

• 2024 Jharkhand Assembly Elections:

• The elections were held to elect representatives for the 81 constituencies of the Jharkhand Assembly.

• Major parties included JMM, BJP, Congress, and regional parties.

• Voter turnout and key issues, such as tribal welfare, employment, and infrastructure, shaped the election results.

• Political Landscape of Jharkhand:

• Jharkhand has a mix of tribal and non-tribal populations, influencing its political dynamics.

• Coalition governments are common in the state due to the fragmented political scenario.

• Key issues include mining rights, tribal welfare, and rural development.

Q77. Answer: (c) Nepal

The correct answer is Nepal.

Key Points

• Nepal is a landlocked country located in South Asia. It is bordered by India to the south, east, and west, and by China (Tibet Autonomous Region) to the north.

• It shares an open and porous border with India, extending over 1,751 kilometers across the states of Uttarakhand, Uttar Pradesh, Bihar, West Bengal, and Sikkim.

• Nepal is completely landlocked, meaning it does not have direct access to the sea.

• The Indo-Nepal Treaty of Peace and Friendship (1950) allows citizens of both countries to travel and work across the borders without requiring a visa or passport.

• Nepal's strategic location in the Himalayan region makes it an important neighbor to India, both culturally and geopolitically.

Additional Information

• Landlocked Countries:

• A landlocked country is one that is entirely surrounded by land or has coastlines on closed seas.

• Nepal is one of the 44 landlocked countries in the world.

• Other landlocked countries in South Asia include Bhutan.

• Indo-Nepal Relations:

• India and Nepal have deep historical, cultural, religious, and economic ties.

• Both countries share open borders, which facilitate trade and the movement of people.

• India is Nepal's largest trade partner and source of foreign investment.

• Geographical Significance of Nepal:

• Nepal is home to eight of the world’s ten highest peaks, including Mount Everest, the highest point on Earth.

• The country lies in the Himalayan mountain range, which forms a natural barrier between the Indian subcontinent and the Tibetan Plateau.

• Border Management:

• The open border system between India and Nepal has both advantages and challenges, including issues related to security and illegal activities.

• Both countries are working on improving border infrastructure and security while maintaining the spirit of free movement.

Q78. Answer: (d) 39%

The correct answer is 0.39.

Key Points

• The rate of increase in capital expenditure by the central government on major infrastructure sectors from 2019-20 to 2023-24 is 0.39 times, indicating a significant rise.

• Capital expenditure refers to funds spent by the government on long-term assets such as infrastructure, including roads, railways, and energy projects.

• In the Union Budget 2023-24, the government announced an allocation of Rs. 10 lakh crore for capital expenditure, a substantial increase compared to previous years.

• This increase reflects the government's focus on boosting infrastructure to drive economic growth and create employment opportunities.

• The higher allocation aligns with India's goal of becoming a $5 trillion economy by 2025, emphasizing investment in infrastructure as a key growth driver.

Additional Information

• Capital Expenditure (CapEx):

• Capital expenditure refers to spending on acquiring, upgrading, or maintaining physical assets such as buildings, technology, or infrastructure.

• It is aimed at enhancing productivity and creating long-term economic benefits.

• Union Budget 2023-24 Highlights:

• The Rs. 10 lakh crore capital expenditure allocation accounts for 3.3% of India's GDP.

• This is the highest-ever outlay for infrastructure development in India's history.

• Importance of Infrastructure Investment:

• Infrastructure investment plays a critical role in stimulating economic growth, attracting private investments, and creating jobs.

• Sectors like transport, energy, and urban development are key areas of focus under the government's plans.

• National Infrastructure Pipeline (NIP):

• NIP is a government initiative launched in 2019 to provide a forward-looking roadmap for infrastructure development.

• It aims to invest Rs. 111 lakh crore in infrastructure projects by 2025.

• Fiscal Responsibility:

• The government ensures that increased capital expenditure is balanced with fiscal prudence to maintain macroeconomic stability.

• Higher spending on infrastructure is expected to have a multiplier effect on the economy.

Q79. Answer: (c) Gautamiputra Satakarni

The correct answer is Gautamiputra Satakarni.

Key Points

• Gautamiputra Satakarni is considered the greatest ruler of the Satavahana dynasty and ruled during the 1st–2nd centuries CE.

• He revived the power of the Satavahanas by defeating the Shakas (Western Kshatrapas) and re-establishing control over the Deccan region.

• His reign is well-documented in the Nashik Prashasti (inscription), composed by his mother Gautami Balashri, which highlights his military conquests and administrative achievements.

• He was known as a defender of Brahmanism and patronized Vedic rituals like the Rajasuya and Ashvamedha, emphasizing his role as a Dharmic ruler.

• Under his rule, the Satavahana kingdom extended over a vast area, including parts of modern-day Maharashtra, Andhra Pradesh, Madhya Pradesh, and Karnataka.

Additional Information

• Satavahana Dynasty:

• The Satavahanas were one of the earliest Indian dynasties to issue coins with inscriptions, reflecting their administrative and economic sophistication.

• They are credited with promoting trade and commerce, especially through the port of Sopara, connecting India with the Roman Empire.

• The Satavahanas were known for their contributions to art and architecture, including the development of Buddhist stupas such as the Amaravati and Sanchi stupas.

• Nashik Inscription:

• Also known as the Nashik Prashasti, it was inscribed by Gautamiputra Satakarni's mother, Gautami Balashri, and is a crucial

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source of information about his reign.

• The inscription highlights his victories against the Shakas, Pahlavas, and Yavanas, establishing him as a powerful ruler in the Deccan region.

• Western Kshatrapas:

• The Western Kshatrapas were the primary rivals of the Satavahanas during Gautamiputra Satakarni's reign.

• They ruled parts of modern-day Gujarat and Maharashtra and were eventually subdued by the Satavahanas under Gautamiputra's leadership.

• Vedic Rituals:

• Gautamiputra Satakarni's performance of Rajasuya and Ashvamedha reflected his authority as a sovereign ruler.

• These rituals were significant in ancient Indian political culture, symbolizing the ruler's legitimacy and dominance.

Q80. Answer: (a) 154 cm²

Shortcut Trick

Sum of perimeters => 4(p + q) = 100 => p + q = 25

Sum of areas => $p^2 + q^2 = 317$

Using identity: $(p + q)^2 = p^2 + q^2 + 2pq$

$25^2 = 317 + 2pq$ => 625 − 317 = 2pq => 308 = 2pq

pq = 154

Therefore The correct answer is 154 cm².

Alternate Method

Given:

Area of square 1 + Area of square 2 = 317 cm²

Perimeter of square 1 + Perimeter of square 2 = 100 cm

Formula Used:

Area of square = side²

Perimeter of square = 4 × side

Algebraic identity: $(a + b)^2 = a^2 + b^2 + 2ab$

Calculations:

=> 4p + 4q = 100

=> 4(p + q) = 100

=> p + q = 25

=> $p^2 + q^2 = 317$

=> $(p + q)^2 = p^2 + q^2 + 2pq$

=> $(25)^2 = 317 + 2pq$

=> 625 = 317 + 2pq

=> 2pq = 625 − 317

=> 2pq = 308

=> pq = 154

Therefore The correct answer is 154 cm².

Additional Information

Properties of a Square

A square has four equal sides and four right angles. The diagonal of a square is √2 × side.

Algebraic Identities

Useful in geometry: $(a - b)^2 = a^2 + b^2 - 2ab$ and $a^2 - b^2 = (a - b)(a + b)$.

Diagonal and Area Relationship

The area of a square can also be calculated as (Diagonal)² ÷ 2.

Q81. Answer: (d) Stratospheric ozone depletion

The correct answer is Stratospheric ozone depletion.

Key Points

• Freon is a trade name for a group of chlorofluorocarbons (CFCs), which are synthetic compounds primarily used in refrigeration, air conditioning, and aerosol propellants.

• When released into the atmosphere, freon compounds rise into the stratosphere, where they are broken down by ultraviolet (UV)

radiation, releasing chlorine atoms.

• These chlorine atoms react with ozone molecules (O3) in the stratosphere, causing the depletion of the ozone layer.

• Stratospheric ozone depletion reduces the layer that protects Earth from harmful UV-B radiation, leading to increased risks of skin cancer, cataracts, and harm to ecosystems.

• The Montreal Protocol, signed in 1987, is an international treaty designed to phase out the production and consumption of ozone-depleting substances like freon.

Additional Information

• Ozone Layer:

• The ozone layer is a region in the Earth's stratosphere that absorbs most of the Sun's harmful ultraviolet radiation.

• It is primarily located between 15 and 35 kilometers above Earth's surface.

• Depletion of the ozone layer results in the "ozone hole," which is particularly prominent over Antarctica.

• Chlorofluorocarbons (CFCs):

• CFCs are man-made chemical compounds composed of carbon, chlorine, and fluorine.

• They were widely used in refrigerants, aerosol propellants, and foam-blowing agents before being regulated.

• CFCs have a high atmospheric lifetime and are significant contributors to ozone depletion.

• Impact of Ozone Depletion:

• Increased UV radiation exposure can lead to skin cancers, cataracts, and suppression of the immune system in humans.

• It also negatively impacts marine ecosystems, especially phytoplankton, which are the foundation of aquatic food chains.

• Excess UV radiation can inhibit plant growth and reduce agricultural productivity.

• Montreal Protocol:

• The Montreal Protocol on Substances that Deplete the Ozone Layer is an international treaty adopted in 1987.

• It aims to phase out the production and consumption of ozone-depleting substances (ODS).

• This treaty is considered one of the most successful environmental agreements, contributing to the recovery of the ozone layer.

Q82. Answer: (a) -2

As per the question,

Given Numbers: 497 581 452 460 775

Rule: Subtract the second digit of the highest number from the second digit of the lowest number.

→ Highest number: 775

→ Second digit of the highest number: 7

→ Lowest number: 452

→ Second digit of the lowest number: 5

(Second digit of lowest) - (Second digit of highest)

5 - 7 = -2

Hence, the correct answer is "Option 1".

Q83. Answer: (d) 4

Shortcut Trick

For any quadratic equation of the form $ax^2 + bx + c = 0$, the sum of the roots is given by the formula $-b/a$.

In the given equation $7x^2 - 28x + 21 = 0$, we have $a = 7$ and $b = -28$.

Sum of roots = $-(-28) / 7$

Sum of roots = $28 / 7 = 4$.

Therefore The correct answer is 4.

Alternate Method

Given:

Quadratic Equation: $7x^2 - 28x + 21 = 0$

Formula Used:

For a quadratic equation $ax^2 + bx + c = 0$:

1. Sum of roots $(\alpha + \beta) = -b/a$

2. Product of roots $(\alpha\beta) = c/a$

Calculations:

Comparing the given equation $7x^2 - 28x + 21 = 0$ with the standard form $ax^2 + bx + c = 0$:

=> $a = 7$

=> b = −28

=> c = 21

The sum of the roots is:

=> Sum = −b / a

=> Sum = −(−28) / 7

=> Sum = 28 / 7

=> Sum = 4

Thus, the sum of the roots of the given quadratic equation is 4.

Therefore The correct answer is 4.

Additional Information

Product of Roots

The product of the roots (αβ) is calculated as c/a. For this equation, product = 21 / 7 = 3.

Nature of Roots

The nature of roots depends on the discriminant D = $b^2 − 4ac$. If D > 0, roots are real and distinct; if D = 0, roots are real and equal; if D < 0, roots are imaginary.

Quadratic Formula

The roots can be found individually using $x = [−b ± \sqrt{(b^2 − 4ac)}] / 2a$.

Relation between Coefficients

A quadratic equation can be rewritten as x^2 − (Sum of roots)x + (Product of roots) = 0.

Q84. Answer: (b) 926

The logic followed here is:

Thus, the missing number in the series is 926.

Hence, the correct answer is "Option 2".

Q85. Answer: (c) 4

The logic followed here is:

The code for "S" is "4".

Hence, the correct answer is "Option 3".

Q86. Answer: (a) 100%

Shortcut Trick

Let the original selling price x = 100.

New selling price = 25% of 100 = 25.

Given, at SP = 25, there is a loss of 50%. Therefore CP × 50/100 = 25 => CP = 50.

Profit at original SP = Original SP − CP = 100 − 50 = 50.

Profit% = (Profit ÷ CP) × 100 = (50 ÷ 50) × 100 = 100%.

Therefore The correct answer is 100%.

Alternate Method

Given: Selling Price = x; New SP = 0.25x; Loss% = 50%.

Formulas: CP = SP × 100 ÷ (100 − Loss%); Profit% = (SP − CP) ÷ CP × 100.

=> Let original SP = x.

=> Case 2: SP = 0.25x. Loss = 50%.

=> CP = (0.25x × 100) ÷ (100 − 50) = 25x ÷ 50 = 0.5x.

=> When sold at original SP (x): Profit = x − 0.5x = 0.5x.

=> Profit% = (0.5x ÷ 0.5x) × 100 = 100%.

Therefore The correct answer is 100%.

Additional Information

Cost Price & Selling Price Relationship

If SP > CP, it is a Profit. If CP > SP, it is a Loss. Profit/Loss% is always calculated on the Cost Price unless stated otherwise.

Multiplier Method

A loss of 50% means SP is 0.5 times the CP. A profit of 100% means SP is 2 times the CP.

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Q87. Answer: (a) Two

Given: Seven friends, C, D, E, F, G, H and P, are sitting in a row facing north.

No one sits to the right of E. Only three people sit between F and C.

P sits to the immediate left of C. Only two people sit between E and P.

H sits to the immediate right of D.

Thus, Only two many people sit between G and H.

Hence, the correct answer is "Option 1".

Q88. Answer: (b) 3 km towards the West

Given:

B starts from Point U and drives 5 km towards the South. He then takes a right turn, drives 2 km, turns right and drives 16 km. He then takes a right turn and drives 3 km, turns left and drives 1 km. He then takes a right turn, takes a final right turn, drives 12 km and stops at Point X.

Thus, he drive 3 km towards the West in order reach point U again.

Hence, the correct answer is "Option 2".

Q89. Answer: (a) Selecting 'Save As' and choosing a new name or location

The correct answer is Selecting 'Save As' and choosing a new name or location.

Key Points

• The 'Save As' option in Excel allows users to save a workbook under a new file name or in a different location.
• This feature ensures the preservation of the original file while creating a new version with the applied changes.
• It is especially useful when users want to create multiple versions of the same document for different purposes.
• Without using 'Save As,' changes made to a workbook will overwrite the existing file if the standard 'Save' option is used.
• By selecting a new name or location, users can organize their files effectively and avoid accidental data loss.

Additional Information

• 'Save' vs 'Save As'
• 'Save' updates the current file with recent changes without altering the file name or location.
• 'Save As' allows users to create a new file with a different name, file format, or save it in another location.
• Keyboard Shortcut for 'Save As'
• In Windows: Press F12 to directly open the 'Save As' dialog box.
• In macOS: Use Shift + Command + S.
• File Formats in Excel
• Excel supports various file formats such as .xlsx, .xls, .csv, .pdf, and .txt for saving workbooks.
• 'Save As' allows users to choose the desired format for compatibility and specific requirements.
• Importance of Saving Work
• Regularly saving files prevents data loss in case of unexpected application crashes or system shutdowns.
• Excel also provides an AutoSave feature for files stored in cloud services like OneDrive.
• Common Errors While Saving
• Errors like "File not found" or "File in use" may occur if the file path is invalid or the file is open elsewhere.
• Ensuring proper access permissions and a valid file path resolves such issues.

Q90. Answer: (c) = KUG, % = FPB

Given:

: UEQ :: VFR : %

Option 1) # = KUG, % = FPU

For # (KUG) to UEQ

The pattern derived from KUG to UEQ is: (+10, +10, +10).

For VFR to % (FPU)

The pattern derived from VFR to FPU is: (+10, +10, +3).

Since the patterns do not match, Option 1 is incorrect.

Option 2) # = KTG, % = FPB

For # (KTG) to UEQ

The pattern derived from KTG to UEQ is: (+10, +11, +10).

For VFR to % (FPB)

The pattern derived from VFR to FPB is: (+10, +10, +10).

Since the patterns do not match, Option 2 is incorrect.

Option 3) # = KUG, % = FPB

For # (KUG) to UEQ

The pattern derived from KUG to UEQ is: (+10, +10, +10).

For VFR to % (FPB)

The pattern derived from VFR to FPB is: (+10, +10, +10).

Since the patterns for both pairs match, Option 3 is the correct answer.

Option 4) #LUG, % = FPB

For # (LUG) to UEQ

The pattern derived from LUG to UEQ is: (+9, +10, +10).

For VFR to % (FPB)

The pattern derived from VFR to FPB is: (+10, +10, +10).

Hence, the correct answer is "Option 3".

Q91. Answer: (d) 21

Calculation:

60% of 40 = (60 × 40) / 100

=> (60 × 40) / 100 = 24

=> (1)/(5) of 15 = 15 × (1/5) = 3

Difference = 24 - 3 = 21

It is greater than 21.

Therefore The correct answer is option (4).

Q92. Answer: (d) Greater Noida

The correct answer is Greater Noida.

Key Points

• The PHD Chamber of Commerce and Industry (PHDCCI) had scheduled its International Week in Greater Noida for March 2025.

• This event was planned to bring together global leaders, policymakers, and industry experts for discussions on international trade and economic collaboration.

• Greater Noida is a hub for business and industrial activities, making it an ideal location for such international events.

• The event has been postponed due to unforeseen circumstances, with new dates expected to be announced soon.

• PHDCCI is one of India's leading chambers of commerce, established in 1905, promoting trade, industry, and economic development across the country.

Additional Information

• About PHDCCI:

• The PHD Chamber of Commerce and Industry (PHDCCI) was founded in 1905 and is headquartered in New Delhi.

• It serves as a platform for business networking and policy advocacy for various industries.

• PHDCCI organizes seminars, expos, and international events to foster global trade collaborations.

• Greater Noida as an Event Destination:

• Greater Noida is part of the National Capital Region (NCR) of India.

• It is known for its well-planned infrastructure, industrial zones, and proximity to Delhi.

• The city hosts several international expos and conferences due to its connectivity and facilities.

• International Trade Events:

• International trade events foster partnerships between businesses across borders.

• They provide a platform for showcasing innovations, products, and services to a global audience.

• Such events help in understanding global market trends and exploring export opportunities.

• Economic Impact of Postponements:

• Postponements of major events can impact local economies and stakeholders.

• Rescheduling ensures safety and better preparedness for organizers and participants.

• Communication of new dates and plans is crucial to maintain trust among stakeholders.

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Q93. Answer: (c) Attempting to access a memory address that has been swapped out to the hard drive

The correct answer is Attempting to access a memory address that has been swapped out to the hard drive.

Key Points

• A page fault occurs when a program tries to access a memory page that is not currently in physical RAM but has been swapped out to the hard drive or virtual memory.

• Modern operating systems use virtual memory management, where some memory pages are stored on disk to optimize RAM usage.

• When a page fault occurs, the operating system retrieves the required page from the hard drive (or swap space) and loads it into physical RAM.

• Page faults are common during normal operation and are handled automatically by the operating system, unless the requested page cannot be found or accessed.

• Page faults are categorized as either minor (page exists in memory but not mapped) or major (page needs to be fetched from disk).

Additional Information

• Virtual Memory:

• Virtual memory is a memory management technique that creates an abstraction of physical memory.

• It allows the system to use disk space as an extension of RAM, enabling programs to run even when physical memory is full.

• Virtual memory relies on paging, where memory is divided into fixed-size blocks called pages.

• Swapping:

• Swapping is the process of moving inactive memory pages from RAM to disk to free up space for active processes.

• The swapped-out pages are stored in a designated area called swap space or pagefile.

• When a swapped-out page is needed, a page fault occurs, and the page is retrieved from disk.

• Page Table:

• A page table is a data structure used by the operating system to map virtual memory addresses to physical memory addresses.

• It contains information about whether a page is in RAM or needs to be fetched from disk.

• Each process has its own page table for efficient memory isolation.

• Common Causes of Page Faults:

• Accessing memory that has been swapped out to disk.

• Accessing memory that has not been initialized.

• Incorrect memory access due to programming errors or bugs.

Q94. Answer: (d) Visakhapatnam

The correct answer is Visakhapatnam.

Key Points

• Visakhapatnam Port is located on the eastern coast of India, along the Bay of Bengal, in the state of Andhra Pradesh.

• It is one of the oldest ports in India, operational since 1933, and plays a key role in maritime trade on the eastern coast.

• Major ports like Kandla, Cochin, and Mangalore are situated on the western coast of India, facing the Arabian Sea.

• The western coast of India is known for its other important ports such as Mumbai Port and Jawaharlal Nehru Port (Nhava Sheva).

• Visakhapatnam Port serves as a major hub for cargo handling, especially coal, petroleum products, and iron ore, on the eastern seaboard of India.

Additional Information

• Major Ports in India

• India has 13 major ports divided between the eastern and western coasts.

• Western coast ports include Kandla, Mumbai, Mangalore, Cochin, and Jawaharlal Nehru Port (Nhava Sheva).

• Eastern coast ports include Visakhapatnam, Paradip, Kolkata (Haldia), and Chennai.

• Strategic Importance of Visakhapatnam Port

• It is a natural harbor and one of the deepest ports in India.

• It is a key gateway for exports and imports for central and eastern India.

• It houses a major shipyard and serves as a base for the Indian Navy's Eastern Command.

• Geographical Features of India's Coastline

• The western coastline runs along the Arabian Sea and includes states like Gujarat, Maharashtra, Goa, Karnataka, and Kerala.

• The eastern coastline runs along the Bay of Bengal and includes states like Tamil Nadu, Andhra Pradesh, Odisha, and West

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Bengal.

• The western coast is characterized by estuaries and lagoons, whereas the eastern coast has deltas formed by major rivers like the Ganges, Godavari, and Krishna.

• Port Development in India

• The Indian government launched the Sagarmala Project to modernize port infrastructure and enhance connectivity.

• Major ports are governed by the Major Port Authorities Act, 2021, which aims to increase their efficiency and autonomy.

Q95. Answer: (d) 24

Given:

1 is added to each even digit and 1 is subtracted from each odd digit in the number 248937615.

Given	2	4	8	9	3	7	6	1	5
Operation	+1	+1	+1	-1	-1	-1	+1	-1	-1
New number	3	5	9	8	2	6	7	0	4

The new number formed is 359826704.

The odd digits in the new number are 3, 5, 9, 7.

The sum of all the odd digits in the new number = 3 + 5 + 9 + 7 = 24.

Hence, the correct answer is "Option 4".

Q96. Answer: (c) 31 March 2026

The correct answer is 31 March 2026.

Key Points

• As per the Goods and Services Tax (Period of Levy and Collection of Cess) Rules, 2022, notified by the Finance Ministry, the GST compensation cess will be levied until March 31, 2026.

• GST compensation cess is a tax levied to compensate states for revenue loss due to the implementation of GST.

• The extension of the GST compensation cess collection period was finalized during the GST Council meetings in response to the pandemic-induced economic disruptions.

• The cess is primarily imposed on luxury and demerit goods such as tobacco, aerated drinks, and automobiles.

• Funds collected via the GST compensation cess are credited to the GST Compensation Fund, which is used to reimburse states for the revenue shortfall.

Additional Information

• Goods and Services Tax (GST)

• GST is a comprehensive indirect tax levied on the supply of goods and services in India.

• It was implemented from 1st July 2017, replacing multiple indirect taxes such as VAT, service tax, and excise duty.

• It is categorized into Central GST (CGST), State GST (SGST), and Integrated GST (IGST).

• GST simplifies the tax structure, promotes transparency, and reduces tax evasion.

• GST Council

• The GST Council is the apex decision-making body for GST-related matters.

• It is chaired by the Union Finance Minister and includes representatives from the central and state governments.

• The council decides on tax rates, exemptions, and administrative procedures for GST.

• GST Compensation Fund

• This fund is created to compensate states for the revenue loss incurred due to the implementation of GST.

• States are guaranteed an annual growth rate of 14% in tax revenue under the GST framework.

• The compensation cess funds are distributed to states periodically to cover shortfalls.

• Demerit Goods

• Demerit goods are products that are considered harmful to consumers or society, such as tobacco and alcohol.

• These goods attract higher tax rates, including cess under GST, to discourage consumption.

Q97. Answer: (c) 1

As per the question,

Given Numbers: 190 735 494 761 781

Rule: Subtract the second digit of the highest number from the second digit of the lowest number.

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→ Lowest number: 190
→ Second digit of the lowest number: 9
→ Highest number: 781
→ Second digit of the highest number: 8
So, required answer = 9 - 8 = 1
Hence, the correct answer is "Option 3".

Q98. Answer: (c) 3

Given: Each of P, Q, R, S, T, U and V has an exam on a different day of a week,
Starting from Monday and ending on Sunday of the same week.
1) P has an exam on Wednesday.

Day	Person
Monday	
Tuesday	
Wednesday	P
Thursday	
Friday	
Saturday	
Sunday	

2) Exactly 3 people have an exam between P and S.
3) V has an exam immediately after T, and Q has an exam immediately before T.
4) Only 3 people have an exam between U and T.

Day	Person
Monday	U
Tuesday	R
Wednesday	P
Thursday	Q
Friday	T
Saturday	V
Sunday	S

So, the person who has an exam after Q is T, V, S.
Hence, the correct answer is Option 3.

Q99. Answer: (a) 65.2

Shortcut Trick
Ratio of students = 12 : 18 = 2 : 3
Difference between averages = 70 − 62 = 8
Apply Net Deviation (taking 62 as base): (2 × 8) ÷ (2 + 3) = 16 ÷ 5 = 3.2
Class Average = 62 + 3.2 = 65.2
Therefore The correct answer is 65.2.
Alternate Method
Given:
Total students (n) = 30
Group 1: Students (n1) = 12, Average (a1) = 70
Group 2: Students (n2) = 30 − 12 = 18, Average (a2) = 62
Formula Used:

Combined Average = (n1a1 + n2a2) ÷ (n1 + n2)

Calculations:

=> Total score of 12 students = 12 × 70 = 840

=> Total score of 18 students = 18 × 62 = 1116

=> Sum of all scores = 840 + 1116 = 1956

=> Average score of the class = 1956 ÷ 30

=> Average score = 65.2

Therefore The correct answer is 65.2.

Additional Information

Weighted Average

When a group is divided into subgroups with different averages, the combined average is the sum of (number × average) of each subgroup divided by the total count.

Net Deviation Method

To simplify calculations, assume a base average (usually the smaller value). The actual average = Base + (Net Deviation ÷ Total observations).

Arithmetic Mean

The most basic average type, calculated as Sum of observations ÷ Number of observations. Formula: μ = (Σx_i) ÷ n.

Q100. Answer: (c) Income inequality

The correct answer is Income inequality.

Key Points

• The Gini Coefficient is a statistical measure used to assess income inequality within a population.

• It ranges from 0 to 1, where 0 represents perfect equality (everyone has the same income) and 1 represents perfect inequality (one person has all the income).

• Developed by Corrado Gini, an Italian statistician, in 1912, it is widely used in economics and social sciences.

• The Gini Coefficient is calculated using the Lorenz curve, which plots cumulative income distribution against population percentiles.

• Countries with lower Gini Coefficients (e.g., Scandinavian nations) generally exhibit more equitable income distribution, whereas higher values indicate significant inequality.

Additional Information

• Income Inequality:

• Refers to the uneven distribution of income among individuals or households within an economy.

• It is influenced by factors such as education, economic policies, globalization, and technological advancements.

• High income inequality can lead to social unrest, reduced economic growth, and political instability.

• Lorenz Curve:

• A graphical representation of income distribution.

• The curve plots cumulative percentages of total income received against cumulative percentages of the population.

• The further the curve is from the diagonal line of equality, the greater the inequality.

• Human Development Index (HDI):

• Includes income inequality as one of its key components to measure economic and social progress.

• A lower HDI score often correlates with higher income inequality within a country.

• Global Income Inequality Trends:

• Countries such as South Africa and Brazil have high Gini Coefficients, indicating significant income disparity.

• Efforts to reduce income inequality include progressive taxation, social welfare programs, and equitable access to education.

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