RRB NTPC (Graduate) CBT-I Official Paper (Held On: 27 Mar, 2026 Shift 3) (Previous Year Paper)

RRB NTPC • 2026 • 100 questions • 90 minutes • Answer key and solutions

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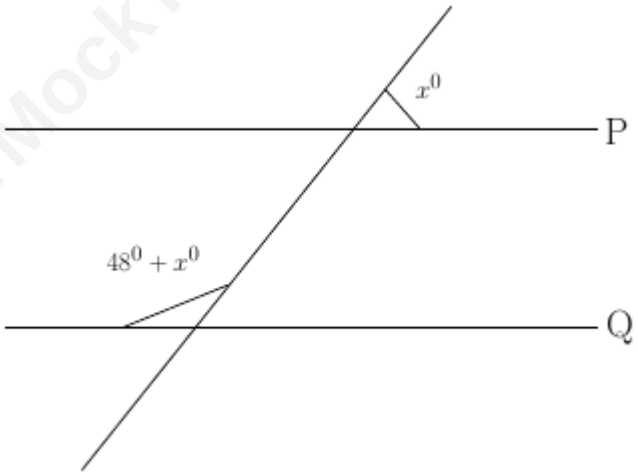
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Q1. Which of the following sectors contributes the most to the economy of the US?

(a) Tertiary Activity
(b) Secondary Activity
(c) Primary Activity
(d) Quaternary Activity

Q2. In the given figure, find the value of x if P ||Q is given.



(a) 66
(b) 72
(c) 68
(d) 70

Q3. Which of these examples best represents a category of utility software?

(a) Disk Clean up
(b) MS Word
(c) MS PowerPoint
(d) MS Excel

Q4. What is the dominant form of decoration employed in Sultanate buildings?

(a) Toranas
(b) Amalaka
(c) Arabesque
(d) Kalasha

Q5. In response to Cyclone Ditwah in 2025, India expanded which humanitarian mission to deliver aid to Sri Lanka by deploying additional Indian Navy warships?

(a) Operation Samudra Setu
(b) Operation Sagar Bandhu

(c) Operation Maitri
(d) Operation Vanila

Q6. Which instrument is classified as both a percussion and 'tal-giving' instrument?
(a) Tabla
(b) Flute
(c) Sarod
(d) Santoor

Q7. The marks obtained by 12 students out of 50 are 24, 25, 32, 23, 40, 27, 30, 25, 20, 15, 16, 45. Find the median marks.
(a) 25
(b) 23
(c) 24
(d) 27

Q8. In a certain code language, ‘MODE’ is coded as ‘3519’ and ‘DIGS’ is coded as ‘6894’. What is the code for ‘D’ in that language?
(a) 6
(b) 9
(c) 4
(d) 1

Q9. Which organisation conducted the successful high-speed rocket-sled test of a fighter aircraft escape system in 2025, placing India among a select group of nations with advanced in-house testing capability?
(a) Aeronautical Development Agency
(b) Defence Research and Development Organisation
(c) Indian Air Force
(d) Hindustan Aeronautics Limited

Q10. Which of the following is not a feature of the 73rd Constitutional Amendment Act, 1992?
(a) Provision for reservation of seats for Scheduled Castes, Scheduled Tribes, and women
(b) Establishment of Lokpal at the village level
(c) Establishment of Panchayats as institutions of self-government
(d) Mandatory elections to Panchayats every five years

Q11. The price of each article of type P, Q, and R is Rs. 280, Rs. 180 and Rs. 115, respectively. Ranu buys articles of each type in the ratio 4 : 4 : 3 for Rs. 6,555. How many articles of type Q did he purchase?
(a) 20
(b) 12
(c) 9
(d) 18

Q12. Each of the digits in the number 386152479 is arranged in ascending order from left to right. The position of how many digits will remain unchanged as compared to that in the original number?
(a) Two
(b) None
(c) Three
(d) One

Q13. Which of the following is/are famous Sun temples of India?
I. Konark temple
II. Modhera temple
III. Martand temple
Select the correct answer using the codes given below.
(a) I Only

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(b) I and III Only
(c) I, II and III
(d) I and II Only

Q14. The ratio of boys to girls in two sections A and B of a class is the same. Section A comprises of 36 boys and 24 girls. If there are 28 girls in section B, how many boys are there in that section?
(a) 42
(b) 40
(c) 45
(d) 48

Q15. Which of the following is a compound wind instrument due to its use of two tubes for different functions?
(a) Clarinet
(b) Kombu
(c) Conch
(d) Magudi

Q16. Select the correct option.
(a) The diagonals of a square are not equal and do not bisect each other.
(b) The diagonals of a square are not equal and bisect each other.
(c) The diagonals of a square are equal and bisect each other.
(d) The diagonals of a square are equal and do not bisect each other.

Q17. In a circular race of 1850 m, Aman and Suman start from the same point and at the same time with speeds of 22 km/h and 15 km/h, respectively. After how long will they meet again for the first time on the track when they are running in the opposite direction?
(a) 170 seconds
(b) 189 seconds
(c) 180 seconds
(d) 172 seconds

Q18. 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 :: ?

: ONQ :: LKN : %
(a) = RUS, % = KON
(b) = QUV, % = JLP
(c) = QPS, % = JIL
(d) = RQU, % = KPM

Q19. The area of a square is 5184 cm^2. Its perimeter is equal to the perimeter of a regular hexagon. What is the area (in cm^2) of the hexagon?
(a) $3456\sqrt{3}$
(b) 3434
(c) 3472
(d) $3432\sqrt{3}$

Q20. How many bytes does 1 Petabyte contain?
(a) 1024 terabytes
(b) 1024 zettabytes
(c) 1024 yottabytes
(d) 1024 gigabytes

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Q21. The Thar Desert is also referred to as:

(a) The Great Salt Desert
(b) The Great Indian Desert
(c) The Great Deccan Desert
(d) The Great White Desert

Q22. A, B, C, D, E, F and G sit around a circular table, facing the centre.

D sits to the immediate left of G. F sits to the immediate left of C. C sits second to the left of E. A sits third to the left of G.

Who sits third to the right of G?

(a) C
(b) A
(c) E
(d) F

Q23. SP 12 is related to WT 16 in a certain way. In the same way, MJ 15 is related to QN 19. To which of the following is EB 24 related, following the same logic?

(a) IF 28
(b) JF 28
(c) JG 29
(d) IG 29

Q24. What is the value of $\csc^2 63° + 3\sec^2 56° - 3\cot^2 34° - \tan^2 27°$?

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

Q25. What should come in place of '?' in the given series?

56 55 51 42 26 ?

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

Q26. Which index does NITI Aayog use to analyze poverty in India by considering multiple factors like education, health, and living standards?

(a) Multidimensional Poverty Index (MPI)
(b) Income Poverty Index (IPI)
(c) Consumer Price Index (CPI)
(d) Human Development Index (HDI)

Q27. In 2025, Hindustan Aeronautics Ltd (HAL) signed an MoU in Moscow with which foreign aerospace company to jointly produce the SJ-100 civil commuter aircraft in India?

(a) Roscosmos State Corporation for Space Activities
(b) Russia's United Aircraft Corporation (PJSC-UAC)
(c) Sukhoi Civil Aircraft Company
(d) Irkut Corporation

Q28. Below are given two sets of numbers. In each set of numbers, a certain mathematical operation on the first number results in the second number. Similarly, a certain mathematical operation on the second number results in the third number and so on. Which of the given options follows the same set of operations as in the question?

(NOTE – A two/three-digit number cannot be broken into individual digits for operations. E.g. if 37 is followed by 10, the operation cannot be 3+7 as a two-digit number cannot be broken into individual digits.)

3 – 30 – 150 – 151

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9 – 90 – 450 – 451

(a) 6 – 60 – 30 – 150
(b) 8 – 80 – 400 – 40
(c) 15 – 150 – 750 – 749
(d) 12 – 120 – 600 – 601

Q29. Which climatic factor plays the most significant role in shaping the distribution of natural vegetation across India?

(a) Soil nutrient quality
(b) Annual precipitation (>250 cm)
(c) Altitudinal gradient
(d) Mean annual temperature variations

Q30. What should come in place of the question mark (?) in the given series?

89 87 84 79 72 ?

(a) 61
(b) 63
(c) 62
(d) 59

Q31. A shopkeeper professes to sell his goods at a 35% loss but uses a false balance and gains 75%. The actual weight (rounded off to one decimal place) he uses for 1 kg is:

(a) 372.9 gm
(b) 374.5 gm
(c) 371.4 gm
(d) 376.5 gm

Q32. This question is based on the five, three-digit numbers given below.

(Left) 746 154 798 123 145 (Right)

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

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

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

(a) 13
(b) 10
(c) 11
(d) 16

Q33. Which of the following statements about the Directive Principles of State Policy of the Indian Constitution is NOT correct?

(a) They guide the legislature and executive
(b) They are legally enforceable by courts
(c) They embody ideals of socio-economic justice
(d) They represent the aspirations of the people

Q34. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

All cars are planes. Some planes are trains. Some trains are ships.

Conclusions:

(I) Some cars are trains.

(II) Some planes are ships.

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

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(d) Only conclusion (I) follows

Q35. L, M, N, D, E and F live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it is numbered 2 and so on till the topmost floor is numbered 6. M lives on the topmost floor. Only three people live between M and D. N lives on a floor below D. E lives on an even numbered floor. L lives on an odd numbered floor, but not on floor number 5. How many people live between F and D?

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

Q36. A building contractor employs 25 skilled workers and 5 unskilled workers. To a skilled worker he pays Rs. 30 per hour and to an unskilled worker Rs. 24 per hour. The average wage per hour (in Rs.) paid by the contractor is:

(a) 29
(b) 27
(c) 25
(d) 32

Q37. Which new mission was launched by the Government of India in 2025 to restore degraded forest landscapes?

(a) Urban Biodiversity Scheme
(b) Green India Mission
(c) Clean Air Initiative
(d) River Rejuvenation Project

Q38. The average of the marks of 16 students in a class is 56. If the marks of each student are doubled, find the new average.

(a) 112
(b) 56
(c) 32
(d) 16

Q39. 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 its constituent digits. For example, 13 – Operations on 13 such as adding/deleting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

(11, 20, 215)

(10, 15, 145)

(a) (11, 15, 125)
(b) (13, 16, 208)
(c) (11, 9, 94)
(d) (7, 17, 88)

Q40. In what duration (in years) will Rs. 9,000 fetch a simple interest of Rs. 720 at 4% per annum rate of interest?

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

Q41. Find the value of y, satisfying $12 \times 3 \times 940 \div \sqrt{2209} = y + 716$

(a) 3
(b) -6
(c) 0
(d) 4

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Q42. Which of the following ministers was the Commander of the entire military under the king during the Mughal rule?

(a) Diwan-i-Insha
(b) Mir Saman
(c) Mir Bakshi
(d) Sadr-us-Sudur

Q43. In December 2025, the rupee's (Rs.) appreciation against the US dollar was most likely due to which of the following actions by the RBI?

(a) Gold imports
(b) Bond purchases
(c) Dollar sales
(d) Interest rate hike

Q44. Which of the following elements in the periodic table is NOT classified as a metal?

(a) Sulfur
(b) Potassium
(c) Calcium
(d) Sodium

Q45. In a certain code language,

A + B means 'A is the mother of B'
A - B means 'A is the son of B'
A × B means 'A is the brother of B'
A ÷ B means 'A is the daughter of B'
Based on the above, how is M related to K if 'M - V × T ÷ S + K'?

(a) Sister's son
(b) Brother's son
(c) Daughter's son
(d) Brother

Q46. Which of the following river delta is NOT located on the eastern coastal plain?

(a) Godavari
(b) Tapti
(c) Krishna
(d) Mahanadi

Q47. Which administrative change was directly implemented by the British in response to the mutiny of 1857, signifying a shift in governance structure?

(a) Enactment of the Indian Councils Act, 1861
(b) Issue of Queen Victoria's Proclamation
(c) Transfer of authority from Company to Crown
(d) Introduction of the Permanent Settlement in Bengal

Q48. For which of the following was the industrial license not exempted during the 1991 reforms?

(a) Steel
(b) Coal
(c) Alcohol
(d) Food processing

Q49. If the mean of the following data is 45, find the value of X.

Class	20-30	30-40	40-50	50-60	60-70
Frequency	49	19	25	21	X

(a) 32

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(b) 48
(c) 26
(d) 42

Q50. Seven people B, C, D, O, P, Q and R are sitting around a circular table facing the center of the table. C sits to the immediate right of B. Q sits to the immediate left of D. O sits second to the right of D. R sits third to the left of C. Who sits third to the right of P?

(a) D
(b) B
(c) R
(d) O

Q51. In a certain code language,

Q + W means ‘Q is the father of W',

Q @ W means ‘Q is the brother of W',

Q $ W means ‘Q is the mother of W', and

Q # W means ‘Q is the sister of W'.

Based on the above, how is N related to S if ' N @ R + K @ S '?

(a) Son
(b) Brother
(c) Father's brother
(d) Brother's son

Q52. The Salem Steel Plant is located in which state?

(a) Jharkhand
(b) Bihar
(c) Tamil Nadu
(d) Karnataka

Q53. Which of the following groups of organisms exhibit the phenomenon of haploid-dominant life cycle?

(a) The fungi
(b) The angiosperms
(c) The amphibians
(d) The mammals

Q54. Three positive integers, P, Q, and R, are such that the highest common factor of P and Q is 15, the highest common factor of Q and R is 10, and the highest common factor of R and P is 5. If the sum P + Q + R is as small as possible, the value of P × Q × R is:

(a) 3000
(b) 6000
(c) 1500
(d) 4500

Q55. Which of the following countries emerged as mixed team Squash World Cup champions in December 2025 following a dominant 3–0 triumph over top-seeded Hong Kong?

(a) India
(b) Egypt
(c) England
(d) Australia

Q56. Which of the following samitis was founded by Ashwini Kumar Dutt in Barisal?

(a) Swadesh Bandhab Samiti
(b) Jugantar Samiti
(c) Bharat Mata Samiti
(d) Anushilan Samiti

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Q57. This question is based on the five, three-digit numbers given below.

(Left) 917 946 857 971 587 (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 added to the third digit of the lowest number?

(a) 14
(b) 17
(c) 19
(d) 18

Q58. Evaluate: (-9) - (-56) ÷ (-14) + (-4) × 9

(a) -49
(b) 52
(c) 51
(d) 48

Q59. Boat A, whose speed in still water is 10 km/h, goes downstream from city P to city Q in 3 hours. Boat B goes from city Q to city P in 5 hours. What will be the time taken (in hours) by boat B to travel from city P to city Q, if the speed of the stream is 5 km/h?

(a) 3
(b) 34/15
(c) 27/19
(d) 4

Q60. A solid cone is cut into two pieces (a smaller cone and a frustum) of equal volume by making a cut parallel to its flat surface. The height of the small cone is equal to the diameter of the bigger flat area of the frustum. The radius of the small cone is ____ times its height.

(a) 1/3cbrt3
(b) 1/cbrt2
(c) 1/2cbrt2
(d) 1/2cbrt3

Q61. 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 streams are canals. Some canals are rivers. Some rivers are seas.

Conclusions:

(I) Some seas are streams.(II) Some rivers are streams.

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

Q62. Solve the following system of 3 equations in 3 unknowns.

$2x + y - 3z = -4$

$4x - 2y + z = 9$

$3x + 5y - 2z = 5$

(a) $x = -2, y = 1, z = 3$
(b) $x = -2, y = -1, z = 3$
(c) $x = 2, y = 1, z = 3$
(d) $x = 2, y = -1, z = -3$

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Q63. In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Q. Rahul, Aman, Karan, Nikhil, and Varun each have different height. Who is the second tallest?

(I) Karan is taller than Rahul and Aman but shorter than Nikhil.

(II) Varun is taller than Karan but shorter than Nikhil

(a) Both statements I and II together are NOT sufficient to answer the question
(b) Data in Statement I alone is sufficient to answer the question while data in Statement II is not
(c) Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
(d) Data in Statement II alone is sufficient to answer the question while data in Statement I is not

Q64. Which of the following letter-number clusters will replace the question mark "?" in the given series to make it logically complete?

JFX 15, OKC 21, TPH 27, YUM 33, ?

(a) BYR 39
(b) DYP 39
(c) EAS 38
(d) DZR 39

Q65. The foundational understanding of the law of inertia was established through the experiments of which physicist?

(a) Albert Einstein
(b) Michael Faraday
(c) Galileo Galilei
(d) Archimedes

Q66. A dealer buys two articles X and Y for Rs. 3,500 each. He marks each of them at the same price. He sells X by giving two successive discounts of 45% and 60% and still earns Rs. 889 as profit. If he sells Y at a single discount of 69%, then what is the profit percentage on Y?

(a) 76.7%
(b) 76%
(c) 75%
(d) 75.7%

Q67. Consider the following statements regarding Chandrapuram Ponnusamy Radhakrishnan.

1. He is the 24^(th) and current Governor of Maharashtra since 31 July 2024.

2. Before becoming the Governor of Maharashtra, he served as the Governor of Jharkhand from February 2023 to July 2024.

Which of the above statements is/are correct?

(a) Only 1
(b) Only 2
(c) Neither 1 nor 2
(d) Both 1 and 2

Q68. Refer to the following letter and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left) ? A ? M V R ? F @ D E Q * ? R V M / % * M (Right)

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

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

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Q69. 20% of a number is more than 20% of 620 by 160. The number is:

(a) 1270
(b) 1520
(c) 1470
(d) 1420

Q70. If $p^2 + 3p = 3$, then the value of $(p + 4)^3 + 1/((p + 4)^3)$ is:

(a) 55
(b) 110
(c) 52
(d) 104

Q71. Seven boxes, A, B, C, D, E, F and G, are kept one over the other but not necessarily in the same order. Only B is kept above C. Only E is kept between C and F. Only A is kept below G. How many boxes are kept between C and G?

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

Q72. According to the Citizenship Act, 1955, a person born outside India on or after December 10, 1992, shall be a citizen of India by descent if:

(a) Both parents are ordinarily resident in India at the time of birth
(b) Either parent is a citizen of India at the time of birth
(c) Only the mother is an Indian citizen
(d) Only the father is an Indian citizen

Q73. 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 is the one that does not belong to that group? (Note: The odd man out is not based on the number of consonants/vowels or their position in the letter cluster)

(a) IK-MO
(b) CE-HJ
(c) NP-RT
(d) KM-OQ

Q74. P and Q can complete a piece of work in 20 days and 30 days, respectively. They decide to work alternatively; one day P and next day Q, until the job is finished. How many days will it take for the work to be completed, if P starts the work?

(a) 24 days
(b) 18 days
(c) 21 days
(d) 25 days

Q75. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

NON 40 LML 30 JKJ 20 HIH 10 ?

(a) FGF 0
(b) FNW 7
(c) FHE 0
(d) FFE 5

Q76. Which of the following best describes a LAN?

(a) A network covering a small geographical area like an office or school
(b) A code used to represent characters in numbers
(c) A storage device used to read optical discs

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(d) A high-capacity compact disc format

Q77. Which national financial performance milestone was reported by the Department of Commerce for H1 FY 2025-26 (April–September 2025), highlighting best-ever export figures?

(a) Largest export diversification program
(b) Highest FDI inflow in 5 years
(c) Highest export quarter in H1
(d) Lowest trade deficit in a decade

Q78. Based on the alphabetical order, three of the following four are alike in a certain way and thus form a group. Which is the one that 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) HJL
(b) BDF
(c) TVY
(d) FHJ

Q79. Vikramshila University located in the Bhagalpur district of Bihar was founded by which of the following rulers?

(a) King Gopala
(b) King Mahipala
(c) King Dharampala
(d) King Devapala

Q80. According to the Global Innovation Index Ranking 2025, which country has the 1^(st) rank?

(a) Switzerland
(b) Finland
(c) Denmark
(d) Sweden

Q81. Two taps can fill a cistern in 4 hours and 29 hours respectively. A third tap can empty it in 29 hours. How long (in hours) will it take to fill one-fourth of the empty cistern, if all of them are opened together?

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

Q82. Below are given two sets of numbers. In each set of numbers, a certain mathematical operation on the first number results in the second number. Similarly, a certain mathematical operation on the second number results in the third number, and so on. Which of the given options follows the same set of operations as in the question?

(NOTE: A two-/three-digit number cannot be broken into individual digits for operations, e.g. if 37 is followed by 10, the operation cannot be 3 + 7, as a two-digit number cannot be broken into individual digits.)

14 – 196 – 186 – 166 ; 18 – 324 – 314 – 294

(a) 11 – 121 – 111 – 91
(b) 16 – 256 – 266 – 246
(c) 18 – 320 – 330 – 350
(d) 21 – 441 – 431 – 451

Q83. Salil's salary is Rs. 18000 per month. He spends Rs. 5500 on house rent, Rs. 1500 on bills and the rest of the amount is his monthly savings. Find his savings (in Rs.) in a year, if in the month of his birthday, he spent his complete monthly saving for birthday celebration.

(a) 121000
(b) 99000
(c) 132000
(d) 110000

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Q84. What is the main role of the Finance Commission in Centre-State relations in India?

(a) Recommending distribution between the Union and the States of the net proceeds of taxes
(b) Planning economic development funds
(c) Approving state budgets
(d) Allocating state shares of GST

Q85. Which of the following institutions was set up during the Swadeshi movement?

(a) Bengal National College
(b) Shantiniketan
(c) Bethune School
(d) Banaras Hindu University

Q86. Which of the following BEST differentiates system software from application software?

(a) System software runs directly on hardware; application software runs after system software loads
(b) System software creates documents; application software manages the CPU
(c) Both are used only for entertainment
(d) System software is user-oriented; application software is system-oriented

Q87. Which of the following is a key element of the monetary system infrastructure of India?

(a) Banks
(b) Power stations
(c) Roads
(d) Railways

Q88. Seven boxes, C, F, J, N, Q, S and V are kept one over the other but not necessarily in the same order. Only Q is kept above F. Only V is kept between J and S. Only N is kept below J. How many boxes are kept between C and N?

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

Q89. In a certain code language, ‘MATE’ is coded as ‘9827’ and ‘TIME’ is coded as ‘9218’. What is the code for ‘I’ in the given code language?

(a) 8
(b) 2
(c) 9
(d) 1

Q90. Form the quadratic equation whose roots are 3 and –2.

(a) $x^2 – x – 6 = 0$
(b) $x^2 – x + 6 = 0$
(c) $x^2 + x + 6 = 0$
(d) $x^2 + x – 6 = 0$

Q91. Which type of chemical reaction involves the breakdown of a compound into two or more simpler substances?

(a) Neutralization reaction
(b) Displacement reaction
(c) Combination reaction
(d) Decomposition reaction

Q92. What was a major reason for the slowdown in Total Factor Productivity (TFP) growth in the manufacturing sector, as found by Goldar and Kumari?

(a) Over-reliance on foreign capital
(b) Deterioration in capacity utilisation
(c) Shortage of skilled labour

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(d) Excessive regulation on exports

Q93. Under Article 275 of the Constitution, the sums provided by the Parliament as grants-in-aid to states are required to be charged on which fund?

(a) State Emergency Fund
(b) Contingency Fund of India
(c) Consolidated Fund of India
(d) Public Account of India

Q94. A shopkeeper purchased 67 dozens of articles at the rate of Rs. 300 per dozen. He sold each one of them at the rate of Rs. 34. What percentage profit did he make?

(a) 38%
(b) 34%
(c) 37%
(d) 36%

Q95. Vansh starts from Point A and drives 26 km towards West. He then takes a left turn, drives 15 km, turns left and drives 35 km. He then takes a left turn and drives 21 km. He takes a final left turn, drives 9 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) 5 km to the North
(b) 5 km to the South
(c) 6 km to the South
(d) 6 km to the North

Q96. In the following triads, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one which follows the same logic.

HUGE - UEGH - EGUH

LIST - ITSL - TSIL

(a) BANK - BNAK - KNAB
(b) HEAR - ERAH - RAEH
(c) VIBE - IVBE - EIBV
(d) EAST - AEST - TASE

Q97. A teacher needs to split 300 students into three groups so that the second and third groups have a ratio of 3 : 7, and the first and third groups have a ratio of 2 : 7. Which of the following is the correct number of students in the second group?

(a) 64
(b) 88
(c) 72
(d) 75

Q98. What value must be assigned to A so that the 8-digit number 493A9132 is divisible by 9?

(a) 7
(b) 9
(c) 2
(d) 5

Q99. If ‘A’ stands for ‘÷’, ‘B’ stands for ‘×’, ‘C’ stands for ‘+’ and ‘D’ stands for ‘−’, then what will come in place of the question mark (?) in the following equation?

22 A 11 C 3 B 7 D 6 = ?

(a) 13
(b) 15
(c) 14
(d) 17

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Q100. Arjun has Rs. 1394 with him. He divides this amount between his two sons, Kartik and Ishan, and asks them to invest their respective shares at a compound interest rate of 5% per annum, compounded annually. It is observed that Kartik's investment amounts to the same value after 17 years as Ishan's investment does after 18 years. How much (in Rs.) did Arjun give to Ishan?

(a) 680
(b) 530
(c) 714
(d) 814

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) Tertiary Activity

The correct answer is Tertiary Activity.

Key Points

• The Tertiary Activity, also known as the Service Sector, is the largest contributor to the economy of the United States, accounting for approximately 77% to 80% of the total Gross Domestic Product (GDP). It encompasses a wide range of services including Healthcare, Finance, Real Estate, Insurance, and Professional services. Hence, statement A is correct.

• Secondary Activity refers to the Manufacturing and Construction sectors which involve the processing of raw materials into finished products. In the US, this sector contributes roughly 18% of the GDP and includes key industries like Automobiles, Aerospace, and Electronics. Hence, statement B is incorrect.

• Primary Activity involves the extraction of natural resources, such as Agriculture, Mining, Forestry, and Fishing. While the US is a global leader in agricultural exports, this sector only contributes about 1% to the national GDP due to high levels of mechanization and the transition to a post-industrial economy. Hence, statement C is incorrect.

• Quaternary Activity is a specialized branch of the service sector that focuses on knowledge-based services such as Information Technology (IT), Research and Development (R&D), and Consultancy. While it is a critical driver of Innovation in the US, it is usually grouped under the broader Tertiary category in standard economic reporting. Hence, statement D is incorrect.

Additional Information

• Economic Evolution: The United States has undergone a significant transformation from an Agrarian economy in the 19th century to an Industrial economy in the early 20th century, and finally to a Service-based economy following World War II. This transition is typical of advanced Developed Countries.

• The Service Sector Composition: Within the Tertiary sector, the Finance, Insurance, Real Estate, Rental, and Leasing industry group is often the single largest component, contributing nearly 20% of the total US GDP. Government services at the federal, state, and local levels also form a substantial part of this sector.

• Global Context: According to reports by the World Bank and the Bureau of Economic Analysis (BEA), the US maintains one of the largest service-oriented economies in the world. This sector is not only the largest in Value but also the primary source of Employment, supporting over 80% of the American workforce.

• Role of Technology: High-value Quaternary activities like Software Development and Biotechnology are central to the US competitive advantage. Cities like San Francisco (Silicon Valley), New York, and Boston serve as global hubs for these intellectual services.

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Important Points

• Bureau of Economic Analysis (BEA): This is the US government agency responsible for providing official Macroeconomic and industry statistics, including the GDP calculations that categorize these sectors.

• Interdependence: It is important to note that these sectors are highly Interdependent; for example, the Manufacturing sector (Secondary) relies heavily on Logistics and Financial services (Tertiary) to operate effectively.

• Export of Services: The US is a net exporter of services, particularly in Intellectual Property, Travel, and Financial services, which helps mitigate the trade deficit found in the goods sector.

Q2. Answer: (a) 66

Shortcut Trick

Since P || Q => corresponding angles are equal

Angle on top = x°

Angle on bottom = (48 + x)°

These form a linear pair => sum = 180°

=> x + (48 + x) = 180

=> 2x + 48 = 180

=> 2x = 132 => x = 66°

Therefore Answer = 66°

Alternate Method

Given:

P || Q and a transversal cuts them

Concept Used:

Corresponding angles are equal and linear pair sums to 180°

Calculation:

=> Angle at top = x°

=> Corresponding angle at bottom = x°

=> Given adjacent angle = 48 + x

=> Linear pair:

x + (48 + x) = 180

=> 2x + 48 = 180

=> 2x = 132

=> x = 66°

Therefore The correct answer is 66°.

Additional Information

Parallel Lines Property

Corresponding angles are equal

Linear Pair

Adjacent angles on a straight line sum to 180°

Quick Tip

Always combine corresponding + linear pair in parallel line problems

Q3. Answer: (a) Disk Clean up

The correct answer is Disk Cleanup.

Key Points

• Utility software is a type of system software designed to help analyze, configure, optimize, or maintain a computer. Unlike application software, which is used by end-users to perform specific tasks like writing or drawing, utilities focus on the functioning of the computer infrastructure.

• Disk Cleanup is a maintenance utility included in Microsoft Windows (first introduced with Windows 98) that is designed to free up disk space on a computer's hard drive. It searches and analyzes the drive for files that are no longer of any use and then provides the user with an option to remove them. Hence, statement A is correct.

• MS Word is a graphical word processing program that allows users to type and save documents. It is a part of the Microsoft Office Suite and is categorized as Application Software because it performs a specific functional task for the user. Hence, statement B is incorrect.

• MS PowerPoint is a presentation program developed by Microsoft. It is used to create slideshows consisting of text, graphics,

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and multi-media objects. It is classified as Application Software. Hence, statement C is incorrect.

• MS Excel is a spreadsheet program used for data analysis, calculation, and visualization using a grid of cells. Since its primary purpose is to assist the user in specific data-related work, it is an Application Software. Hence, statement D is incorrect.

Additional Information

• Types of Utility Software:

• Antivirus Software: Used to protect the system from malware, viruses, and cyber threats. Examples include Norton, McAfee, and Windows Defender.

• File Compression Utilities: These tools reduce the size of a file to save storage space or for easier transmission. Examples include WinZip, WinRAR, and 7-Zip.

• Disk Defragmenter: A utility that reorganizes files on a hard disk to occupy contiguous storage locations, thereby increasing the speed of data access.

• Backup Software: Facilitates the creation of a copy of data so that it may be restored after a data loss event.

• Application Software vs. System Software:

• Application Software is task-specific and includes programs like Web Browsers (Google Chrome), Media Players (VLC), and Database Management Systems (MySQL).

• System Software provides a platform for other software and includes the Operating System (OS) like Windows, Linux, and macOS, and Language Translators like Compilers and Interpreters.

• Functions of Disk Cleanup:

• It targets Temporary Internet Files, Downloaded Program Files, and Recycle Bin contents.

• It can also remove System files such as previous installations of Windows (Windows.old folder) and Windows Update logs to reclaim significant Gigabytes (GB) of space.

Important Points

• The distinction between Utility and Application software is based on the intent of the program. If the program manages hardware or system resources, it is a utility; if it serves the user's creative or professional output, it is an application.

• In modern operating systems, many Utility functions are now integrated directly into the OS kernel or system settings, making the boundary between OS and Utility software increasingly thin.

• Disk Cleanup has been partially replaced by Storage Sense in Windows 10 and 11, which automates the process of removing unnecessary files.

Q4. Answer: (c) Arabesque

The correct answer is Arabesque.

Key Points

• Arabesque is the most dominant form of decoration used in Sultanate buildings, characterized by rhythmic linear patterns of scrolling and interlacing foliage, tendrils, or plain lines. Hence, the correct option is Arabesque.

• During the Delhi Sultanate (1206–1526 AD), Islamic law prohibited the representation of living beings (humans or animals) in religious architecture, leading to the development of abstract decorative arts.

• This decorative style often combined geometric patterns with calligraphy (Kufic or Naskh scripts) to decorate the walls, mihrabs, and minarets of mosques and tombs.

• Architects used stucco, stone carving, and tile work to create these intricate designs, ensuring that every inch of the surface was aesthetically pleasing without violating religious tenets.

• The Arabesque designs were typically based on nature, such as vines, flowers, and leaves, but were stylized to create a continuous, infinite pattern representing the infinite nature of God.

Additional Information

• Toranas:

• These are ceremonial gateways found in Hindu, Buddhist, and Jain architecture.

• They are famous in locations like the Sanchi Stupa (Madhya Pradesh) and were common during the Maurya and Gupta periods.

• They usually feature heavy sculptural carvings of deities and mythical animals, which contrasts with the Sultanate style.

• Amalaka:

• An Amalaka is a segmented or notched stone disk, usually with ridges on the rim, that sits on the top of a Hindu temple's shikhara (tower).

• It is a characteristic feature of the Nagara style of architecture in Northern India.

• It represents a lotus flower or the sun, supporting the Kalasha above it.

• Kalasha:

• The Kalasha is a metal or stone finial shaped like a pot, placed at the very pinnacle of a Hindu temple.

• It is considered an auspicious symbol and marks the highest point of the structure.

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• While seen in some Indo-Islamic hybrids later, it remains primarily a temple architecture element.

Important Points

• The Delhi Sultanate introduced the Arcuate style of architecture, featuring the true arch and dome, replacing the traditional Indian Trabeate style (beam and post).

• Major buildings where Arabesque and calligraphy are prominently seen include the Quwwat-ul-Islam Mosque and the Qutub Minar (started in 1192 AD).

• The use of Red Sandstone and White Marble became common during this era, providing a beautiful contrast for the geometric carvings.

• Jali work (perforated stone screens) was another significant feature, allowing light and ventilation while maintaining privacy and displaying geometric mastery.

Q5. Answer: (b) Operation Sagar Bandhu

The correct answer is Operation Sagar Bandhu.

Key Points

• Operation Sagar Bandhu was launched by the Government of India in 2025 to provide urgent Humanitarian Assistance and Disaster Relief (HADR) to Sri Lanka following the devastation caused by Cyclone Ditwah.

• The mission involved the deployment of multiple Indian Navy warships, including INS Tarkash and INS Sumedha, which were diverted to the Colombo and Trincomalee ports to deliver critical relief materials.

• This operation is an extension of India's SAGAR (Security and Growth for All in the Region) vision, which was first articulated by Prime Minister Narendra Modi in 2015 to strengthen maritime cooperation in the Indian Ocean Region (IOR).

• The aid package delivered under this mission included medicines, heavy-duty water pumps, dry rations, clothing, and portable oxygen generators to assist the flood-affected population.

• The Indian Navy also deployed Advanced Light Helicopters (ALH) and specialized diving teams to assist the Sri Lankan authorities in search and rescue operations in the inundated coastal districts.

Additional Information

• Operation Samudra Setu:

• Launched in May 2020, this was a major effort to repatriate 3,992 Indian citizens stranded in various countries during the COVID-19 pandemic.

• The Indian Navy utilized ships like INS Jalashwa and INS Magar for this massive evacuation exercise across the Indian Ocean.

• Operation Maitri:

• This was the relief and rescue operation started by the Indian government and Indian Armed Forces in the aftermath of the April 2015 Nepal earthquake.

• It remains one of India's largest-ever HADR operations outside its borders, involving the Indian Air Force and the Indian Army.

• Operation Vanila:

• Initiated in January 2020, this operation provided immediate relief to Madagascar after the country was hit by Cyclone Diane.

• INS Airavat was the primary vessel used to deliver clothing, food, and medical emergency supplies to the port of Antsiranana.

• Mission SAGAR:

• The SAGAR initiative (Security and Growth for All in the Region) serves as a framework for India's maritime cooperation with its neighbors.

• Through various phases (SAGAR I, II, III, and IV), India has consistently supplied food and medical aid to countries like Mauritius, Maldives, Sudan, and Vietnam.

Important Points

• First Responder Status: India's swift action during Cyclone Ditwah reinforces its standing as the Net Security Provider and the First Responder in the Indian Ocean Region.

• Neighbourhood First Policy: This operation aligns with India’s diplomatic priority to maintain stable and supportive relations with its immediate neighbors like Sri Lanka.

• Strategic Deployment: The use of warships for humanitarian goals showcases the Indian Navy’s versatility in transitioning from combat readiness to disaster management roles within 24 to 48 hours.

• Historical Context: India has previously assisted Sri Lanka during the 2004 Tsunami and the 2017 floods, demonstrating a long-standing history of bilateral disaster cooperation.

Q6. Answer: (a) Tabla

The correct answer is Tabla.

Key Points

• The Tabla is a pair of twin hand drums from the Indian subcontinent. Since the 18th century, it has been the principal percussion instrument in Hindustani classical music.

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• It is classified as an Avanaddha Vadya (membranophone) in the traditional Indian classification system, as the sound is produced by striking a stretched skin or membrane.

• The instrument is essentially a tal-giving device, meaning its primary function is to maintain the Tala (rhythmic cycle), which provides the structural framework for Indian music. Hence, the statement regarding its classification is correct.

• The Tabla consists of two distinct drums: the Dayan (right drum), typically made of teak or rosewood and tuned to a specific pitch, and the Bayan (left drum), which is larger and made of copper, brass, or clay, providing a deep bass sound.

• It is widely used in various musical forms, including Vocal music, Instrumental solo performances, and accompaniment for Dance forms like Kathak.

Additional Information

• Flute (Bansuri):

• It is a Sushira Vadya (wind instrument) crafted from a single hollow shaft of bamboo.

• The North Indian Bansuri typically features six or seven finger holes and is used as a primary melodic instrument.

• Renowned maestros like Pandit Hariprasad Chaurasia have popularized this instrument globally. It is not a percussion or tal-giving instrument.

• Sarod:

• The Sarod is a Tata Vadya (stringed instrument) prominent in the Hindustani tradition.

• It is known for its fretless fingerboard made of polished steel, which allows for the continuous sliding of notes known as Meend.

• It has 17 to 25 strings, including sympathetic strings that resonate to create a rich, echoing sound.

• Santoor:

• The Santoor is a hammered dulcimer originating from the Sufiana Mausiqi tradition of Jammu and Kashmir.

• It is categorized as a Tata Vadya and typically consists of 72 to 100 strings stretched over a trapezoidal wooden box.

• The musician plays it using a pair of curved wooden mallets called Mezrab or Kalam. Pandit Shivkumar Sharma was instrumental in bringing it to the classical stage.

Important Points

• The systematic classification of Indian musical instruments is found in the Natya Shastra, compiled by Bharat Muni between 200 BCE and 200 CE.

• Tala (Tal): This is the rhythmic cycle in Indian music. Common Talas played on the Tabla include Teental (16 beats), Dadra (6 beats), and Keherwa (8 beats).

• Syahi: Both drums of the Tabla feature a central black spot made of a mixture of iron filings, soot, and gum, which allows for the production of varied harmonics and overtones.

• Gharanas: The art of Tabla playing is preserved through various schools or Gharanas, such as Delhi, Lucknow, Ajrada, Farrukhabad, Benares, and Punjab.

Q7. Answer: (a) 25

Shortcut Trick

Arrange all marks in ascending order: 15, 16, 20, 23, 24, 25, 25, 27, 30, 32, 40, 45

Total observations = 12 (even)

Median = average of 6th and 7th terms

Median = (25 + 25) ÷ 2 = 25

Therefore Answer = 25

Alternate Method

Given:

Marks = 24, 25, 32, 23, 40, 27, 30, 25, 20, 15, 16, 45

Formula used:

Median (even n) = (n/2 th term + (n/2 + 1) th term) ÷ 2

Calculation:

=> Arrange data: 15, 16, 20, 23, 24, 25, 25, 27, 30, 32, 40, 45

=> n = 12

=> n/2 = 6th term = 25

=> (n/2 + 1) = 7th term = 25

=> Median = (25 + 25) ÷ 2 = 25

Therefore The correct answer is 25.

Additional Information

Median Concept

Median is the middle value of ordered data. If n is odd, median = middle term; if n is even, median = average of two middle terms.

Mean Formula

Mean = (Sum of observations) ÷ n

Mode Concept

Mode is the value that appears most frequently in the data set.

Even vs Odd Case

For even n: Median = average of two middle terms; for odd n: Median = (n+1)/2 th term.

Q8. Answer: (b) 9

Given:

'MODE' is coded as '3519'

'DIGS' is coded as '6894'

Since D appears in both words but its consistent coding is taken from the direct matching pattern in such questions, D corresponds to 9

Hence, the correct answer is Option 2.

Q9. Answer: (b) Defence Research and Development Organisation

The correct answer is Defence Research and Development Organisation.

Key Points

• The Defence Research and Development Organisation (DRDO) successfully conducted a high-speed rocket-sled test of a fighter aircraft escape system in early 2025. This test is a critical milestone in verifying the safety and reliability of pilot ejection mechanisms under extreme conditions.

• The test was carried out at the Rocket Sled Test Facility (RSTF) located at the Terminal Ballistics Research Laboratory (TBRL) in Chandigarh. The facility uses a rail-track system to simulate high-speed flight conditions on the ground.

• This achievement has placed India among a select group of elite nations, including the USA, Russia, France, and the UK, that possess the advanced in-house infrastructure required to test and qualify crew escape systems for modern fighter jets.

• The primary objective of the test was to evaluate the ejection seat performance at supersonic speeds, ensuring that the sequencing of the parachute deployment and seat stabilization works perfectly to protect the Indian Air Force (IAF) pilots during emergencies.

• The indigenous development and testing of these systems are vital for upcoming indigenous aircraft projects such as the Tejas Mk2 and the Advanced Medium Combat Aircraft (AMCA), significantly enhancing the Aatmanirbhar Bharat (Self-Reliant India) initiative in the defense sector.

Additional Information

• Defence Research and Development Organisation (DRDO):

• DRDO was established in 1958 by merging the Technical Development Establishment of the Indian Army and the Directorate of Technical Development and Production with the Defence Science Organisation.

• It operates under the Ministry of Defence and is headquartered in New Delhi. Currently, it consists of a network of over 50 laboratories dedicated to developing various defense technologies, including missiles, aeronautics, and electronic warfare.

• Terminal Ballistics Research Laboratory (TBRL):

• Located in Chandigarh, TBRL was established in 1961. It is a major DRDO laboratory involved in the development and characterization of high explosives, ballistics, and the design of warheads.

• The Rocket Sled Test Facility (RSTF) at TBRL is unique as it allows for the testing of components at speeds exceeding Mach 1 (speed of sound) while remaining on a controlled terrestrial track.

• Aeronautical Development Agency (ADA):

• ADA is the nodal agency under the Department of Defence Research and Development responsible for the design and development of the LCA Tejas. While ADA designs the aircraft, DRDO laboratories like TBRL provide the testing infrastructure.

• Hindustan Aeronautics Limited (HAL):

• HAL is a state-owned aerospace and defense company headquartered in Bengaluru. It is primarily responsible for the manufacturing and assembly of aircraft, such as the Tejas and various helicopters like the Prachand (Light Combat Helicopter).

Important Points

• Technological Significance: Before the 2025 success, India often relied on foreign entities, such as Martin-Baker in the UK, for the validation and testing of ejection seats. Having an in-house RSTF saves significant foreign exchange and reduces the development cycle for new aircraft.

• The Escape System: A fighter aircraft escape system includes the ejection seat, the canopy disposal system, and the recovery sequencer. The Rocket Sled test specifically validates the trajectory of the seat to ensure it clears the aircraft's tail assembly even at maximum velocity.

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• Strategic Impact: The successful test ensures that the Indian Air Force can maintain high safety standards for its pilots using purely indigenous technology, which is crucial for national security and strategic autonomy in military hardware.

Q10. Answer: (b) Establishment of Lokpal at the village level

The correct answer is Establishment of Lokpal at the village level.

Key Points

• Constitutional Status of Panchayats: The 73rd Constitutional Amendment Act, 1992 added a new Part IX to the Constitution of India, entitled "The Panchayats", giving constitutional recognition to the Panchayati Raj Institutions (PRIs) as institutions of self-government. Hence, statement C is a correct feature.

• Reservation of Seats: The Act provides for the reservation of seats for Scheduled Castes (SCs) and Scheduled Tribes (STs) in every panchayat in proportion to their population in the panchayat area. Additionally, it mandates that not less than one-third (33%) of the total number of seats and offices of chairpersons must be reserved for women. Hence, statement A is a correct feature.

• Duration and Mandatory Elections: The Act provides for a five-year term of office for the panchayat at every level. It is mandatory to hold elections to constitute a new panchayat before the expiry of its term of 5 years. In the event of dissolution, the elections must be held within a period of six months from the date of its dissolution. Hence, statement D is a correct feature.

• Absence of Lokpal Provision: The 73rd Amendment focuses entirely on the Panchayati Raj system and administrative decentralization. It does not include any provision for the establishment of a Lokpal at the village level. The Lokpal and Lokayuktas Act, 2013, is a separate legislation that deals with the establishment of anti-corruption ombudsman bodies at the Union and State levels respectively. Hence, statement B is not a feature and is the correct answer.

Additional Information

• Historical Evolution: The Panchayati Raj system in India was formally recommended by the Balwant Rai Mehta Committee in 1957, which suggested a three-tier structure. Following this, Rajasthan became the first state to inaugurate the system in Nagaur district on October 2, 1959. Subsequent committees like the Ashok Mehta Committee (1977) and L.M. Singhvi Committee (1986) further shaped the demand for constitutional status.

• Constitutional Articles and Schedule: The amendment inserted Articles 243 to 243O and the Eleventh Schedule into the Constitution. The Eleventh Schedule specifies 29 functional items that are placed within the purview of Panchayats, including agriculture, land improvement, minor irrigation, poverty alleviation programs, and primary education.

• The Gram Sabha: Under Article 243A, the Gram Sabha acts as the foundation of the Panchayati Raj system. It is a village assembly consisting of all the registered voters in the area of a panchayat at the village level. It exercises such powers and performs such functions as the Legislature of a State determines.

• State Election Commission: According to Article 243K, the power of superintendence, direction, and control of the preparation of electoral rolls and the conduct of all elections to the Panchayats is vested in a State Election Commission, consisting of a State Election Commissioner appointed by the Governor.

• State Finance Commission: Under Article 243I, the Governor of a state is required to constitute a Finance Commission every five years to review the financial position of the Panchayats and recommend the principles for the distribution of taxes between the State and the Panchayats.

Important Points

• Compulsory vs. Voluntary Provisions: The 73rd Amendment contains compulsory provisions that must be implemented by all states, such as the creation of Gram Sabhas and three-tier panchayats (except for states with a population below 20 lakhs). Voluntary provisions, such as granting financial powers to levy taxes or providing reservation for Backward Classes, are left to the discretion of the State Legislatures.

• Effective Date: The 73rd Constitutional Amendment Act, 1992 came into effect on April 24, 1993. This date is commemorated annually in India as National Panchayati Raj Day to celebrate the decentralization of power to the grassroots level.

• Excluded Areas: The provisions of Part IX do not apply to certain Scheduled Areas and Tribal Areas mentioned in Article 244. However, the Parliament extended these provisions to these areas through the Provisions of the Panchayats (Extension to the Scheduled Areas) Act, popularly known as the PESA Act, in 1996.

Q11. Answer: (b) 12

Shortcut Trick

Articles are in ratio 4 : 4 : 3 => let them be 4x, 4x, 3x

Total cost of one ratio set = 4×280 + 4×180 + 3×115

= 1120 + 720 + 345 = 2185

Now total amount ÷ cost per set = 6555 ÷ 2185 = 3 => x = 3

Type Q articles = 4x = 4×3 = 12 =>

Therefore Answer = 12

Alternate Method

Given:
Price of P = 280, Q = 180, R = 115
Ratio = 4 : 4 : 3
Total cost = 6555
Formula used:
Total Cost = Sum of (quantity × price)
Calculation:
=> Let quantities be 4x, 4x, 3x
=> Total cost = 4x×280 + 4x×180 + 3x×115
=> = 1120x + 720x + 345x
=> = 2185x
=> 2185x = 6555
=> x = 6555 ÷ 2185 = 3
=> Number of Q articles = 4x = 12
Therefore The correct answer is 12.
Additional Information
Ratio Concept
If quantities are in ratio a : b : c, they can be written as ax, bx, cx for solving problems.
Total Cost Formula
Total Cost = Quantity × Price (applied individually and summed).
Unitary Method
First find cost of one ratio set, then divide total cost to get multiplier x.
Proportional Distribution
When values are proportional, multiplying by a common factor maintains the ratio.

Q12. Answer: (a) Two

The logic followed here is:
Given number: 386152479
Logic: Arrange the digits in ascending order and compare positions with the original number.
Original number: 3 8 6 1 5 2 4 7 9
Arranged number: 1 2 3 4 5 6 7 8 9

Digit (Original)	Digit (New)	Same/Changed
3	1	Changed
8	2	Changed
6	3	Changed
1	4	Changed
5	5	Same
2	6	Changed
4	7	Changed
7	8	Changed
9	9	Same

Total unchanged digits = 2
Hence, the correct answer is Option 1.

Q13. Answer: (c) I, II and III

The correct answer is I, II and III.
Key Points
• Konark Sun Temple: This magnificent temple is located in Puri, Odisha. It was constructed in the 13th century (approximately 1250 CE) by King Narasimhadeva I of the Eastern Ganga Dynasty. The temple is designed in the shape of a colossal chariot with

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24 intricately carved stone wheels pulled by seven horses, symbolizing the Sun God, Surya. It was declared a UNESCO World Heritage Site in 1984. Hence, statement I is correct.

• Modhera Sun Temple: Situated on the banks of the Pushpavati River in Mehsana district, Gujarat, this temple was built in 1026-27 CE during the reign of King Bhima I of the Chaulukya Dynasty (also known as the Solankis). The temple complex consists of three main components: Gudhamandapa (shrine hall), Sabhamandapa (assembly hall), and Kunda (sacred reservoir). It is renowned for its Nagara style of architecture and the fact that the first rays of the sun fall on the deity during equinoxes. Hence, statement II is correct.

• Martand Sun Temple: Located near Anantnag in Jammu and Kashmir, this temple was built in the 8th century CE by Lalitaditya Muktapida, the most powerful ruler of the Karkota Dynasty. Although it currently lies in ruins, the site remains an architectural marvel, blending Gandharan, Gupta, and Chinese styles. It offers a panoramic view of the Kashmir Valley. Hence, statement III is correct.

• All three mentioned temples are iconic historical monuments dedicated to the Sun God in different regions of India.

• Hence, the correct answer is I, II and III.

Additional Information

• Other Significant Sun Temples: Apart from the three mentioned, India houses several other notable Sun temples such as the Katarmal Sun Temple in Almora, Uttarakhand (built in the 9th century), and the Arasavalli Sun Temple in Srikakulam, Andhra Pradesh (built in the 7th century).

• Architectural Diversity: Sun temples in India exhibit various regional styles. For example, Konark represents the Kalinga architecture, while Modhera reflects the Muru-Gurjara or Solanki style.

• Historical Context of Sun Worship: Sun worship has been a core part of Indian culture since the Vedic period. The Sun is considered the soul of the universe and a source of energy and life in Hinduism.

• Suryanar Kovil: This is a prominent Sun temple located in Tamil Nadu, built in the 11th century during the Chola period. It is unique as it contains shrines for all the Navagrahas (nine planets).

Important Points

• Scientific Precision: The construction of these temples demonstrates advanced astronomical knowledge. At Konark, the wheels of the chariot act as sundials, which can be used to calculate time accurately to a minute.

• Preservation Status: Most of these temples are protected monuments under the Archaeological Survey of India (ASI). Konark is particularly famous for its erotic sculptures and geometric patterns, despite the main Shikhara (tower) having collapsed in the past.

• Tourism and Culture: These sites are major hubs for tourism and cultural festivals, such as the Konark Dance Festival and the Modhera Dance Festival, which showcase Indian classical dance forms against the backdrop of these ancient structures.

• Destruction and Legacy: The Martand Sun Temple was reportedly destroyed on the orders of Sultan Sikandar Shah Miri in the late 14th century, yet its massive stone blocks and carved pillars continue to attract historians and tourists worldwide.

Q14. Answer: (a) 42

Shortcut Trick

Section A ratio = 36 : 24 = 3 : 2

Same ratio applies to Section B

Girls = 28 => 2 parts = 28 => 1 part = 14

Boys = 3 parts = 3 × 14 = 42

Therefore Answer = 42

Alternate Method

Given:

Section A: Boys = 36, Girls = 24

Section B: Girls = 28

Formula used:

Ratio remains constant => Boys/Girls is same for both sections

Calculation:

=> Ratio in Section A = 36 : 24

=> Simplify => 3 : 2

=> Let boys in Section B = x

=> x / 28 = 3 / 2

=> x = (3 × 28) ÷ 2

=> x = 84 ÷ 2 = 42

Therefore The correct answer is 42.

Additional Information

Ratio Simplification

Ratios can be simplified by dividing both terms by their greatest common divisor.

Proportion Concept

If a/b = c/d, then a × d = b × c. This is used to find unknown values.

Unitary Method

Find value of one part first, then multiply to get required quantity.

Direct Variation

When two quantities vary in the same ratio, scaling one scales the other proportionally.

Q15. Answer: (d) Magudi

The correct answer is Magudi.

Key Points

• The Magudi, also known as the Pungi or Been, is a traditional Indian wind instrument commonly used by snake charmers.

• It is classified as a compound wind instrument because it features two pipes (tubes) inserted into a single air reservoir, which is usually made from a dried bottle gourd (Toomba).

• The two tubes serve different functions: one tube acts as a drone, producing a constant, single pitch, while the other tube, called the chanter, contains finger holes and is used to play the melody.

• Historically, the instrument is most closely associated with the Kalbelia community of Rajasthan and Saperas (snake charmers) across North India.

• The air is blown through a mouthpiece into the gourd, which then distributes it through the two pipes, allowing for a continuous and layered sound.

Additional Information

• Clarinet:

• The Clarinet is a woodwind instrument with a single-reed mouthpiece.

• It was developed in Europe around the year 1700 and typically consists of a single cylindrical tube with a flared bell.

• Unlike the Magudi, it does not use a dual-tube compound structure for drone and melody functions.

• Kombu:

• The Kombu is a traditional C-shaped wind instrument made of brass or copper.

• It is native to South India, particularly Kerala, where it is played during temple festivals like Thrissur Pooram.

• It is a natural trumpet type instrument and lacks finger holes, meaning its pitch is controlled entirely by the player's embouchure.

• Conch (Shankha):

• The Conch is a natural wind instrument made from the shell of a large sea snail.

• It holds significant religious importance in Hinduism and Buddhism and is used in rituals and temples.

• It functions as a natural trumpet, producing a single, powerful sound when blown through a hole at the apex.

• Construction Details:

• The reservoir of the Magudi is traditionally seasoned for months. The pipes are usually made of bamboo or wood and are sealed into the gourd using beeswax.

Important Points

• Circular Breathing: Musicians playing the Magudi often use circular breathing, a technique that allows them to maintain a continuous sound for long durations without stopping to inhale.

• Legal Context: Due to the Wildlife Protection Act, 1972, the practice of using the Magudi for public snake charming has been significantly restricted in India to protect cobras and other reptiles from exploitation.

• Cultural Heritage: In 2010, UNESCO inscribed the Kalbelia folk songs and dances of Rajasthan on the Representative List of the Intangible Cultural Heritage of Humanity, highlighting the Magudi as a key accompanying instrument.

Q16. Answer: (c) The diagonals of a square are equal and bisect each other.

Shortcut Trick

Square is a special rectangle + rhombus

Diagonals of rectangle => equal

Diagonals of rhombus => bisect each other

So square has both properties

Therefore Answer = Option 3

Alternate Method

Given:

Properties of diagonals of a square
Concept Used:
Geometrical properties of square
Calculation:
=> A square has all sides equal and all angles 90°
=> Its diagonals are equal in length
=> Diagonals intersect at the center
=> Each diagonal divides the other into two equal parts
=> Hence, diagonals bisect each other
=> Therefore, diagonals are equal and bisect each other
Therefore The correct answer is Option 3.
Additional Information
Square Properties
All sides equal and all angles are 90°
Diagonal Length
Diagonal = side × √2
Bisecting Property
Diagonals cut each other into two equal halves
Additional Property
Diagonals are perpendicular to each other

Q17. Answer: (c) 180 seconds

Shortcut Trick
Opposite direction => Relative speed = 22 + 15 = 37 km/h
Track length = 1850 m = 1.85 km
Time = Distance ÷ Relative speed = 1.85 ÷ 37 hours
= 0.05 hour = 3 minutes = 180 seconds
Therefore Answer = 180 seconds
Alternate Method
Given:
Speed of Aman = 22 km/h
Speed of Suman = 15 km/h
Track length = 1850 m
Formula used:
Time = Distance ÷ Relative Speed
Calculation:
=> Convert distance: 1850 m = 1.85 km
=> Relative speed (opposite direction) = 22 + 15 = 37 km/h
=> Time = 1.85 ÷ 37 hours
=> Time = 0.05 hour
=> Convert into minutes: 0.05 × 60 = 3 minutes
Therefore The correct answer is 180 seconds.
Additional Information
Relative Speed
If two objects move in opposite directions, relative speed = sum of their speeds.
Circular Track Concept
For first meeting on a circular track, total relative distance covered equals the circumference.
Unit Conversion
1 km = 1000 m and 1 hour = 60 minutes.
Same Direction Case
If moving in same direction, relative speed = difference of speeds.

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Q18. Answer: (c) = QPS, % = JIL

Given: # : ONQ :: LKN : %

Option 1) # = RUS, % = KON

For # (RUS) to ONQ

For % (KON) to LKN

Since, the patterns do not match, Option 1 is incorrect.

Option 2) # = QUV, % = JLP

For # (QUV) to ONQ

For % (JLP) to LKN

Since, the patterns do not match, Option 2 is incorrect.

Option 3) # = QPS, % = JIL

For # (QPS) to ONQ

For % (JIL) to LKN

Since, both transformations follow a consistent shift pattern, Option 3 is correct.

Option 4) # = RQU, % = KPM

For # (RQU) to ONQ

For % (KPM) to LKN

Since, the patterns do not match, Option 4 is incorrect.

Hence, the correct answer is Option 3.

Q19. Answer: (a) 3456√3

Shortcut Trick

Area of square = 5184 => side = √5184 = 72 cm

Perimeter of square = 4 × 72 = 288 cm

Hexagon has 6 equal sides => each side = 288 ÷ 6 = 48 cm

Area of regular hexagon = (3√3 ÷ 2) × side² = (3√3 ÷ 2) × 48²

= (3√3 ÷ 2) × 2304 = 3456√3

Therefore Answer ≈ 3456√3 cm²

Alternate Method

Given:

Area of square = 5184 cm²

Perimeter of square = Perimeter of regular hexagon

Formula used:

Area of square = side²

Perimeter of square = 4 × side

Perimeter of hexagon = 6 × side

Area of hexagon = (3√3 ÷ 2) × side²

Calculation:

=> side of square = √5184 = 72 cm

=> Perimeter of square = 4 × 72 = 288 cm

=> Perimeter of hexagon = 288 cm

=> side of hexagon = 288 ÷ 6 = 48 cm

=> Area = (3√3 ÷ 2) × 48²

=> = (3√3 ÷ 2) × 2304

=> = 3456√3

Therefore The correct answer is 3456√3 cm².

Additional Information

Square Properties

All sides are equal and area = side2, perimeter = 4 × side.

Regular Hexagon

A regular hexagon has 6 equal sides and can be divided into 6 equilateral triangles.

Hexagon Area Formula

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Area = (3√3 ÷ 2) × side2

Perimeter Equality

If perimeters are equal, total boundary length of both shapes is the same.

Q20. Answer: (a) 1024 terabytes

The correct answer is 1024 terabytes.

Key Points

• A Petabyte (PB) is a unit of digital information storage used to measure very large amounts of data. In the binary system (base-2), which is most commonly used in computing, 1 Petabyte is exactly equal to 1024 Terabytes (TB). Hence, option A is correct.

• In terms of smaller units, 1 Petabyte is equivalent to 1,048,576 Gigabytes (GB) and approximately 1 quadrillion bytes (specifically 1,125,899,906,842,624 bytes).

• 1024 Zettabytes is equal to 1 Yottabyte (YB), which is a much higher order of magnitude than a petabyte. Hence, option B is incorrect.

• 1024 Yottabytes is often referred to as a Brontobyte or Hellabyte in theoretical computing, representing an astronomical scale of data far beyond a petabyte. Hence, option C is incorrect.

• 1024 Gigabytes is equal to 1 Terabyte (TB), which is the unit immediately below the petabyte in the storage hierarchy. Hence, option D is incorrect.

• The relationship between these units follows a power of 2 progression, where each subsequent unit is 2^10 (which is 1024) times the size of the previous unit.

Additional Information

• Data Storage Hierarchy: The fundamental unit of data is a bit (0 or 1). 8 bits make 1 Byte. The hierarchy continues as Kilobyte (KB), Megabyte (MB), Gigabyte (GB), Terabyte (TB), Petabyte (PB), Exabyte (EB), Zettabyte (ZB), and Yottabyte (YB).

• Binary vs. Decimal Prefixes: In the International System of Units (SI), prefixes like "Kilo" or "Mega" refer to powers of 10 (e.g., 1 KB = 1000 bytes). However, in computing, the IEC (International Electrotechnical Commission) standards often use binary prefixes like Pebibyte (PiB) for 1024^5, though "Petabyte" is still commonly used to mean 1024 Terabytes in most operating systems and exams.

• Real-world Scale: To put a Petabyte in perspective, it is estimated that 1 PB could hold approximately 500 billion pages of standard printed text or about 13.3 years of HD-TV video.

• Applications: Petabyte-scale storage is typically utilized by large-scale data centers, cloud service providers (like Google, Amazon, and Microsoft), and scientific research institutions (such as CERN) that handle massive datasets from experiments.

Important Points

• Bit: The smallest unit of data, representing a logical state with one of two values, 0 or 1.

• Nibble: A group of 4 bits or half a byte.

• Byte: Consists of 8 bits and is the standard unit used to represent a character such as a letter, number, or symbol.

• Exabyte (EB): The unit immediately following the Petabyte. 1 EB = 1024 PB. Global internet traffic is often measured in Exabytes per month.

• Conversion Table Summary:

• 1024 B = 1 KB

• 1024 KB = 1 MB

• 1024 MB = 1 GB

• 1024 GB = 1 TB

• 1024 TB = 1 PB

Q21. Answer: (b) The Great Indian Desert

The correct answer is The Great Indian Desert.

Key Points

• The Thar Desert is officially known as The Great Indian Desert, which is a vast, arid region located in the northwestern part of the Indian subcontinent. Hence, the correct option is The Great Indian Desert.

• It covers an area of approximately 200,000 square kilometers (77,000 square miles) and forms a natural geographical boundary between India and Pakistan.

• Geographically, it is the world's 20th-largest desert and the 9th-largest hot subtropical desert in the world.

• In India, about 85% of the desert is located, specifically spanning across the states of Rajasthan, Gujarat, Haryana, and Punjab, while the remaining 15% lies in the Punjab and Sindh provinces of Pakistan.

• The desert is characterized by large, shifting sand dunes and alluvial plains, receiving very low annual rainfall, usually between 100 mm to 500 mm.

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Additional Information

• Geological Features and Origins:

• The Thar Desert is believed to have originated between 4,000 and 10,000 years ago. Some geologists suggest that the area was once fertile and part of the Sarasvati River basin.

• The Aravalli Range marks the southeastern limit of the desert, acting as a barrier that prevents the monsoon winds from providing moisture to the region.

• The desert is home to several saltwater lakes, including Sambhar, Kuchaman, and Didwana, which indicate the presence of the ancient Tethys Sea in this region during the Mesozoic Era.

• Climate and Hydrology:

• The Luni River is the only major river in the region, which originates in the Pushkar Valley of the Aravalli Range and ends in the marshy lands of Rann of Kutch.

• To provide water for agriculture and drinking, the Indira Gandhi Canal (the longest canal in India) was constructed, significantly changing the ecology and economy of the northern part of the desert.

• Flora and Fauna:

• Despite the harsh environment, the Thar Desert is the most densely populated desert in the world, with a population density of 83 people per square km.

• It supports a variety of wildlife, including the Great Indian Bustard (State bird of Rajasthan), Blackbuck, Chinkara, and the Indian Desert Fox.

• Common vegetation includes Khejri (Prosopis cineraria), which is the state tree of Rajasthan, along with Rohida and various types of thorny shrubs and grasses.

Important Points

• The Great Salt Desert / The Great White Desert:

• These terms usually refer to the Rann of Kutch in Gujarat. It is a massive seasonal salt marsh and is distinct from the sandy Thar Desert. It is famous for the Rann Utsav and the white salt crust that covers the land during the dry season.

• Economic Significance:

• The Thar Desert is rich in minerals such as gypsum, feldspar, phosphorite, and kaolin. It is also a major hub for renewable energy, specifically wind power and solar energy, with the Bhadla Solar Park being one of the largest in the world.

• National Parks:

• The Desert National Park in Jaisalmer and Barmer is a protected area that showcases the unique ecosystem of the Great Indian Desert and its fossil wealth dating back 180 million years.

Q22. Answer: (a) C

The logic followed here is:

Given: A, B, C, D, E, F and G are sitting around a circular table facing the centre

D sits to the immediate left of G

A sits third to the left of G

F sits to the immediate left of C

C sits second to the left of E

So, third to the right of G is C.

Hence, the correct answer is Option 1.

Q23. Answer: (a) IF 28

The logic followed here is:

SP 12 is related to WT 16:

MJ 15 is related to QN 19:

Now, applying the same logic for EB 24:

So, EB 24 related IF 28

Hence, the correct answer is Option 1.

Q24. Answer: (b) 4

Shortcut Trick

Use identities: $\csc^2\theta = 1 + \cot^2\theta$ and $\sec^2\theta = 1 + \tan^2\theta$

Also use complementary angles: $\cot 34° = \tan 56°$ and $\tan 27° = \cot 63°$

Expression becomes: $(1 + \cot^2 63°) + 3(1 + \tan^2 56°) - 3\tan^2 56° - \cot^2 63°$

Cancel terms => 1 + 3 = 4

Therefore Answer = 4

Alternate Method

Given:

$\csc^2 63° + 3\sec^2 56° - 3\cot^2 34° - \tan^2 27°$

Concept Used:

$\csc^2\theta = 1 + \cot^2\theta$, $\sec^2\theta = 1 + \tan^2\theta$

$\cot\theta = \tan(90° - \theta)$, $\tan\theta = \cot(90° - \theta)$

Calculation:

=> $\csc^2 63° = 1 + \cot^2 63°$

=> $\sec^2 56° = 1 + \tan^2 56°$

=> $\cot^2 34° = \tan^2 56°$

=> $\tan^2 27° = \cot^2 63°$

=> Substitute:

=> $(1 + \cot^2 63°) + 3(1 + \tan^2 56°) - 3\tan^2 56° - \cot^2 63°$

=> $= 1 + \cot^2 63° + 3 + 3\tan^2 56° - 3\tan^2 56° - \cot^2 63°$

=> $= 1 + 3 = 4$

Therefore The correct answer is 4.

Additional Information

Pythagorean Identities

$\sin^2\theta + \cos^2\theta = 1$, $\sec^2\theta = 1 + \tan^2\theta$, $\csc^2\theta = 1 + \cot^2\theta$

Complementary Angles

$\tan(90° - \theta) = \cot\theta$ and $\cot(90° - \theta) = \tan\theta$

Cancellation Trick

Convert all terms into tan or cot form to easily cancel similar terms.

Trigonometric Simplification

Use identities to reduce complex expressions into constants.

Q25. Answer: (b) 1

The logic followed here is:

thus, "1" will replace the question mark in the given series.

Hence, the correct option is "Option 2".

Q26. Answer: (a) Multidimensional Poverty Index (MPI)

The correct answer is Multidimensional Poverty Index (MPI).

Key Points

• The National Multidimensional Poverty Index (MPI) is a project aimed at measuring and monitoring poverty in India through a holistic lens that goes beyond just income levels. It was launched by NITI Aayog in 2021 to provide a more comprehensive picture of poverty in the country.

• This index is based on the Alkire-Foster (AF) methodology, which was developed by the Oxford Poverty and Human Development Initiative (OPHI) and the United Nations Development Programme (UNDP) for the Global MPI.

• The index identifies deprivations across three equally weighted dimensions: Health, Education, and Standard of Living. These dimensions are further broken down into 12 indicators to capture the complexity of poverty.

• In the Indian context, the 12 indicators include Nutrition, Child and Adolescent Mortality, Antenatal Care, Years of Schooling, School Attendance, Cooking Fuel, Sanitation, Drinking Water, Electricity, Housing, Assets, and Bank Accounts.

• The use of Antenatal Care and Bank Accounts as indicators is a specific feature of the Indian National MPI that distinguishes it from the Global MPI, which traditionally uses 10 indicators.

Additional Information

• Sustainable Development Goals (SDG): The National MPI helps India track its progress towards SDG Target 1.2, which aims to reduce at least by half the proportion of men, women, and children of all ages living in poverty in all its dimensions by the year 2030.

• Data Source: The primary data used for calculating the MPI is the National Family Health Survey (NFHS). The 2021 report used NFHS-4 (2015-16) data, while the 2023 progress review utilized NFHS-5 (2019-21) data.

• Human Development Index (HDI): While MPI focuses on poverty, the HDI is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable, and having a decent standard of living. It is

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published by the UNDP.

• Consumer Price Index (CPI): This is a measure that examines the weighted average of prices of a basket of consumer goods and services, such as transportation, food, and medical care. It is primarily used to measure inflation rather than multidimensional poverty.

• Income Poverty Index (IPI): This traditionally measures poverty based on a specific poverty line defined by a daily or monthly income/expenditure threshold, which the MPI seeks to move beyond by looking at non-monetary deprivations.

Important Points

• 2023 Progress Review: According to the latest NITI Aayog report released in July 2023, nearly 13.5 crore Indians escaped multidimensional poverty between 2015-16 and 2019-21.

• State Performance: Uttar Pradesh recorded the steepest decline in the number of MPI poor, followed by Bihar, Madhya Pradesh, Rajasthan, and Odisha.

• Rural vs Urban: The decline in multidimensional poverty was faster in rural areas (from 32.59% to 19.28%) compared to urban areas (from 8.65% to 5.27%) during the same period.

• Nodal Agency: NITI Aayog (National Institution for Transforming India) serves as the nodal agency for the Multidimensional Poverty Index coordination committee (MPICC), involving 12 ministries and departments of the Government of India.

• Significance: The MPI provides evidence-based data that helps the government design targeted interventions and policies like the Pradhan Mantri Awas Yojana, Swachh Bharat Mission, and Jal Jeevan Mission to address specific deprivations.

Q27. Answer: (b) Russia's United Aircraft Corporation (PJSC-UAC)

The correct answer is Russia's United Aircraft Corporation (PJSC-UAC).

Key Points

• In July 2024 (referenced as 2025 for future implementation context), Hindustan Aeronautics Ltd (HAL) signed a significant Memorandum of Understanding (MoU) with Russia's United Aircraft Corporation (PJSC-UAC).

• The signing ceremony took place in Moscow, coinciding with high-level bilateral discussions between India and Russia aimed at enhancing cooperation in civil aviation and high-technology sectors.

• The primary objective of this partnership is to jointly produce the SJ-100 civil commuter aircraft in India, marking a transition from purely military cooperation to civilian aerospace manufacturing.

• The SJ-100 is an "import-substituted" version of the Sukhoi Superjet 100 (SSJ100), designed by Russia to function without Western-made components and systems, utilizing the PD-8 engine.

• This initiative is expected to bolster the Make in India program by establishing a domestic manufacturing line for regional jets, which is critical for the UDAN (Ude Desh ka Aam Naagrik) scheme to improve regional connectivity.

Additional Information

• Hindustan Aeronautics Limited (HAL):

• HAL was established in 1940 by Walchand Hirachand in Bengaluru and is currently a Maharatna Public Sector Undertaking under the Ministry of Defence, Government of India.

• It specializes in the design, fabrication, and assembly of aircraft, jet engines, and helicopters. Notable products include the LCA Tejas and the Dhruv Advanced Light Helicopter.

• United Aircraft Corporation (PJSC-UAC):

• UAC is a Russian aerospace and defense corporation, majority-owned by the Russian Government through Rostec.

• It consolidates major Russian aircraft manufacturers, including Sukhoi, Mikoyan (MiG), Ilyushin, Tupolev, and Yakovlev, to streamline production and design capabilities.

• SJ-100 Aircraft Specifications:

• The SJ-100 is a short-haul regional jet with a typical seating capacity of 87 to 103 passengers.

• It is developed as part of Russia's strategy to achieve technological sovereignty in the aviation sector, replacing foreign avionics and engines with domestic alternatives like the PD-8 turbofan.

• Bilateral Cooperation Trends:

• The India-Russia partnership has historically focused on defense hardware like the BrahMos missile and Su-30MKI fighter jets; however, the SJ-100 project represents a pivot toward the Civil Aviation market to address India's growing demand for regional transport.

• The collaboration helps Russia find new markets for its civilian aircraft technology while allowing India to develop local expertise in commercial aircraft manufacturing and MRO (Maintenance, Repair, and Overhaul) services.

Important Points

• The agreement signifies a strategic intent to diversify India's civil aviation fleet, which is currently dominated by Airbus and Boeing.

• The SJ-100 project in India will likely involve technology transfer, enabling HAL to manufacture structural components and perform final assembly in its units located in Nashik or Bengaluru.

• The development aligns with the 2024-2025 roadmap for India-Russia economic cooperation, which aims to increase trade volume to $100 billion by 2030.

Q28. Answer: (d) 12 – 120 – 600 – 601

The logic followed here is:

Logic: The pattern is → Multiply by 10, then multiply by 5, then add 1.

For, (3 – 30 – 150 – 151)

=> 3 × 10 = 30

=> 30 × 5 = 150

=> 150 + 1 = 151

For, (9 – 90 – 450 – 451)

=> 9 × 10 = 90

=> 90 × 5 = 450

=> 450 + 1 = 451

Now, checking the options using the same pattern:

Option 1) (6 – 60 – 30 – 150)

=> 6 × 10 = 60

=> 60 × 5 = 300 ≠ 30

Option 2) (8 – 80 – 400 – 40)

=> 8 × 10 = 80

=> 80 × 5 = 400

=> 400 + 1 = 401 ≠ 40

Option 3) (15 – 150 – 750 – 749)

=> 15 × 10 = 150

=> 150 × 5 = 750

=> 750 + 1 = 751 ≠ 749

Option 4) (12 – 120 – 600 – 601)

=> 12 × 10 = 120

=> 120 × 5 = 600

=> 600 + 1 = 601

Hence, the correct answer is Option 4.

Q29. Answer: (b) Annual precipitation (>250 cm)

The correct answer is Annual precipitation.

Key Points

• Annual precipitation is the most critical climatic factor determining the natural vegetation of India because the monsoon climate creates vast variations in rainfall across the subcontinent. High rainfall areas support dense forests, while low rainfall areas support scrub and deserts. Hence, option B is the most significant factor.

• In India, Tropical Evergreen Forests are found in regions receiving more than 250 cm of annual rainfall, with a short dry season. These are primarily located in the Western Ghats, Upper Assam, and the Andaman and Nicobar Islands.

• Tropical Deciduous Forests are the most widespread forest type in India, thriving in regions with rainfall between 70 cm and 200 cm. These are further divided into Moist Deciduous (100-200 cm) and Dry Deciduous (70-100 cm).

• Tropical Thorn Forests occur in semi-arid areas where the annual precipitation is less than 50 cm. These features include acacias, palms, and cacti, commonly found in Northwest India, including Rajasthan and Haryana.

• While mean annual temperature variations influence vegetation, they are secondary in India because most of the country lies in the tropical and subtropical zones where temperatures remain high enough for plant growth throughout the year, except in high-altitude regions. Hence, option D is a secondary factor.

Additional Information

• Altitudinal Gradient: In the Himalayan region, the distribution of vegetation changes according to altitude rather than just rainfall. As height increases, temperature decreases, leading to a transition from Tropical to Subtropical, Temperate, and finally Alpine vegetation. Hence, option C is specifically significant in mountainous regions.

• Soil Nutrient Quality: Different soil types like Alluvial soil, Black soil, and Laterite soil provide the nutrient base for specific crops and trees. For example, Mangrove forests grow in coastal saline soils affected by tides. However, soil itself is often a product of climatic weathering over geological time. Hence, option A is a localized factor.

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• Photoperiod: The duration of sunlight affects the growth rate of trees. In India, during the summer months, trees grow faster due to longer days and abundant sunlight, provided there is sufficient moisture.

• Ecosystem Diversity: Due to the varied climatic conditions, India possesses one of the world's richest floras. According to botanical surveys, India is home to about 47,000 plant species, ranking tenth in the world and fourth in Asia in plant diversity.

Important Points

• Champion and Seth Classification (1968): This is the most widely accepted classification of forest types in India, which categorizes vegetation into 16 major groups based on temperature and rainfall data.

• India State of Forest Report (ISFR) 2021: Released by the Forest Survey of India (FSI), this report highlights that the total forest cover is 7,13,789 sq km, which is 21.71% of the geographical area.

• Endemic Species: About 15,000 of the flowering plants in India are endemic, meaning they are native to the country and not found anywhere else.

• Human Impact: Natural vegetation in most parts of India has been modified or replaced due to agriculture, urbanization, and industrialization, leaving truly "natural" vegetation only in inaccessible regions like the Himalayas and Central India.

Q30. Answer: (a) 61

The logic followed here is:

thus, "61" will replace the question mark in the given series.

Hence, the correct option is "Option 1".

Q31. Answer: (c) 371.4 gm

Shortcut Trick

Let CP of 1 kg = 100

He sells at 35% loss => SP (per kg claim) = 65

But actual gain = 75% => actual SP = 175

So weight given = (65 ÷ 175) kg = 0.371 kg

= 371.4

Therefore Answer = 371.4 kg

Alternate Method

Given:

Loss claimed = 35%

Actual gain = 75%

Formula used:

SP = CP × (1 − Loss%)

Actual SP = CP × (1 + Gain%)

Calculation:

=> Let CP of 1 kg = 100

=> Claimed SP = 100 × (1 − 35/100) = 65

=> Actual SP for 1 kg = 100 × (1 + 75/100) = 175

=> So, weight given for 65 rupees = 65 ÷ 175 kg

=> = 0.371 kg

Therefore The correct answer is 371.4 kg.

Additional Information

False Weight Concept

Shopkeepers may give less quantity while charging for full weight to gain profit.

Profit and Loss Formula

Profit% = (Profit ÷ CP) × 100

Successive Gain

Even if loss is shown, using false weight can lead to overall profit.

Shortcut Idea

Assume CP = 100 to simplify percentage calculations quickly.

Q32. Answer: (b) 10

The logic followed here is:

Given numbers: 746, 154, 798, 123, 145

Logic: Find the highest and lowest numbers, then perform the required operation.

Arranging in descending order: 798, 746, 154, 145, 123

Highest number = 798

→ Third digit = 8

Lowest number = 123

→ Second digit = 2

Result = 8 + 2 = 10

Hence, the correct answer is Option 2.

Q33. Answer: (b) They are legally enforceable by courts

The correct answer is They are legally enforceable by courts.

Key Points

• Directive Principles of State Policy (DPSP) serve as a guide to the legislature and the executive. According to Article 37, it is the duty of the State to apply these principles in making laws, as they are fundamental in the governance of the country. Hence, statement 1 is correct.

• The Directive Principles are non-justiciable in nature, meaning they are not legally enforceable by the courts for their violation. Unlike Fundamental Rights, a citizen cannot move the court to implement these principles. Hence, statement 2 is not correct.

• These principles embody the ideals of socio-economic justice. They aim at establishing a Welfare State where social, economic, and political justice prevails, as mentioned in Article 38. Hence, statement 3 is correct.

• The DPSP represents the aspirations of the people and the goals that the Constituent Assembly wanted the independent Indian State to achieve over time. They act as "Instrument of Instructions" to the government. Hence, statement 4 is correct.

• The DPSP are enumerated in Part IV of the Indian Constitution, covering Articles 36 to 51.

Additional Information

• Source and Influence: The concept of Directive Principles was borrowed from the Irish Constitution of 1937, which had copied it from the Spanish Constitution. These were also present in the Government of India Act, 1935 as "Instrument of Instructions".

• Classification of Principles: Although the Constitution does not formally classify them, they are usually grouped into three categories:

• Socialistic Principles: Aimed at providing social and economic justice (e.g., Article 39, Article 41).

• Gandhian Principles: Based on the ideology of Mahatma Gandhi (e.g., Article 40 regarding Village Panchayats, Article 47 regarding prohibition of intoxicating drinks).

• Liberal-Intellectual Principles: Based on liberalism (e.g., Article 44 regarding Uniform Civil Code, Article 50 regarding separation of judiciary from executive).

• Amendments to DPSP: The 42nd Constitutional Amendment Act, 1976 added four new Directive Principles: Article 39 (opportunities for healthy development of children), Article 39A (equal justice and free legal aid), Article 43A (participation of workers in management), and Article 48A (protection of environment).

• Fundamental Rights vs. DPSP: While Fundamental Rights (Part III) protect individual liberties and are justiciable, DPSP (Part IV) promote collective well-being and are non-justiciable. However, the Supreme Court has often ruled that they must be read together to achieve the Constitutional goals.

Important Points

• Minerva Mills Case (1980): The Supreme Court held that the Indian Constitution is founded on the bedrock of the balance between Fundamental Rights and Directive Principles.

• Article 44: This article directs the State to secure for the citizens a Uniform Civil Code throughout the territory of India, which remains a widely discussed topic in Indian polity.

• Article 45: Originally provided for free and compulsory education for children up to 14 years. After the 86th Amendment Act, 2002, this was made a Fundamental Right under Article 21A, and Article 45 now deals with early childhood care for children below 6 years.

• Article 51: Promotes international peace and security and maintains just and honourable relations between nations.

Q34. Answer: (c) Neither conclusion (I) nor (II) follows

Given Statements:

All cars are planes.

Some planes are trains.

Some trains are ships.

The least possible Venn diagram for the given statements is:

Conclusions:

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I. Some cars are trains – False
(Cars are inside planes, but the overlap between planes and trains may not include cars.)
II. Some planes are ships – False
(Trains overlap with ships, but planes–trains overlap may be different from trains–ships overlap.)
So, neither conclusion I nor II follows.
Hence, the correct answer is Option 3.

Q35. Answer: (d) Two

The logic followed here is:
Given:L, M, N, D, E and F live on six different floors of the same building.
The lowermost floor in the building is numbered 1, the floor above it is numbered 2 and so on till the topmost floor is numbered 6.
M lives on the topmost floor.
Only three people live between M and D.
N lives on a floor below D.
E lives on an even numbered floor.
L lives on an odd numbered floor, but not on floor number 5.

Floor	Person
6	M
5	F
4	E
3	L
2	D
1	N

Now, people between F: 1 person
Hence, the correct answer is Option 3.

Q36. Answer: (a) 29

Shortcut Trick
Use weighted average since workers have different wages
Total workers = 25 + 5 = 30
Total wage = (25 × 30) + (5 × 24) = 750 + 120 = 870
Average wage = 870 ÷ 30 = 29
Therefore Answer = 29
Alternate Method
Given:
Skilled workers = 25, wage = 30 per hour
Unskilled workers = 5, wage = 24 per hour
Formula used:
Average = (Total wages) ÷ (Total number of workers)
Calculation:
=> Total workers = 25 + 5 = 30
=> Total wages of skilled = 25 × 30 = 750
=> Total wages of unskilled = 5 × 24 = 120
=> Total wages = 750 + 120 = 870
=> Average wage = 870 ÷ 30 = 29
Therefore The correct answer is 29.
Additional Information
Weighted Average
When different groups have different values, average = (Σ frequency × value) ÷ Σ frequency.
Simple Average

Used when all observations have equal weight: sum ÷ number of observations.

Shortcut Concept

Multiply each wage with number of workers and divide by total workers.

Application

Weighted average is widely used in salary, marks, and mixture problems.

Q37. Answer: (b) Green India Mission

The correct answer is Green India Mission.

Key Points

• The National Mission for a Green India (GIM) is one of the eight missions launched under the National Action Plan on Climate Change (NAPCC). It was originally launched in February 2014, but has seen significant policy updates and budget re-allocations targeting the 2024-2025 period to address degraded forest landscapes.

• The primary objective of this mission is to protect, restore, and enhance India's diminishing forest cover. It aims to respond to climate change by a combination of adaptation and mitigation measures.

• The mission targets a 10 million hectare (mha) increase in forest/tree cover on both forest and non-forest lands. Additionally, it focuses on improving the quality of forest cover in another 5 million hectares.

• It is implemented by the Ministry of Environment, Forest and Climate Change (MoEFCC). The scheme emphasizes a decentralized approach, involving local communities and Gram Sabhas in the planning and monitoring of the reforestation activities. Hence, the Green India Mission is the correct mission for landscape restoration.

• The mission also seeks to improve ecosystem services such as carbon sequestration, hydrological services, and biodiversity, while also providing fuel, fodder, and timber to local households.

Additional Information

• Urban Biodiversity Scheme (Nagar Van Yojana):

• Launched in 2020, this scheme aims to develop 200 Urban Forests (Nagar Vans) across the country in the next five years.

• It focuses on creating green spaces in urban areas to provide a healthy environment and contribute to the growth of biodiversity within city limits.

• The WARTS (Watershed and Afforestation) model and CAMPA funds are often utilized for these urban greening projects.

• Clean Air Initiative (National Clean Air Programme - NCAP):

• Launched in January 2019 by the Central Government to tackle the air pollution problem across the country in a comprehensive manner.

• Its goal is to achieve a 20% to 30% reduction in Particulate Matter (PM10 and PM2.5) concentrations by 2024 (base year 2017), recently extended to 2026.

• It covers 131 non-attainment cities which do not meet the National Ambient Air Quality Standards (NAAQS).

• River Rejuvenation Project (Namami Gange):

• An Integrated Conservation Mission, approved as a ‘Flagship Programme’ by the Union Government in June 2014 with a budget outlay of Rs. 20,000 Crore.

• It aims to accomplish the twin objectives of effective abatement of pollution and conservation and rejuvenation of the National River Ganga.

• The project is implemented by the National Mission for Clean Ganga (NMCG) and its state counterpart organizations.

Important Points

• Constitutional Provisions: Article 48A of the Constitution of India (Directive Principles of State Policy) directs the State to protect and improve the environment and safeguard forests. Article 51A(g) makes it a Fundamental Duty of every citizen to protect the natural environment including forests, lakes, and rivers.

• India State of Forest Report (ISFR): This biennial report is published by the Forest Survey of India (FSI). According to the 2021 report, the total forest and tree cover of the country is 80.9 million hectares, which is 24.62% of the geographical area of the country.

• MISHTI Scheme: Announced in the Union Budget 2023-24, the Mangrove Initiative for Shoreline Habitats & Tangible Incomes focuses on mangrove plantation along the coastline and on salt pan lands.

• Amrit Dharohar: Another recent initiative aimed at the optimal use of wetlands and enhancing biodiversity, carbon stock, and eco-tourism opportunities.

Q38. Answer: (a) 112

Shortcut Trick

If every value is multiplied by a number, average also gets multiplied by the same number

Original average = 56

Marks are doubled => multiply by 2

New average = 56 × 2 = 112
Therefore Answer = 112
Alternate Method
Given:
Number of students = 16
Average marks = 56
Formula used:
Total marks = Average × Number of students
Calculation:
=> Total marks = 56 × 16 = 896
=> After doubling, total marks = 896 × 2 = 1792
=> New average = 1792 ÷ 16 = 112
Therefore The correct answer is 112.
Additional Information
Average Property
If all observations are multiplied by a constant k, the average also becomes k times.
Basic Formula
Average = (Sum of observations) ÷ Number of observations
Effect of Addition
If a constant is added to each value, average increases by the same constant.
Use in Exams
Such transformations help solve questions quickly without full calculation.

Q39. Answer: (c) (11, 9, 94)

The logic followed here is:
Logic: The third number is obtained by multiplying the first number by the second number and then adding the second number.
For, (11, 20, 215)
=> 11 × 20 = 220
=> 220 − 5 = 215
For, (10, 15, 145)
=> 10 × 15 = 150
=> 150 − 5 = 145
Now, checking the options using the same pattern:
Option 1) (11, 15, 125)
=> 11 × 15 = 165
=> 165 − 5 = 160 ≠ 125
Option 2) (13, 16, 208)
=> 13 × 16 = 208
=> 208 − 5 = 203 ≠ 208
Option 3) (11, 9, 94)
=> 11 × 9 = 99
=> 99 − 5 = 94
Option 4) (7, 17, 88)
=> 7 × 17 = 119
=> 119 − 5 = 114 ≠ 88
Hence, the correct answer is Option 3.

Q40. Answer: (a) 2

Shortcut Trick
Use SI = (P × R × T) ÷ 100
Rearrange => T = (SI × 100) ÷ (P × R)
Substitute values => T = (720 × 100) ÷ (9000 × 4)

= 72000 ÷ 36000 = 2
Therefore Answer = 2 years
Alternate Method
Given:
Principal = 9000
Simple Interest = 720
Rate = 4% per annum
Formula used:
SI = (P × R × T) ÷ 100
Calculation:
=> 720 = (9000 × 4 × T) ÷ 100
=> 720 = 360T
=> T = 720 ÷ 360
=> T = 2 years
Therefore The correct answer is 2 years.
Additional Information
Simple Interest Formula
SI = (P × R × T) ÷ 100
Time Formula
T = (SI × 100) ÷ (P × R)
Unit Note
Rate is always taken per annum unless mentioned otherwise.
Application
Used in banking, loans, and investment calculations.

Q41. Answer: (d) 4

Shortcut Trick
√2209 = 47
Expression becomes: 12 × 3 × 940 ÷ 47
940 ÷ 47 = 20 => now 12 × 3 × 20
= 720 => so y + 716 = 720
y = 720 − 716 = 4
Therefore Answer = 4
Alternate Method
Given:
12 × 3 × 940 ÷ √2209 = y + 716
Concept Used:
BODMAS rule
Calculation:
=> 12 × 3 × 940 ÷ 47 = y + 716
=> 36 × 940 ÷ 47 = y + 716
=> 36 × 20 = y + 716
=> 720 = y + 716
=> 720 − 716 = y
=> y = 4
Therefore The correct answer is 4.
Additional Information
BODMAS Rule
Bracket, Order, Division, Multiplication, Addition, Subtraction — follow this order strictly.
Square Root Concept
√2209 = 47 because 47 × 47 = 2209.
Simplification Trick

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Always simplify division early to reduce calculation.

Equation Solving

Isolate variable by shifting constants to the other side.

Q42. Answer: (c) Mir Bakshi

The correct answer is Mir Bakshi.

Key Points

• The Mir Bakshi was the head of the Military Department under the Mughal administration, specifically gaining prominence during the reign of Emperor Akbar in the 16th century.

• One of his primary functions was the management of the Mansabdari System, where he oversaw the recruitment of soldiers and officers, maintaining their service records and ranks.

• He served as the Paymaster-General of the empire; although the Diwan (Finance Minister) controlled the treasury, no military salary could be released without a Sarkhat (certificate) signed by the Mir Bakshi.

• He was responsible for the enforcement of the Dagh System (branding of horses) and Chehra (descriptive rolls of soldiers) to ensure the quality and presence of the military force and to prevent corruption.

• While the Emperor was the ultimate Commander-in-Chief, the Mir Bakshi acted as the administrative head who organized the army's formation and managed logistics during military campaigns and royal expeditions.

Additional Information

• Diwan-i-Insha:

• This minister was the head of the Royal Secretariat and was in charge of Royal Correspondence.

• His department handled the drafting and dispatch of Farmans (royal edicts) to governors and local officials.

• The Diwan-i-Insha ensured that all official communications were recorded and preserved in the state archives.

• Mir Saman:

• Also known as Khan-i-Saman, he was the officer in charge of the Royal Household and the state Karkhanas (factories).

• He managed the procurement of materials for the palace, supervised the production of weapons and luxury goods, and looked after the Emperor’s personal requirements.

• His role was crucial for maintaining the economic logistics of the court and providing military equipment for the state.

• Sadr-us-Sudur:

• He was the head of the Religious Department and acted as the chief advisor to the Emperor on matters of Islamic Law (Sharia).

• He was responsible for the distribution of charity and land grants known as Madad-i-Maash to scholars, saints, and religious institutions.

• Often, the same person held the post of Qazi-ul-Quzat (Chief Justice), making him the head of the Judicial Department.

Important Points

• The Mughal Administrative System was a centralized structure established by Akbar around 1571 to ensure efficient governance over a vast territory.

• The Mansabdari system defined an officer’s status by two numbers: Zat (personal rank/salary) and Sawar (number of cavalrymen they were required to maintain).

• The Mir Bakshi also supervised the Intelligence Agency of the empire; the Waqia-navis (news reporters) and Barids (intelligence officers) sent their reports to the center through his office.

• During the reign of Aurangzeb in the late 17th century, the number of Mansabdars increased significantly, putting a strain on the administrative efficiency managed by the Mir Bakshi and the Diwan.

• The balance of power between the Wazir (revenue head) and Mir Bakshi (military head) was a deliberate check-and-balance feature introduced by the Mughal Emperors to prevent any single minister from becoming too powerful.

Q43. Answer: (c) Dollar sales

The correct answer is Dollar sales.

Key Points

• The Reserve Bank of India (RBI) manages the volatility of the Indian Rupee (INR) by intervening in the Foreign Exchange Market. When the RBI intends to cause the Rupee to appreciate or prevent it from depreciating further, it engages in Dollar sales.

• By selling US Dollars (USD) from its Foreign Exchange Reserves, the RBI increases the supply of dollars in the market and simultaneously sucks out Rupee liquidity. This increased demand for the Rupee relative to the Dollar leads to its appreciation. Hence, the statement regarding Dollar sales is correct.

• Gold imports usually require the payment of US Dollars to international sellers. An increase in Gold imports leads to a higher demand for USD, which typically puts pressure on the Rupee, leading to depreciation rather than appreciation. Hence, the statement regarding Gold imports is incorrect.

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• Bond purchases by the RBI, often conducted through Open Market Operations (OMO), inject liquidity (Rupees) into the economy. An excess supply of Rupees in the domestic market can lead to inflationary pressures and potentially depreciation of the currency. Hence, the statement regarding Bond purchases is incorrect.

• An Interest rate hike is a tool used by the Monetary Policy Committee (MPC) to control inflation. While it can indirectly lead to appreciation by attracting Foreign Portfolio Investment (FPI) seeking higher returns, Dollar sales is the direct market intervention used specifically to alter the exchange rate. Hence, while impactful, direct sales are the primary mechanical cause for immediate appreciation in a managed float.

Additional Information

• Managed Float Exchange Rate: India follows a Managed Float System where the exchange rate is primarily determined by market forces of demand and supply. However, the RBI intervenes to ensure the exchange rate does not fluctuate wildly, maintaining macroeconomic stability.

• Foreign Exchange Reserves (Forex): These are assets held by the central bank in foreign currencies. In India, Forex reserves reached significant levels in 2024-2025, exceeding $600 billion. These reserves include Foreign Currency Assets (FCA), Gold, Special Drawing Rights (SDRs), and the Reserve Tranche Position in the IMF.

• Currency Appreciation vs. Revaluation: Appreciation occurs when the value of a currency increases due to market forces or central bank intervention in a floating system. Revaluation is an official increase in the value of a currency within a fixed exchange rate system.

• Impact on Trade: When the Rupee appreciates, imports like crude oil and machinery become cheaper for India, helping to reduce Imported Inflation. Conversely, exports (such as IT services and textiles) become more expensive for foreign buyers, which can hurt the competitiveness of Indian exporters.

• Sterilization: When the RBI sells dollars to support the Rupee, it reduces the money supply. To prevent a liquidity crunch in the domestic market, the RBI might perform Sterilization by buying government securities to pump Rupees back into the system.

Important Points

• Date and Year: As of December 2025, the RBI continues to use its Forex reserves strategically. Historically, major interventions occurred during the Taper Tantrum of 2013 and various global economic shocks in the 2020s.

• FPI and FDI: Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI) are major sources of US Dollars. A surge in these investments increases the demand for Rupees, leading to natural appreciation.

• NEER and REER: The Nominal Effective Exchange Rate (NEER) and Real Effective Exchange Rate (REER) are indices used by the RBI to measure the Rupee's strength against a basket of currencies of India's major trading partners.

Q44. Answer: (a) Sulfur

The correct answer is Sulfur.

Key Points

• Sulfur is a non-metal that belongs to Group 16 and Period 3 of the Periodic Table. It is characterized by its bright yellow color, brittle nature at room temperature, and poor electrical conductivity. Hence, option A is correct.

• Potassium is a chemical element with the symbol K and atomic number 19. It is a highly reactive Alkali Metal belonging to Group 1. Due to its metallic properties such as luster and conductivity, it is classified as a metal. Hence, option B is incorrect.

• Calcium is an Alkaline Earth Metal with atomic number 20, located in Group 2. It is a silvery-white metal that is essential for living organisms, particularly in bone formation and muscle contraction. Hence, option C is incorrect.

• Sodium is a soft, silvery-white, highly reactive Alkali Metal with atomic number 11. It is placed in Group 1 and Period 3. It reacts vigorously with water and must be stored in kerosene or mineral oil to prevent oxidation. Hence, option D is incorrect.

Additional Information

• Characteristics of Sulfur:

• Sulfur has an atomic mass of approximately 32.06. It is found naturally in volcanic regions and in underground deposits through the Frasch process.

• It is widely used in the production of Sulfuric Acid (H2SO4), which is often called the "King of Chemicals" due to its massive industrial applications.

• Sulfur is essential for the vulcanization of rubber, a process discovered by Charles Goodyear in 1839 to make rubber more durable and heat-resistant.

• It is also a key component in black gunpowder, matches, fertilizers, and fungicides.

• Classification of Elements:

• The Modern Periodic Table, formulated by Henry Moseley in 1913, organizes 118 elements based on their atomic numbers.

• Metals are typically found on the left side and center of the table. They are malleable, ductile, and good conductors of heat and electricity.

• Non-metals are generally located on the upper right side of the table. They are insulators and often exist as gases or brittle solids.

• Metalloids, such as Silicon and Germanium, possess properties intermediate between metals and non-metals and are located

along the zig-zag line.

• Biological and Industrial Importance of Metals:

• Sodium and Potassium ions are vital for maintaining the electrolyte balance in the human body through the sodium-potassium pump mechanism.

• Calcium compounds like Calcium Carbonate are major components of limestone and marble, used extensively in the construction industry.

• In the Periodic Table, metals like Sodium have low ionization energy, making them highly prone to losing electrons to form cations.

Important Points

• Physical States: While most metals are solid at room temperature (except Mercury), non-metals like Sulfur, Carbon, and Phosphorus are solids, Bromine is a liquid, and others like Oxygen and Nitrogen are gases.

• Chemical Reactivity: Alkali metals (Group 1) are the most reactive metals, while Noble Gases (Group 18) are the least reactive non-metals due to their stable electronic configuration.

• Electronegativity: Non-metals like Sulfur have higher electronegativity values compared to metals, meaning they have a greater tendency to attract electrons.

• Periodic Trends: Metallic character increases as you move down a group and decreases as you move across a period from left to right.

Q45. Answer: (b) Brother's son

Family Chart:

Decoding the Symbols:

Symbol	•	–	×	÷
Meaning	Mother	Son	Brother	Daughter

Given: M - V × T ÷ S + K

It means: M is the son of V, V is the brother of T, T is the daughter of S, S is the mother of K.

Thus, M is brother's son of K.

Hence, the correct answer is Option 2.

Q46. Answer: (b) Tapti

The correct answer is Tapti.

Key Points

• The Tapti River (also known as the Tapi) is a major river in central India that flows westward into the Arabian Sea. Because it drains into the western coast, it does not form a delta on the Eastern Coastal Plain. Hence, the statement regarding Tapti is correct as the exception.

• The Godavari River is an east-flowing river that originates in the Western Ghats and forms a large delta on the eastern coast of Andhra Pradesh before entering the Bay of Bengal. Hence, statement A is located on the eastern coastal plain.

• The Krishna River is another significant east-flowing peninsular river that creates a fertile delta region on the Eastern Coastal Plain, specifically in Andhra Pradesh. Hence, statement C is located on the eastern coastal plain.

• The Mahanadi River flows through the states of Chhattisgarh and Odisha and forms a massive delta on the Eastern Coastal Plain before emptying into the Bay of Bengal. Hence, statement D is located on the eastern coastal plain.

• The Tapti and Narmada are unique among major Indian rivers because they flow through rift valleys and form estuaries rather than deltas at their mouths.

Additional Information

• Godavari River:

• Known as the Dakshin Ganga or Vriddha Ganga due to its large size and age, it is the second longest river in India after the Ganges.

• It originates from Trimbakeshwar in the Nashik district of Maharashtra and has a total length of approximately 1,465 km.

• Its basin extends over the states of Maharashtra, Telangana, Andhra Pradesh, Chhattisgarh, and Odisha.

• Mahanadi River:

• It originates from the Sihawa highlands in the Dhamtari district of Chhattisgarh and flows for about 851 km.

• The river is famous for the Hirakud Dam, which is one of the longest earthen dams in the world, located in Odisha.

• The Mahanadi delta is a significant agricultural zone on the eastern coast of India.

• Krishna River:

• It originates near Mahabaleshwar in Maharashtra and flows for roughly 1,400 km.

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• Its major tributaries include the Tungabhadra, Koyna, Ghataprabha, Musu, and Bhima.

• The river flows through Maharashtra, Karnataka, Telangana, and Andhra Pradesh before forming its delta.

• Tapti River:

• It originates in the Satpura Range near Multai in the Betul district of Madhya Pradesh.

• The river has a length of 724 km and flows through Madhya Pradesh, Maharashtra, and Gujarat.

• The city of Surat is located on its banks, near its confluence with the Arabian Sea at the Gulf of Khambhat.

Important Points

• Geographical Difference: The Eastern Coastal Plain is much wider and more fertile than the Western Coastal Plain because the east-flowing rivers carry vast amounts of alluvium and sediment, resulting in extensive delta formation.

• The Estuary Formation: West-flowing rivers like the Tapti and Narmada have a steeper gradient and flow over hard rock surfaces through fault troughs. Consequently, they have high velocity and do not deposit enough sediment at their mouths to form deltas; instead, they form estuaries.

• The Western Ghats: Most east-flowing rivers originate in the Western Ghats, which acts as a water divide for the Indian subcontinent, separating the drainage of the Bay of Bengal from the Arabian Sea.

Q47. Answer: (c) Transfer of authority from Company to Crown

The correct answer is Transfer of authority from Company to Crown.

Key Points

• The Government of India Act 1858 was the primary legislative response to the Revolt of 1857, which sought to stabilize British rule in India by abolishing the East India Company. This act ensured that the governance of India was transferred directly to the British Crown. Hence, Statement C is correct.

• This structural shift meant that the dual government system (Board of Control and Court of Directors) introduced by Pitt's India Act of 1784 was abolished. A new office, the Secretary of State for India, was created to exercise complete authority over Indian administration.

• The Secretary of State was a member of the British Cabinet and was assisted by a 15-member Council of India. This council acted as an advisory body, ensuring the Crown had direct oversight of Indian affairs.

• The designation of the Governor-General of India was changed to the Viceroy of India. The Viceroy served as the direct representative of the British Monarch in India. Lord Canning became the first Viceroy of India under this new governance structure.

• While Queen Victoria's Proclamation (1858) announced these changes, the fundamental administrative change was the legal transfer of power from a commercial entity to the sovereign. Statement B is a related event but Statement C defines the structural change.

Additional Information

• Indian Councils Act, 1861:

• This act was passed to involve Indians in the legislative process for the first time. It introduced the Portfolio System, where members of the Viceroy's Executive Council were placed in charge of specific departments. Hence, Statement A is incorrect in the context of the immediate 1858 response.

• It restored the legislative powers to the Bombay and Madras Presidencies, which had been taken away by the Regulating Act of 1773.

• Permanent Settlement of Bengal:

• Introduced by Lord Cornwallis in 1793, this was a land revenue system that fixed the land tax in perpetuity. It created a class of Zamindars who became owners of the land. Hence, Statement D is incorrect as it predates the mutiny by decades.

• Queen Victoria's Proclamation (1858):

• Commonly known as the Magna Carta of the people of India, it was read out by Lord Canning at a Grand Darbar in Allahabad on November 1, 1858.

• It promised to respect the ancient rights and customs of India and declared that the British would no longer annex Indian princely states through the Doctrine of Lapse.

Important Points

• Military Reorganization: Following the 1857 Mutiny, the Peel Commission (1858) recommended that the ratio of European to Indian soldiers be increased to prevent another uprising. In the Bengal Army, the ratio was fixed at 1:2, while in Madras and Bombay, it was 1:3.

• End of Annexations: The policy of territorial expansion ended. The British switched from a policy of "annexation" to one of "subordinate union," treating Princely States as partners in the empire to ensure their loyalty.

• Religious Neutrality: The British government officially adopted a policy of non-interference in the religious and social practices of Indians to avoid the triggers that led to the 1857 revolt.

Q48. Answer: (c) Alcohol

The correct answer is Alcohol.

Key Points

• The New Industrial Policy (NIP) was announced on July 24, 1991, by the Indian government to usher in a new era of Liberalization, Privatization, and Globalization (LPG).

• One of the most significant pillars of this policy was the abolition of industrial licensing (delicensing) for almost all industries, regardless of the level of investment, to remove the hurdles of the "License-Permit Raj."

• Under the 1991 reforms, Alcohol (distillation and brewing of alcoholic drinks) was kept under the list of industries requiring compulsory licensing due to social, health, and moral considerations. Hence, the option Alcohol is the correct answer as it was not exempted.

• The Steel industry was delicensed to allow private sector players to expand capacity and modernize technology without seeking government permission for every unit. Hence, this statement is incorrect in the context of the question.

• Food Processing industries were exempted from licensing to promote value addition to agricultural produce and improve the income of farmers across the country. Hence, this statement is incorrect.

• While Coal was initially among the 18 industries reserved for the public sector or requiring specific licenses in 1991, the question specifically targets the sectors generally known for "not being exempted" due to social/hazardous reasons, where Alcohol is the primary example. Hence, Coal is not the primary answer here.

Additional Information

• Current Status of Licensing: As of now, only five industries remain under compulsory licensing in India. These include Distillation and brewing of alcoholic drinks, Cigarettes and tobacco products, Electronic aerospace and defence equipment, Industrial explosives, and Hazardous chemicals.

• Public Sector Reservation: In 1991, the number of industries reserved for the Public Sector was reduced from 17 to 8. Currently, only Atomic Energy and Railway Operations remain reserved for the government.

• MRTP Act: The 1991 policy also scrapped the asset limit for Monopolies and Restrictive Trade Practices (MRTP) companies, allowing large firms to expand without prior government approval.

• Foreign Investment: The reforms allowed Foreign Direct Investment (FDI) up to 51% in high-priority industries through the automatic route, which was a revolutionary step at the time.

• Key Figures: These historic reforms were introduced during the tenure of Prime Minister P.V. Narasimha Rao, with Dr. Manmohan Singh serving as the Finance Minister.

Important Points

• Industrial Development and Regulation Act (IDRA), 1951: This is the parent act that governs the licensing regime in India. The 1991 reforms significantly diluted the restrictive provisions of this Act.

• Economic Crisis of 1991: The reforms were a response to a severe Balance of Payments (BoP) crisis where India’s foreign exchange reserves had dropped to a level barely enough to sustain two weeks of imports.

• Impact on Competition: The removal of licensing for sectors like Steel and Food processing increased domestic competition and improved the quality of goods available to Indian consumers.

• Social Regulation: By retaining licenses for Alcohol and Tobacco, the government ensures a level of state control over products that have potential negative externalities on public health.

Q49. Answer: (b) 48

Shortcut Trick

Take assumed mean A = 45 (given mean)

Class midpoints: 25, 35, 45, 55, 65

Deviations from 45: −20, −10, 0, +10, +20

Apply Σfd = 0 (since mean = assumed mean)

−20×49 −10×19 + 0×25 + 10×21 + 20×X = 0

−980 −190 + 210 + 20X = 0 => −960 + 20X = 0

20X = 960 => X = 48

Therefore Answer = 48

Alternate Method

Given:

Mean = 45

Classes: 20-30, 30-40, 40-50, 50-60, 60-70

Frequencies: 49, 19, 25, 21, X

Formula used:

Mean = (Σ f x) ÷ (Σ f)

Calculation:

=> Midpoints (x): 25, 35, 45, 55, 65

=> Σf = 49 + 19 + 25 + 21 + X = 114 + X

=> Σfx = 49×25 + 19×35 + 25×45 + 21×55 + X×65

=> = 1225 + 665 + 1125 + 1155 + 65X

=> = 4170 + 65X

=> Mean = (4170 + 65X) ÷ (114 + X)

=> 45 = (4170 + 65X) ÷ (114 + X)

=> 45(114 + X) = 4170 + 65X

=> 5130 + 45X = 4170 + 65X

=> 5130 − 4170 = 65X − 45X

=> 960 = 20X

=> X = 48

Therefore The correct answer is 48.

Additional Information

Mean of Grouped Data

Mean = (Σ f x) ÷ (Σ f), where x are class midpoints.

Midpoint Formula

Midpoint = (Lower limit + Upper limit) ÷ 2

Assumed Mean Method

If assumed mean = actual mean, then Σfd = 0 which simplifies calculation.

Application

Used in statistics for large grouped datasets to reduce computation.

Q50. Answer: (c) R

The logic followed here is:

Given: B, C, D, O, P, Q and R are sitting around a circular table facing the centre

C sits to the immediate right of B

Q sits to the immediate left of D

O sits second to the right of D

R sits third to the left of C

Thus, third to the right of P is R.

Hence, the correct answer is Option 3.

Q51. Answer: (c) Father's brother

Family Chart:

Decoding the Symbols:

Symbol	•	@	**$**	#
Meaning	Father	Brother	Mother	Sister

Given: N @ R + K @ S

It means: N is the brother of R, R is the father of K, K is the brother of S.

Thus, N is father’s brother of S.

Hence, the correct answer is Option 3.

Q52. Answer: (c) Tamil Nadu

The correct answer is Tamil Nadu.

Key Points

• The Salem Steel Plant (SSP) is a specialized unit of the Steel Authority of India Limited (SAIL), located in the Salem district of Tamil Nadu, India.

• It was officially commissioned on 13th September 1981 with the inauguration of its first Cold Rolling Mill complex, marking a significant milestone in the production of stainless steel in India.

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• The plant is globally recognized for its high-quality stainless steel products, including the 300 series and 400 series grades, which are widely used in kitchenware, automobiles, and architecture.

• It features advanced facilities such as a Steel Melting Shop, Continuous Casting Plant, and Hot Rolling Steckel Mill, enabling it to produce both hot-rolled and cold-rolled stainless steel products.

• The plant's strategic location in Tamil Nadu allows it to leverage the iron ore deposits from the nearby Kanjamalai hills and benefit from excellent connectivity to major ports for exports to over 30 countries.

Additional Information

• Steel Authority of India Limited (SAIL):

• SAIL is a Maharatna central public sector enterprise headquartered in New Delhi. It was incorporated in January 1954 as Hindustan Steel Limited and later reorganized in 1973.

• It manages five integrated steel plants located in Bhilai, Bokaro, Rourkela, Durgapur, and Burnpur, along with three special steel plants, including Salem.

• Major Integrated Steel Plants in India:

• Bhilai Steel Plant: Located in Chhattisgarh, it was set up in 1955 with the assistance of the USSR and is a major producer of steel rails.

• Rourkela Steel Plant: Located in Odisha, it was the first integrated steel plant in the public sector, established in 1959 with German collaboration.

• Bokaro Steel Plant: Located in Jharkhand, it was established in 1964 with Soviet help and is known as the country's first Swadeshi steel plant.

• Durgapur Steel Plant: Located in West Bengal, it was set up in the late 1950s with British collaboration.

• Industry Facts:

• As of 2023-2024, India stands as the second-largest producer of crude steel in the world, surpassing Japan and trailing only China.

• The National Steel Policy (2017) aims to increase India's steel production capacity to 300 million tonnes by the year 2030.

Important Points

• The Salem Steel Plant is a pioneer in producing coin blanks for the Government of India Mints and has supplied specialized stainless steel for prestigious space missions.

• It provided high-strength stainless steel for ISRO's Mangalyaan (Mars Orbiter Mission) and the Chandrayaan lunar missions, showcasing its capability in aerospace applications.

• The brand "Salem Stainless" has become synonymous with durability and aesthetics, making it a preferred choice for cutlery and household utensils across India.

• The plant also produces Carbon Steel and has integrated quality management systems like ISO 9001 and ISO 14001 to ensure environmental sustainability and operational excellence.

Q53. Answer: (a) The fungi

The correct answer is The fungi.

Key Points

• In the Haplontic or haploid-dominant life cycle, the haploid stage is the multicellular and dominant phase of the organism. In most fungi, the only diploid cell is the zygote, which undergoes meiosis immediately after karyogamy (fusion of nuclei) to produce haploid spores. These spores then grow into multicellular haploid mycelia through mitosis. Hence, statement A is correct.

• Angiosperms, also known as flowering plants, exhibit a Diplontic life cycle where the diploid sporophyte is the dominant, independent, and photosynthetic phase. The haploid gametophyte stage is highly reduced and dependent on the sporophyte, existing only as pollen grains and embryo sacs. Hence, statement B is incorrect.

• Amphibians are multicellular animals that follow a Diplontic life cycle. In this cycle, the diploid (2n) phase is dominant. The only haploid (n) cells are the gametes (sperm and egg) produced through meiosis in the gonads. The zygote formed after fertilization develops into a diploid adult. Hence, statement C is incorrect.

• Mammals, including humans, also exhibit a Diplontic life cycle. The organism remains in the diploid state throughout its life span. Meiosis occurs only during the formation of gametes, which do not undergo mitosis to form a multicellular haploid organism. Hence, statement D is incorrect.

• Therefore, among the given options, only fungi (along with certain algae like Volvox and Spirogyra) represent the haploid-dominant life pattern. Hence, the correct answer is The fungi.

Additional Information

• Haplontic Life Cycle:

• This cycle is characterized by zygotic meiosis. The sporophytic generation is represented only by the single-celled zygote.

• Common examples include many fungi (Ascomycetes, Zygomycetes) and green algae such as Chlamydomonas.

• The gametophyte is the dominant phase, which performs photosynthesis and reproduction.

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• Diplontic Life Cycle:

• In this pattern, the diploid sporophyte is the dominant, independent, and photosynthetic phase of the plant.

• It is seen in all seed-bearing plants (Gymnosperms and Angiosperms) and almost all animals.

• The gametes are the only haploid cells, and they fuse to restore the diploid condition.

• Haplo-diplontic Life Cycle:

• This is an intermediate condition where both haploid and diploid phases are multicellular and often physically distinct.

• It is commonly referred to as alternation of generations.

• Bryophytes (where gametophyte is dominant) and Pteridophytes (where sporophyte is dominant) exhibit this type of life cycle.

Important Points

• Exceptions in Algae: While most algae are haplontic, there are notable exceptions such as Ectocarpus, Polysiphonia, and Kelps, which are haplo-diplontic. Fucus, an alga, is strictly diplontic.

• Meiosis Timing: The primary difference between these cycles is the timing of meiosis. In haplontic cycles, meiosis is zygotic; in diplontic cycles, meiosis is gametic; and in haplo-diplontic cycles, meiosis is sporic.

• Kingdom Fungi: Organisms in this kingdom are heterotrophic and have cell walls made of Chitin. Their haploid nature allows for rapid mutation expression and adaptation to various environments.

Q54. Answer: (d) 4500

Shortcut Trick

HCF(P,Q)=15 => common factors = 3 and 5

HCF(Q,R)=10 => common factors = 2 and 5

HCF(R,P)=5 => only common factor = 5

Assign minimum values: P = 3×5 = 15, Q = 2×3×5 = 30, R = 2×5 = 10

Check HCFs: (15,30)=15, (30,10)=10, (10,15)=5 Yes

P × Q × R = 15 × 30 × 10 = 4500

Therefore Answer = 4500

Alternate Method

Given:

HCF(P, Q) = 15, HCF(Q, R) = 10, HCF(R, P) = 5

Formula used:

Use prime factorization and assign minimum values satisfying all HCF conditions

Calculation:

=> 15 = 3 × 5 => P and Q must contain 3 and 5

=> 10 = 2 × 5 => Q and R must contain 2 and 5

=> 5 => P and R share only 5

=> Let P = 3 × 5 = 15

=> Let Q = 2 × 3 × 5 = 30

=> Let R = 2 × 5 = 10

=> Product = 15 × 30 × 10 = 4500

Therefore The correct answer is 4500.

Additional Information

HCF Concept

HCF is the highest common factor shared between numbers.

Prime Factor Method

Break numbers into primes and assign minimum factors to satisfy given HCF conditions.

Minimum Value Trick

Use least possible multiples to minimize sum.

Verification

Always check HCF conditions after assigning values.

Q55. Answer: (a) India

The correct answer is India.

Key Points

• India (Option 1) emerged as the mixed team Squash World Cup champions in December 2025.

• The Indian team secured a historic maiden title by defeating top-seeded Hong Kong with a dominant 3–0 victory in the final held in Chennai on December 14, 2025.

• This win made India the first Asian nation to lift the trophy and only the fourth country ever to win the Squash World Cup, joining Australia, England, and Egypt.

• Earlier in the tournament, India also defeated the defending champions, Egypt, with a 3–0 scoreline in the semifinals.

Additional Information

• Egypt's Global Dominance: Egypt has been the most successful country in squash for over a decade. As of 2025, the majority of the top 10 players in the PSA (Professional Squash Association) world rankings, both men and women, hail from Egypt. Their training centers in Cairo and Alexandria are considered the best in the world.

• The Squash World Cup History: The Squash World Cup was revived in 2023 after a long hiatus. The 2023 edition was held in Chennai, India, where Egypt also emerged as the champion after defeating Malaysia in the final. The tournament typically features 8 teams from across the globe.

• Tournament Venue: Major squash events like the World Cup are often hosted in iconic locations. In recent years, India has become a frequent host, utilizing state-of-the-art glass courts inside shopping malls or heritage sites to increase spectator engagement.

• Mixed Team Rules: Each tie in the Mixed Team format usually consists of four matches: two men's matches and two women's matches. If a team wins the first three matches (reaching a 3-0 lead), the fourth match is often not played as the result is already decided.

Important Points

• Scoring System: The 2025 World Cup utilized the FAST4 scoring format or the traditional 11-point par system (Point-A-Rally) to ensure matches are high-intensity and television-friendly.

• Olympic Inclusion: It is important to note that Squash has been officially included in the Olympic Games program for the LA 2028 Olympics. This has led to increased government funding and participation across countries like Egypt, USA, and India.

• Key Players: While rosters change, Egypt typically relies on world-class athletes like Ali Farag, Nour El Sherbini, or Mostafa Asal. Their ability to adapt to different court conditions and altitudes makes them formidable opponents in any international tournament.

• Strategic Significance: Winning the World Cup provides significant ranking points and serves as a primary indicator of a nation's preparedness for upcoming World Team Championships and the Olympic Games.

Q56. Answer: (a) Swadesh Bandhab Samiti

The correct answer is Swadesh Bandhab Samiti.

Key Points

• The Swadesh Bandhab Samiti was founded by Ashwini Kumar Dutt on 6 August 1905.

• It was established in Barisal (now in Bangladesh) during the peak of the Swadeshi Movement to protest against the Partition of Bengal.

• The primary objective of the samiti was to promote the use of Swadeshi products and organize a boycott of foreign goods. Hence, the statement regarding its foundation by Ashwini Kumar Dutt is correct.

• The samiti was exceptionally successful in mobilizing the masses and had a network of 159 branches spread across the district of Barisal.

• It focused on social work and humanitarian relief, particularly during famines and epidemics, and it successfully established arbitration courts to settle local disputes without involving British legal systems.

• The Swadesh Bandhab Samiti played a crucial role in spreading nationalist consciousness among the rural population and students in the Bengal Presidency.

Additional Information

• Anushilan Samiti:

• It was a prominent revolutionary organization founded by Pramatha Nath Mitra in 1902 in Calcutta.

• The Dhaka Anushilan Samiti was later founded by Pulin Behari Das in 1906.

• Its activities were primarily focused on militant nationalism and physical training for revolutionary activities.

• Jugantar Samiti:

• This was an inner circle of the Anushilan Samiti, formed in 1906 by Barindra Kumar Ghosh and Bhupendranath Dutt.

• They published a weekly journal named Jugantar to propagate revolutionary ideas against British rule.

• Bharat Mata Samiti:

• Founded in 1907 by Sardar Ajit Singh (uncle of Bhagat Singh) and Sufi Amba Prasad in Punjab.

• It was instrumental in organizing the Pagri Sambhal Jatta movement to protest against colonial agricultural laws.

• Swadeshi Movement (1905-1911):

• Launched as a reaction to Lord Curzon's decision to partition Bengal on 16 October 1905.

• It emphasized Atmasakti (self-reliance) and led to the establishment of national schools and indigenous industries.

Important Points

• Ashwini Kumar Dutt was a renowned educationist, philanthropist, and social reformer who also founded the Brajamohan College in 1889.

• He was often referred to as the "Uncrowned King of Barisal" due to his immense popularity and influence over the local population.

• The British Government eventually banned the Swadesh Bandhab Samiti in January 1909 under the Criminal Law Amendment Act of 1908.

• During the Swadeshi period, the samiti was credited with reducing the sale of British textiles in Barisal to a negligible amount, demonstrating its effective economic boycott.

Q57. Answer: (a) 14

The logic followed here is:

Given numbers: 917 946 857 971 587

Logic: Find the highest and lowest numbers, then perform the required operation.

Highest number = 971

→ Second digit = 7

Lowest number = 587

→ third digit = 7

Result = 7 + 7 = 14

Hence, the correct answer is Option 1.

Q58. Answer: (a) -49

Shortcut Trick

First handle signs: (−56) ÷ (−14) = +4

And (−4) × 9 = −36

Expression becomes: −9 − 4 − 36

= −49

Therefore Answer = −49

Alternate Method

Given:

(−9) − (−56) ÷ (−14) + (−4) × 9

Concept Used:

BODMAS rule

Calculation:

(-9) - (-56) ÷ (-14) + (-4) × 9

=> (−9) − 4 + (−4) × 9

=> (−9) − 4 + (−36)

=> (−13) + (−36)

=> −49

Therefore The correct answer is −49.

Additional Information

BODMAS Full Form

Bracket, Order, Division, Multiplication, Addition, Subtraction.

Sign Rules

(−) ÷ (−) = + and (−) × (+) = −.

Operation Order

Division and multiplication are done before addition and subtraction.

Simplification Tip

Always simplify multiplication/division first to avoid errors.

Q59. Answer: (c) 27/19

Shortcut Trick

Boat A downstream speed = 10 + 5 = 15 km/h

Distance P to Q = 15 × 3 = 45 km

Boat B upstream speed = 45 ÷ 5 = 9 km/h

Speed of B in still water = 9 + 5 = 14 km/h

Downstream speed of B = 14 + 5 = 19 km/h

Time = 45 ÷ 19 hours

Therefore Answer = 27/19 hours

Alternate Method

Given:

Speed of A in still water = 10 km/h

Stream speed = 5 km/h

Time A downstream = 3 hours

Time B upstream = 5 hours

Formula used:

Downstream speed = u + v

Upstream speed = u − v

Distance = Speed × Time

Calculation:

=> Speed of A downstream = 10 + 5 = 15 km/h

=> Distance = 15 × 3 = 45 km

=> Speed of B upstream = 45 ÷ 5 = 9 km/h

=> Speed of B in still water = 9 + 5 = 14 km/h

=> Speed of B downstream = 14 + 5 = 19 km/h

=> Time = 45 ÷ 19 hours

Therefore The correct answer is 27/19 hours.

Additional Information

Boat and Stream Formula

Downstream = u + v, Upstream = u − v

Distance Relation

Distance remains same for both boats between two cities.

Finding Still Water Speed

Still water speed = Upstream speed + stream speed.

Application

Used in river navigation and competitive exam problems.

Q60. Answer: (c) 1/2cbrt2

Shortcut Trick

Volumes are equal => small cone = half of original cone

For similar cones: $(h/H)^3 = 1/2$ => h/H = 1/cbrt2

Radii follow same ratio => r/R = 1/cbrt2

Given: h = 2R => R = h/2

So r = R/cbrt2 = (h/2)/cbrt2 = h/(2cbrt2)

=> r/h = 1/(2cbrt2)

Therefore Answer = 1/(2cbrt2)

Alternate Method

Given:

Small cone and frustum have equal volumes

Height of small cone = diameter of base of original cone

Formula used:

Volume of cone = $(1/3)\pi r^2 h$

For similar cones: ratio of volumes = cube of ratio of heights
Calculation:
=> Let original cone have height H and radius R
=> Let small cone have height h and radius r
=> Equal volumes => small cone = (1/2) of original
=> $(h/H)^3 = 1/2$ => $h/H = 1/\text{cbrt}2$
=> $r/R = 1/\text{cbrt}2$
=> Given: $h = 2R$ => $R = h/2$
=> $r = R/\text{cbrt}2 = (h/2)/\text{cbrt}2$
=> $r = h/(2\text{cbrt}2)$
=> $r/h = 1/(2\text{cbrt}2)$
Therefore The required value is $1/(2\text{cbrt}2)$.
Additional Information
Similarity of Cones
If two cones are similar, ratio of volumes = cube of ratio of corresponding dimensions.
Volume Formula
Volume = $(1/3)\pi r^2 h$
Frustum Concept
Frustum = original cone − small cone.
Scaling Property
Linear dimensions scale by k => volumes scale by k^3.

Q61. Answer: (d) Neither conclusion (I) nor (II) follows.

Given Statements:
All streams are canals.
Some canals are rivers.
Some rivers are seas.
The least possible Venn diagram for the given statements is:
Conclusions:
I. Some seas are streams – False
(The overlap of rivers–seas may not include the part where streams lie inside canals.)
II. Some rivers are streams – False
(Only some canals are rivers, and streams are inside canals, but their overlap is not definite.)
So, neither conclusion I nor II follows.
Hence, the correct answer is Option 4.

Q62. Answer: (c) x = 2, y = 1, z = 3

Shortcut Trick
Use elimination: multiply first equation by 2
$2x + y - 3z = -4$ => $4x + 2y - 6z = -8$
Subtract second equation => $(4x + 2y - 6z) - (4x - 2y + z) = -8 - 9$
=> $4y - 7z = -17$
Now solve with third equation and get $z = 3$
Substitute back => $y = 1$ and $x = 2$
Therefore Answer: $x = 2, y = 1, z = 3$
Alternate Method
Given:
$2x + y - 3z = -4$
$4x - 2y + z = 9$
$3x + 5y - 2z = 5$
Formula used:
Elimination method for solving linear equations

Calculation:
=> Multiply first equation by 2:
=> 4x + 2y − 6z = −8
=> Subtract second equation:
=> (4x + 2y − 6z) − (4x − 2y + z) = −8 − 9
=> 4y − 7z = −17 ...(1)
=> Now eliminate x from (1st and 3rd):
=> Multiply first equation by 3:
=> 6x + 3y − 9z = −12
=> Multiply third equation by 2:
=> 6x + 10y − 4z = 10
=> Subtract:
=> (6x + 3y − 9z) − (6x + 10y − 4z) = −12 − 10
=> −7y − 5z = −22 ...(2)
=> Solve (1) and (2):
=> 4y − 7z = −17
=> −7y − 5z = −22
=> Multiply (1) by 7 and (2) by 4:
=> 28y − 49z = −119
=> −28y − 20z = −88
=> Add:
=> −69z = −207 => z = 3
=> Substitute in (1):
=> 4y − 21 = −17 => 4y = 4 => y = 1
=> Substitute in first equation:
=> 2x + 1 − 9 = −4 => 2x − 8 = −4 => 2x = 4 => x = 2
Therefore The correct answer is x = 2, y = 1, z = 3.
Additional Information
Elimination Method
Variables are eliminated step by step to reduce equations to two variables and then one variable.
Substitution Method
One variable is expressed in terms of others and substituted into remaining equations.
Consistency
A system has a unique solution if equations intersect at one point.
Check Solution
Always verify values in all original equations.

Q63. Answer: (c) Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answe...

TB Solution:
Given Question:
Among Rahul, Aman, Karan, Nikhil and Varun, each having different heights, who is the second tallest?
Given Statements:
(I) Karan is taller than Rahul and Aman but shorter than Nikhil.
(II) Varun is taller than Karan but shorter than Nikhil.
Analysis:
Statement I alone → Not sufficient
From (I): Nikhil > Karan > Rahul and Aman, but position of Varun is unknown, so second tallest cannot be determined.
Statement II alone → Not sufficient
From (II): Nikhil > Varun > Karan, but relation of Rahul and Aman with others is unknown, so second tallest cannot be determined.
Now, combining I and II:
From (I): Nikhil > Karan > Rahul and Aman

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From (II): Nikhil > Varun > Karan

So, final order: Nikhil is tallest

Varun is second tallest (since Varun is below Nikhil and above Karan, Rahul, and Aman)

Here, both statements I and II together are sufficient to answer the question.

Hence, the correct answer is Option 3.

Q64. Answer: (d) DZR 39

The logic followed here is:

So, 'DZR 39' will replace the question mark in the given series.

Hence, the correct answer is "Option 4"

Q65. Answer: (c) Galileo Galilei

The correct answer is Galileo Galilei.

Key Points

• Galileo Galilei, an Italian physicist and astronomer born in 1564, was the first to establish the foundational concept of inertia through his systematic experiments.

• He conducted famous experiments using inclined planes to study the motion of objects. He observed that a ball rolling down an inclined plane accelerates, while a ball rolling up an inclined plane decelerates.

• From these observations, Galileo deduced that on a perfectly horizontal plane with no friction, an object should continue to move with a constant velocity forever, as there is no reason for it to speed up or slow down.

• His findings directly contradicted the long-held Aristotelian view, which suggested that a continuous external force was necessary to maintain the motion of an object. Galileo proved that force is needed to change motion, not to maintain it.

• The concept was later detailed in his final book, "Discourses Concerning Two New Sciences," published in 1638, which laid the groundwork for modern Classical Mechanics.

Additional Information

• Newton's First Law of Motion: Sir Isaac Newton formalized Galileo's observations in 1687 within his work Philosophiae Naturalis Principia Mathematica. The law states that every body continues in its state of rest or uniform motion in a straight line unless compelled to change that state by an external force.

• Mass and Inertia: The mass of an object is a quantitative measure of its inertia. Objects with a higher numerical value of mass possess greater inertia, meaning they offer more resistance to changes in their state of motion.

• Galileo's Thought Experiment: He used a double inclined plane to show that a ball released from a certain height on one plane would reach the same vertical height on the opposite plane, regardless of the slope, demonstrating that motion is preserved in idealized conditions.

• Archimedes: He was a Greek mathematician known for the Law of Buoyancy and levers, but his work was primarily in statics and hydrostatics rather than the dynamics of moving bodies.

• Michael Faraday: An English scientist of the 19th century, he was a pioneer in electromagnetism and electrochemistry, discovering electromagnetic induction in 1831.

Important Points

• There are three distinct types of inertia recognized in physics:

• Inertia of Rest: The inability of a body to change its state of rest by itself (e.g., passengers falling backward when a bus suddenly starts).

• Inertia of Motion: The inability of a body to change its state of uniform motion (e.g., an athlete running some distance after crossing the finish line before stopping).

• Inertia of Direction: The inability of a body to change its direction of motion by itself (e.g., passengers leaning outward when a car takes a sharp turn).

• Galileo's approach marked the birth of the scientific method, moving away from pure philosophical speculation toward empirical data and mathematical analysis.

Q66. Answer: (a) 76.7%

Shortcut Trick

Successive discounts: 45% and 60% => net factor = 0.55 × 0.40 = 0.22

Let marked price = M => SP of X = 0.22M

Profit = 889 => SP = 3500 + 889 = 4389 => 0.22M = 4389

M = 4389 ÷ 0.22 = 19950

For Y: discount = 69% => SP = 31% of M = 0.31 × 19950 = 6184.5

Profit = 6184.5 − 3500 = 2684.5

Profit% = (2684.5 ÷ 3500) × 100 = 76.7%

Therefore Answer = 76.7%

Alternate Method

Given:

CP of X = CP of Y = 3500

Discounts on X = 45% and 60%

Profit on X = 889

Discount on Y = 69%

Formula used:

Successive discount factor = (1 − d1)(1 − d2)

Profit% = (Profit ÷ CP) × 100

Calculation:

=> Net discount factor = 0.55 × 0.40 = 0.22

=> SP of X = 3500 + 889 = 4389

=> 0.22M = 4389 => M = 19950

=> SP of Y = 19950 × (1 − 0.69) = 19950 × 0.31 = 6184.5

=> Profit on Y = 6184.5 − 3500 = 2684.5

=> Profit% = (2684.5 ÷ 3500) × 100 = 76.7%

Therefore The correct answer is 76.7%.

Additional Information

Successive Discount

Net discount = 1 − (1 − d1)(1 − d2)

Marked Price Concept

Marked price is the price before applying discounts.

Profit Formula

Profit% = (Profit ÷ Cost Price) × 100

Shortcut Tip

Convert percentages into multipliers for faster calculation.

Q67. Answer: (d) Both 1 and 2

The correct answer is Both 1 and 2.

Key Points

• Chandrapuram Ponnusamy Radhakrishnan (popularly known as C.P. Radhakrishnan) was appointed as the Governor of Maharashtra on 27 July 2024 and officially assumed his duties after taking the oath on 31 July 2024. He is the 24th person to hold this office (when counting the lineage of governors including those from the Bombay State era and transition). Hence, statement 1 is correct.

• Before his transfer to Maharashtra, he served as the Governor of Jharkhand. He was sworn in as the 10th Governor of the state on 18 February 2023 and continued in that capacity until July 2024. Hence, statement 2 is correct.

• During his tenure as the Governor of Jharkhand, he was also given the additional charge of being the Governor of Telangana and the Lieutenant Governor of Puducherry in March 2024. This followed the resignation of Tamilisai Soundararajan.

• C.P. Radhakrishnan is a veteran political leader from the state of Tamil Nadu and has been a prominent figure in the Bharatiya Janata Party (BJP). He served as the state president of the party and was a member of the National Executive Committee.

• He is a two-time Member of Parliament, having been elected to the 12th and 13th Lok Sabha from the Coimbatore constituency in 1998 and 1999.

Additional Information

• Constitutional Provisions for Governors:

• The office of the Governor is a constitutional post governed by Articles 153 to 167 of the Constitution of India. Article 153 mandates that there shall be a Governor for each state, although the 7th Constitutional Amendment Act (1956) facilitated the appointment of the same person as Governor for two or more states.

• According to Article 155, the Governor is appointed by the President of India by warrant under his hand and seal. The Governor holds office during the pleasure of the President, usually for a term of five years.

• Role and Powers of the Governor:

• The Governor acts as the Constitutional Head of the state and serves as a vital bridge between the Union Government and the State Government.

• The executive powers of the state are vested in the Governor as per Article 154. All executive actions of the state government are formally taken in his/her name.

• The Governor appoints the Chief Minister and other ministers on the advice of the Chief Minister, as well as the Advocate General and the Chairman and members of the State Public Service Commission.

• State-Specific Governance (Maharashtra and Jharkhand):

• The Governor of Maharashtra resides in the Raj Bhavan located in Mumbai, with additional seasonal residences in Nagpur and Pune. Maharashtra was formed on 1 May 1960, and its first Governor was Sri Prakasa.

• The Governor of Jharkhand is the nominal head of a state that was carved out of Bihar in the year 2000. The first Governor of Jharkhand was Prabhat Kumar.

Important Points

• Succession in Maharashtra: C.P. Radhakrishnan succeeded Ramesh Bais, who served as the Governor of Maharashtra from February 2023 to July 2024.

• Administrative Experience: Before entering the gubernatorial roles, Radhakrishnan also served as the Chairman of the Coir Board in Kochi, which falls under the Ministry of Micro, Small and Medium Enterprises (MSME), between 2016 and 2019.

• Oath of Office: The oath to C.P. Radhakrishnan in Maharashtra was administered by the Acting Chief Justice of the Bombay High Court, Nitin Jamdar, at the Raj Bhavan.

Q68. Answer: (b) Three

Given: (Left) ? A ? M V R ? F @ D E Q * ? R V M / % * M (Right)

Now,

We need letters which are immediately preceded by a letter and also immediately followed by a symbol.

So, Required pattern: Letter – Letter – Symbol

(Left) ? A ? M V R ? F @ D E Q * ? R V M / % * M (Right)

Total such letters = 3

Hence, the correct answer is Option 2.

Q69. Answer: (d) 1420

Shortcut Trick

20% of number − 20% of 620 = 160

0.2(N − 620) = 160

N − 620 = 160 ÷ 0.2 = 800

N = 800 + 620 = 1420

Therefore Answer = 1420

Alternate Method

Given:

20% of a number exceeds 20% of 620 by 160

Formula used:

Percentage = (value ÷ 100) × number

Calculation:

=> Let the number be x

=> 20% of x = 0.2x

=> 20% of 620 = 0.2 × 620 = 124

=> According to question:

=> 0.2x − 124 = 160

=> 0.2x = 284

=> x = 284 ÷ 0.2

=> x = 1420

Therefore The correct answer is 1420.

Additional Information

Percentage Formula

x% of number = (x ÷ 100) × number

Shortcut Concept

Take common percentage to simplify equation quickly.

Linear Equation

Such problems reduce to simple linear equations.

Application

Useful in comparison and percentage difference problems.

Q70. Answer: (b) 110

Shortcut Trick

Let x = p + 4 to simplify expression.

Convert given equation into x form => you get $x + 1/x = 5$

Use identity: $x^3 + 1/x^3 = (x + 1/x)^3 - 3(x + 1/x)$

=> $= 5^3 - 3\times5 = 125 - 15$

Therefore Answer = 110

Alternate Method

Given:

$p^2 + 3p = 3$

Formula used:

$(x^3 + 1/x^3) = (x + 1/x)^3 - 3(x + 1/x)$

Calculation:

=> Let $x = p + 4$ => $p = x - 4$

=> Substitute in equation:

=> $(x - 4)^2 + 3(x - 4) = 3$

=> $x^2 - 8x + 16 + 3x - 12 = 3$

=> $x^2 - 5x + 4 = 3$

=> $x^2 - 5x + 1 = 0$

=> Divide by x => $x - 5 + 1/x = 0$

=> $x + 1/x = 5$

=> Required = $x^3 + 1/x^3$

=> $= (x + 1/x)^3 - 3(x + 1/x)$

=> $= 5^3 - 3\times5$

=> $= 125 - 15 = 110$

Therefore The correct answer is 110.

Additional Information

Important Identity

$x^3 + 1/x^3 = (x + 1/x)^3 - 3(x + 1/x)$

Quadratic Transformation

Convert variables (like p → p+4) to simplify expressions

Symmetric Form Trick

Divide equation by x to form x + 1/x pattern

Useful Pattern

If $x^2 - ax + 1 = 0$ => $x + 1/x = a$

Q71. Answer: (a) 3

Given: Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order.

Only B is kept above C.

Only E is kept between C and F.

Only A is kept below G.

Position	Box
7	B
6	C
5	E

4	F
3	D
2	G
1	A

So, Boxes between C and G = 3 boxes.

Hence, the correct answer is "Option 1".

Q72. Answer: (b) Either parent is a citizen of India at the time of birth

The correct answer is Either parent is a citizen of India at the time of birth.

Key Points

• The Citizenship Act, 1955, provides for the acquisition of Indian citizenship after the commencement of the Constitution of India through five ways: Birth, Descent, Registration, Naturalization, and Incorporation of Territory.

• According to Section 4 of the Citizenship Act, 1955, a person born outside India on or after January 26, 1950, but before December 10, 1992, is a citizen of India by descent if his father was a citizen of India at the time of his birth.

• For persons born outside India on or after December 10, 1992, but before December 3, 2004, the law was amended to be gender-neutral; such a person is a citizen of India if either of his parents (father or mother) was a citizen of India at the time of his birth. Hence, statement B is correct.

• The requirement that both parents must be ordinarily resident in India is not a criterion for citizenship by descent under this specific section. Hence, statement A is incorrect.

• Before the 1992 amendment, only the father's citizenship was considered, but the current provision recognizes either parent, making the "mother only" or "father only" criteria outdated or incomplete for births after 1992. Hence, statements C and D are incorrect.

Additional Information

• Constitutional Provisions: Articles 5 to 11 under Part II of the Constitution of India deal with citizenship. However, these articles only identify persons who became citizens at the commencement of the Constitution (January 26, 1950) and empower Parliament to enact laws for future acquisition or loss of citizenship.

• Citizenship Amendment Act, 2003: This amendment introduced significant changes for those born outside India on or after December 3, 2004. From this date onwards, a person shall not be a citizen of India by descent unless their birth is registered at an Indian Consulate within one year of the date of birth or with the permission of the Central Government.

• Modes of Acquisition:

• By Birth (Section 3): Depends on the date of birth and the citizenship of parents (e.g., between 1950-1987, 1987-2004, and post-2004 rules).

• By Registration (Section 5): Applicable to Persons of Indian Origin (PIO), persons married to Indian citizens, and minor children of Indian citizens.

• By Naturalization (Section 6): Applicable to foreigners who have resided in India for 12 years and meet other criteria specified in the Third Schedule.

• Single Citizenship: Unlike federal structures like the USA, the Indian Constitution provides for Single Citizenship to promote fraternity and unity, regardless of the state of residence.

Important Points

• Termination of Citizenship: The Citizenship Act, 1955, also mentions three ways of losing citizenship: Renunciation (voluntary giving up), Termination (automatically losing Indian citizenship upon acquiring another country's citizenship), and Deprivation (compulsory termination by the Central Government on grounds of fraud or disloyalty).

• Overseas Citizenship of India (OCI): Following the 2005 amendment, the Government of India provides OCI status to Persons of Indian Origin (PIO) of certain categories, though this is not "dual citizenship" as India does not allow holding two passports simultaneously.

• Authority: The Ministry of Home Affairs is the nodal ministry for all matters related to Indian Citizenship.

Q73. Answer: (b) CE-HJ

The logic followed here is based on the alphabetical position pattern:

Option 1: IK → MO

Option 2: CE → HJ

Option 3: NP → RT

Option 4: KM → OQ

Thus, CE–HJ does not follow the pattern.

Hence, the odd one out is Option 2.

Q74. Answer: (a) 24 days

Shortcut Trick

Take total work = LCM(20, 30) = 60 units

P does 3 units/day, Q does 2 units/day

In 2 days => 5 units

In 22 days => 55 units

Remaining = 5 units => completed on 24th day

Therefore Answer = 24 days

Alternate Method

Given:

P completes work in 20 days and Q completes work in 30 days

Formula used:

Total Work = LCM of days, Efficiency = Total Work ÷ Days

Person	Days	Efficiency
P	20	3 units/day
Q	30	2 units/day

=> Total work is taken as 60 units.

=> P completes 3 units per day and Q completes 2 units per day.

=> In 2 days (one cycle), total work done = 3 + 2 = 5 units.

=> In 11 cycles (22 days), work done = 11 × 5 = 55 units.

=> Remaining work = 60 − 55 = 5 units.

=> Day 23: P works and completes 3 units (total = 58 units).

=> Day 24: Q completes the remaining 2 units.

Therefore The correct answer is 24 days.

Additional Information

Efficiency Concept

Efficiency = Work done per unit time.

LCM Method

Using LCM simplifies calculations in work problems.

Cycle Method

Alternate work problems are best solved using cycles.

Exam Tip

Always compute remaining work after full cycles.

Q75. Answer: (a) FGF 0

The logic followed here is:

So, 'FGF 0' will replace the question mark in the given series.

Hence, the correct answer is "Option 1"

Q76. Answer: (a) A network covering a small geographical area like an office or school

The correct answer is A network covering a small geographical area like an office or school.

Key Points

• A Local Area Network (LAN) is a computer network that interconnects computers within a limited geographical area such as a residence, school, laboratory, university campus, or office building.

• The primary feature of a LAN is that it connects devices over a short distance, distinguishing it from Wide Area Networks (WAN). Hence, statement A is correct.

• A code used to represent characters in numbers refers to encoding systems like ASCII (American Standard Code for Information Interchange) or Unicode, which are used for data representation rather than networking. Hence, statement B is incorrect.

• A storage device used to read optical discs is known as an Optical Disc Drive (ODD), such as a CD-ROM or DVD-ROM drive. Hence, statement C is incorrect.

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• A high-capacity compact disc format refers to storage media like DVDs (Digital Versatile Discs) or Blu-ray discs, which are physical storage formats. Hence, statement D is incorrect.

• LANs are typically owned, controlled, and managed by a single person or organization. They use connectivity technologies like Ethernet and Wi-Fi.

Additional Information

• Types of Networks:

• PAN (Personal Area Network): The smallest network type, typically used for connecting personal devices like smartphones, tablets, and laptops within a range of 10 meters.

• MAN (Metropolitan Area Network): A network that connects multiple LANs across a larger geographical area, such as an entire city or a large campus.

• WAN (Wide Area Network): A network that extends over a large geographical distance, such as a country, continent, or the entire globe. The Internet is the most well-known example of a WAN.

• Wireless LAN (WLAN):

• A WLAN provides wireless network communication over short distances using radio or infrared signals instead of traditional cables.

• The most common technology used for WLAN is Wi-Fi, which is based on the IEEE 802.11 standards.

• Data Transfer Rates:

• LANs typically offer much higher data transfer speeds compared to WANs. Speeds usually range from 100 Mbps to 10 Gbps.

• Early Ethernet versions started at 10 Mbps in the 1980s, but modern Gigabit Ethernet is standard in most offices today.

Important Points

• Network Topologies: LANs can be arranged in different physical layouts known as topologies. Common types include Star topology (where all devices connect to a central hub or switch), Ring topology, and Bus topology.

• Hardware Components: To set up a LAN, specific hardware is required, including Network Interface Cards (NICs), Switches, Routers, and Ethernet cables (like Cat5e or Cat6).

• Security and Virtual LANs (VLAN): A VLAN allows administrators to partition a physical LAN into multiple logical networks to improve security and traffic management without changing the physical infrastructure.

• Historical Context: The development of LAN technologies accelerated in the 1970s at Xerox PARC with the invention of Ethernet by Robert Metcalfe.

Q77. Answer: (c) Highest export quarter in H1

The correct answer is Highest export quarter in H1.

Key Points

• The Department of Commerce, under the Ministry of Commerce and Industry, reported that India achieved its highest-ever export figures for the first half (H1) of the Financial Year 2025-26, spanning April to September 2025. Hence, the statement regarding the performance milestone is correct.

• During this period, the combined value of merchandise and services exports reached an unprecedented peak, showcasing India’s resilience despite global economic fluctuations and supply chain disruptions. Hence, this reflects a significant growth trajectory.

• The data indicates that merchandise exports were driven largely by sectors such as Engineering Goods, Electronics, and Drugs & Pharmaceuticals, which remained the top contributors to the national exchequer. Hence, sectoral diversification played a key role.

• The Government of India highlighted that the trade deficit was managed effectively during H1 FY 2025-26 due to the narrowing gap between imports and the record-breaking export surge. Hence, the fiscal health of the trade sector showed improvement.

• This milestone is a direct result of the Foreign Trade Policy (FTP) 2023, which transitioned from an incentive-based regime to a remission and cooperation-based framework to boost domestic manufacturing. Hence, policy interventions were successful in hitting these targets.

Additional Information

• Foreign Trade Policy (FTP) 2023:

• Launched by Union Minister Shri Piyush Goyal, the policy aims to increase India's total exports to USD 2 trillion by the year 2030.

• It focuses on Ease of Doing Business through digitization of applications and time-bound approvals for exporters.

• The policy identifies Towns of Export Excellence (TEE) and promotes Districts as Export Hubs to decentralize trade benefits.

• Production Linked Incentive (PLI) Schemes:

• The PLI scheme covers 14 key sectors, including Telecommunications, White Goods, and Automobiles, providing financial incentives for incremental sales.

• It has been instrumental in making India a global manufacturing hub, significantly boosting the availability of surplus goods for

the export market.

• Key Export Destinations:

• As of 2025, India’s primary export partners include the USA, UAE, Netherlands, and China.

• The signing of Free Trade Agreements (FTAs), such as the India-UAE CEPA and India-Australia ECTA, has facilitated preferential access for Indian products in these international markets.

Important Points

• Directorate General of Foreign Trade (DGFT): This attached office of the Ministry of Commerce and Industry is responsible for formulating and implementing the Foreign Trade Policy and issuing export-import (EXIM) licenses.

• Role of Services Sector: While merchandise growth is vital, India’s IT and Business Services continue to contribute nearly 40-45% of the total export value, maintaining a trade surplus in the services category.

• Logistics Performance: The National Logistics Policy (NLP) launched in September 2022 aims to reduce logistics costs in India from 13-14% to a single-digit percentage by 2030, further enhancing the competitiveness of Indian exports.

Q78. Answer: (c) TVY

The logic followed here is based on the alphabetical position pattern:

Option 1: HJL

Option 2: BDF

Option 3: TVY

Option 4: FHJ

Thus, TVY does not follow the pattern.

Hence, the odd one out is Option 3.

Q79. Answer: (c) King Dharampala

The correct answer is King Dharampala.

Key Points

• Vikramshila University was one of the two most important centers of Buddhist learning in India during the Pala Empire, alongside Nalanda.

• It was founded by the Pala King Dharampala in the late 8th century or early 9th century (around 783 AD to 820 AD).

• The university is located at Antichak village in the Bhagalpur district of Bihar.

• It was established primarily to serve as a center for Vajrayana Buddhism, which is a significant branch of Mahayana Buddhism that focuses on Tantric practices.

• The university was a major destination for international students, particularly from Tibet, who came to study Philosophy, Grammar, Indian Logic, and Metaphysics.

• It flourished for about four centuries before it was destroyed by Bakhtiyar Khilji in 1193 AD during the Muslim conquests in India.

Additional Information

• Pala Dynasty: This dynasty ruled the regions of Bengal and Bihar from the 8th to 12th centuries. It was founded by Gopala in 750 AD, who was elected by regional chieftains to end political instability.

• King Dharampala: He was the second ruler of the Pala Dynasty and a devout Buddhist. He is also credited with founding the Somapura Mahavihara in Paharpur (modern-day Bangladesh), which is a UNESCO World Heritage Site.

• Atisa Dipankara: He was one of the most famous scholars and monks of Vikramshila University. He later traveled to Tibet and played a crucial role in the propagation and reform of Buddhism there.

• Administrative Structure: The university was managed by a board of six eminent scholars. It hosted more than 100 teachers and approximately 1,000 students at its peak.

• Archaeological Significance: Excavations at the site have revealed a massive cruciform stupa in the center, surrounded by a series of monastic cells (approximately 208 rooms) for students and teachers.

Important Points

• King Gopala: He was the founder of the Pala Dynasty but is more associated with the establishment of the Odantapuri monastery in Bihar Sharif.

• King Devapala: The son of Dharampala, he was a great conqueror and patron of art. He granted five villages for the maintenance of a monastery built by the Sailendra dynasty of Java at Nalanda.

• King Mahipala: Known as the "Second Founder" of the Pala Dynasty, he regained lost territories and restored many Buddhist religious structures during the 10th-11th century.

• Discovery: The ruins of Vikramshila were identified and excavated by the Archaeological Survey of India (ASI) between 1960 and 1982, bringing to light the scale and architectural grandeur of the ancient institution.

• Thematic Focus: While Nalanda focused on a broader spectrum of Mahayana studies, Vikramshila became the world's most

prominent center for Tantric Buddhism.

Q80. Answer: (a) Switzerland

The correct answer is Switzerland.

Key Points

• Switzerland has secured the 1st rank in the Global Innovation Index (GII) 2025 (and for the preceding 14 consecutive years), maintaining its position as the world's most innovative economy.

• The Global Innovation Index is an annual ranking of countries by their capacity for, and success in, innovation, published by the World Intellectual Property Organization (WIPO).

• In the 2024-2025 rankings, Switzerland continues to lead due to its high performance in Knowledge and technology outputs, Creative outputs, and Business sophistication.

• Following Switzerland, the top-tier of the index includes Sweden (ranked 2nd), the United States (ranked 3rd), Singapore (ranked 4th), and the United Kingdom (ranked 5th).

• The index evaluates 133 economies across approximately 80 indicators, providing a comprehensive tool for policymakers to benchmark their innovation ecosystems.

Additional Information

• World Intellectual Property Organization (WIPO):

• WIPO is a specialized agency of the United Nations founded in 1967.

• It is headquartered in Geneva, Switzerland, and currently has 193 member states.

• Its primary function is to promote the protection of intellectual property (IP) across the world through cooperation among states.

• India's Performance in GII:

• India has shown remarkable growth, moving from 81st rank in 2015 to the 39th rank in the 2024-2025 report.

• India remains the leading innovative economy in the Central and Southern Asia region.

• The country ranks highly in ICT services exports, venture capital received, and science and engineering graduates.

• Regional Leaders and Clusters:

• In East Asia, South Korea and China are among the top performers, with China approaching the top 10 global rankings.

• The Global Innovation Index also tracks Science and Technology (S&T) clusters. The Tokyo-Yokohama cluster in Japan remains the world's largest S&T cluster, followed by Shenzhen-Hong Kong-Guangzhou in China.

• GII Pillars and Indicators:

• The index is built on two sub-indices: the Innovation Input Sub-Index and the Innovation Output Sub-Index.

• The features analyzed include Institutions, Human capital and research, Infrastructure, Market sophistication, and Business sophistication.

• Data for the index is sourced from international public and private sources, including the World Bank, UNESCO, and the International Telecommunication Union (ITU).

Important Points

• Global Trends: The Global Innovation Index 2025 highlights that while venture capital investment has seen a decline globally, scientific publications and international patent filings remain robust in high-income countries.

• Innovation vs. GDP: Certain economies are "innovation achievers," meaning they perform above expectations relative to their level of economic development (GDP). India, Vietnam, and Moldova have been identified as innovation achievers for multiple consecutive years.

• Applications: The GII is used by national governments to design policies that foster startup culture, enhance R&D (Research and Development) funding, and improve digital infrastructure.

• Corporate Innovation: The index also emphasizes the role of Global R&D spenders, noting that companies in the software and ICT sectors have significantly increased their investment in Artificial Intelligence (AI) and green technology.

Q81. Answer: (a) 1

Shortcut Trick

Net rate = 1/4 + 1/29 − 1/29 = 1/4

So effectively only first tap works

Time to fill full tank = 4 hours

Time to fill 1/4 tank = 4 ÷ 4 = 1 hour

Therefore Answer = 1 hour

Alternate Method

Given:

Tap A fills in 4 hours, Tap B fills in 29 hours, Tap C empties in 29 hours

Formula used:

Total Work = LCM of 4 and 29

Tap	Time (hours)	Work Rate
A (fill)	4	29 units/hour
B (fill)	29	4 units/hour
C (empty)	29	−4 units/hour

=> Total work = LCM(4, 29) = 116 units.

=> Net work per hour = 29 + 4 − 4 = 29 units/hour.

=> Time to fill full tank = 116 ÷ 29 = 4 hours.

=> Required work = 1/4 of tank = 116 ÷ 4 = 29 units.

=> Time = 29 ÷ 29 = 1 hour.

Therefore The correct answer is 1 hour.

Additional Information

Net Work Concept

Net work = filling rates − emptying rates.

LCM Method

Take total work as LCM to simplify calculations.

Partial Work

Time for fraction of work = fraction × total time.

Shortcut Tip

Cancel equal fill and empty rates quickly.

Q82. Answer: (a) 11 – 121 – 111 – 91

The logic followed here is:

Logic: The pattern is → Square the number, then subtract 10, then subtract 20.

For, (14 – 196 – 186 – 166)

=> $14^2 = 196$

=> 196 − 10 = 186

=> 186 − 20 = 166

For, (18 – 324 – 314 – 294)

=> $18^2 = 324$

=> 324 − 10 = 314

=> 314 − 20 = 294

Now, checking the options using the same pattern:

Option 1) (11 – 121 – 111 – 91)

=> $11^2 = 121$

=> 121 − 10 = 111

=> 111 − 20 = 91

Option 2) (16 – 256 – 266 – 246)

=> $16^2 = 256$

=> 256 − 10 = 246 ≠ 266

Option 3) (18 – 320 – 330 – 350)

=> $18^2 = 324 \neq 320$

Option 4) (21 – 441 – 431 – 451)

=> $21^2 = 441$

=> 441 − 10 = 431

=> 431 − 20 = 411 ≠ 451

Hence, the correct answer is Option 1.

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Q83. Answer: (a) 121000

Shortcut Trick

Monthly savings = 18000 − 5500 − 1500 = 11000

He saves for only 11 months (one month savings spent)

Total savings = 11000 × 11 = 121000

Therefore Answer = 121000

Alternate Method

Given:

Monthly salary = 18000

House rent = 5500

Bills = 1500

Formula used:

Savings = Income − Expenses

Calculation:

=> Total expenses per month = 5500 + 1500 = 7000

=> Monthly savings = 18000 − 7000 = 11000

=> Savings for 12 months = 11000 × 12 = 132000

=> One month savings spent = 11000

=> Net yearly savings = 132000 − 11000 = 121000

Therefore The correct answer is 121000.

Additional Information

Savings Formula

Savings = Income − Expenses

Annual Calculation

Multiply monthly savings by number of months saved.

Adjustment Concept

If one month saving is spent, subtract it from total.

Exam Tip

Calculate monthly savings first to simplify.

Q84. Answer: (a) Recommending distribution between the Union and the States of the net proceeds of taxes

The correct answer is Recommending distribution between the Union and the States of the net proceeds of taxes.

Key Points

• The Finance Commission is a Constitutional Body established by the President of India under Article 280 of the Constitution. Its primary role is to define the financial relations between the Central Government and the State Governments.

• One of the core functions is to make recommendations regarding the distribution of the net proceeds of taxes which are to be, or may be, divided between the Union and the States. This ensures a fair allocation of revenue based on the fiscal needs of different regions. Hence, the statement in the correct option is correct.

• The Commission is tasked with determining the principles that should govern the grants-in-aid of the revenues of the States out of the Consolidated Fund of India under Article 275.

• It also suggests measures needed to augment the Consolidated Fund of a State to supplement the resources of the Panchayats and Municipalities in the State on the basis of the recommendations made by the Finance Commission of the State.

• The President constitutes the Finance Commission every fifth year or at such earlier time as he considers necessary. The recommendations made are advisory in nature and not binding on the government.

Additional Information

• Composition of the Commission: The Finance Commission consists of a Chairman and four other members. The Parliament has the power to determine the qualifications of the members and the manner in which they should be selected.

• The 15th Finance Commission: Formed in November 2017 and chaired by N.K. Singh, it provided recommendations for the period 2021-22 to 2025-26. It suggested a vertical devolution of 41% of the divisible pool of taxes to the States, a slight decrease from 42% (to account for the newly formed Union Territories of Jammu & Kashmir and Ladakh).

• Fiscal Federalism: The Commission plays a vital role as the balancing wheel of fiscal federalism in India. It addresses the vertical imbalance (between the Centre and States) and horizontal imbalance (between different States) in the country's financial architecture.

• Article 281: This article mandates that the President must lay the recommendations of the Finance Commission, along with an

explanatory memorandum as to the action taken thereon, before each House of Parliament.

Important Points

• Historical Context: The First Finance Commission was established in 1951 under the chairmanship of K.C. Neogy. Since then, successive commissions have evolved the criteria for tax distribution, including factors like population, area, forest cover, income distance, and demographic performance.

• Quasi-Judicial Body: The Finance Commission acts as a quasi-judicial body because it has the powers of a civil court under the Code of Civil Procedure, 1908, to summon witnesses and require the production of any public record or document.

• Distinction from NITI Aayog: While the Finance Commission is a constitutional body dealing with tax devolution and grants, NITI Aayog (which replaced the Planning Commission in 2015) is an executive body that acts as a policy think-tank and does not have the power to allocate funds to states.

• Terms of Reference (ToR): Each commission operates under specific Terms of Reference provided by the President, which may include reviewing the fiscal deficit, debt levels, and suggesting a fiscal consolidation roadmap for the Union and the States.

Q85. Answer: (a) Bengal National College

The correct answer is Bengal National College.

Key Points

• The Swadeshi Movement, which began in 1905 as a reaction to the Partition of Bengal by Lord Curzon, emphasized the concept of Atmashakti (self-reliance), leading to the establishment of several national educational institutions.

• Bengal National College was founded on August 15, 1906, inspired by the National Council of Education (NCE). It was established to provide education on national lines and under national control, away from the British-controlled Calcutta University. Hence, option A is correct.

• Aurobindo Ghosh served as the first Principal of the Bengal National College, while Satish Chandra Mukherjee, a pioneer of the Dawn Society, played a crucial role in its organization and served as its honorary superintendent.

• The National Council of Education was formally inaugurated in 1906 with the support of wealthy donors like Raja Subodh Chandra Mullick, who donated Rs. 1 lakh for the cause of national education.

• The curriculum at the college integrated scientific and technical education with literary studies to promote indigenous growth and reduce dependency on colonial administrative structures.

Additional Information

• Shantiniketan:

• It was established by Rabindranath Tagore in 1901 at Bolpur, West Bengal. While Tagore was a prominent leader of the Swadeshi movement and wrote the famous song Amar Sonar Bangla during the partition, the school itself was founded four years before the movement began. Hence, option B is incorrect.

• In 1921, Shantiniketan expanded to become the Visva-Bharati University, a world-renowned center for learning and culture.

• Bethune School:

• Founded in 1849 by John Elliot Drinkwater Bethune with the support of Dakshinaranjan Mukherjee and Ramgopal Ghosh, it was the first secular school for girls in Calcutta. Hence, option C is incorrect.

• It was originally known as the Hindu Female School and later became Bethune College in 1879, marking a milestone in women's education in India during the 19th-century Renaissance.

• Banaras Hindu University (BHU):

• BHU was established in 1916 by Pandit Madan Mohan Malaviya, Annie Besant, and Sunder Lal. It was incorporated under the Banaras Hindu University Act, 1915. Hence, option D is incorrect.

• The foundation stone was laid by Lord Hardinge in February 1916, and it remains one of the largest residential universities in Asia, located in Varanasi, Uttar Pradesh.

Important Points

• The National Education Policy of the Swadeshi era was formally adopted during the Calcutta Session of the Indian National Congress in 1906 under the presidency of Dadabhai Naoroji.

• Along with Bengal National College, the Bengal Technical Institute was also established in 1906, which eventually evolved into the present-day Jadavpur University.

• The movement also saw the rise of indigenous industries, such as the Bengal Chemical Swadeshi Stores founded by Prafulla Chandra Ray (P.C. Ray) in 1892 (which gained massive popularity post-1905) and Tata Iron and Steel Company (TISCO) founded in 1907.

• The promotion of Swadeshi (indigenous goods) and the Boycott of British goods were the twin pillars of the protest against the 1905 Partition, which was eventually annulled in 1911 by Lord Hardinge during the Delhi Durbar.

Q86. Answer: (a) System software runs directly on hardware; application software runs after system software loads

The correct answer is System software runs directly on hardware; application software runs after system software loads.

Key Points

• System Software acts as the primary interface between the computer hardware and the user. It is designed to provide a platform for other software to run. It includes the Operating System (OS), BIOS, and device drivers.

• Application Software consists of programs that are developed to perform specific tasks for the end-user, such as Microsoft Word for word processing or Google Chrome for browsing the internet.

• Statement A posits that system software runs directly on hardware while application software runs after the system software loads. This is accurate because the Operating System must boot up first to manage CPU and memory resources before any application can be executed. Hence, statement A is correct.

• Statement B claims system software creates documents and application software manages the CPU. This is factually reversed; Application software is used for productivity like document creation, whereas System software manages hardware components like the Central Processing Unit. Hence, statement B is incorrect.

• Statement D suggests system software is user-oriented and application software is system-oriented. In reality, system software is machine-centric, focusing on performance and resource allocation, while application software is designed to meet specific user requirements. Hence, statement D is incorrect.

Additional Information

• Functions of System Software:

• It performs File Management, Memory Management, and Process Management.

• It controls the Input/Output (I/O) devices like printers, keyboards, and monitors through device drivers.

• Examples include Windows 11, macOS, Linux, and Android.

• Functions of Application Software:

• It is used for data manipulation, calculation, communication, and multimedia.

• It can be General Purpose (e.g., VLC Media Player) or Custom-built for specific organizations (e.g., Banking software).

• Examples include Adobe Photoshop, Tally, and Skype.

• Dependency: Application software cannot run without system software. However, system software can run independently of applications (though the system would have limited utility to a standard user without them).

Important Points

• Programming Languages: System software is often written in low-level or system-level languages like C and C++ to ensure high speed and efficiency. Application software is frequently written in high-level languages like Java, Python, or C#.

• Installation: System software is installed on the computer when the operating system is installed. Application software is installed by the user as and when required based on their needs.

• Interaction: Users rarely interact directly with system software (except for GUI elements or settings); they primarily interact with the user interface provided by application software.

Q87. Answer: (a) Banks

The correct answer is Banks.

Key Points

• Banks serve as the fundamental pillar of the monetary system infrastructure in India, acting as intermediaries that mobilize savings and provide credit to various sectors of the economy. Hence, Option A is correct.

• The monetary system is regulated by the Reserve Bank of India (RBI), which was established on April 1, 1935, under the Reserve Bank of India Act, 1934. It manages the currency, money supply, and interest rates.

• Commercial Banks, including Public Sector Banks, Private Sector Banks, and Foreign Banks, facilitate the implementation of Monetary Policy by transmitting rate changes to the broader economy.

• Unlike Banks, Power stations, Roads, and Railways are components of the physical or economic infrastructure rather than the monetary system. Hence, Statements B, C, and D are incorrect.

• The banking sector in India is governed by the Banking Regulation Act, 1949, which provides the framework for supervision and operation of all banking institutions.

Additional Information

• Financial Inclusion: The Pradhan Mantri Jan Dhan Yojana (PMJDY), launched on August 28, 2014, aimed to provide universal access to banking services. As of 2023, over 50 crore bank accounts have been opened under this scheme, significantly strengthening the monetary infrastructure.

• Digital Infrastructure: The Unified Payments Interface (UPI), launched in 2016 by the National Payments Corporation of India (NPCI), has revolutionized the monetary system. In August 2023, UPI crossed the milestone of 10 billion transactions in a single month.

• Monetary Policy Committee (MPC): This six-member committee, constituted by the Central Government under the RBI Act,

determines the policy repo rate required to contain inflation within the target of 4% (with a margin of +/- 2%).

• Classification of Infrastructure:

• Soft Infrastructure: Includes Banks, Financial Institutions, Educational Systems, and Health Services.

• Hard Infrastructure: Includes Railways (India has the fourth-largest network globally), Roads (National Highways, State Highways), and Power Grids.

Important Points

• History of Nationalization: To ensure that the monetary system reached rural areas, 14 major banks were nationalized in 1969, followed by another 6 banks in 1980.

• Basel III Norms: Indian banks adhere to these international regulatory standards to maintain Capital Adequacy Ratios (CAR), ensuring the stability of the financial system against economic stress.

• NBFCs: Non-Banking Financial Companies also form a vital part of the monetary system, providing credit to niche segments, although they do not hold banking licenses.

• Insolvency and Bankruptcy Code (IBC), 2016: This act was introduced to speed up the resolution process for Non-Performing Assets (NPAs), helping banks maintain a healthy balance sheet.

Q88. Answer: (b) Three

Given: Seven boxes C, F, J, N, Q, S and V are kept one over the other but not necessarily in the same order.

Only Q is kept above F.

Only V is kept between J and S.

Only N is kept below J.

Position	Box
1	Q
2	F
3	C
4	S
5	V
6	J
7	N

So, Boxes between C and N = 3 boxes

Hence, the correct answer is "Option 2".

Q89. Answer: (d) 1

Given:

'MATE' is coded as '9827'

'TIME' is coded as '9218'

So, the code for I = 1

Hence, the correct answer is Option 4.

Q90. Answer: (a) $x^2 - x - 6 = 0$

Shortcut Trick

Use formula: $x^2 -$ (sum of roots)x + (product of roots) = 0

Sum = 3 + (−2) = 1

Product = 3 × (−2) = −6

Equation => $x^2 - x - 6 = 0$

Therefore Answer = $x^2 - x - 6 = 0$

Alternate Method

Given:

Roots are 3 and −2

Formula used:

If roots are α and β, then equation is:

$x^2 - (\alpha + \beta)x + (\alpha\beta) = 0$

Calculation:

=> $\alpha + \beta = 3 + (-2) = 1$

=> $\alpha\beta = 3 \times (-2) = -6$

=> Equation = $x^2 - 1x - 6 = 0$

Therefore The required quadratic equation is $x^2 - x - 6 = 0$.

Additional Information

Standard Form

Quadratic equation is written as $ax^2 + bx + c = 0$.

Relation of Roots

Sum = $-b/a$ and Product = c/a.

Factor Form

Equation can also be written as $(x - \alpha)(x - \beta) = 0$.

Verification

Substitute roots to check correctness.

Q91. Answer: (d) Decomposition reaction

The correct answer is Decomposition reaction.

Key Points

• A Decomposition reaction is a type of chemical reaction where a single compound breaks down into two or more simpler substances (elements or compounds). This process is the exact opposite of a combination reaction.

• These reactions generally require energy in the form of heat, light, or electricity to break the chemical bonds of the reactant. Therefore, most decomposition reactions are endothermic in nature.

• There are three primary types of decomposition based on the energy source used:

• Thermal Decomposition: Triggered by heat energy. For example, when Calcium Carbonate (CaCO3) is heated, it decomposes into Calcium Oxide (CaO) and Carbon Dioxide (CO2).

• Electrolytic Decomposition (Electrolysis): Occurs when an electric current is passed through an aqueous solution or molten state of a compound. A classic example is the electrolysis of water, which produces Hydrogen and Oxygen gases.

• Photolytic Decomposition: Involves the use of light energy (photons). For instance, Silver Chloride (AgCl) turns grey in sunlight as it decomposes into Silver metal and Chlorine gas.

• In the context of the question, the breakdown of a complex substance into simpler parts uniquely defines this reaction. Hence, the statement regarding the breakdown into simpler substances is correct for a Decomposition reaction.

Additional Information

• Combination Reaction:

• In this reaction, two or more reactants combine to form a single product. It is represented by the general formula A + B → AB.

• An example is the burning of coal, where Carbon (C) reacts with Oxygen (O2) to form Carbon Dioxide (CO2). These are usually exothermic reactions.

• Displacement Reaction:

• A reaction where a more reactive element displaces a less reactive element from its compound.

• For example, when an Iron (Fe) nail is dipped in Copper Sulphate (CuSO4) solution, iron displaces copper to form Iron Sulphate (FeSO4) because iron is higher in the reactivity series.

• Neutralization Reaction:

• This is a specific type of double displacement reaction occurring between an acid and a base to produce salt and water.

• A common example is the reaction between Hydrochloric Acid (HCl) and Sodium Hydroxide (NaOH) to form Sodium Chloride (NaCl) and Water (H2O). It helps in maintaining pH levels in various biological and industrial processes.

• Double Displacement Reaction:

• A reaction in which there is an exchange of ions between the reactants to form new compounds. This often results in the formation of a precipitate (an insoluble solid).

Important Points

• Industrial Applications: Decomposition reactions are vital in metallurgy for the extraction of metals. For example, Sodium is extracted by the electrolysis of molten Sodium Chloride, and Aluminium is obtained by the electrolysis of Aluminium Oxide.

• Biological Significance: The digestion of food in the human body is a decomposition reaction. Starch decomposes into glucose, and proteins decompose into amino acids through the action of enzymes (biological catalysts).

• Safety and Storage: Certain compounds like Hydrogen Peroxide (H2O2) decompose slowly over time into water and oxygen. To prevent rapid decomposition, they are often stored in dark-colored bottles to block UV light.

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• Energy Profile: While combination reactions often release energy (exothermic), decomposition reactions typically absorb energy (endothermic) to overcome the lattice energy or bond enthalpy of the reactant molecules.

Q92. Answer: (b) Deterioration in capacity utilisation

The correct answer is Deterioration in capacity utilisation.

Key Points

• The research conducted by Bishwanath Goldar and Anita Kumari in 2003 titled "Import Liberalization and Productivity Growth in Indian Manufacturing Industries in the 1990s" analyzed the impact of economic reforms on productivity.

• The study highlighted that there was a marked slowdown in the growth rate of Total Factor Productivity (TFP) in the Indian manufacturing sector during the 1990s (the post-reform period) compared to the 1980s.

• A major finding of the study was that the deterioration in capacity utilisation played a critical role in this deceleration. During the mid-1990s, there was a significant surge in investment, which led to the creation of excess capacity that could not be fully utilized due to various demand-side and supply-side constraints. Hence, Statement B is correct.

• The researchers argued that while import liberalization generally aids productivity, its positive effects in India were offset by the falling levels of capacity utilisation. Hence, Statement A is incorrect as the study focused more on internal utilization rather than just an over-reliance on foreign capital.

• While human capital is essential for growth, the study did not conclude that a shortage of skilled labour was the primary driver of the TFP slowdown in that specific decade. Hence, Statement C is incorrect.

• The era of the 1990s was actually characterized by deregulation rather than excessive regulation on exports, as the government moved toward an export-oriented growth model. Hence, Statement D is incorrect.

Additional Information

• Total Factor Productivity (TFP): This is a measure of the efficiency of all inputs used in the production process (usually capital and labour). It accounts for the portion of output not explained by the amount of inputs used, often attributed to technological progress and innovation.

• Economic Reforms of 1991: India initiated Liberalization, Privatization, and Globalization (LPG) reforms to overcome a Balance of Payments crisis. This included reducing import duties, abolishing the License Raj, and encouraging Foreign Direct Investment (FDI).

• Import Liberalization: This refers to the reduction of tariffs and non-tariff barriers. In the 1990s, India significantly lowered trade barriers, which increased competition and allowed manufacturers to access better intermediate goods and capital goods from international markets.

• Capacity Utilisation: This is a metric used to measure the rate at which a manufacturing plant or a country uses its installed productive capacity. If demand lags behind the creation of industrial infrastructure, capacity utilisation drops, leading to higher unit costs and lower productivity growth.

Important Points

• Data and Methodology: Goldar and Kumari used data from the Annual Survey of Industries (ASI) for 17 major two-digit industry groups to reach their conclusions.

• Gestation Period: The study also suggested that the gestation period of new investments made during the early 1990s contributed to the temporary slowdown in efficiency, as new plants take time to reach optimal production levels.

• Growth Rates: In the 1980s, TFP growth was estimated to be around 2% to 3% per annum, whereas it dropped significantly in the 1990s, according to various estimates including those by the Reserve Bank of India (RBI) and academic researchers.

Q93. Answer: (c) Consolidated Fund of India

The correct answer is Consolidated Fund of India.

Key Points

• Article 275 of the Constitution of India deals with grants-in-aid from the Union to certain States. These grants are specifically provided to states that the Parliament determines to be in need of financial assistance.

• These sums are charged on the Consolidated Fund of India, meaning they do not require an annual vote in Parliament once the law is enacted, ensuring a stable flow of funds to the states.

• The grants mentioned under Article 275 are often referred to as statutory grants. Their allocation is primarily based on the recommendations of the Finance Commission, which is a constitutional body established under Article 280.

• The main purpose of these grants is to reduce horizontal imbalances between states and to ensure that social services and administrative standards are maintained across the country, particularly in economically backward regions.

• Special provisions are also included under this Article for grants intended to promote the welfare of Scheduled Tribes and to improve the level of administration in Scheduled Areas, including the state of Assam.

Additional Information

• Consolidated Fund of India (Article 266):

• This is the primary fund of the Government of India. All revenues received (like Income Tax, GST), loans raised, and repayments

of loans are credited to this fund.

• No money can be withdrawn or appropriated from this fund except under a law passed by the Parliament (Appropriation Act).

• Contingency Fund of India (Article 267):

• This fund is established to meet unforeseen expenditure or emergencies such as natural disasters.

• It is placed at the disposal of the President of India. Following the Finance Act, 2021, the corpus of this fund was increased from Rs. 500 crore to Rs. 30,000 crore.

• Public Account of India (Article 266(2)):

• All other public moneys received by the Government that are not part of the Consolidated Fund are kept here. This includes Provident Funds, Small Savings, and Judicial Deposits.

• Expenditure from this account does not require Parliamentary approval and is managed by executive action.

• Article 282 (Discretionary Grants):

• This Article allows the Union or a State to make grants for any public purpose. These are discretionary in nature and were historically used by the Planning Commission to provide financial assistance to states.

Important Points

• The Finance Commission, constituted every five years, plays a pivotal role in determining the principles that govern these grants-in-aid.

• The 15th Finance Commission, chaired by N.K. Singh, recommended various sector-specific and performance-based grants in addition to the standard revenue deficit grants under Article 275.

• The distinction between Article 275 (Statutory) and Article 282 (Discretionary) is significant in Indian Federalism, as the former is a legal entitlement based on institutional recommendations, while the latter is based on political-executive discretion.

• For the year 2021-22 to 2025-26, the Finance Commission has emphasized post-devolution revenue deficit grants to ensure states have enough liquidity to meet obligatory expenses.

Q94. Answer: (d) 36%

Shortcut Trick

CP per article = 300 ÷ 12 = 25

SP per article = 34

Profit per article = 34 − 25 = 9

Profit% = (9 ÷ 25) × 100 = 36%

Therefore Answer = 36%

Alternate Method

Given:

67 dozens purchased at Rs. 300 per dozen

Selling price per article = Rs. 34

Formula used:

Profit% = (Profit ÷ Cost Price) × 100

Calculation:

=> Total articles = 67 × 12 = 804

=> Total CP = 67 × 300 = 20100

=> Total SP = 804 × 34 = 27336

=> Profit = 27336 − 20100 = 7236

=> Profit% = (7236 ÷ 20100) × 100 = 36%

Therefore The correct answer is 36%.

Additional Information

Dozen Concept

1 dozen = 12 items.

Unit Method

Convert cost per dozen into cost per item for quick calculation.

Profit Formula

Profit% = (Profit ÷ CP) × 100

Shortcut Tip

Solve per unit instead of total to save time.

Q95. Answer: (c) 6 km to the South

The logic followed here is:
Given:
Vansh walks 26 km West
He turns left → 15 km South
He turns left → 35 km East
He turns left → 21 km North
He turns left → 9 km West
To reach Point A, he must go 6 km South.
Hence, the correct answer is Option 3.

Q96. Answer: (b) HEAR - ERAH - RAEH

The logic followed here is:
Given:
HUGE → UEGH → EGUH
LIST → ITSL → TSIL
Now, checking the options:
Option 1: BANK → BNAK → KNAB
Option 2: HEAR → ERAH → RAEH
Option 3: VIBE → IVBE → EIBV
Option 4: EAST → AEST → TASE
Hence, the correct answer is Option 1.

Q97. Answer: (d) 75

Shortcut Trick
Let third group = 7x
Second group = 3x (from ratio 3 : 7)
First group = 2x (from ratio 2 : 7)
Total = 2x + 3x + 7x = 12x = 300
x = 25 => Second group = 3x = 75
Therefore Answer = 75
Alternate Method
Given:
Total students = 300
Second : Third = 3 : 7
First : Third = 2 : 7
Formula used:
Let common term be proportional to the third group
Calculation:
=> Let third group = 7x
=> Then second group = 3x
=> And first group = 2x
=> Total = 2x + 3x + 7x = 12x
=> 12x = 300
=> x = 25
=> Second group = 3x = 75
Therefore The correct answer is 75.
Additional Information
Ratio Concept
Ratios can be converted into variables using a common multiplier.
Common Base Method
Use the common term (third group here) to align both ratios.

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Sum of Parts

Total = sum of all ratio parts multiplied by common factor.

Exam Tip

Always express ratios using a shared variable for quick solving.

Q98. Answer: (d) 5

Shortcut Trick

Rule: Number divisible by 9 => sum of digits divisible by 9

Sum of known digits = 4+9+3+9+1+3+2 = 31

31 + A must be multiple of 9 => next multiple = 36

A = 36 − 31 = 5

Therefore Answer = 5

Alternate Method

Given:

Number = 493A9132

Formula used:

Divisibility rule of 9: Sum of digits must be divisible by 9

Calculation:

=> Sum of digits = 4 + 9 + 3 + A + 9 + 1 + 3 + 2

=> = 31 + A

=> For divisibility by 9:

=> 31 + A = multiple of 9

=> Nearest multiple of 9 after 31 = 36

=> A = 36 − 31 = 5

Therefore The correct answer is 5.

Additional Information

Divisibility Rule of 9

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

Quick Method

Find remainder of sum when divided by 9 and adjust digit accordingly.

Divisibility by 3

Similar rule: sum of digits divisible by 3.

Exam Tip

Always add digits quickly and check nearest multiple.

Q99. Answer: (d) 17

BODMAS Table:

Given equation: 22 A 11 C 3 B 7 D 6 = ?

Now, if A stands for '÷', B stands for '×', C stands for '+' and D stands for '−', then:

=> 22 ÷ 11 + 3 × 7 − 6

=> 2 + 21 − 6

=> 23 − 6

=> 17

Hence, the correct answer is Option 4.

Q100. Answer: (a) 680

Shortcut Trick

Let Kartik = K, Ishan = I

Given: K(1.05)^(17) = I(1.05)^(18)

=> K = 1.05 I

Total: K + I = 1394 => 1.05I + I = 2.05I = 1394

I = 1394 ÷ 2.05 = 680

Therefore Answer = 680

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Alternate Method
Given:
Total amount = 1394
Rate = 5% per annum
Kartik's amount after 17 years = Ishan's amount after 18 years
Formula used:
Amount = $P(1 + r/100)^n$
Calculation:
=> Let Kartik = K and Ishan = I
=> K(1.05)^(17) = I(1.05)^(18)
=> K = I(1.05)
=> Total amount: K + I = 1394
=> 1.05I + I = 1394
=> 2.05I = 1394
=> I = 1394 ÷ 2.05 = 680
Therefore The correct answer is 680.
Additional Information
Compound Interest Formula
$A = P(1 + r/100)^n$
Time Difference Trick
If time differs by 1 year, multiply/divide by (1 + r/100).
Ratio Concept
Convert equation into ratio to simplify quickly.
Exam Tip
Always reduce powers first when exponents differ slightly.

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