RRB NTPC (Graduate) CBT-I Official Paper (Held On: 19 Mar, 2026 Shift 2) (Previous Year Paper)

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

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Q1. What condition must be fulfilled by a person born outside India after December 3, 2004, to be considered an Indian citizen by descent?

(a) Both parents must be Indian citizens.
(b) They must reside in India for at least 5 years.
(c) They must renounce any other nationality.
(d) They must reside in India for 10 years.

Q2. In a certain code language, ‘MINT’ is coded as ‘6134’ and ‘TIME’ is coded as ‘4365’. What is the code for ‘E’ in the given code language?

(a) 3
(b) 5
(c) 6
(d) 4

Q3. A shopkeeper professes to sell his goods at a 60% loss but uses a false balance and gains 70%. The actual weight (rounded off to one decimal place) that he uses instead of 1 kg is:

(a) 241.3 gm
(b) 239.8 gm
(c) 230.9 gm
(d) 235.3 gm

Q4. J, K, L, M, N and O live on six different floors of the same building. The bottommost floor of the building is numbered as 1; the floor above it is numbered as 2 and so on. The topmost floor is numbered as 6.

K lives on an odd-numbered floor but not on floor number 3. Only two people live between K and L. J lives immediately below K. M lives on an even-numbered floor. O does not live on the bottommost floor.

How many people live between N and J?

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

Q5. If $8x^3 - 27y^3 = (Ax + By)(Cx^2 - Dy^2 + Exy)$. then the value of (A + B + C + D + E) is:

(a) -1
(b) -3
(c) 0
(d) 2

Q6. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

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

(24, 578, 3)

(23, 536, 8)

(a) (10, 106, 7)
(b) (9, 109, 24)
(c) (16, 285, 25)
(d) (47, 2230, 17)

Q7. Which authority is empowered under the Constitution to define the powers, privileges, and immunities of the members of each House of Parliament and their committees?

(a) Supreme Court
(b) Speaker of the Lok Sabha
(c) Parliament itself
(d) President of India

Q8. The following table shows the distribution of marks obtained by 100 students in a test.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Number of Students	5	9	14	22	30	20

The median marks is:

(a) 42.2
(b) 38.8
(c) 40.0
(d) 39.2

Q9. If a 7-digit number 56339A8 is completely divisible by 6, what is the minimum value of A?

(a) 2
(b) 5
(c) 1
(d) 3

Q10. The 'Make in India' initiative was launched in which of the following years?

(a) 2013
(b) 2014
(c) 2012
(d) 2015

Q11. Three friends X, Y and Z started a business by investing a sum of money in the ratio of 6 : 3 : 5. After 6 months, X withdraws half of his capital. If the sum invested by Z is Rs. 12,000, then out of a total annual profit of Rs. 69,000, what is the difference between X's and Y's profit?

(a) Rs. 7290
(b) Rs. 9910
(c) Rs. 8120
(d) Rs. 8280

Q12. Which port did the Portuguese capture in 1510, making it their colony’s capital in India?

(a) Calicut
(b) Bombay
(c) Surat
(d) Goa

Q13. The fourth generation of computers marked the use of integrated circuits and compact computing. This generation began with the invention of which key component?

(a) Microprocessor Chip
(b) Transistor Device Unit
(c) ENIAC Computer System

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(d) Tabulating Machine Device

Q14. Which publisher released 'Mother Mary Comes to Me' by Arundhati Roy in September 2025?

(a) Penguin Random House India
(b) HarperCollins India
(c) Hachette India
(d) Rupa Publications

Q15. M, N, O, P, Q, R and S are sitting around a circular table facing the centre of the table. M sits fourth to the right of S. Only two people sit between P and Q when counted from the left of P. R sits third to the left of O. N is an immediate neighbour of O and Q. How many people between M and N when counted from the left of N?

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

Q16. If 1 is added to each odd digit and 2 is subtracted from each even digit in the number 8371456, what will be the sum of the digits that are second from the left and second from the right in the new number thus formed?

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

Q17. What kind of justice do the Directive Principles of State Policy of the Indian Constitution mainly aim to achieve?

(a) All legal justice
(b) Religious justice
(c) Political justice
(d) Economic and social justice

Q18. If x is inversely proportional to y, and y = 30 when x = 28, find the value of x, when y = 20.

(a) 38
(b) 52
(c) 42
(d) 33

Q19. Which feature of the 10th-century CE Lingaraja Temple in Bhubaneswar reflects the Nagara architectural style?

(a) Stepped pyramid vimana
(b) Circular stupa dome
(c) Ornate gopuram entrance
(d) Curvilinear shikhara tower

Q20. Based on the English 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) TXC
(b) FJN
(c) XBG
(d) QUZ

Q21. What should come in place of '?' in the given series?

77 78 82 91 107 ?

(a) 132
(b) 133
(c) 131
(d) 134

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Q22. Which of the following is NOT correct about the scheme of Jan Shikshan Sansthan of the Ministry of Skill Development and Entrepreneurship (MSDE)?

(a) It focuses on creation of a pool of master trainers
(b) It is implemented through Industrial Training Institutes (ITIs)
(c) It focuses to improve the occupational skills and technical knowledge of the non/neo literates and persons having rudimentary level of education
(d) It focuses on identifying and promoting traditional skills in the districts through skilling/upskilling

Q23. In a certain code language, ‘WINS’ is coded as ‘8246’ and ‘NORM’ is coded as ‘3851’.

What is the code for 'N’ in the given code language?

(a) 4
(b) 8
(c) 1
(d) 3

Q24. The e/m ratio for electron was determined by:

(a) Albert Einstein
(b) Niels Bohr
(c) Issac Newton
(d) J.J. Thomson

Q25. 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 :: ?

: LHN :: PLR : %

(a) = MIO, % = OLQ
(b) = MIP, % = OKQ
(c) = MIO, % = OKQ
(d) = MIO, % = OKR

Q26. A woman travelled at a speed of 20 m/min for 90 min, and at a speed of 70 m/min for 60 min. Her average speed (in m/min) for the entire journey is:

(a) 33
(b) 46
(c) 44
(d) 40

Q27. P and Q are two stations. A train travels from P to Q at a speed of 144 km/h and returns to P at a slower speed. If the average speed for the entire journey is 126 km/h, find the speed at which the train returns.

(a) 112 km/h
(b) 124 km/h
(c) 128 km/h
(d) 121 km/h

Q28. At what rate (in percentage, rounded off to two decimal place) per year will a sum of money 5 times itself in 18 years on simple interest?

(a) 44.44
(b) 24.22
(c) 22.22
(d) 20.22

Q29. In October 2025, Morocco’s U-20 World Cup victory over Argentina was significant for what reason?

(a) It marked Morocco’s first-ever U-20 World Cup title.
(b) Morocco hosted the U-20 World Cup for the first time.
(c) Morocco won after a penalty shootout.
(d) It was Argentina’s first defeat in tournament history.

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Q30. Which of the following does NOT belong to the Tibeto-Burman language family?

(a) Lepcha
(b) Bodo
(c) Garo
(d) Assamese

Q31. A shopkeeper purchased 21 dozens of articles at the rate of Rs. 150 per dozen. He sold each one of them at the rate of Rs. 78. What percentage profit did he make?

(a) 525%
(b) 523%
(c) 526%
(d) 524%

Q32. What is the primary role of the Control Unit (CU) within the Central Processing Unit (CPU)?

(a) It performs all the arithmetic and logical calculations on data.
(b) It manages and coordinates the flow of instructions and data throughout the computer system.
(c) It provides the system's primary volatile storage for active programs.
(d) It permanently stores the operating system and basic boot instructions.

Q33. Akhaj Mesolithic site is found in which state of India?

(a) Assam
(b) Meghalaya
(c) Gujarat
(d) Bihar

Q34. Laman, in which a group of girls sing a stanza and a group of boys reply in the song which continues for hours, is a popular folk music of which state?

(a) Haryana
(b) Gujarat
(c) Rajasthan
(d) Himachal Pradesh

Q35. In a certain code language,

A + B means ‘A is the son of B’

A – B means ‘A is the brother of B’

A x B means ‘A is the wife of B’

A ÷ B means ‘A is the father of B’

Based on the above, how is W related to G if ‘W – O x R + K ÷ G’?

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

Q36. What type of agriculture is still widely practiced in India despite modern agricultural changes?

(a) Organic Agriculture
(b) Subsistence Agriculture
(c) Commercial Agriculture
(d) Plantation Agriculture

Q37. Which of the following statements differentiates bryophytes from algae?

(a) Bryophytes can prepare their own food
(b) Bryophytes exhibit the formation of an embryo from the zygote
(c) Bryophytes are cryptogams
(d) Bryophytes possess chlorophyll

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Q38. Which shortcut saves the current file?

(a) Ctrl+P
(b) Ctrl+S
(c) Ctrl+L
(d) Ctrl+R

Q39. In which year was the Pradhan Mantri Kaushal Vikas Yojana (PMKVY) launched?

(a) 2015
(b) 2025
(c) 2010
(d) 2020

Q40. A conical open packet is made from a rectangular sheet of paper of length 66 cm and breadth 30 cm. The height of the packet is as large as possible and the length of the rectangle forms the circumference of the base of the conical packet. The conical packet is stapled at a height of 2 cm from the vertex of the cone, to avoid spilling of items inside it. Find the volume (in cm^3) of the packet, rounded off to the nearest whole number.

(use $\pi = 22/7$)

(a) 3296
(b) 3582
(c) 3464
(d) 3638

Q41. Read the given statements and conclusions carefully. Assuming that the information given in the statement(s) 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 statement(s).

Statements:

All skin is hair. All hair is fur. All fur is fleece.

Conclusions:

(I) All skin is fleece.

(II) Some fleeces are hair.

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

Q42. In an election between two candidates, 80% of the registered voters cast their vote and 15% of the votes polled were found invalid. Winning candidate got 75% of the valid votes and won the election by a margin of 289 votes. How many voters were registered?

(a) 848
(b) 852
(c) 850
(d) 851

Q43. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only. All numbers are single-digit numbers only.

(Left) \ ? % 4 ? 3 / 3 / 9 4 6 4 1 ? * + ^ > 2 * (Right)

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

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

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Q44. A dealer buys two articles X and Y for Rs. 1,000 each. He marks each of them at the same price. He sells X by giving two successive discounts of 15% and 30% and still earns Rs. 337 as profit. If he sells Y at a single discount of 49%, then what is the profit percentage on Y?

(a) 13%
(b) 14.6%
(c) 14%
(d) 13.6%

Q45. Simplify:

$(\cot\theta-\cos\theta)/(\cot\theta+\cos\theta)$

(a) $(\sec\theta + 1)/(\sec\theta - 1)$
(b) $(\operatorname{cosec}\theta - 1)/(\operatorname{cosec}\theta + 1)$
(c) $(\operatorname{cosec}\theta + 1)/(\operatorname{cosec}\theta - 1)$
(d) $(\sec\theta - 1)/(\sec\theta + 1)$

Q46. Find the mean proportional between 9 and 25.

(a) 21
(b) 15
(c) 12
(d) 18

Q47. Each of A, B, L, I, N, G and S has exam on a different day of a week starting from Monday and ending on Sunday of the same week. B has exam on first day of the week. Only three people have exam between B and L. Only one person has exam between L and A. N has exam on Sunday. S has exam on one of the days after I but on one of the days before G. Who has exam on Thursday?

(a) A
(b) S
(c) G
(d) I

Q48. In which year did India officially join the Shanghai Cooperation Organization (SCO) as a full member?

(a) 2008
(b) 2021
(c) 2017
(d) 2012

Q49. Evaluate: $(-9) - (-56) \div (-14) + (-3) \times 6$

(a) -33
(b) -31
(c) -34
(d) -30

Q50. 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 :: ?

: LOU :: WZF : %

(a) = EHN, % = DGM
(b) = EHN, % = DGO
(c) = EHN, % = DGI
(d) = FHN, % = DGM

Q51. The area of a square is 3969 cm^2. Its perimeter is equal to the perimeter of a regular hexagon. What is the area (in cm^2) of the hexagon?

(a) 2608
(b) 2600
(c) $2646\sqrt{3}$

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(d)

$$2662\sqrt{3}$$

Q52. As of April 2025, the Ministry of Agriculture and Farmers Welfare is administered by _____.

(a) Shri Nitin Jairam Gadkari
(b) Shri Piyush Goyal
(c) Shri Shivraj Singh Chouhan
(d) Shri Pralhad Joshi

Q53. At present, Vanraj is three times as old as his son, and his daughter is 3 years younger than the son. If the sum of the ages of these three people 3 years ago was 93 years, then Vanraj's present age (in years) is:

(a) 63
(b) 49
(c) 44
(d) 39

Q54. What material was commonly used for Harappan sculptures, such as the Dancing Girl, around 2500 BCE?

(a) Silver
(b) Bronze
(c) Granite
(d) Marble

Q55. The modified petiole of Acacia species that resembles a leaf blade is termed as _____.

(a) spine
(b) phyllode
(c) tendril
(d) bracts

Q56. When was the second edition of the RESPECT women prevention framework launched in 2025?

(a) 8 March
(b) 25 November
(c) 19 November
(d) 10 December

Q57. Which of the following is NOT a primary air pollutant?

(a) Sulfur dioxide
(b) Carbon monoxide
(c) Nitrogen oxide
(d) Ozone

Q58. Restarting a computer means:

(a) Only refreshing the desktop
(b) Turning it off permanently
(c) Installing a new OS
(d) Turning it off and on again automatically

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Q59. 20% of a number is more than 20% of 620 by 190. The number is:

(a) 1570
(b) 1670
(c) 1620
(d) 1420

Q60. In November 2025, which of the following organizations collaborated with UNICEF to secure a new deal for affordable malaria vaccines?

(a) Doctors Without Borders
(b) Red Cross
(c) Gavi
(d) Oxfam

Q61. Which of the following leader is associated with the founding of the Brahmo Samaj and its emphasis on monotheism and social reform?

(a) Ishwar Chandra Vidyasagar
(b) Raja Ram Mohan Roy
(c) Debendranath Tagore
(d) Swami Dayananda Saraswati

Q62. This question is based on the five, three-digit numbers given below.

(Left) 419 975 573 389 937 (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) 19
(b) 16
(c) 18
(d) 17

Q63. There are 32 members in group A, 52 members in group B and 73 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are Rs. 266, Rs. 470 and Rs. 168, respectively. The overall average amount (in Rs.) spent per member is:

(a) 292
(b) 288
(c) 286
(d) 291

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

KUO 5, PZT 12, UEY 19, ZJD 26, ?

(a) EOI 33
(b) EPK 35
(c) ENG 33
(d) DNH 32

Q65. GKOS is related to INQV in a certain way based on the English alphabetical order. In the same way, HLPT is related to JORW. To which of the following is AEIM related, following the same logic?

(a) DGKP
(b) CHKP
(c) DHLQ
(d) CGLQ

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Q66. Which of the following is/are example(s) of an abiotic factor in an ecosystem?

(a) Soil
(b) Bacteria
(c) Insects
(d) Trees

Q67. In August 2025, which paramilitary force launched Operation Alert along the Rajasthan border?

(a) Indian Coast Guard
(b) Central Industrial Security Force (CISF)
(c) Border Security Force (BSF)
(d) Indian Navy

Q68. Let ABCD be a quadrilateral which satisfies any of the following conditions.

(i) opposite sides are equal
(ii) each diagonal of ABCD divides it into congruent triangles
(iii) each pair of opposite angles are equal
(iv) diagonals of ABCD bisect each other
Then ABCD has to be a _____.

(a) rectangle
(b) parallelogram
(c) kite
(d) trapezium

Q69. Ajay gets double the amount in 7 years when invested at compound interest, compounded annually. In how many years will the amount become sixteen times itself?

(a) 28
(b) 14
(c) 112
(d) 56

Q70. Fardin starts from Point A and drives 42 km towards the West. He then takes a left turn, drives 40 km, turns left and drives 49 km. He then takes a left turn and drives 46 km. He takes a final left turn, drives 7 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-degree turns only unless specified.)

(a) 8 km to the South
(b) 5 km to the South
(c) 6 km to the South
(d) 7 km to the South

Q71. A typist takes 40 minutes to type 2 pages. How long (in minutes) will he take to type 87 pages?

(a) 1750
(b) 1730
(c) 1745
(d) 1740

Q72. The Twelfth Schedule of the Indian Constitution defines how many new tasks in the functional domain of the Urban Local Bodies as of March 2025?

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

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Q73. Chilika Lake spans across which three districts of Odisha?

(a) Puri, Jagatsinghpur and Khurda
(b) Cuttack, Puri and Kendrapara
(c) Puri, Khurda and Ganjam
(d) Khurda, Balasore and Ganjam

Q74. Which of the following is equivalent to a quadratic equation?

(a)

$$\frac{(x^2-1)}{(x+1)} = x - 2$$

(b)

$$\frac{x}{x-1} + \frac{2x}{x-1} = 3$$

(c)

$$x^3 - 3x^2 + 3x - 1 = (x-1)^3$$

(d) (x2 + 1)2 − x4 = 2x + 1

Q75. During October–November 2025, which two Indian states hosted the Trishul 2025 tri-services exercise?

(a) Maharashtra and Punjab
(b) Tamil Nadu and Kerala
(c) Gujarat and Rajasthan
(d) Uttar Pradesh and Bihar

Q76. If 4 lines of a print, in a column of a book, contain 36 words, how many words will a column of 93 lines contain?

(a) 837
(b) 841
(c) 847
(d) 833

Q77. What is the average of all the natural numbers from 1 to 64?

(a) 32
(b) 33
(c) 33.5
(d) 32.5

Q78. 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.

Question:

Among 5 trees, L, M, N, T and V each having a different height, which tree is the shortest?

Statements:

(I) N is shorter than only three trees.

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(II) N is taller than M but shorter than T.

(a) Data in Statement II alone is sufficient to answer the question while data in statement I is not
(b) Both statements I and II together are NOT sufficient to answer the question
(c) Data in Statement I alone is sufficient to answer the question while data in statement II is not
(d) Both statements I and II together (and not statement 1 alone or statement II alone) are sufficient to answer the question

Q79. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

5-7-9

11-13-15

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

(a) 4-39-61
(b) 18-15-12
(c) 21-23-25
(d) 4-30-84

Q80. Which of the given letter-number clusters will replace the question mark (?) in the following series to make it logically complete?

YQM 2 SKG 6 MEA 12 GYU 20 ?

(a) LWY 30
(b) ASO 30
(c) DZP 30
(d) BTP 32

Q81. 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 lions are monkeys. Some monkeys are cats. All pigs are cats.

Conclusions:

(I) Some pigs are lions.

(II) Some pigs are monkeys.

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

Q82. 10 is related to 120 following a certain logic. Following the same logic, 12 is related to 168. To which of the following is 18 related, following the same logic?

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

(a) 360
(b) 256
(c) 324
(d) 400

Q83. The conceptual framework of Human Development was pioneered by:

(a) Dr. Abdus Salam
(b) Prof. Amartya Sen
(c) Ellen C. Semple
(d) Dr. Mahbub-ul-Haq

Q84. The sum of two numbers a and b, where a < b, is 129. The HCF and LCM of a and b are 3 and 1350 resptively. Find the value of (1/a) - (1/b).

(a) -21/1550
(b) 7/1350
(c) 441/450
(d) -3/4550

Q85. X, Y, Z, S, T and U 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. X lives on an even numbered floor but not on floor number 4. Only two people live between X and T. S lives on an odd numbered floor but not on the lowermost floor. Only two people live between S and Y. Z lives immediately below S. How many people live between U and Z?

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

Q86. In a certain code language,

X + Y means 'X is the husband of Y',

X – Y means 'X is the mother of Y',

X × Y means 'X is the wife of Y' and

X ÷ Y means 'X is the father of Y'.

Based on the above, how is P related to T if 'P + Q – R × S ÷ T'?

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

Q87. What will come in the place of '?' in the following equation, if '+' and '-' are interchanged and '×' and '÷' are interchanged?

216 ÷ 3 + 1313 × 13 - 112 = ?

(a) 659
(b) 722
(c) 523
(d) 586

Q88. Which award was announced by the Government of India on 26 October 2025 to honour excellence in Science, Technology, and Innovation?

(a) Shanti Swarup Bhatnagar Prize
(b) Rashtriya Vigyan Puraskar
(c) Bharat Ratna
(d) Padma Vibhushan

Q89. Which of the following factors does NOT contribute to farming variety in India?

(a) Irrigation availability
(b) Soil types
(c) Climate
(d) Uniform landform

Q90. What should come in place of '?' in the given series?

52 50 47 42 35 ?

(a) 26
(b) 24
(c) 25

(d) 23

Q91. P, Q, R, S, T, U and V sit around a circular table facing the centre. Only two people sit between P and U when counted from the right of P. Only two people sit between U and V. Only three people sit between P and T. S sits to the immediate left of R. How many people sit between P and Q when counted from the right of Q?

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

Q92. If $x = \sqrt[3]{31 + 14\sqrt{3}}$ and $y = \sqrt[3]{31 - 14\sqrt{3}}$, then the value of $x^3 + y^3 + 3x^3y^3$ is

(a) 1198
(b) 1157
(c) 1181
(d) 1143

Q93. Mango showers occur in which of the following groups of states?

(a) Karnataka and Kerala
(b) Bihar and West Bengal
(c) Andhra Pradesh and Telangana
(d) Kerala and Tamilnadu

Q94. Which European power was the first to establish trading settlements in India during the early modern period?

(a) Portuguese
(b) English
(c) Dutch
(d) French

Q95. Which Indian organization signed a memorandum of understanding with Russia's UAC to produce the SJ-100 in October 2025?

(a) Bharat Electronics Limited
(b) Hindustan Aeronautics Limited
(c) ISRO
(d) DRDO

Q96. Based on the English 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 man out is not based on the number of consonants/vowels or their position in the letter cluster)

(a) NQS
(b) DGH
(c) BEG
(d) EHJ

Q97. Refer to the following letter, symbol series and answer the question. Counting to be done from left to right only.

(Left) C P # A G = % B H * + D F ? E ! L M $ I O (Right)

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

(a) ONE
(b) FOUR
(c) FIVE
(d) TWO

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Q98. Let C be a circle with centre O and radius 21 cm. Let OAB be a sector of C. If the area of the sector is 385 cm², then find the angle made by the sector at O. (Use π = 22/7.)

(a) 60°
(b) 120°
(c) 100°
(d) 80°

Q99. If the mean of the following data is 40, find the value of X.

Class	10-20	20-30	30-40	40-50	50-60
Frequency	42	19	23	26	X

(a) 38
(b) 40
(c) 88
(d) 79

Q100. King Kharavela belonged to which of the following dynasties?

(a) Chedi dynasty
(b) Satavahana dynasty
(c) Kanva dynasty
(d) Shunga dynasty

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (c) They must renounce any other nationality.

The correct answer is They must renounce any other nationality.

Key Points

• Indian citizenship is governed by the Citizenship Act, 1955, which provides various ways to acquire citizenship, including by birth, descent, registration, and naturalization.

• For persons born outside India on or after December 3, 2004, the rules for citizenship by descent were made more stringent by the Citizenship (Amendment) Act, 2003.

• Under this amendment, a person born outside the country shall not be an Indian citizen unless their birth is registered at an Indian Consulate within one year of the date of birth.

• Furthermore, the parents of such a minor must provide a declaration that the child does not hold the passport of another country. This essentially means they must not hold (or must effectively renounce) any other nationality to claim Indian citizenship.

• The Central Government may, however, allow registration after the expiry of the one year period if the parents can show sufficient cause for the delay.

Additional Information

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• Constitutional Provisions: Articles 5 to 11 of Part II of the Constitution of India deal with citizenship. However, these articles only identified persons who became citizens at the commencement of the Constitution on January 26, 1950.

• Citizenship by Birth:

• A person born in India on or after January 26, 1950, but before July 1, 1987, is a citizen by birth regardless of the nationality of their parents.

• From July 1, 1987, to December 2, 2004, a person is a citizen only if at least one parent was an Indian citizen at the time of birth.

• After December 3, 2004, a person born in India is a citizen only if both parents are Indian citizens or one is a citizen and the other is not an illegal migrant.

• Citizenship by Registration: The Central Government may register any person (not being an illegal migrant) as a citizen if they belong to categories such as Persons of Indian Origin (PIO) who have been ordinarily resident in India for 7 years.

• Citizenship by Naturalization: A foreigner can acquire Indian citizenship by naturalization if they have resided in India for 12 years (specifically 11 years in the preceding 14 years plus the 12 months immediately preceding the application).

• Single Citizenship: Unlike federal systems like the USA, the Indian Constitution provides for single citizenship, meaning there is no separate state citizenship.

Important Points

• The Ministry of Home Affairs is the nodal organisation responsible for matters related to citizenship in India.

• The Parliament derives its power to legislate on citizenship from Article 11 of the Constitution.

• Loss of Citizenship: The Citizenship Act, 1955 also prescribes three ways of losing citizenship: Renunciation (voluntary), Termination (when another country's citizenship is acquired), and Deprivation (compulsory termination by the government based on fraud or disloyalty).

• The concept of Overseas Citizenship of India (OCI) was introduced to provide certain rights to the Indian diaspora, but it does not equate to dual citizenship as OCI holders do not have voting rights or the right to hold constitutional posts.

Q2. Answer: (b) 5

Given:

'MINT' is coded as '6134'

'TIME' is coded as '4365'

Now,

Code for E = 5

Hence, the correct answer is Option 2.

Q3. Answer: (d) 235.3 gm

Shortcut Trick

Assume CP of 1 kg = 100

60% loss => SP (claimed) = 40

70% gain => Actual SP = 170

=> Weight used = (40/170) kg = 0.235 kg

Therefore Answer = 235.3 gm

Alternate Method

Given:

Loss claimed = 60%

Actual gain = 70%

Formula:

SP = CP × (1 − loss%)

Actual gain => SP = CP × (1 + profit%)

Calculation:

=> Let CP of 1 kg = 100

=> Claimed SP = 40

=> Actual gain 70% => SP = 170

=> Weight used = Claimed SP ÷ Actual SP

=> = 40 ÷ 170 = 4/17 ≈ 0.235 kg

Therefore Answer = 235.3 gm

Additional Information

False Weight: Gain = selling less quantity

Key Idea: Compare claimed SP with actual SP
Ratio Trick: Weight = Claimed ÷ Actual
Tip: Assume CP = 100 for speed

Q4. Answer: (b) Two

Given: J, K, L, M, N and O live on six different floors of the same building.
The lowermost floor is numbered 1, the floor above it is numbered 2 and so on, till the topmost floor is numbered 6.
K lives on an odd-numbered floor but not on floor 3.
Only two people live between K and L.
J lives immediately below K.
M lives on an even-numbered floor.
O does not live on the bottommost floor.

Floor	Person
6	M
5	K
4	J
3	O
2	L
1	N

Now, people between N and J: 2 people
Hence, the correct answer is Option 2.

Q5. Answer: (c) 0

Shortcut Trick
Use identity: $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
=> $8x^3 - 27y^3 = (2x - 3y)(4x^2 + 6xy + 9y^2)$
=> A=2, B=−3, C=4, D=−9, E=6
=> Sum = 2 − 3 + 4 − 9 + 6 = 0
Therefore Answer = 0
Alternate Method
Given:
$8x^3 - 27y^3 = (Ax + By)(Cx^2 - Dy^2 + Exy)$
Formula:
$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
Calculation:
=> $8x^3 = (2x)^3$, $27y^3 = (3y)^3$
=> $8x^3 - 27y^3 = (2x - 3y)(4x^2 + 6xy + 9y^2)$
=> Compare with $(Ax + By)(Cx^2 - Dy^2 + Exy)$
=> A = 2, B = −3
=> C = 4, D = −9, E = 6
=> A + B + C + D + E = 2 − 3 + 4 − 9 + 6 = 0
Therefore Final Answer = 0
Additional Information
Identity: $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
Substitution: Replace a = 2x, b = 3y
Comparison: Match coefficients carefully
Tip: Always check signs in middle term

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Q6. Answer: (a) (10, 106, 7)

The logic followed here is:

Logic: second number = (first number × 24) + (third number − 1)

For, (24, 578, 3)

=> 24 × 24 = 576

=> 576 + (3 − 1) = 576 + 2 = 578

For, (23, 536, 8)

=> 23 × 23 = 529

=> 529 + (8 − 1) = 529 + 7 = 536

Now, checking the options using the same pattern:

Option 1) (10, 106, 7)

=> 10 × 10 = 100

=> 100 + (7 − 1) = 100 + 6 = 106

Option 2) (9, 109, 24)

=> 9 × 9 = 81

=> 81 + (24 − 1) = 81 + 23 = 104 ≠ 109

Option 3) (16, 285, 25)

=> 16 × 16 = 256

=> 256 + (25 − 1) = 256 + 24 = 280 ≠ 285

Option 4) (47, 2230, 17)

=> 47 × 47 = 2209

=> 2209 + (17 − 1) = 2209 + 16 = 2225 ≠ 2230

Hence, the correct answer is Option 1.

Q7. Answer: (c) Parliament itself

The correct answer is Parliament itself.

Key Points

• Article 105 of the Constitution of India specifically deals with the powers, privileges, and immunities of the Houses of Parliament and their members and committees.

• According to Article 105(3), the powers, privileges, and immunities of each House of Parliament, and of the members and the committees of each House, shall be such as may from time to time be defined by Parliament by law. Hence, the statement that Parliament itself is empowered is correct.

• Until so defined by law, these privileges were to be the same as those of the House of Commons of the Parliament of the United Kingdom as of January 26, 1950.

• The 44th Amendment Act of 1978 modified this provision to state that the privileges are those which the House, its members, and committees had at the time the amendment came into force, omitting the direct reference to the British House of Commons.

• While the Supreme Court (Option 1) has the power of judicial review to ensure privileges do not violate Fundamental Rights, it does not define the privileges themselves. Hence, statement 1 is incorrect.

• The Speaker of the Lok Sabha (Option 2) is the guardian of the privileges and decides on matters of breach of privilege within the House but does not have the constitutional authority to "define" them through legislation. Hence, statement 2 is incorrect.

• The President of India (Option 4) summons the sessions but does not define the legal scope of parliamentary immunities. Hence, statement 4 is incorrect.

Additional Information

• Individual Privileges:

• Freedom of Speech: Under Article 105(1), members have freedom of speech in Parliament. No member is liable to any proceedings in any court in respect of anything said or any vote given by him in Parliament or any committee thereof as per Article 105(2).

• Freedom from Arrest: Members cannot be arrested during the session of Parliament and 40 days before the beginning and 40 days after the end of a session. This privilege is limited to civil cases and does not extend to criminal cases or preventive detention.

• Exemption from Jury Service: Members can refuse to give evidence and appear as a witness in a case pending in a court when Parliament is in session.

• Collective Privileges:

• Right to Publish Proceedings: The House has the right to publish its reports, debates, and proceedings and can also prohibit

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others from publishing them.

• Exclusion of Strangers: Each House has the right to exclude strangers from its proceedings and hold secret sittings to discuss important matters.

• Right to Punish: Parliament has the power to punish members as well as outsiders for breach of privilege or contempt of the House through reprimand, admonition, or imprisonment.

• Inquiry into Proceedings: The courts are prohibited from inquiring into the proceedings of a House or its committees.

• State Legislatures:

• Similar to Article 105, Article 194 of the Constitution of India defines the powers, privileges, and immunities of the State Legislatures, their members, and committees.

Important Points

• Codification of Privileges: To date, Parliament has not enacted any comprehensive law to codify all its privileges. They remain based largely on British parliamentary conventions and precedents established over time.

• Privileges vs. Fundamental Rights: In the MSM Sharma case (1959), the Supreme Court held that parliamentary privileges are not subject to Article 19(1)(a) (freedom of speech). However, in the Keshav Singh case (1965), the court clarified that privileges are subject to Article 21 (Right to Life and Personal Liberty).

• Rule of Law: Despite having vast powers, the exercise of privileges must not be arbitrary and must align with the broader constitutional framework of India.

Q8. Answer: (c) 40.0

Shortcut Trick

Total = 100 => N/2 = 50

Cumulative freq: 5, 14, 28, 50, 80, 100

Median class = 30–40

l = 30, f = 22, cf = 28, h = 10

Median = 30 + [(50 − 28)/22] × 10 = 30 + 10 = 40

Therefore Answer = 40

Alternate Method

Given:

Total students = 100

N/2 = 50

Formula: Median = l + [(N/2 − cf)/f] × h

Calculation:

=> Cumulative frequency:

5, 14, 28, 50, 80, 100

=> Median class = 30–40

=> l = 30, f = 22, cf = 28, h = 10

=> Median = 30 + [(50 − 28)/22] × 10

=> = 30 + (22/22) × 10

=> = 30 + 10 = 40

Therefore Final Answer = 40

Additional Information

Median Class: Where cumulative freq ≥ N/2

Class Width (h): Upper − Lower limit

cf: Cumulative frequency before median class

Tip: Always compute cumulative frequency first

Q9. Answer: (a) 2

Shortcut Trick

Divisible by 6 => divisible by 2 and 3

Last digit = 8 => divisible by 2 Yes

Sum = 5+6+3+3+9+A+8 = 34 + A

For ÷3 => (34 + A) multiple of 3

=> 34 mod 3 = 1 => A mod 3 = 2

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Smallest A = 2

Therefore Answer = 2

Alternate Method

Given: Number = 56339A8

Formula:

Divisible by 6 => divisible by 2 and 3

Calculation:

=> Check divisibility by 2:

Last digit = 8 => divisible Yes

=> Check divisibility by 3:

Sum of digits = 5+6+3+3+9+A+8 = 34 + A

=> (34 + A) divisible by 3

=> 34 ÷ 3 gives remainder 1

=> So A must give remainder 2

=> Possible A = 2, 5, 8

=> Minimum A = 2

Therefore Final Answer = 2

Additional Information

Divisibility by 2: Last digit even

Divisibility by 3: Sum of digits multiple of 3

Divisibility by 6: Must satisfy both 2 and 3

Tip: Use remainder method for speed

Q10. Answer: (b) 2014

The correct answer is 2014.

Key Points

• The 'Make in India' initiative was officially launched by Prime Minister Narendra Modi on September 25, 2014.

• It was designed to facilitate investment, foster innovation, enhance skill development, protect intellectual property, and build best-in-class manufacturing infrastructure in India.

• The primary goal of the initiative is to transform India into a global design and manufacturing hub, increasing the manufacturing sector's contribution to the GDP to 25% by 2025.

• The logo of 'Make in India' is a Lion made of gear wheels, which represents manufacturing, strength, and national pride, reflecting the integral role of the industry in the nation's growth.

• Initially, the program targeted 25 economic sectors for job creation and skill enhancement, including automobiles, aviation, biotechnology, chemicals, defense manufacturing, electronic systems, and pharmaceuticals.

Additional Information

• Four Pillars of Make in India:

• New Processes: Focuses on 'Ease of Doing Business' by de-licensing and de-regulating the industry to reduce the complexity of government processes.

• New Infrastructure: Aims to develop industrial corridors, smart cities, and state-of-the-art technology to provide modern logistical support.

• New Sectors: Identification of 25 sectors in manufacturing, infrastructure, and service activities to provide detailed information and hand-holding for investors.

• New Mindset: A shift in the government’s role from being a regulator to a facilitator, partnering with industry to achieve economic growth.

• Foreign Direct Investment (FDI): Since the launch in 2014, the government has liberalized FDI norms in several sectors such as Defense, Railways, Space, and Single Brand Retail Trading to attract global capital.

• World Bank Rankings: Due to various reforms under this initiative, India’s rank in the World Bank’s Ease of Doing Business report improved significantly from 142nd in 2014 to 63rd in 2019.

• National Single Window System (NSWS): Launched to provide a digital platform to investors for identifying and applying for approvals according to their business requirements, further supporting the Make in India vision.

Important Points

• DPIIT: The initiative is spearheaded by the Department for Promotion of Industry and Internal Trade (DPIIT), which falls under the Ministry of Commerce and Industry of the Government of India.

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• Production Linked Incentive (PLI) Scheme: To bolster the Make in India initiative, the government introduced the PLI scheme in 2020 across 14 key sectors to encourage domestic manufacturing and exports.

• Zero Defect Zero Effect: A key slogan under the initiative which implies that manufactured goods should have zero defects (high quality) and zero effect on the environment (sustainability).

• Atmanirbhar Bharat: Launched in May 2020, the Self-Reliant India campaign works in tandem with Make in India to reduce import dependence and promote vocal for local.

Q11. Answer: (d) Rs. 8280

Shortcut Trick

Use full ratio (X:Y:Z):

=> X effective = 9, Y = 6, Z = 10

Total ratio = 25

=> Difference (X−Y) = (9−6)/25 × 69000

=> = (3/25) × 69000 = 8280

Therefore Answer = 8280

Alternate Method

Given:

X : Y : Z = 6 : 3 : 5

Z = 12000

X withdraws half after 6 months

Total profit = 69000

Formula Used:

Profit prop. to Capital × Time

Calculation:

=> 5 parts = 12000

=> 1 part = 2400

=> X = 6 × 2400 = 14400

=> Y = 3 × 2400 = 7200

=> X for 6 months = 14400 × 6 = 86400

=> Remaining X = 7200

=> Next 6 months = 7200 × 6 = 43200

=> Total X = 129600

=> Y for 12 months = 7200 × 12 = 86400

=> Z for 12 months = 12000 × 12 = 144000

=> Ratio = 129600 : 86400 : 144000

=> Divide by 14400 => 9 : 6 : 10

=> Total ratio = 25

=> X profit = (9/25) × 69000 = 24840

=> Y profit = (6/25) × 69000 = 16560

=> Difference = 24840 − 16560 = 8280

Therefore Final Answer = 8280

Additional Information

Profit Sharing: prop. to Capital × Time

Withdrawal: Break into time segments

Ratio Method: Convert to simplest ratio

Tip: Always include all partners in ratio

Q12. Answer: (d) Goa

The correct answer is Goa.

Key Points

• The Portuguese governor Afonso de Albuquerque captured the port of Goa in 1510. He led a successful expedition against the Sultan of Bijapur, Ismail Adil Shah, to secure a strategic naval base on the western coast of India.

• Upon its capture, Goa became the first Indian territory to be under European subordination since the time of Alexander the

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Great. This established Goa as a permanent Portuguese settlement.

• Initially, the Portuguese headquarters were located in Cochin (Kochi). However, after the capture and consolidation of power, the capital of the Portuguese State of India (Estado da Índia) was officially shifted to Goa in 1530 by Nino da Cunha.

• The port of Goa was strategically vital for controlling the trade of Arabian horses and the export of spices, specifically pepper and cinnamon, to Europe.

• The Portuguese rule in Goa lasted for about 450 years, making it one of the longest colonial possessions in the world. Hence, Goa is the correct answer.

Additional Information

• Vasco da Gama and Calicut:

• The Portuguese first arrived in India when Vasco da Gama reached Calicut (Kozhikode) on May 20, 1498. He was received by the local ruler known as the Zamorin.

• While Calicut was the entry point, the Portuguese faced stiff resistance from Arab traders there, which eventually led them to seek other bases like Goa and Cochin.

• Francisco de Almeida:

• He was appointed as the first Governor of the Portuguese in India in 1505.

• He is famous for the Blue Water Policy (Cartaz System), which aimed at making the Portuguese the masters of the Indian Ocean through naval supremacy rather than land-based forts.

• Afonso de Albuquerque:

• Known as the Real Founder of Portuguese power in India, he succeeded Almeida as Governor in 1509.

• He abolished the practice of Sati in Goa and encouraged Portuguese men to marry Indian women to create a loyal local population.

• Other Portuguese Settlements:

• Apart from Goa, they established colonies in Daman, Diu, Salsette, Bassein, and Chaul.

• The island of Bombay (Mumbai) was also under Portuguese control until 1661, when it was given to King Charles II of England as part of the dowry for Catherine of Braganza.

Important Points

• End of Portuguese Rule:

• Goa remained a Portuguese colony even after India gained independence from the British in 1947.

• The Government of India launched Operation Vijay on December 18, 1961, to liberate Goa, Daman, and Diu.

• Goa was officially integrated into the Indian Union on December 19, 1961, as a Union Territory and later became a full-fledged State on May 30, 1987.

• Cultural Impact:

• The Portuguese introduced the Printing Press in India at Goa in 1556.

• They also introduced new crops to India, including tobacco, pineapple, cashew, and chilli.

Q13. Answer: (a) Microprocessor Chip

The correct answer is Microprocessor Chip.

Key Points

• The fourth generation of computers (roughly 1971 to 1980) is defined by the development and implementation of the Microprocessor Chip. This technology allowed thousands of integrated circuits to be built onto a single silicon chip. Hence, the statement regarding the Microprocessor Chip is correct.

• In 1971, the Intel 4004 chip, developed by Ted Hoff and his team, located all the components of the computer—from the central processing unit (CPU) and memory to input/output controls—on a single chip.

• This era saw the transition from Large Scale Integration (LSI) to Very Large Scale Integration (VLSI) technology. VLSI enabled the placement of hundreds of thousands of transistors on a single microchip, drastically reducing the size and cost of computers.

• The microprocessor moved computers out of the realm of government and large corporations and into the consumer market, leading to the birth of the Personal Computer (PC) and handheld devices.

• Fourth-generation computers also marked the beginning of networking, leading to the eventual development of the Internet and distributed operating systems.

Additional Information

• Transistor Device Unit: This component was the hallmark of the second generation of computers (1956–1963). Transistors replaced vacuum tubes, making computers smaller, faster, and cheaper to produce. However, they were still limited compared to later integrated circuits. Hence, this option is incorrect for the fourth generation.

• ENIAC Computer System: The Electronic Numerical Integrator and Computer (ENIAC) was the first programmable, electronic, general-purpose digital computer, completed in 1945. It belonged to the first generation and used over 18,000 vacuum tubes,

occupying roughly 1,800 square feet. Hence, this option is incorrect.

• Tabulating Machine Device: Invented by Herman Hollerith in the late 1880s, this was an electromechanical machine designed to assist in summarizing information stored on punched cards for the 1890 U.S. Census. It is a precursor to modern computing but does not belong to the electronic four-generation hierarchy. Hence, this option is incorrect.

• GUI and Software: The fourth generation also saw the rise of Graphical User Interfaces (GUI), the mouse, and advanced operating systems like MS-DOS and Apple Macintosh, which made computing user-friendly for non-specialists.

Important Points

• Generational Evolution:

• First Generation (1940-1956): Used Vacuum Tubes.

• Second Generation (1956-1963): Used Transistors.

• Third Generation (1964-1971): Used Integrated Circuits (ICs).

• Fourth Generation (1971-Present/1980): Uses Microprocessors (VLSI).

• Fifth Generation (Present and Beyond): Uses Artificial Intelligence (AI) and Ultra Large Scale Integration (ULSI).

• Memory and Storage: Fourth-generation computers utilized semiconductor memory like RAM (Random Access Memory) and ROM (Read-Only Memory), replacing the magnetic core memory used in previous versions. This era also introduced magnetic disks and optical disks for high-capacity storage.

• Programming Languages: High-level programming languages such as C, C++, and Java were developed or became widely popular during this generation, allowing for more complex and portable software applications across different hardware platforms.

Q14. Answer: (a) Penguin Random House India

The correct answer is Penguin Random House India.

Key Points

• The highly anticipated memoir titled 'Mother Mary Comes to Me' by the internationally acclaimed author Arundhati Roy is scheduled to be published in September 2025.

• In India, the rights for this memoir have been acquired by Penguin Random House India, which will publish the book under its prestigious Hamish Hamilton imprint.

• The book is described as a "memoir of a mother and a daughter" and explores Arundhati Roy's complex relationship with her mother, Mary Roy, who was a famous educator and women's rights activist.

• The memoir will be released simultaneously across the globe, with Hamish Hamilton publishing it in the United Kingdom and Scribner handling the publication in the United States and Canada.

• This work marks a significant milestone in Roy's literary career, as it is her first full-length personal memoir, moving from her established legacy in fiction and political essays.

Additional Information

• Arundhati Roy: She is a world-renowned Indian author who rose to global fame after winning the Man Booker Prize for Fiction in 1997 for her debut novel, 'The God of Small Things'.

• Mary Roy: The memoir is deeply rooted in the life of Arundhati's mother, Mary Roy, who passed away in September 2022. She was best known for winning a landmark Supreme Court case in 1986 that ensured equal inheritance rights for Syrian Christian women in Kerala.

• Literary Works: Apart from her debut novel, Roy published her second novel, 'The Ministry of Utmost Happiness', in 2017, which was longlisted for the Man Booker Prize.

• Political Activism: Over the years, Roy has been an influential political activist, focusing on issues such as environmental protection, human rights, and globalization. Her non-fiction works include 'The Algebra of Infinite Justice' and 'Azadi: Freedom. Fascism. Fiction.'

• Penguin Random House India: One of the largest English-language trade publishers in the Indian subcontinent, it publishes a wide range of genres and hosts many award-winning authors under various imprints.

Important Points

• Global Release: The publication of 'Mother Mary Comes to Me' is considered one of the most significant literary events of 2025. It will be published in seven languages worldwide upon its debut.

• Themes: The memoir is expected to delve into themes of family, identity, social change, and the political landscape of India, seen through the lens of her personal upbringing in Kerala.

• Awards: In 2024, Arundhati Roy was honored with the PEN Pinter Prize, further cementing her status as a writer of outstanding literary merit who takes a "unflinching, unswerving" gaze upon the world.

• Significance: The book provides a bridge between her fictional world, which often drew inspiration from her life, and the actual biographical facts of her childhood and her mother's legacy.

Q15. Answer: (d) Four

Given: M, N, O, P, Q, R and S are sitting around a circular table facing the centre.

M sits fourth to the right of S.

Only two people sit between P and Q when counted from the left of P.

R sits third to the left of O.

N is an immediate neighbour of O and Q.

Between N and M, the people are: O, S, P, R => 4 people

Hence, the correct answer is Option 4.

Q16. Answer: (a) 10

The logic followed here is:

Given number: 8371456

Logic:

Add 1 to each odd digit

Subtract 2 from each even digit

Original number:

8 3 7 1 4 5 6

Digit	Type	Operation	New Digit
8	Even	8 − 2	6
3	Odd	3 + 1	4
7	Odd	7 + 1	8
1	Odd	1 + 1	2
4	Even	4 − 2	2
5	Odd	5 + 1	6
6	Even	6 − 2	4

New number: 6 4 8 2 2 6 4

Now, Second digit from left = 4

Second digit from right = 6

Sum = 4 + 6 = 10

Hence, the correct answer is Option 1.

Q17. Answer: (d) Economic and social justice

The correct answer is Economic and social justice.

Key Points

• The Directive Principles of State Policy (DPSP) are enumerated in Part IV of the Constitution of India under Articles 36 to 51.

• The main objective of these principles is to establish a Welfare State by ensuring economic and social justice for all citizens. They serve as guidelines for the Central and State governments to keep in mind while framing laws and policies. Hence, option 4 is correct.

• While the Preamble mentions justice—social, economic, and political, the DPSP specifically focuses on providing the socio-economic foundation of a democracy. Political justice is primarily secured through Fundamental Rights, such as the right to vote and equality before the law. Hence, statement 3 is not the main aim of DPSP alone.

• Article 37 of the Constitution clarifies that these principles are non-justiciable, meaning they are not enforceable by any court. However, they are fundamental in the governance of the country, and it shall be the duty of the State to apply these principles in making laws.

• The DPSP aims to minimize inequalities in income, status, facilities, and opportunities as per Article 38. It seeks to promote the welfare of the people by securing a social order permeated by social and economic justice.

Additional Information

• Source and Background: The concept of Directive Principles of State Policy was borrowed from the Irish Constitution of 1937, which had itself borrowed it from the Spanish Constitution. Dr. B.R. Ambedkar described these principles as "Novel Features" of the Indian Constitution.

• Classification of DPSP: Though the Constitution does not formally classify them, they are generally grouped into three categories

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based on their content:

• Socialistic Principles: These aim at providing social and economic justice. They direct the state to secure a social order for the welfare of the people (Article 38), equal pay for equal work (Article 39), and the right to work and education (Article 41).

• Gandhian Principles: These are based on the ideology of Mahatma Gandhi. Examples include the organization of Village Panchayats (Article 40), promotion of cottage industries (Article 43), and the prohibition of intoxicating drinks and drugs (Article 47).

• Liberal-Intellectual Principles: These reflect the ideology of liberalism. Examples include a Uniform Civil Code for the citizens (Article 44), providing early childhood care and education (Article 45), and separation of the Judiciary from the Executive (Article 50).

• Important Amendments:

• The 42nd Amendment Act of 1976 added four new 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).

• The 86th Amendment Act of 2002 changed the subject of Article 45 and made elementary education a Fundamental Right under Article 21A.

Important Points

• Fundamental Rights vs. DPSP: While Fundamental Rights (Part III) protect individual liberties and provide political justice, the DPSP (Part IV) promote the collective well-being and provide economic and social justice. In the Minerva Mills Case (1980), the Supreme Court held that the Indian Constitution is founded on the bedrock of the balance between Part III and Part IV.

• Implementation: Several laws have been enacted to implement DPSP, such as the Minimum Wages Act (1948), the Maternity Benefit Act (1961), and the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) of 2005.

• International Peace: Article 51 specifically directs the State to promote international peace and security and maintain just and honorable relations between nations.

Q18. Answer: (c) 42

Shortcut Trick

Inverse => x × y = constant

=> 28 × 30 = x × 20

=> x = (28 × 30) ÷ 20 = 42

Therefore Answer = 42

Alternate Method

Given:

x prop. to 1/y

x = 28 when y = 30

Find x when y = 20

Formula:

x × y = constant

Calculation:

=> Constant = 28 × 30 = 840

=> x × 20 = 840

=> x = 840 ÷ 20 = 42

Therefore Final Answer = 42

Additional Information

Inverse Proportion: x prop. to 1/y

Relation: x × y = constant

Key Idea: Product remains fixed

Tip: Use cross multiplication quickly

Q19. Answer: (d) Curvilinear shikhara tower

The correct answer is Curvilinear shikhara tower.

Key Points

• The Lingaraja Temple, located in Bhubaneswar, Odisha, is one of the most prominent examples of the Kalinga style of architecture, which is a sub-type of the broader Nagara architectural style.

• Built primarily in the 11th Century CE, the temple is dedicated to Lord Shiva (worshipped as Harihara) and was largely constructed by the Somavamsi dynasty, with later additions by the Ganga rulers.

• A defining feature of the Nagara style is the Shikhara (mountain peak), and in the case of the Lingaraja Temple, it features a massive Curvilinear shikhara tower. This tower, known as Rekha Deula, rises to a height of about 55 meters (180 feet).

• The temple complex is structured into four distinct components: the Garbhagriha (sanctum sanctorum), the Jagamohana (assembly hall), the Natamandira (festival/dance hall), and the Bhoga-mandapa (hall of offerings).

• The Curvilinear shikhara is topped with an Amalaka (a ribbed stone disk) and a Kalasha (finial), which are quintessential elements of the Nagara tradition in North India.

Additional Information

• Nagara Architectural Style:

• Originating in North India, this style is characterized by a cruciform plan and a curvilinear tower.

• Unlike South Indian temples, Nagara temples typically do not have elaborate boundary walls or massive gateways (Gopurams).

• Stepped pyramid vimana:

• This feature is characteristic of the Dravidian style of architecture found in South India, where the tower (Vimana) rises in a series of diminishing tiers. While Kalinga architecture uses "Pidha Deula" (stepped roofs) for assembly halls, the main sanctum's tower in Nagara style is curvilinear. Hence, this statement is incorrect regarding the primary Nagara reflective feature.

• Circular stupa dome:

• The Stupa is a core element of Buddhist architecture, such as the Great Stupa at Sanchi. It is a hemispherical mound used to house relics and is not a feature of Hindu Nagara temple towers. Hence, this statement is incorrect.

• Ornate gopuram entrance:

• Gopurams are the monumental, highly decorated entrance towers typical of Dravidian architecture (e.g., Meenakshi Temple in Madurai). In Nagara style, the entrance is usually less emphasized than the main Shikhara. Hence, this statement is incorrect.

Important Points

• Historical Context: The construction is often attributed to King Jajati Keshari of the Soma Dynasty and was completed by his son Lalatendu Keshari.

• Materials: The temple is built using dark red sandstone and laterite, which were locally available in Odisha.

• Significance: Bhubaneswar is often referred to as the "Ekambra Kshetra" or the "Temple City of India" due to the density of these medieval structures.

• Cultural Impact: The Lingaraja Temple set the benchmark for subsequent Odishan temples, including the world-famous Jagannath Temple in Puri and the Sun Temple at Konark (built in the 13th Century CE).

• Iconography: The exterior walls are decorated with intricate sculptures of Gods, Goddesses, musical instruments, and secular scenes, representing the peak of Odishan artistic excellence.

Q20. Answer: (b) FJN

The logic followed here is based on the alphabetical position difference between consecutive letters in each cluster:

Option 1: TXC

Option 2: FJN

Option 3: XBG

Option 4: QUZ

Thus, FJN follows a different pattern.

Hence, the odd one out is Option 2.

Q21. Answer: (a) 132

The logic followed here is:

thus, "132" will replace the question mark in the given series.

Hence, the correct option is "Option 1".

Q22. Answer: (b) It is implemented through Industrial Training Institutes (ITIs)

The correct answer is It is implemented through Industrial Training Institutes (ITIs).

Key Points

• Statement 1: The Jan Shikshan Sansthan (JSS) scheme emphasizes the creation of a pool of master trainers and resource persons who are skilled in specific vocations to provide training at the grassroots level. Hence, statement 1 is correct.

• Statement 2: The JSS scheme is not implemented through Industrial Training Institutes (ITIs); instead, it is implemented through Non-Governmental Organizations (NGOs) and voluntary agencies registered under the Societies Registration Act, 1860. Hence, statement 2 is incorrect.

• Statement 3: The primary objective of the scheme is to improve the occupational skills and technical knowledge of non-literates, neo-literates, and persons with a rudimentary level of education (up to 8th standard) and school dropouts (up to 12th standard). Hence, statement 3 is correct.

• Statement 4: The scheme focuses on identifying and promoting traditional skills in the districts through skilling and upskilling, ensuring that local heritage and indigenous crafts provide livelihood opportunities. Hence, statement 4 is correct.

• The Jan Shikshan Sansthan scheme is a unique initiative that aims to provide vocational training in a non-formal mode to the marginalized sections of society.

Additional Information

• Historical Background: The scheme was initially launched as Shramik Vidyapeeth in the year 1967 in Mumbai. It was later renamed Jan Shikshan Sansthan in the year 2000.

• Institutional Transfer: The scheme was previously under the Ministry of Human Resource Development (MHRD), but it was transferred to the Ministry of Skill Development and Entrepreneurship (MSDE) in July 2018 to better align vocational training with market demands.

• Target Demographics: The priority group for JSS includes women, Scheduled Castes (SC), Scheduled Tribes (ST), minorities, and other economically weaker sections. The age group of the target beneficiaries is usually 15 to 45 years.

• Geographical Reach: There are approximately 301 functional Jan Shikshan Sansthans spread across various districts in India, serving both rural and urban slum areas.

• Course Varieties: The training includes a wide range of trades such as cutting and tailoring, beauty culture and health care, electrical technician, soft toys making, and handicrafts.

Important Points

• Funding Structure: JSS is a 100% Central Sector Scheme. The Government of India provides an annual recurring grant to the NGOs for infrastructure, staff salaries, and training expenses.

• Certification: Trainees receive a certificate upon successful completion of the course, which is often validated by the National Council for Vocational Education and Training (NCVET), improving their chances for self-employment or wage employment.

• Digital Literacy: In recent years, the MSDE has integrated digital literacy and life skills into the JSS curriculum to ensure that beneficiaries can navigate the modern digital economy and access government schemes.

• Impact and Monitoring: The performance of each Sansthan is monitored through a dedicated JSS Portal, which tracks enrollment, training progress, and placement data of the candidates.

Q23. Answer: (b) 8

Given:

'WINS' is coded as '8246'

'NORM' is coded as '3851'

So, N = 8

Hence, the correct answer is Option 2.

Q24. Answer: (d) J.J. Thomson

The correct answer is J.J. Thomson.

Key Points

• The e/m ratio, which represents the charge-to-mass ratio of an electron, was first determined by the British physicist J.J. Thomson in the year 1897.

• Thomson utilized a Cathode Ray Tube (CRT) experiment to measure the deflection of cathode rays under the simultaneous application of electric and magnetic fields.

• He observed that the amount of deviation of the particles from their path in the presence of an electrical or magnetic field depends upon the magnitude of the negative charge on the particle, the mass of the particle, and the strength of the magnetic or electric field.

• By balancing the transverse electric and magnetic fields, he was able to calculate the velocity of the particles and subsequently determine the specific charge (e/m) of the electron.

• The value determined for the e/m ratio of an electron is approximately 1.758820×10^{11} C/kg (Coulombs per kilogram).

Additional Information

• Albert Einstein: He is renowned for his theory of relativity and the mass-energy equivalence formula ($E=mc^2$). In 1905, he explained the Photoelectric Effect, which provided crucial evidence for the quantization of light (photons), for which he received the Nobel Prize in Physics in 1921.

• Niels Bohr: A Danish physicist who proposed the Bohr Model of the atom in 1913. He introduced the idea that electrons move in fixed orbits (energy levels) around the nucleus and that angular momentum is quantized. His work was fundamental to quantum mechanics.

• Issac Newton: An English mathematician and physicist who formulated the Laws of Motion and the Universal Law of Gravitation. His work, Philosophiæ Naturalis Principia Mathematica, published in 1687, laid the foundation for classical mechanics.

• J.J. Thomson's Plum Pudding Model: Following his discovery of the electron, Thomson proposed that an atom is a sphere of

positive electrification in which negatively charged electrons are embedded like seeds in a watermelon or raisins in a pudding.

Important Points

• Millikan's Oil Drop Experiment: While Thomson found the ratio, the actual charge (e) of an electron was determined by R.A. Millikan in 1909. He found the charge to be -1.6022 × 10^(-19) Coulombs.

• Mass of Electron: By combining Thomson's e/m ratio and Millikan's charge (e), the mass (m) of the electron was calculated to be 9.1094 × 10^(-31) kg.

• Nature of Cathode Rays: Thomson concluded that cathode rays consist of negatively charged particles, which he called "corpuscles," later named electrons. He also found that the e/m ratio was independent of the nature of the gas or the material of the electrodes used in the discharge tube, proving that electrons are basic constituents of all atoms.

Q25. Answer: (c) = MIO, % = OKQ

The logic followed here is based on a uniform alphabetical shift between corresponding letters in each cluster:

PLR → %

Let's first observe the pattern in PLR:

P → O (−1)

L → K (−1)

R → Q (−1)

So, PLR → OKQ (uniform shift of −1)

Now applying the same logic to find # from LHN:

LHN → #

L → M (+1)

H → I (+1)

N → O (+1)

So, LHN → MIO (uniform shift of +1)

Thus, the correct pair is:# = MIO, % = OKQ

Hence, the correct answer is Option 3.

Q26. Answer: (d) 40

Shortcut Trick

Total distance = 20×90 + 70×60

=> = 1800 + 4200 = 6000 m

Total time = 90 + 60 = 150 min

Average speed = 6000 ÷ 150 = 40

Therefore Answer = 40 m/min

Alternate Method

Given:

Speed1 = 20 m/min, Time1 = 90 min

Speed2 = 70 m/min, Time2 = 60 min

Formula:

Average speed = Total distance ÷ Total time

Calculation:

=> Distance1 = 20 × 90 = 1800 m

=> Distance2 = 70 × 60 = 4200 m

=> Total distance = 1800 + 4200 = 6000 m

=> Total time = 90 + 60 = 150 min

=> Average speed = 6000 ÷ 150 = 40 m/min

Therefore Final Answer = 40 m/min

Additional Information

Average Speed: Total distance ÷ Total time

Key Idea: Always calculate distance first

Common Mistake: Do not average speeds directly

Tip: Use d = s × t quickly

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Q27. Answer: (a) 112 km/h

Shortcut Trick

Use: Average speed (equal distance) = (2xy)/(x+y)

=> 126 = (2 × 144 × v)/(144 + v)

=> 126(144 + v) = 288v

=> 18144 + 126v = 288v

=> 18144 = 162v => v = 112

Therefore Answer = 112 km/h

Alternate Method

Given:

Speed1 = 144 km/h

Speed2 = v km/h

Average speed = 126 km/h

Formula: Average speed (equal distance) = (2xy)/(x + y)

Calculation:

=> 126 = (2 × 144 × v)/(144 + v)

=> 126(144 + v) = 288v

=> 18144 + 126v = 288v

=> 18144 = 162v

=> v = 18144 ÷ 162 = 112

Therefore Final Answer = 112 km/h

Additional Information

Equal Distance Avg: 2xy/(x+y)

Harmonic Mean: Used in such problems

Tip: Use formula directly to save time

Common Mistake: Do not use simple average

Q28. Answer: (c) 22.22

Shortcut Trick

5 times => Interest = 4P

=> Rate = (400 ÷ 18)

=> = 22.22%

Therefore Answer = 22.22%

Alternate Method

Given:

Time = 18 years

Amount = 5P

Formula: SI = (P × R × T) ÷ 100

Calculation:

=> SI = Amount − Principal = 5P − P = 4P

=> 4P = (P × R × 18) ÷ 100

=> 4 = (R × 18) ÷ 100

=> R = (400 ÷ 18) = 22.22%

Therefore Final Answer = 22.22%

Additional Information

Simple Interest: SI = (P × R × T) ÷ 100

Multiplication Rule: n times => SI = (n−1)P

Shortcut: Rate = [(n−1)×100] ÷ Time

Tip: Cancel P early

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Q29. Answer: (a) It marked Morocco's first-ever U-20 World Cup title.

The correct answer is It marked Morocco's first-ever U-20 World Cup title.

Key Points

• The victory in October 2025 is a landmark event because it signifies Morocco securing its first-ever FIFA U-20 World Cup title. This win makes them one of the very few African nations to ever lift this prestigious trophy, following the footsteps of Ghana who won it in 2009. Hence, statement 1 is correct.

• While Morocco has emerged as a major footballing hub, the 2025 FIFA U-20 World Cup was hosted by Chile, not Morocco. Morocco is, however, preparing to co-host the 2030 FIFA World Cup alongside Spain and Portugal. Hence, statement 2 is incorrect.

• While many tournament finals are decided by intense play, the historical "significance" mentioned in the context of a first-time victory over a powerhouse like Argentina primarily refers to the achievement of the title itself rather than the specific method of winning, such as a penalty shootout. Hence, statement 3 is less significant than the title milestone.

• Argentina is the most successful nation in the history of the U-20 World Cup with 6 titles (1979, 1995, 1997, 2001, 2005, 2007). However, they have faced numerous defeats in various editions of the tournament since its inception in 1977, making the claim of a "first defeat" factually inaccurate. Hence, statement 4 is incorrect.

• This achievement is a result of the Royal Moroccan Football Federation's (FRMF) long-term investment in youth development and infrastructure, such as the Mohammed VI Football Academy, which has consistently produced world-class talent.

Additional Information

• FIFA U-20 World Cup History:

• The tournament was founded in 1977 and is held every 2 years. It serves as a global stage for players under the age of 20 to showcase their talent.

• Famous players who rose to prominence through this tournament include Diego Maradona, Lionel Messi, and Erling Haaland.

• The 2025 edition held in Chile saw a shift in global dominance as African and Asian teams showed significant tactical improvements against traditional South American and European giants.

• Morocco's Football Rise:

• Morocco became the first African and Arab nation to reach a FIFA World Cup semi-final during the 2022 edition in Qatar.

• The nation also secured a Bronze Medal at the 2024 Paris Olympics, further cementing its status as a powerhouse in International Football.

• The FRMF, led by Fouzi Lekjaa, has been instrumental in upgrading stadiums and training facilities across the country.

• Argentina's Pedigree:

• Argentina remains a dominant force in youth football, having produced some of the greatest players in the world. Their 6 titles are a record in this specific FIFA category.

• The 2025 final loss represents a rare instance where their clinical tournament record was challenged by a rapidly developing Moroccan side.

Important Points

• Geopolitical Impact: Success in FIFA tournaments often leads to increased sports tourism and prestige for the country, assisting Morocco in its bid for other international sporting events.

• Continental Significance: A win for Morocco boosts the CAF (Confederation of African Football) coefficient and encourages greater investment in youth academies across the African continent.

• Tournament Format: The U-20 World Cup involves 24 teams competing in a group stage followed by a knockout phase, testing the depth and endurance of young squads over a period of roughly three weeks.

Q30. Answer: (d) Assamese

The correct answer is Assamese.

Key Points

• Assamese is an Indo-Aryan language spoken primarily in the state of Assam. It serves as the lingua franca of the region and is the easternmost Indo-Aryan language, having developed from Magadhi Prakrit. Since it belongs to the Indo-European family rather than the Sino-Tibetan family, it does not belong to the Tibeto-Burman group. Hence, the statement regarding Assamese is correct.

• Lepcha is a language spoken by the Lepcha people in Sikkim and the Darjeeling district of West Bengal. It is a member of the Tibeto-Burman language family, which is a subgroup of the larger Sino-Tibetan family. Hence, the statement regarding Lepcha is incorrect.

• Bodo (also known as Boro) is an official language of the state of Assam and is part of the Bodo-Koch group of the Tibeto-Burman language family. It is predominantly spoken by the Bodo community in Northeast India. Hence, the statement regarding Bodo is incorrect.

• Garo is a language spoken by the Garo people, mainly in the Garo Hills of Meghalaya, as well as in parts of Assam and

Bangladesh. It is closely related to the Bodo language and falls under the Bodo-Garo subfamily of the Tibeto-Burman languages. Hence, the statement regarding Garo is incorrect.

Additional Information

• Indo-Aryan Language Family: This family includes major languages of Northern and Central India such as Hindi, Bengali, Punjabi, Marathi, Gujarati, and Assamese. These languages are descendants of Old Indo-Aryan (Sanskrit). Assamese specifically uses a script that is almost identical to the Bengali script, with a few minor variations.

• Tibeto-Burman Language Family: This is a massive group of languages spoken across Southeast Asia, China, and the Himalayan regions. In India, these languages are prevalent in the Seven Sister States (Northeast) and Ladakh. Examples include Manipuri (Meitei), Mizo, Angami, and Adi.

• Linguistic Diversity of Northeast India: The region is a "linguistic mosaic" where three major language families meet: Indo-Aryan (Assamese, Sylheti), Sino-Tibetan/Tibeto-Burman (Bodo, Garo, Naga languages), and Austroasiatic (Khasi, Jaintia).

• Geographical Distribution: While Assamese is concentrated in the Brahmaputra Valley, Tibeto-Burman languages are typically found in the surrounding hilly terrains. For instance, Garo is prominent in the western part of Meghalaya, and Lepcha is found in the high-altitude regions of the Eastern Himalayas.

Important Points

• Constitutional Status: Both Assamese and Bodo are recognized in the Eighth Schedule of the Constitution of India. Assamese was included in the original list in 1950, whereas Bodo was added through the 92nd Amendment Act in 2003.

• Classical Language Status: In October 2024, the Union Cabinet of India approved the conferment of Classical Language status to Assamese, along with Marathi, Pali, Prakrit, and Bengali, recognizing its ancient literary heritage.

• Language Characteristics: Tibeto-Burman languages are often tonal (like Bodo) or have complex agglutinative structures. In contrast, Assamese is an inflected language, similar to other Indo-European languages, though it has been significantly influenced by the surrounding Sino-Tibetan phonology and vocabulary over centuries.

• Demographics: According to the 2011 Census, Assamese is spoken by over 15 million people, making it the most widely spoken language in Northeast India. Bodo has approximately 1.4 million speakers, and Garo has about 1.1 million speakers in India.

Q31. Answer: (d) 524%

Shortcut Trick

CP per article = 150 ÷ 12 = 12.5

SP per article = 78

Profit per article = 78 − 12.5 = 65.5

Profit% = (65.5 ÷ 12.5) × 100 = 524%

Therefore Answer = 524%

Alternate Method

Given:

21 dozens = 21 × 12 = 252 articles

CP per dozen = 150

SP per article = 78

Formula: Profit% = (Profit ÷ CP) × 100

Calculation:

=> Total CP = 21 × 150 = 3150

=> Total SP = 252 × 78 = 19656

=> Profit = 19656 − 3150 = 16506

=> Profit% = (16506 ÷ 3150) × 100 = 524%

Therefore Final Answer = 524%

Additional Information

Dozen: 12 items

Unit Method: Convert to per item

Profit%: (Profit ÷ CP) × 100

Tip: Use per unit for quick calculation

Q32. Answer: (b) It manages and coordinates the flow of instructions and data throughout the computer system.

The correct answer is It manages and coordinates the flow of instructions and data throughout the computer system..

Key Points

• The Control Unit (CU) is a core component of the Central Processing Unit (CPU) that directs the operation of the processor. It essentially acts as the "manager" or "brain" of the CPU, ensuring all components work in harmony.

• Its primary function is to manage and coordinate the movement of data and instructions between the CPU, Main Memory, and various Input/Output (I/O) devices.

• The Control Unit does not execute the data processing itself; instead, it issues timing and control signals to other units, such as the Arithmetic Logic Unit (ALU) and Registers, telling them what to do.

• It is responsible for the Instruction Cycle, which includes fetching an instruction from memory, decoding it to understand the required operation, and executing it by routing signals to the appropriate hardware components.

• By interpreting the machine code or assembly language instructions, the CU ensures that the hardware performs the correct sequence of steps for any given software program.

Additional Information

• Arithmetic Logic Unit (ALU):

• This component performs all arithmetic calculations (like addition, subtraction, multiplication, and division) and logical comparisons (such as AND, OR, NOT, and equal to).

• While the Control Unit directs the flow, the ALU is the part of the CPU where the actual mathematical "work" is completed. Hence, option 1 describes the ALU and is incorrect.

• Random Access Memory (RAM):

• RAM serves as the system's primary volatile storage. It holds the data and active programs currently in use by the CPU.

• It is called volatile because all stored information is lost when the power is turned off. Hence, option 3 describes RAM and is incorrect.

• Read-Only Memory (ROM) and Hard Drives:

• ROM stores permanent instructions such as the BIOS (Basic Input/Output System), which are necessary to boot the computer.

• Hard Disk Drives (HDD) or Solid State Drives (SSD) provide non-volatile storage for the Operating System and user files. Hence, option 4 describes permanent storage devices and is incorrect.

• Registers:

• These are small, high-speed storage locations inside the CPU. They hold immediate data, addresses, and instructions that are being processed at that very microsecond.

Important Points

• Types of Control Units: There are generally two types of Control Units. The Hardwired CU uses fixed logic circuits (like gates and flip-flops) and is extremely fast. The Microprogrammed CU uses a control store to hold micro-instructions, making it more flexible and easier to design but slightly slower.

• Program Counter (PC): This is a special register used by the Control Unit to keep track of the memory address of the next instruction to be processed.

• System Clock: The Control Unit relies on the System Clock to synchronize all internal operations. The speed at which the CU can process instructions is often measured in Gigahertz (GHz).

• Control Bus: The CU communicates with other hardware via the Control Bus, sending signals that specify whether a read or write operation is being performed on the memory or I/O devices.

Q33. Answer: (c) Gujarat

The correct answer is Gujarat.

Key Points

• Akhaj is a prominent Mesolithic archaeological site located in the Mehsana district of Gujarat, India.

• The site is part of the Langhnaj cultural complex, situated within the sandy plains of the Sabarmati river basin, which is known for its rich density of prehistoric settlements.

• It represents the Middle Stone Age (Mesolithic) culture, a period characterized by a shift in human lifestyle toward more specialized hunting-gathering and the early stages of sedentism.

• Findings at Akhaj include a significant collection of microliths, which are tiny, sharp stone tools made from materials like chert, agate, and chalcedony, used for hunting and domestic activities.

• Archaeological excavations in this region have provided evidence of various animal remains, such as wild cattle, deer, and boar, suggesting a diverse diet and an environment that supported a wide range of fauna during the Holocene epoch.

Additional Information

• The Mesolithic Period in India:

• The Mesolithic era in India generally dates from approximately 10,000 BCE to 4,000 BCE. It serves as a vital bridge between the Palaeolithic (Old Stone Age) and the Neolithic (New Stone Age).

• This period is marked by a transition in climate to warmer and more humid conditions following the end of the last Ice Age, leading to changes in flora and fauna.

• Geographical Distribution:

• Apart from Gujarat, significant Mesolithic sites are found across India, including Bagor in Rajasthan (one of the largest Mesolithic sites), Adamgarh in Madhya Pradesh, and Sarai Nahar Rai in Uttar Pradesh.

• In Gujarat, other notable sites include Loteshwar and Ratanpur, which provide evidence of very early animal domestication, particularly sheep and goats.

• Tool Technology:

• The defining feature of this period is microlithic technology. These tools were often geometric in shape, such as crescents, triangles, and trapezes, and were frequently hafted onto wooden or bone handles to make composite tools like arrows or sickles.

• Socio-Cultural Evolution:

• During the later Mesolithic phases at sites like Akhaj, humans began to use handmade pottery, indicating an evolution in storage and cooking techniques.

• There is also evidence of rock art and paintings from this period (most famously at Bhimbetka), which depict scenes of hunting, dancing, and social life.

Important Points

• Role of H.D. Sankalia: The archaeological landscape of Gujarat was extensively studied by the renowned archaeologist H.D. Sankalia between 1941 and 1963. His work at Langhnaj (near Akhaj) was pioneering in establishing the sequence of the Mesolithic culture in Western India.

• Burial Practices: Excavations at Mesolithic sites in Gujarat have unearthed human skeletons. The burials were typically in a flexed or crouched position, often with the head facing West, and sometimes included grave goods like bone ornaments or stone tools, reflecting early ritualistic behaviors.

• Environmental Adaptation: The people of Akhaj lived on sand dunes (fossilized dunes) located near oxbow lakes or rivers, demonstrating a strategic choice of location to ensure access to water and diverse food resources.

Q34. Answer: (d) Himachal Pradesh

The correct answer is Himachal Pradesh.

Key Points

• Laman is a distinct and highly popular folk music tradition of Himachal Pradesh, specifically deep-rooted in the cultural landscape of the Kullu Valley.

• The structure of Laman is unique as it involves a musical dialogue or a lyrical battle where a group of girls sings a specific stanza and a group of boys responds with a matching or witty poetic reply.

• This form of singing is often extempore, meaning the verses are created on the spot, and these sessions are known to continue for several hours during local gatherings or festivals.

• The primary theme of Laman is romance and love, often utilizing metaphors from the natural beauty of the Himalayas, such as flowers, mountains, and rivers.

• It serves as a vital medium for social interaction among the youth in rural Himachali communities, preserving the Pahari language and local idioms through oral performance.

Additional Information

• Himachal Pradesh Folk Music: Apart from Laman, the state is home to other romantic folk songs like Jhauri and Chhanjoti. Religious songs called Ainchaliyan are also prominent, typically sung at the house of a bridegroom. The music is characterized by its simplicity and the use of local instruments like the Ektara, Dhol, and Nagara.

• Haryana Folk Music: The folk music of Haryana is heavily influenced by the Saang (folk theatre) tradition. Popular forms include Ragini, which often depicts historical legends or social satires. The use of the Been, Sarangi, and Ghara (earthen pot) is common in Haryanvi musical performances.

• Gujarat Folk Music: This state is world-famous for Garba and Dandiya Raas, which are rhythmic folk dances accompanied by energetic music, especially during the Navratri festival. Other forms include Sugam Sangeet and Dayro, which are often based on the poetry of Narsinh Mehta and other saint-poets.

• Rajasthan Folk Music: Rajasthan possesses a vast musical heritage with professional singing communities like the Langas and Manganiyars. Famous styles include Maand (a sophisticated folk style), and songs like Panihari (sung by women fetching water) and Gorbandh (dedicated to camel ornaments).

Important Points

• Geographical Influence: The topography of Himachal Pradesh significantly influences its music; the high-altitude regions like Lahaul and Spiti have music influenced by Tibetan Buddhism, whereas the lower foothills follow the Pahari folk style.

• Linguistic Diversity: Laman stanzas are usually composed in local dialects such as Kulluvi or Mandyali, making it a repository of linguistic heritage for the Western Pahari group of languages.

• Seasonal Performance: While Laman can be sung anytime, it is most prominent during the spring and summer seasons when fairs (locally called Melas) are held across the hills.

• Instruments: Although Laman is primarily vocal-centric, it may be accompanied by the Flute (Bansuri) or the Karnal (a long straight brass trumpet) to add a melodic backdrop to the scenic performance.

Q35. Answer: (d) Brother's wife's brother

Family Chart:

Decoding the Symbols:

Symbol	•	−	×	÷
Meaning	Son	Brother	Wife	Father

Given: W − O × R + K ÷ G

It means: W is the brother of O, O is the wife of R, R is the son of K, K is the father of G.

So ,W is Brother's wife's brother of G.

Hence, the correct answer is Option 4.

Q36. Answer: (b) Subsistence Agriculture

The correct answer is Subsistence Agriculture.

Key Points

• Subsistence Agriculture is a type of farming where the primary goal of the farmer is to produce enough food to sustain themselves and their family, leaving little to no surplus for sale or trade. In India, despite significant technological advancements, this remains the most widely practiced form of agriculture because a vast majority of farmers have very small landholdings.

• Primitive Subsistence Farming is still practiced in certain pockets of India on small patches of land. It utilizes traditional tools such as the hoe, dao, and digging sticks, and relies heavily on family or community labor.

• This method of farming is highly dependent on the monsoon, the natural fertility of the soil, and other environmental factors. Because it does not typically use modern inputs like artificial fertilizers or irrigation systems, the productivity remains low.

• Another variation is Intensive Subsistence Farming, which is practiced in areas of high population pressure on land. It involves labor-intensive techniques and the use of high doses of biochemical inputs and irrigation to obtain higher production from small land portions.

• Due to the "Right of Inheritance" leading to the division of land among successive generations, landholdings in India have become fragmented and economically unviable, forcing farmers to continue subsistence farming as they lack the capital for large-scale commercialization.

Additional Information

• Commercial Agriculture: Unlike subsistence farming, the main objective here is profit. It involves the use of modern inputs such as High Yielding Variety (HYV) seeds, chemical fertilizers, insecticides, and pesticides. The degree of commercialization varies by region; for example, Rice is a commercial crop in Haryana and Punjab, but a subsistence crop in Odisha.

• Plantation Agriculture: This is a specific type of commercial farming where a single crop is grown on a very large estate. It requires huge capital investment and migrant labor. Notable examples in India include Tea in Assam and North Bengal, Coffee in Karnataka, and Rubber in Kerala.

• Organic Agriculture: This is a modern, eco-friendly approach that excludes the use of synthetic fertilizers and pesticides. Sikkim achieved the milestone of becoming the world's first fully organic state in 2016. This practice is growing in India due to health awareness and environmental concerns.

• Shifting Cultivation (Jhumming): A form of primitive subsistence agriculture where farmers clear a patch of land by slashing and burning the vegetation. Once the soil fertility decreases, they move to a new patch. In India, it is famously known as Jhum in the North-Eastern states like Assam, Meghalaya, and Mizoram.

Important Points

• Demographic Data: Approximately 86% of Indian farmers are categorized as small and marginal farmers, holding less than 2 hectares of land. This demographic reality makes subsistence agriculture a necessity for survival for millions.

• Regional Nomenclature: Shifting cultivation, a primitive subsistence method, has various names across India: 'Bewar' or 'Dahiya' in Madhya Pradesh, 'Podu' or 'Penda' in Andhra Pradesh, 'Pama Dabi' or 'Koman' in Odisha, and 'Kumari' in the Western Ghats.

• Green Revolution Impact: While the Green Revolution of the 1960s introduced modern agricultural changes to India, its benefits were primarily concentrated in wheat and rice producing regions like Punjab, Haryana, and Western Uttar Pradesh, leaving large parts of the country still practicing subsistence methods.

• Economic Contribution: Agriculture contributes about 18-20% to India's GDP and employs nearly 50% of the workforce, highlighting the sector's reliance on traditional subsistence models for employment even as commercial output grows.

Q37. Answer: (b) Bryophytes exhibit the formation of an embryo from the zygote

The correct answer is Bryophytes exhibit the formation of an embryo from the zygote.

Key Points

• Bryophytes are distinguished from Algae primarily by their reproductive biology, specifically the development of an embryo. In Bryophytes, the zygote remains within the female reproductive organ (archegonium) and undergoes mitotic division to form a

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multicellular embryo. Hence, statement 2 is correct.

• Both Bryophytes and Algae contain chlorophyll and are photoautotrophic, meaning they can prepare their own food. Since both groups share this feature, it does not serve as a differentiating factor. Hence, statement 1 is incorrect.

• Cryptogams are plants that reproduce via spores rather than seeds. This category includes Thallophyta (Algae), Bryophyta, and Pteridophyta. Because both belong to this classification, it is not a point of difference. Hence, statement 3 is incorrect.

• The possession of chlorophyll is a fundamental characteristic of almost all green plants, including all Algae and Bryophytes. It allows them to perform photosynthesis to sustain growth. Hence, statement 4 is incorrect.

• In Algae, the zygote is usually released from the parent plant or undergoes meiosis directly without forming a multicellular embryo stage, which is the key evolutionary advancement seen in Bryophytes.

Additional Information

• Bryophytes (The Amphibians of the Plant Kingdom):

• Location and Habitat: They are found in moist, shady, and humid localities. They are called amphibians because they live on land but require water for fertilization (for the movement of flagellated antherozoids).

• Structure: The plant body is more differentiated than that of algae. It is thallus-like and prostrate or erect, attached to the substratum by unicellular or multicellular rhizoids. They lack true roots, stems, or leaves.

• Life Cycle: The dominant phase of the life cycle is the haploid gametophyte. The sporophyte is physically dependent on the gametophyte for nutrition.

• Examples: Common examples include Marchantia (Liverwort), Funaria (Moss), and Anthoceros (Hornwort).

• Algae (Thallophyta):

• Features: They are chlorophyll-bearing, simple, thalloid, and largely aquatic (both freshwater and marine) organisms.

• Classification: Based on pigmentation, they are divided into Chlorophyceae (Green algae), Phaeophyceae (Brown algae), and Rhodophyceae (Red algae).

• Functions: They are the primary producers of energy-rich compounds in aquatic ecosystems and are responsible for at least half of the total carbon dioxide fixation on Earth.

• Uses: Many species like Porphyra, Laminaria, and Sargassum are used as food, while others produce hydrocolloids like algin and carrageenan.

Important Points

• Embryophyta: This is a subkingdom of plants that includes Bryophytes, Pteridophytes, Gymnosperms, and Angiosperms. The defining characteristic is the protection of the embryo within maternal tissues.

• Sex Organs: In Bryophytes, the sex organs (Antheridium and Archegonium) are multicellular and protected by a sterile jacket of cells. In Algae, sex organs are typically unicellular and lack a protective jacket (except in Chara).

• Vascular Tissue: Both Algae and Bryophytes lack vascular tissues like xylem and phloem, which is why they generally remain small in size. The evolution of vascular tissue first occurred in Pteridophytes.

• Ecological Importance: Bryophytes play a significant role in plant succession on bare rocks and soil, helping in the formation of soil and preventing erosion.

Q38. Answer: (b) Ctrl+S

The correct answer is Ctrl+S.

Key Points

• The keyboard shortcut Ctrl+S is universally recognized across the Windows and Linux operating systems as the primary command to save the current file or document.

• When a user presses Ctrl+S in applications like Microsoft Word, Excel, or Notepad, the software writes the current state of the data to the hard drive or storage medium. Hence, the option Ctrl+S is correct.

• For a new file that has not been saved before, pressing Ctrl+S typically triggers the "Save As" dialog box, prompting the user to enter a file name and select a storage location.

• In web browsers such as Google Chrome or Mozilla Firefox, this shortcut allows the user to save the entire HTML webpage to their local system for offline viewing.

• The equivalent command for users on Apple's macOS is Command+S, which performs the exact same function of data preservation.

Additional Information

• Ctrl+P: This shortcut is used to initiate the print command. It opens the Print Dialog box, allowing users to select the printer, number of copies, and page range. Hence, this statement is incorrect in the context of saving a file.

• Ctrl+L: In word processors like Microsoft Word, this command is used for Left Alignment of the text. In web browsers, it is a very useful shortcut to quickly highlight and jump to the Address Bar to type a new URL. Hence, this statement is incorrect.

• Ctrl+R: This shortcut has dual functions depending on the software; it is used for Right Alignment of text in document editors, and it functions as a Reload/Refresh command in Internet browsers to update the current page content. Hence, this statement is

incorrect.

• Ctrl+N: This is commonly used to open a new window or create a new blank document within the same application.

• Ctrl+O: This shortcut is the standard way to open an existing file from the computer's directory.

Important Points

• Data Security: Frequent use of Ctrl+S is a recommended practice in computing to prevent data loss resulting from sudden power failures, system crashes, or software glitches.

• Save As vs. Save: While Ctrl+S updates an existing file, the F12 key is often used in Microsoft Office as a shortcut for "Save As" to create a duplicate file with a different name or format (e.g., PDF, RTF, or TXT).

• Cloud Computing: In modern SaaS (Software as a Service) platforms like Google Docs or Microsoft 365, the manual save shortcut is becoming less critical due to Auto-save features that sync data to the Cloud in real-time.

• Development History: Keyboard shortcuts were standardized in the 1980s and 1990s to improve user interface (UI) efficiency, reducing the reliance on computer mice and menu navigation.

Q39. Answer: (a) 2015

The correct answer is 2015.

Key Points

• The Pradhan Mantri Kaushal Vikas Yojana (PMKVY) was officially launched on 15 July 2015, coinciding with the first-ever World Youth Skills Day. Hence, the option 2015 is correct.

• It is the flagship scheme of the Ministry of Skill Development and Entrepreneurship (MSDE), aimed at mobilizing a large number of Indian youth to take up industry-relevant skill training.

• The scheme is implemented by the National Skill Development Corporation (NSDC), a public-private partnership that facilitates the involvement of private training providers.

• The primary objective of PMKVY is to provide Skill Certification to youth, enabling them to secure a better livelihood through standardized training and assessment.

• Individuals with prior learning experience or skills are also assessed and certified under the Recognition of Prior Learning (RPL) component of the scheme.

Additional Information

• Evolution of PMKVY Versions:

• PMKVY 1.0 (2015-16): Launched with an outlay of Rs. 1,500 crore, it successfully reached 19.85 lakh candidates.

• PMKVY 2.0 (2016-20): Scaled up significantly with a budget of Rs. 12,000 crore. It was aligned with other missions like Make in India, Digital India, and Swachh Bharat Mission.

• PMKVY 3.0 (2020-21): Launched in January 2021, this version shifted focus towards a demand-driven approach and decentralized implementation through District Skill Committees (DSCs).

• PMKVY 4.0: Announced in the Union Budget 2023-24, it aims to skill lakhs of youth within the next three years, focusing on New Age courses like Coding, AI, Robotics, Mechatronics, IOT, and 3D printing.

• Key Components of the Scheme:

• Short Term Training (STT): Aimed at school/college dropouts or unemployed youth to provide training in various sectors according to National Skills Qualification Framework (NSQF).

• Recognition of Prior Learning (RPL): Individuals with existing skills are assessed and certified, aligning their competencies with the NSQF.

• Special Projects: Targeted at providing training in special areas, government premises, or for vulnerable groups that cannot be covered under standard STT.

Important Points

• Skill India Mission: PMKVY is a part of the broader Skill India Mission launched by Prime Minister Narendra Modi to create a skilled workforce that can meet global demands.

• Target Beneficiaries: The scheme targets youth in the age group of 15-45 years. It specifically encourages women and persons with disabilities to participate in the workforce.

• Financial Support: The entire training and assessment fees are paid directly by the Government of India to the training providers, making it a completely free scheme for the beneficiaries.

• Placement Assistance: Training centers under PMKVY are mandated to provide placement assistance to certified candidates to ensure the transition from training to employment.

• Kaushal and Rozgar Mela: To increase the reach and visibility of the scheme, NSDC organizes mobilization camps and job fairs regularly across various States and Districts in India.

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Q40. Answer: (c) 3464

Shortcut Trick

Radius r = Circumference / 2π = 66 / (2 × 22/7) = 10.5 cm.

Max possible height h = Breadth of the sheet = 30 cm.

Total Volume V = (1/3) × (22/7) × 10.5 × 10.5 × 30 = 3465 cm^3.

Stapled tip volume v = (Staple height / Total height)³ × V = (2/30)³ × 3465 ≈ 1 cm^3.

Volume of packet = 3465 − 1 = 3464 cm^3.

Therefore The correct answer is 3464 cm^3.

Alternate Method

Given:

Length of rectangular sheet = 66 cm (Circumference of cone base)

Breadth of rectangular sheet = 30 cm (Maximum height of cone)

Staple height (h_s) = 2 cm from vertex

Formula Used:

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

Volume of small cone / Volume of large cone = (h_(small) / h_(large))³

Length = 66 cm 30 cm h = 30 cm Staple at 2cm r = 10.5 cm

=> 2 × (22/7) × r = 66

=> r = (66 × 7) / 44 = 10.5 cm

=> Total Volume (V) = (1/3) × (22/7) × 10.5 × 10.5 × 30

=> V = 1/3 × 22 × 1.5 × 10.5 × 30

=> V = 11 × 10.5 × 30 = 3465 cm^3

=> Volume of excluded tip (v) = (h_s / h)³ × V

=> v = (2 / 30)³ × 3465 = (1/15)³ × 3465

=> v = 3465 / 3375 ≈ 1.027 cm^3

=> Packet Volume = 3465 − 1.027 = 3463.973 cm^3

=> Nearest whole number = 3464 cm^3

Therefore The correct answer is 3464 cm^3.

Additional Information

Cone Measurements

Slant height l = √(r^2 + h^2). Curved Surface Area = πrl. Total Surface Area = $\pi r(l + r)$.

Volume Ratio of Similar Solids

If two cones are similar with heights h1 and h2, the ratio of their volumes is (h1/h2)³.

Frustum of a Cone

Volume of a frustum = (1/3)$\pi H(R^2 + r^2 + Rr)$, where H is the height, R and r are radii of the two bases.

Q41. Answer: (a) Both conclusions (I) and (II) follow.

Given Statements:

All skin is hair.

All hair is fur.

All fur is fleece.

The least possible Venn diagram for the given statement is:

Conclusions:

I. All skin is fleece - True (Since Skin is inside Hair, Hair is inside Fur, and Fur is inside Fleece, therefore Skin is also inside Fleece).

II. Some fleeces are hair - True (Since Hair is fully inside Fleece, so definitely some fleeces are hair).

So, both conclusion (I) and (II) follow.

Hence, the correct answer is "Option 1".

Q42. Answer: (c) 850

Shortcut Trick

Valid votes = 80% × 85% = 68% of N

Winning margin = (75% − 25%) = 50% of valid
=> Margin = 50% of 68% = 34% of N
=> 0.34N = 289 => N = 850
Therefore Answer = 850
Alternate Method
Given:
Votes cast = 80%
Invalid votes = 15%
Winner gets 75%
Margin = 289
Formula: Margin = Difference% × Valid votes
Calculation:
=> Let total voters = N
=> Votes polled = 0.8N
=> Valid votes = 85% of 0.8N = 0.68N
=> Winner votes = 75% of 0.68N = 0.51N
=> Loser votes = 25% of 0.68N = 0.17N
=> Margin = 0.51N − 0.17N = 0.34N
=> 0.34N = 289
=> N = 289 ÷ 0.34 = 850
Therefore Total voters = 850
Additional Information
Valid Votes: Total polled − Invalid
Margin: Difference of % × valid votes
Tip: Combine percentages stepwise
Shortcut: Work directly in % of total

Q43. Answer: (d) Two

Given: (Left) \ ? % 4 ? 3 / 3 / 9 4 6 4 1 ? * + ^ > 2 * (Right)
Now,
Symbols which are immediately preceded by another symbol and also immediately followed by a number.
So, needed pattern is: Symbol - Symbol - Number
(Left) \ ? % 4 ? 3 / 3 / 9 4 6 4 1 ? * + ^ > 2 * (Right)
Only Two symbol satisfies the condition.
Hence, the correct answer is 'Option 4'.

Q44. Answer: (b) 14.6%

Shortcut Trick
Successive discount => 85% × 70% = 59.5%
=> 59.5% of MP = SP of X = 1000 + 337 = 1337
=> MP = 1337 ÷ 0.595 = 2247.06
=> For Y: SP = 51% of MP
=> SP ≈ 0.51 × 2247.06 ≈ 1146
=> Profit = 1146 − 1000 = 146
=> Profit% = 14.6%
Therefore Answer ≈ 14.6%
Alternate Method
Given:
CP of X = CP of Y = 1000
Discounts on X = 15% and 30%
Profit on X = 337 => SP of X = 1337
Formula:

Successive discount = (1 − d1)(1 − d2)
Calculation:
=> Net SP factor = 0.85 × 0.70 = 0.595
=> 0.595 × MP = 1337
=> MP = 1337 ÷ 0.595 ≈ 2247.06
=> For Y: discount = 49%
=> SP = 0.51 × 2247.06 ≈ 1146
=> Profit = 1146 − 1000 = 146
=> Profit% = (146/1000) × 100 = 14.6%
Therefore Final Answer ≈ 14.6%
Additional Information
Successive Discount: Multiply factors
SP Relation: SP = MP × (1 − discount)
Profit%: (Profit ÷ CP) × 100
Tip: First find MP using X, then apply to Y

Q45. Answer: (b) (cosecθ - 1)/(cosecθ + 1)

Shortcut Trick
Divide numerator & denominator by cosθ:
=> (cotθ − cosθ)/(cotθ + cosθ)
=> (cosecθ − 1)/(cosecθ + 1)
Therefore Answer = (cosecθ − 1)/(cosecθ + 1)
Alternate Method
Given:
(cotθ − cosθ)/(cotθ + cosθ)
Formula:
cotθ = cosθ/sinθ
cosecθ = 1/sinθ
Calculation:
=> Replace cotθ = cosθ/sinθ
=> Numerator:
= (cosθ/sinθ − cosθ)
= cosθ(1/sinθ − 1)
= cosθ(cosecθ − 1)
=> Denominator:
= (cosθ/sinθ + cosθ)
= cosθ(1/sinθ + 1)
= cosθ(cosecθ + 1)
=> Cancel cosθ
=> Result = (cosecθ − 1)/(cosecθ + 1)
Therefore Final Answer = (cosecθ − 1)/(cosecθ + 1)
Additional Information
cotθ: cosθ/sinθ
cosecθ: 1/sinθ
Tip: Convert everything in sin & cos
Shortcut: Divide by common factor

Q46. Answer: (b) 15

Shortcut Trick
=> Mean proportional = √(9 × 25)
=> = √225 = 15
Therefore Answer = 15

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Alternate Method

Given:

a = 9, b = 25

Formula Used:

Mean proportional = √(a × b)

Calculation:

=> = √(9 × 25)

=> = √225

=> = 15

Therefore The correct answer is 15.

Additional Information

Mean Proportional: √(a × b)

Also Called: Geometric Mean

Property: If a : x = x : b => x^2 = ab

Exam Tip: Look for perfect squares

Q47. Answer: (b) S

Given:

A, B, L, I, N, G and S have exams on different days from Monday to Sunday.

B has exam on Monday.

Only three people have exams between B and L.

Only one person has exam between L and A.

N has exam on Sunday.

S has exam after I but before G.

Position	Day	Person
1	Monday	B
2	Tuesday	I
3	Wednesday	A
4	Thursday	S
5	Friday	L
6	Saturday	G
7	Sunday	N

Now, Thursday is S

Hence, the correct answer is Option 2.

Q48. Answer: (c) 2017

The correct answer is 2017.

Key Points

• India officially became a full member of the Shanghai Cooperation Organization (SCO) on 9 June 2017. This historic transition took place during the SCO Summit held in Astana, the capital of Kazakhstan.

• Alongside India, Pakistan also received full membership during the same summit in 2017, increasing the total number of member states from six to eight at that time.

• Prior to becoming a full member, India had been associated with the SCO as an observer state since the year 2005. The decision to admit India as a full member was initiated during the Ufa Summit in Russia in 2015.

• The Shanghai Cooperation Organization is a permanent intergovernmental international organization that focuses on strengthening mutual trust and neighborliness among member states while promoting cooperation in politics, trade, economy, research, technology, and culture.

• The inclusion of India was seen as a significant step toward enhancing regional security and connectivity, especially in Central Asia.

Additional Information

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• Origin and Evolution of SCO:

• The SCO was founded on 15 June 2001 in Shanghai, China. It was built upon the "Shanghai Five" mechanism, which consisted of China, Kazakhstan, Kyrgyzstan, Russia, and Tajikistan.

• In 2001, with the inclusion of Uzbekistan, the group was renamed the Shanghai Cooperation Organization.

• The SCO Charter was signed during the St. Petersburg Summit in June 2002 and entered into force on 19 September 2003.

• Member States and Expansion:

• As of 2024, the SCO comprises ten member states: China, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Uzbekistan, India, Pakistan, Iran, and Belarus.

• Iran officially joined as the ninth member in July 2023 during the summit hosted virtually by India.

• Belarus became the tenth full member of the organization in July 2024 during the Astana Summit.

• Organizational Structure:

• The SCO Secretariat is based in Beijing, China, and serves as the main executive body.

• The Regional Anti-Terrorist Structure (RATS), headquartered in Tashkent, Uzbekistan, is a permanent organ of the SCO which promotes cooperation of member states against terrorism, separatism, and extremism.

• The Council of Heads of State is the highest decision-making body in the SCO, meeting once a year to decide upon all important issues of the organization.

Important Points

• India's Presidency (2023): India held the presidency of the SCO for the first time since joining and hosted the 23rd Summit of the SCO Council of Heads of State in a virtual format on 4 July 2023. The theme of the Indian presidency was "SECURE" (Security, Economic development, Connectivity, Unity, Respect for sovereignty and territorial integrity, and Environmental protection).

• Geopolitical Significance: The SCO represents approximately 40% of the world's population and contributes to over 20% of the global GDP. It is often described as the "Alliance of the East" and is considered one of the world's most powerful regional organizations.

• Working Languages: The official working languages of the Shanghai Cooperation Organization are Chinese and Russian.

• Objectives: The primary goals are to maintain peace, security, and stability in the region and to move towards the establishment of a democratic, fair, and rational new international political and economic order.

Q49. Answer: (b) -31

Shortcut Trick

=> (−56) ÷ (−14) = 4

=> (−3) × 6 = −18

=> Expression = −9 − 4 − 18

=> = −31

Therefore Answer = −31

Alternate Method

Given:

(−9) − (−56) ÷ (−14) + (−3) × 6

Concept Used:

BODMAS rule

Calculation:

=> (−9) − 4 + (−3 × 6)

=> (−9) − 4 + (−18)

=> (−9) − 4 − 18

=> −13 − 18

=> −31

Therefore The correct answer is −31.

Additional Information

BODMAS: Division & multiplication before addition/subtraction

Sign Rule: (− ÷ −) = +, (− × +) = −

Exam Tip: Simplify step-by-step

Q50. Answer: (a) = EHN, % = DGM

The logic followed here is based on a uniform alphabetical shift between corresponding letters in each cluster:

WZF → %

→ W → D (+7)

→ Z → G (+7)

→ F → M (+7)

So, WZF → DGM (uniform cyclic shift)

Now, applying the same logic to find # from LOU:

LOU → #

→ L → E (−7)

→ O → H (−7)

→ U → N (−7)

So, LOU → EHN (uniform backward shift of 7)

Thus, the correct pair is: # = EHN, % = DGM

Hence, the correct answer is Option 1.

Q51. Answer: (c) 2646√3

Shortcut Trick

=> Area of square = 3969 => side = √3969 = 63

=> Perimeter of square = 4 × 63 = 252

=> Hexagon side = 252 ÷ 6 = 42

=> Area of regular hexagon = (3√3 / 2) × side²

=> = (3√3 / 2) × 42² = 2646√3

Therefore Answer = 2646√3 cm²

Alternate Method

Given:

Area of square = 3969 cm²

Formula Used:

Area of square = side²

Perimeter = 4 × side

Area of hexagon = (3√3 / 2) × a²

Calculation:

=> side of square = √3969 = 63

=> Perimeter of square = 4 × 63 = 252

=> Side of hexagon = 252 ÷ 6 = 42

=> Area of hexagon = (3√3 / 2) × 42²

=> = (3√3 / 2) × 1764

=> = 2646√3 cm²

Therefore The correct answer is 2646√3 cm².

Additional Information

Square: Area = side²

Hexagon: 6 equal sides

Formula: (3√3 / 2)a²

Exam Tip: Always equate perimeters first

Q52. Answer: (c) Shri Shivraj Singh Chouhan

The correct answer is Shri Shivraj Singh Chouhan.

Key Points

• Shri Shivraj Singh Chouhan assumed the charge of the Union Minister of Agriculture and Farmers Welfare in June 2024. As of April 2025, he continues to lead this crucial ministry under the 18th Lok Sabha administration of the Government of India.

• He is a veteran politician from the Bharatiya Janata Party (BJP) and represents the Vidisha constituency of Madhya Pradesh in the Lok Sabha. He won the 2024 General Elections with a massive margin of over 8.21 lakh votes.

• Before joining the Union Cabinet, Shivraj Singh Chouhan served as the Chief Minister of Madhya Pradesh for four terms, spanning from 2005 to 2023, making him the longest-serving Chief Minister of the state.

• The Ministry of Agriculture and Farmers Welfare is the apex body for the formulation and administration of rules, regulations, and laws related to agriculture in India. His appointment is seen as a strategic move to leverage his extensive experience in rural

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development and farmer-centric governance.

• Under his leadership, the ministry focuses on strengthening the agricultural infrastructure, ensuring minimum support price (MSP) efficiency, and promoting digital agriculture across the country.

Additional Information

• Structure of the Ministry: The ministry is headquartered at Krishi Bhavan in New Delhi. It consists of two primary departments: the Department of Agriculture and Farmers Welfare and the Department of Agricultural Research and Education (DARE).

• Historical Context: Originally established as the Ministry of Agriculture, it was renamed the Ministry of Agriculture and Farmers Welfare in August 2015 to shift the focus from mere production to the holistic welfare of the farming community.

• Major Initiatives:

• PM-KISAN: The Pradhan Mantri Kisan Samman Nidhi scheme provides an annual financial benefit of Rs. 6,000 to eligible farmer families across the country.

• PMFBY: The Pradhan Mantri Fasal Bima Yojana is a government-sponsored crop insurance scheme that integrates multiple stakeholders on a single platform.

• e-NAM: The National Agriculture Market is a pan-India electronic trading portal that networks the existing APMC mandis to create a unified national market for agricultural commodities.

• Key Figures in the Ministry: Along with the Union Minister, the ministry is supported by Ministers of State, including Shri Ram Nath Thakur and Shri Bhagirath Choudhary, who assist in administrative and legislative functions.

Important Points

• Shri Nitin Jairam Gadkari: He serves as the Union Minister for Road Transport and Highways. He is known for his work in expanding the national highway network and promoting green fuels.

• Shri Piyush Goyal: He is the Union Minister of Commerce and Industry. He has previously held portfolios like Railways and Finance and is a key figure in managing India's international trade.

• Shri Pralhad Joshi: As of the 2024 cabinet reshuffle, he serves as the Union Minister of Consumer Affairs, Food and Public Distribution and the Minister of New and Renewable Energy.

• Agricultural Significance: Agriculture remains the backbone of the Indian economy, contributing significantly to the Gross Value Added (GVA) and providing employment to nearly 50% of the workforce. Policies drafted by this ministry directly impact the socio-economic status of over 14 crore farmer households.

Q53. Answer: (a) 63

Shortcut Trick

=> Let son = x => Vanraj = 3x, daughter = x − 3

=> 3 years ago sum = (3x−3) + (x−3) + (x−6) = 93

=> 5x − 12 = 93 => 5x = 105 => x = 21

=> Vanraj = 3x = 63

Therefore Answer = 63 years

Alternate Method

Given:

Vanraj = 3 × son

Daughter = son − 3

Sum of ages 3 years ago = 93

Formula Used:

Present age − 3 gives age 3 years ago

Calculation:

=> Let son's present age = x

=> Vanraj = 3x, Daughter = x − 3

=> 3 years ago:

=> Vanraj = 3x − 3

=> Son = x − 3

=> Daughter = x − 6

=> Sum = (3x − 3) + (x − 3) + (x − 6) = 93

=> 5x − 12 = 93

=> 5x = 105

=> x = 21

=> Vanraj = 3x = 63

Therefore The correct answer is 63 years.

Additional Information

Age Concept: Ages decrease equally in past

Equation: Form linear equation using relations

Exam Tip: Handle “years ago” carefully

Q54. Answer: (b) Bronze

The correct answer is Bronze.

Key Points

• The Dancing Girl is a masterpiece of the Indus Valley Civilization, specifically created around 2500 BCE. It is made of Bronze, which is an alloy typically consisting of Copper and Tin. Hence, this option is correct.

• Silver was known to the Harappans and was used to create jewelry, vessels, and seals, but it was not the primary material for iconic sculptures like the Dancing Girl. Hence, this option is incorrect.

• Granite is a hard rock that was not widely utilized for fine sculptural work in the Mature Harappan phase; instead, they preferred softer stones or metals. Hence, this option is incorrect.

• Marble was not a material used for the creation of sculptures during this era of the Bronze Age. Hence, this option is incorrect.

• The sculpture was discovered in 1926 by Ernest Mackay in the city of Mohenjo-daro, which is located in present-day Pakistan.

• The figure is approximately 10.5 centimeters (4.1 inches) in height and represents a stylized female figure in a confident, standing pose.

Additional Information

• Lost-Wax Casting (Cire Perdue): This is the advanced metallurgical technique used by Harappan craftsmen. It involved creating a wax model, covering it with clay, heating it to remove the wax, and then filling the cavity with molten bronze.

• Artistic Features: The Dancing Girl is depicted wearing about 24 to 25 bangles on her left arm and a few on her right arm. Her hair is tied in a bun, and she has a relaxed posture with her right hand on her hip.

• Material Sources: The Harappans likely procured Copper from the Khetri mines of Rajasthan and Tin from Afghanistan or Hazaribagh to manufacture bronze.

• Cultural Context: The presence of such artifacts indicates a high degree of social stratification, artistic specialization, and a flourishing urban culture where aesthetics were valued.

• Current Location: This world-famous artifact is currently preserved and displayed in the National Museum in New Delhi, India.

Important Points

• Other Materials Used: While bronze was used for the Dancing Girl, the Harappans also used Steatite (soapstone) for making seals and the famous Bearded Man (or Priest-King) statue.

• Terracotta Art: Common people often used Terracotta (fired clay) for making figurines of the Mother Goddess, animal toys, and household items.

• Stone Sculptures: Another famous sculpture is the Male Torso found at Harappa, which was carved out of Red Sandstone.

• Geographical Spread: The use of bronze was widespread across major sites like Harappa, Mohenjo-daro, Lothal, and Kalibangan, signifying the technological uniformity of the Indus Valley Civilization.

• Significance of 2500 BCE: This period marks the Mature Phase of the civilization, where metallurgy and urban planning reached their zenith before the gradual decline around 1900 BCE.

Q55. Answer: (b) phyllode

The correct answer is phyllode.

Key Points

• A phyllode is a specialized modified petiole or a portion of the leaf rachis that becomes flattened, green, and leaf-like in appearance and function. In certain plants, especially the Australian Acacia (such as Acacia auriculiformis), the true leaves are bipinnately compound but fall off very early in the plant's life cycle (deciduous).

• The primary function of a phyllode is to carry out photosynthesis, a role typically performed by the leaf blade (lamina). Because these plants often grow in arid or xerophytic environments, this modification helps in reducing transpiration.

• Phyllodes are usually oriented vertically. This specific feature allows them to avoid the direct impact of the intense midday sun, thereby reducing heat absorption and water loss, which is a critical adaptation for survival in dry climates.

• Morphologically, the phyllode can be distinguished from a true leaf by the absence of a leaf blade and its origin from the petiole. It contains chlorophyll and possesses stomata, though they are often fewer in number compared to regular leaves to conserve moisture. Hence, the statement regarding the modified petiole in Acacia is correct.

Additional Information

• Spines:

• These are hard, pointed structures that represent modified leaves, stipules, or parts of leaves.

• Their primary function is to provide protection against herbivores and to reduce the surface area for transpiration in desert plants.

• Examples include the spines found in Cactus (Opuntia), where the entire leaf is modified into a spine, or Ziziphus, where stipules become spines.

• Tendrils:

• These are thin, thread-like, sensitive structures used by climbing plants for support.

• In some species, the entire leaf is modified into a tendril (e.g., Wild Pea or Lathyrus aphaca), while in others, only the leaflets are modified (e.g., Garden Pea or Pisum sativum).

• They exhibit thigmotropism, meaning they coil around any object they come into contact with to help the plant climb.

• Bracts:

• These are modified leaves associated with reproductive structures like flowers or inflorescences.

• While they often look like small green scales, in plants like Bougainvillea, they are brightly colored to attract pollinators such as insects and birds.

• They are located at the base of the flower pedicel or the main axis of the inflorescence.

Important Points

• It is important to distinguish a phyllode from a phylloclade. While a phyllode is a modified petiole (leaf part), a phylloclade is a modified stem (e.g., Opuntia) that performs photosynthesis and stores water.

• The location of most Acacia species with phyllodes is Australia, where they have evolved to thrive in nutrient-poor and water-stressed soils.

• The year 1860 and onwards saw significant botanical documentation of these species by taxonomists like George Bentham, who categorized them based on these unique morphological features.

• In the context of India, the Australian Acacia (Acacia auriculiformis) is widely used in social forestry and afforestation programs due to its fast growth and adaptability to degraded lands.

Q56. Answer: (c) 19 November

The correct answer is 19 November.

Key Points

• The second edition of the RESPECT women prevention framework was launched on 19 November 2025 by the World Health Organization (WHO) and UN Women.

• This updated version aims to accelerate progress toward Sustainable Development Goal 5.2 (eliminating violence against women and girls) and includes new evidence from humanitarian and development settings.

Additional Information

• The RESPECT Acronym: The framework is built around seven core strategies:

• R - Relationship skills strengthened: Focusing on couples and families to foster healthy interaction.

• E - Empowerment of women: Including economic and social empowerment through microfinance and life skills training.

• S - Services ensured: Providing comprehensive health, legal, and social services for survivors.

• P - Poverty reduced: Addressing the economic stressors that can lead to violence.

• E - Environments made safe: Improving public spaces, schools, and workplaces through better infrastructure and lighting.

• C - Child and adolescent abuse prevented: Targeting early intervention to break the cycle of violence.

• T - Transformed attitudes, beliefs, and norms: Using community mobilization to challenge harmful patriarchal structures.

• Historical Context: The first edition of the RESPECT framework was originally launched in May 2019. It was developed in response to the Global Plan of Action approved by the 69th World Health Assembly in 2016.

• Target Goal: The framework is a key tool for achieving Sustainable Development Goal (SDG) 5, specifically Target 5.2, which aims to eliminate all forms of violence against women and girls in the public and private spheres.

• Statistical Reality: According to WHO estimates, nearly 30% (about 1 in 3) of women worldwide have been subjected to either physical and/or sexual intimate partner violence or non-partner sexual violence in their lifetime.

Important Points

• Multi-Sectoral Approach: The framework highlights that Ministry of Health, Ministry of Education, and Ministry of Justice must work in tandem to create a sustainable impact.

• Adaptability: A major feature of the 2025 update is its increased focus on digital safety and preventing online violence against women, reflecting modern technological challenges.

• Global Implementation: Since its inception, the RESPECT framework has been piloted and adapted in numerous countries across Africa, Asia, and Latin America to suit local cultural contexts.

• The 16 Days of Activism: While 8 March marks the launch of this specific edition, the framework is also heavily promoted during the 16 Days of Activism against Gender-Based Violence, which runs from 25 November (International Day for the Elimination of Violence against Women) to 10 December (Human Rights Day).

Q57. Answer: (d) Ozone

The correct answer is Ozone.

Key Points

• Primary pollutants are those that are emitted directly into the atmosphere from a source, such as volcanoes, industrial stacks, or vehicle exhausts.

• Sulfur dioxide (SO2) is a primary pollutant primarily produced from the combustion of fossil fuels (like coal and oil) and industrial processes such as smelting. Hence, statement 1 is incorrect in the context of the question.

• Carbon monoxide (CO) is a colorless, odorless gas that is a primary pollutant, emitted directly from the incomplete combustion of carbon-based fuels in motor vehicles and power plants. Hence, statement 2 is incorrect in the context of the question.

• Nitrogen oxides (NOx), specifically Nitrogen dioxide (NO2) and Nitric oxide (NO), are primary pollutants produced during high-temperature combustion in car engines and factories. Hence, statement 3 is incorrect in the context of the question.

• Ozone (O3) is not emitted directly into the air; instead, it is a secondary pollutant formed by chemical reactions between Nitrogen oxides (NOx) and Volatile Organic Compounds (VOCs) in the presence of sunlight. Hence, statement 4 is correct as it is NOT a primary pollutant.

Additional Information

• Secondary Air Pollutants:

• These are not emitted directly but form when primary pollutants react in the atmosphere.

• Key examples include Ozone (O3), Peroxyacetyl Nitrate (PAN), Sulfuric acid (H2SO4), and Nitric acid (HNO3).

• Photochemical Smog is a mixture of primary and secondary pollutants, primarily composed of ground-level ozone.

• Ground-level Ozone vs. Stratospheric Ozone:

• Tropospheric (ground-level) Ozone is a harmful air pollutant that affects human health and vegetation.

• Stratospheric Ozone (the Ozone Layer) is "good" ozone located 10 to 50 km above the Earth, protecting life from Ultraviolet (UV) radiation.

• Air Pollution Control in India:

• The Air (Prevention and Control of Pollution) Act was enacted in 1981 to combat air pollution.

• The Central Pollution Control Board (CPCB) monitors air quality through the National Air Quality Index (AQI), which tracks eight major pollutants including PM10, PM2.5, NO2, SO2, CO, O3, NH3, and Pb (Lead).

Important Points

• Particulate Matter (PM): These are primary pollutants categorized by size. PM2.5 refers to particles smaller than 2.5 micrometers, which can penetrate deep into the lungs and bloodstream.

• Acid Rain: It is a result of secondary pollutants. When Sulfur dioxide and Nitrogen oxides react with water vapor in the air, they form sulfuric and nitric acids, falling as acidic precipitation with a pH lower than 5.6.

• Volatile Organic Compounds (VOCs): These are organic chemicals (like benzene and formaldehyde) that have a high vapor pressure at room temperature. They are crucial precursors to the formation of ozone.

• National Ambient Air Quality Standards (NAAQS): In India, NAAQS are the standards for ambient air quality set by the CPCB to protect public health and the environment from the harmful effects of air pollution.

Q58. Answer: (d) Turning it off and on again automatically

The correct answer is Turning it off and on again automatically.

Key Points

• Restarting, also known as rebooting, is the process by which a running computer system is closed and then started again. This process involves the Operating System (OS) closing all applications, clearing the RAM, and then reloading the system software and drivers.

• Only refreshing the desktop refers to a manual action (typically using the F5 key or Right-click > Refresh) that reloads the icons and graphical user interface (GUI) without affecting running background processes or the hardware state. Hence, this statement is incorrect.

• Turning it off permanently refers to a Shutdown operation, where the power supply is cut off and the CPU stops processing entirely until a user manually presses the physical power button. Hence, this statement is incorrect.

• Installing a new OS is a complex process called a clean installation or upgrade, which involves rewriting the hard drive or SSD data. While it requires restarts, the act of restarting itself is not the same as an installation. Hence, this statement is incorrect.

• Turning it off and on again automatically is the standard function of a restart command in modern computing. The system shuts down the software environment and triggers the BIOS/UEFI to initiate the boot sequence immediately. Hence, this statement is correct.

Additional Information

• Types of Booting:

• Cold Booting: This occurs when a computer is started from a completely powered-off state. It involves the Power-on Self-test (POST) which checks the integrity of the hardware like RAM, CPU, and Storage.

• Warm Booting: This is a restart initiated while the computer is already on. It is typically faster than a cold boot because it might skip some hardware diagnostic tests performed by the BIOS.

• Functions and Benefits:

• Clearing Memory: A restart clears the Random Access Memory (RAM), which removes temporary files, cached data, and memory leaks caused by poorly coded applications.

• Software Updates: Many Security Patches and OS updates require a restart to replace system files that are currently in use by the Operating System.

• Troubleshooting: It is the primary step in IT Support to resolve system freezes, peripheral connectivity issues, and network errors.

• Power States:

• Sleep Mode: Keeps the current session in RAM and uses a small amount of power for instant resumption.

• Hibernation: Saves the RAM state to the hard disk and turns off the power completely.

Important Points

• BIOS/UEFI Role: When a restart occurs, the Basic Input/Output System (BIOS) or the modern Unified Extensible Firmware Interface (UEFI) takes control to identify and initialize system hardware before handing off control back to the Bootloader.

• History: In older computers (pre-1990s), a restart often required a physical reset button. In modern systems, the ACPI (Advanced Configuration and Power Interface) allows the OS to manage power states and automatic restarts seamlessly.

• Data Integrity: Performing a proper restart via the menu (Soft Reset) is always safer than a Hard Reset (unplugging power), as it allows the disk to finish write operations and prevents file system corruption.

Q59. Answer: (a) 1570

Shortcut Trick

=> Difference in 20% = 190

=> So difference in numbers = 190 ÷ 20% = 190 ÷ 0.2 = 950

=> Required number = 620 + 950 = 1570

Therefore Answer = 1570

Alternate Method

Given:

20% of number is 190 more than 20% of 620

Formula Used:

Percentage = (Value × Percentage) ÷ 100

Calculation:

=> Let number = x

=> (20/100)x = (20/100 × 620) + 190

=> 0.2x = 124 + 190

=> 0.2x = 314

=> x = 314 ÷ 0.2

=> x = 1570

Therefore The correct answer is 1570.

Additional Information

Percentage: Convert to decimal for speed

Shortcut Idea: Difference ÷ percentage

Exam Tip: Avoid long equations when possible

Q60. Answer: (c) Gavi

The correct answer is Gavi.

Key Points

• In a major step toward global health equity, UNICEF and Gavi, the Vaccine Alliance, collaborated to secure a new supply agreement for the R21/Matrix-M malaria vaccine. This partnership is designed to ensure a steady and affordable supply of vaccines for countries most affected by the disease. Hence, the mention of Gavi as the collaborating organization is correct.

• The R21/Matrix-M vaccine was developed by the University of Oxford and is manufactured by the Serum Institute of India (SII). This vaccine is the second malaria vaccine to be recommended by the World Health Organization (WHO), following the RTS,S

vaccine.

• The deal achieved a significant reduction in cost, bringing the price down to approximately $3.90 per dose. This makes it one of the most cost-effective vaccines available for a disease that kills hundreds of thousands of children annually.

• This collaboration focuses on high-burden areas, particularly in Africa, where malaria remains a leading cause of childhood mortality. The goal is to distribute tens of millions of doses to reach children under the age of 5.

• The Serum Institute of India has committed to producing over 100 million doses annually, ensuring that supply meets the high demand projected for the coming years.

Additional Information

• Gavi, the Vaccine Alliance:

• Founded in the year 2000, Gavi is a public-private partnership that helps vaccinate half the world's children against some of the deadliest diseases. It brings together developing country and donor governments, the WHO, UNICEF, and the World Bank.

• Gavi plays a critical role in the Malaria Vaccine Implementation Programme (MVIP), providing the necessary funding for the rollout of vaccines in low-income nations.

• UNICEF (United Nations International Children's Emergency Fund):

• UNICEF is the world's largest procurement agent for vaccines. It procures more than 2 billion doses of various vaccines annually for nearly 100 countries.

• In the context of malaria, UNICEF manages the logistics and supply chain to ensure vaccines reach the most remote and vulnerable communities.

• Malaria Disease Overview:

• Malaria is caused by Plasmodium parasites and is transmitted through the bites of infected female Anopheles mosquitoes.

• According to the World Malaria Report, there were an estimated 249 million cases of malaria globally in 2022, with the vast majority of deaths occurring in the WHO African Region.

Important Points

• R21 vs. RTS,S: While RTS,S (known as Mosquirix) was the first vaccine to be approved in 2021, the R21 vaccine (approved in October 2023) is easier to manufacture at scale and is significantly cheaper, which is vital for mass immunization programs.

• Funding Mechanism: The procurement of these vaccines is supported by Gavi's funding window for malaria vaccines, which was approved by the Gavi Board in December 2021.

• Serum Institute of India (SII): Based in Pune, India, SII is the world's largest vaccine manufacturer by number of doses produced and sold globally. Their involvement is key to the "Make in India" initiative and global health security.

• Target Timeline: The agreement finalized in late 2023 and 2024 ensures that by November 2025, a robust distribution network is in place to handle the increased volume of R21 doses.

Q61. Answer: (b) Raja Ram Mohan Roy

The correct answer is Raja Ram Mohan Roy.

Key Points

• Raja Ram Mohan Roy founded the Brahmo Sabha in August 1828, which was later renamed the Brahmo Samaj. It was one of the first socio-religious reform movements in India aimed at purging Hinduism of its social evils and superstitions.

• He was a strong proponent of monotheism and believed in the worship of one Supreme God. To promote this, he published Tuhfat-ul-Muwahhidin (A Gift to Monotheists) in 1803 and translated the Upanishads into Bengali to prove that ancient Hindu texts supported monotheism.

• One of his most significant social reforms was the agitation against the practice of Sati. His relentless efforts led the then Governor-General Lord William Bentinck to pass the Sati Regulation Act in 1829, which declared the practice illegal and punishable by law.

• He advocated for women's rights, including the right of widows to remarry and the right of women to hold property. He vehemently opposed polygamy and the caste system, arguing for a more egalitarian society.

• In the field of education, he supported Western science and English education. He collaborated with David Hare to establish the Hindu College in Calcutta (now Kolkata) in 1817 and founded the Vedanta College in 1825.

Additional Information

• Debendranath Tagore:

• He joined the Brahmo Samaj in 1842 and gave it a more formal structure. Before joining, he had founded the Tattvabodhini Sabha in 1839 to encourage a systematic study of India's past through a rational outlook.

• Under his leadership, the Brahmo Samaj focused on the propagation of Vedic knowledge and monotheism. However, internal differences regarding the extent of radical reforms led to a split in the organization in 1866.

• Ishwar Chandra Vidyasagar:

• Known as a great scholar and reformer, he is best remembered for his contribution to the legalization of widow remarriage. His activism led to the passing of the Hindu Widows' Remarriage Act, 1856.

• He served as the Principal of Sanskrit College in Calcutta and opened the gates of the college to non-Brahmin students, breaking the monopoly of higher castes over priestly education.

• Swami Dayananda Saraswati:

• He founded the Arya Samaj in 1875 in Bombay. His slogan was "Back to the Vedas," as he believed the Vedas contained the infallible knowledge of God and Nature.

• He published Satyarth Prakash (The Light of Truth) in 1875, which outlined his philosophy and criticism of contemporary social and religious practices like idol worship and child marriage.

• Keshab Chandra Sen:

• He was instrumental in spreading the Brahmo Samaj outside Bengal to places like Bombay, Madras, and the North-Western Provinces. After the split in 1866, he headed the Brahmo Samaj of India.

Important Points

• Title of Raja: The title "Raja" was conferred upon Ram Mohan Roy by the Mughal Emperor Akbar II in 1830, when he was sent to England as an envoy to represent the Emperor's grievances to the British King.

• Journalism: He is considered the pioneer of Indian journalism. He published journals like Sambad Kaumudi (in Bengali, started in 1821) and Mirat-ul-Akbar (in Persian, started in 1822) to educate the public and voice social concerns.

• Atmiya Sabha: Before the Brahmo Samaj, he established the Atmiya Sabha (Society of Friends) in 1814 to hold philosophical discussions on monotheism and social reforms in Calcutta.

• Historical Significance: Raja Ram Mohan Roy is often referred to as the "Father of Modern India" or the "Father of the Indian Renaissance" because of his efforts to bridge the gap between Indian tradition and Western modernity.

Q62. Answer: (b) 16

The logic followed here is:

Given numbers: 419, 975, 573, 389, 937

Here, Highest and lowest numbers:

Highest number = 975

Lowest number = 389

Required digits:

Second digit of highest number (975) = 7

Third digit of lowest number (389) = 9

Sum: 7 + 9 = 16

Hence, the correct answer is Option 2.

Q63. Answer: (b) 288

Shortcut Trick

=> Use weighted average

=> Total = (32×266) + (52×470) + (73×168)

=> = 8512 + 24440 + 12264 = 45216

=> Total members = 32 + 52 + 73 = 157

=> Average = 45216 ÷ 157 = 288

Therefore Answer = 288

Alternate Method

Given:

Group A → 32 members, avg = 266

Group B → 52 members, avg = 470

Group C → 73 members, avg = 168

Formula Used:

Overall Average = Σ (n × avg) ÷ Σ n

Calculation:

=> Total A = 32 × 266 = 8512

=> Total B = 52 × 470 = 24440

=> Total C = 73 × 168 = 12264

=> Total expenditure = 8512 + 24440 + 12264 = 45216

=> Total members = 32 + 52 + 73 = 157

=> Overall average = 45216 ÷ 157 = 288

Therefore The correct answer is 288.

Additional Information

Weighted Average: (Σ n×x) ÷ Σ n

Concept: Multiply first, then divide once

Exam Tip: Avoid separate averages

Q64. Answer: (a) EOI 33

The logic followed here is:

So, 'EOI 33' will replace the question mark in the given series.

Hence, the correct answer is "Option 1"

Q65. Answer: (b) CHKP

The logic followed here is:

For, GKOS → INQV

Similarly, HLPT → JORW

Now, apply the same rule to AEIM:

Here, AEIM → CHKP

Hence, the correct answer is Option 2.

Q66. Answer: (a) Soil

The correct answer is Soil.

Key Points

• An ecosystem is composed of two major components: Biotic factors (living components) and Abiotic factors (non-living components).

• Soil is a critical abiotic factor as it is a non-living substance consisting of minerals, organic matter, gases, liquids, and countless organisms that together support life on Earth. It provides nutrients and physical support for plants. Hence, Soil is the correct answer.

• Bacteria are unicellular microorganisms that are considered living organisms. In an ecosystem, they often function as decomposers or pathogens, making them a biotic factor. Hence, Bacteria is an incorrect statement.

• Insects are multicellular organisms belonging to the Animalia kingdom. They are living beings that interact with their environment as pollinators, consumers, or prey, which classifies them as biotic factors. Hence, Insects is an incorrect statement.

• Trees are perennial plants that are living organisms. They act as primary producers in many ecosystems by converting solar energy into chemical energy through photosynthesis, thus they are biotic factors. Hence, Trees is an incorrect statement.

Additional Information

• Abiotic Factors: These refer to the non-living physical and chemical elements in the ecosystem. Abiotic resources are usually obtained from the lithosphere, atmosphere, and hydrosphere.

• Sunlight: The ultimate source of energy for life on Earth. It governs the temperature and drives photosynthesis.

• Water: A vital abiotic component required for biochemical reactions within living cells. Its availability determines the type of ecosystem (e.g., desert vs. rainforest).

• Temperature: Influences the metabolic rates of organisms. Most life forms are adapted to survive within a specific temperature range.

• Atmosphere: Provides Oxygen for respiration and Carbon Dioxide for photosynthesis.

• Biotic Factors: These are the living parts of an ecosystem, which include animals, plants, fungi, and bacteria.

• Producers (Autotrophs): Organisms like green plants and algae that produce their own food.

• Consumers (Heterotrophs): Organisms that depend on others for food, such as herbivores, carnivores, and omnivores.

• Decomposers (Saprotrophs): Organisms like fungi and bacteria that break down dead organic matter, recycling nutrients back into the soil.

Important Points

• Interdependence: Biotic and abiotic factors are interrelated. If one factor is altered or removed, it can affect the entire ecosystem. For example, a change in soil pH (abiotic) can prevent certain plants (biotic) from growing.

• Limiting Factors: Any abiotic factor that restricts the numbers, reproduction, or distribution of organisms is called a limiting factor. Common examples include scarcity of water in arid regions or low sunlight in the deep ocean.

• Location-specific Factors: The importance of specific abiotic factors can vary by location. In marine ecosystems, salinity and water pressure are key factors, whereas in terrestrial ecosystems, soil composition and altitude are more significant.

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Q67. Answer: (c) Border Security Force (BSF)

The correct answer is Border Security Force (BSF).

Key Points

• The Border Security Force (BSF) traditionally launches Operation Alert along the International Border (IB) with Pakistan to enhance security and vigilance.

• In August 2025, this operation is conducted to thwart any potential infiltration or smuggling attempts from across the border ahead of India's Independence Day on 15th August.

• The exercise covers the entire Rajasthan and Gujarat frontier, particularly focusing on the Jaisalmer, Barmer, Bikaner, and Sri Ganganagar districts of Rajasthan.

• During this period, the BSF increases its patrolling frequency, deploys additional manpower, and utilizes high-tech surveillance equipment to monitor the Thar Desert region.

• The operation involves a multi-layered security grid to ensure that anti-national elements do not exploit the geographical terrain or weather conditions like sandstorms or monsoon rains.

Additional Information

• Border Security Force (BSF):

• Established on 1st December 1965, the BSF was formed following the Indo-Pakistani War of 1965 to ensure the security of the borders of India.

• It is one of the seven Central Armed Police Forces (CAPF) of India and functions under the administrative control of the Ministry of Home Affairs.

• Its motto is "Jeevan Paryant Kartavya" (Duty Unto Death), reflecting the dedication of its personnel guarding the borders 24/7.

• The BSF is responsible for guarding the 6,386.36 km long international border with Pakistan and Bangladesh.

• Other Paramilitary and Security Forces:

• Indian Coast Guard (ICG): Established in 1977, it protects India's maritime interests and enforces maritime law within the Exclusive Economic Zone (EEZ).

• Central Industrial Security Force (CISF): Established in 1969, it provides security to critical infrastructure like airports, metro rails, and Public Sector Undertakings (PSUs).

• Indian Navy: The naval branch of the Indian Armed Forces, responsible for maritime security and projecting India's power in the Indian Ocean Region.

Important Points

• The Rajasthan sector of the India-Pakistan border is approximately 1,037 km long and is characterized by shifting sand dunes and extreme temperatures.

• Operation Alert is a routine but critical security exercise carried out twice a year, specifically around Republic Day (January 26) and Independence Day (August 15).

• Technical surveillance used during this operation includes Hand-Held Thermal Imagers (HHTI), Night Vision Goggles (NVG), and unmanned aerial vehicles (UAVs) to maintain a constant vigil.

• The Director General of the BSF (as of recent appointments) oversees such large-scale mobilizations to ensure the operational readiness of the troops at the zero line.

• The BSF is currently the largest border guarding force in the world, consisting of over 180 battalions and a strength of approximately 2.65 lakh personnel.

Q68. Answer: (b) parallelogram

Shortcut Trick

=> All given properties are standard properties of a parallelogram

=> Opposite sides equal Yes

=> Diagonals bisect each other Yes

=> Opposite angles equal Yes

=> Diagonal divides into congruent triangles Yes

Therefore Answer = Parallelogram

Alternate Method

Given:

(i) Opposite sides equal

(ii) Diagonals divide into congruent triangles

(iii) Opposite angles equal

(iv) Diagonals bisect each other

Concept Used:
Properties of quadrilaterals
Calculation:
=> A quadrilateral with opposite sides equal is a parallelogram
=> If diagonals bisect each other => parallelogram
=> Opposite angles equal => parallelogram
=> Diagonal divides into congruent triangles => parallelogram
=> All conditions confirm the same figure
Therefore The correct answer is Parallelogram.
Additional Information
Parallelogram: Both pairs of opposite sides parallel
Key Properties: Opp sides equal, diagonals bisect
Triangles: Diagonal forms congruent triangles
Exam Tip: Any one of these is sufficient condition

Q69. Answer: (a) 28

Shortcut Trick
=> Amount doubles in 7 years => growth factor = 2
=> 16 = 2^4
=> So time = 4 × 7 = 28 years
Therefore Answer = 28 years
Alternate Method
Given:
Amount doubles in 7 years
Formula Used:
$A = P(1 + r)^n$
Calculation:
=> After 7 years => A = 2P
=> After 14 years => A = 4P
=> After 21 years => A = 8P
=> After 28 years => A = 16P
Therefore The correct answer is 28 years.
Additional Information
Compound Growth: Repeated multiplication
Key Idea: Convert into powers
Shortcut: 16 = 2^4
Exam Tip: Use doubling concept for CI

Q70. Answer: (c) 6 km to the South

Given:
Fardin starts from Point A and drives 42 km West.
He turns left → 40 km South.
He turns left → 49 km East.
He turns left → 46 km North.
He takes a final left → 7 km West.
To reach Point A, he must travel 6 km South.
Hence, the correct answer is Option 3.

Q71. Answer: (d) 1740

Shortcut Trick
=> 2 pages → 40 min => 1 page → 20 min
=> 87 pages → 87 × 20 = 1740 min
Therefore Answer = 1740 minutes

Alternate Method

Given:

2 pages → 40 minutes

Required → 87 pages

Concept Used:

Unitary method (Time prop. to pages)

Calculation:

=> Time for 1 page = 40 ÷ 2 = 20 minutes

=> Time for 87 pages = 87 × 20

=> = 1740 minutes

Therefore The correct answer is 1740 minutes.

Additional Information

Unitary Method: Find value of 1 unit first

Direct Proportion: More pages → more time

Exam Tip: Reduce to per unit quickly

Q72. Answer: (b) 18

The correct answer is 18.

Key Points

• The Twelfth Schedule of the Indian Constitution was added by the 74th Constitutional Amendment Act, 1992, which came into force on June 1, 1993.

• It contains a list of 18 functional items that fall under the jurisdiction of Urban Local Bodies (ULBs), such as Municipal Corporations, Municipal Councils, and Nagar Panchayats.

• These items are listed under Article 243-W of the Constitution of India, which empowers the State Legislatures to devolve powers and responsibilities to municipalities to enable them to function as institutions of self-government.

• The functional domain includes crucial urban tasks such as Urban Planning, Regulation of land-use, Planning for economic and social development, and Public Health and Sanitation.

• As of March 2025, these 18 tasks remain the constitutional standard for the functional responsibilities of urban governance in India.

Additional Information

• The 74th Constitutional Amendment Act, 1992:

• This act granted constitutional status and protection to Urban Local Bodies.

• It initiated a uniform structure for municipalities across India, ensuring regular elections and the establishment of State Finance Commissions to review the financial position of municipalities.

• The act inserted Part IX-A into the Constitution, titled 'The Municipalities', spanning from Article 243-P to 243-ZG.

• Comparison with the Eleventh Schedule:

• While the Twelfth Schedule deals with urban areas and contains 18 items, the Eleventh Schedule deals with Rural Local Bodies (Panchayati Raj Institutions).

• The Eleventh Schedule was added by the 73rd Constitutional Amendment Act, 1992 and contains 29 functional items.

• Both schedules aim at democratic decentralization and strengthening local self-governance in India.

• Composition of ULBs:

• Nagar Panchayat: For a transitional area (an area in transition from a rural area to an urban area).

• Municipal Council: For a smaller urban area.

• Municipal Corporation: For a larger urban area (Metropolitan cities).

Important Points

• The 18 Functional Items of the Twelfth Schedule include:

• 1. Urban planning including town planning.

• 2. Regulation of land-use and construction of buildings.

• 3. Planning for economic and social development.

• 4. Roads and bridges.

• 5. Water supply for domestic, industrial, and commercial purposes.

• 6. Public health, sanitation conservancy, and solid waste management.

• 7. Fire services.

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• 8. Urban forestry, protection of the environment, and promotion of ecological aspects.

• 9. Safeguarding the interests of weaker sections of society, including the handicapped and mentally retarded.

• 10. Slum improvement and upgradation.

• 11. Urban poverty alleviation.

• 12. Provision of urban amenities and facilities such as parks, gardens, playgrounds.

• 13. Promotion of cultural, educational, and aesthetic aspects.

• 14. Burials and burial grounds; cremations, cremation grounds, and electric crematoriums.

• 15. Cattle pounds; prevention of cruelty to animals.

• 16. Vital statistics including registration of births and deaths.

• 17. Public amenities including street lighting, parking lots, bus stops, and public conveniences.

• 18. Regulation of slaughterhouses and tanneries.

• Article 243-W: This specific article mandates that the State Legislature may, by law, endow the Municipalities with such powers and authority as may be necessary to enable them to function as institutions of self-government.

Q73. Answer: (c) Puri, Khurda and Ganjam

The correct answer is Puri, Khurda and Ganjam.

Key Points

• Chilika Lake is situated on the east coast of India in the state of Odisha. It is separated from the Bay of Bengal by a narrow spit and is spread across the districts of Puri, Khurda, and Ganjam.

• It is recognized as the largest brackish water lagoon in India and the second-largest coastal lagoon in the world after the New Caledonian barrier reef.

• The lake is pear-shaped and covers an area that fluctuates between 900 sq km during the summer to 1,165 sq km during the monsoon season.

• The Puri district covers the eastern part of the lagoon, which includes the sea mouth where the lake meets the Bay of Bengal.

• The Khurda district encompasses the northern reaches of the lake, where the Daya River and Bhargavi River flow into the lagoon, significantly influencing its salinity levels.

• The Ganjam district hosts the southern part of Chilika Lake, providing a diverse ecosystem for local fishing communities and tourism activities.

Additional Information

• Biodiversity and Wildlife: The lake is a vital ecosystem that supports Irrawaddy dolphins (Orcaella brevirostris), which are the primary attraction for tourists in the Satapada region of the lake. It is also home to a variety of migratory birds that arrive during the winter months from places as far as Siberia, Central Asia, Iran, and Lake Baikal.

• Ramsar Convention: In 1981, Chilika Lake was designated as the first Indian wetland of international importance under the Ramsar Convention. This recognition was due to its immense biological diversity and its role in supporting endangered species.

• Nalbana Bird Sanctuary: Located within the lake, Nalbana Island is a notified Bird Sanctuary under the Wildlife Protection Act. During the monsoon, the island is often submerged, but it emerges in winter to host thousands of birds.

• Economic Importance: The lagoon is a lifeline for over 1.5 lakh fisherfolk living in 132 villages along the shore and on islands. The annual catch includes commercial varieties of prawns, crabs, and fish like Khainga and Bhetki.

• Cultural Significance: The Kalijai Temple, located on an island in Chilika Lake, is a major pilgrimage site and is considered the abode of the deity Goddess Kalijai, the presiding deity of the lagoon.

Important Points

• Environmental Management: The Chilika Development Authority (CDA) was established in 1991 by the Government of Odisha for the conservation and all-round development of the lake.

• Montreux Record: Due to siltation and choking of the mouth of the lake, Chilika was placed on the Montreux Record (a record of Ramsar sites where changes in ecological character have occurred) in 1993. However, following successful restoration and the opening of a new mouth in 2000, it was removed from the list in 2002, making it the first site in Asia to be removed from the record after successful restoration.

• Salinity Gradient: One of the unique features of the lake is its salinity gradient, which ranges from fresh water (near the river mouths) to seawater (near the outer channel), allowing both freshwater and marine species to thrive.

• Tourism: Major entry points for tourism include Barkul, Rambha, Satapada, and Balugaon, providing facilities for boating and bird watching.

Q74. Answer: (d) (x2 + 1)2 − x4 = 2x + 1

Shortcut Trick

=> Check which simplifies to degree 2 (quadratic)

=> Option (4): $(x^2 + 1)^2 - x^4 = 2x + 1$

=> Expand => x^4 + 2x² + 1 − x^4 = 2x + 1

=> 2x² + 1 = 2x + 1 => 2x² − 2x = 0

=> x² − x = 0 (quadratic)

Therefore Answer = Option 4

Alternate Method

Given:

Check which option becomes a quadratic equation

Concept Used:

Quadratic equation => highest power of x is 2

Calculation:

Option 1: (x²−1)/(x+1) = x−2 => simplifies to linear

Option 2: x/(x−1) + 2x/(x−1) = 3 => linear

Option 3: x³−3x²+3x−1 = (x−1)³ => identity => 0 = 0

Option 4:

=> (x²+1)² − x^4 = 2x+1

=> x^4 + 2x² + 1 − x^4 = 2x + 1

=> 2x² + 1 = 2x + 1

=> 2x² − 2x = 0

=> x² − x = 0 => quadratic

Therefore The correct answer is Option 4.

Additional Information

Quadratic: ax² + bx + c = 0

Degree: Highest power determines type

Exam Tip: Simplify each option quickly

Q75. Answer: (c) Gujarat and Rajasthan

The correct answer is Gujarat and Rajasthan.

Key Points

• The Trishul 2025 exercise is a significant tri-services military drill conducted by the Indian Armed Forces to test and enhance the operational preparedness of the Army, Navy, and Air Force.

• This massive exercise was hosted in the Western Sector, specifically across the states of Gujarat and Rajasthan, during the months of October and November 2025. Hence, the statement regarding these states being the hosts is correct.

• The primary objective of the exercise was to practice interoperability and jointmanship among the three wings of the military, ensuring a cohesive response to any potential external threats along the international borders.

• The geographical diversity of Rajasthan (vast desert terrain) and Gujarat (extensive coastline and salt marshes) provided a complex environment for testing various war-fighting assets and strategic maneuvers.

• The exercise involved the deployment of advanced fighter jets, attack helicopters, main battle tanks, and naval assets, demonstrating India's integrated combat power.

Additional Information

• Strategic Significance of the Western Sector:

• The states of Gujarat and Rajasthan share a long international border with Pakistan. Rajasthan accounts for approximately 1,037 km of the border, while Gujarat shares about 508 km.

• Conducting exercises in these regions acts as a strategic deterrent and helps the South Western Command and Western Command of the Indian Army to refine their battlefield tactics.

• Atmanirbhar Bharat in Defense:

• The Trishul 2025 exercise showcased several indigenously developed platforms. Key equipment included the LCA Tejas, Prachand Light Combat Helicopter (LCH), and the Arjun Main Battle Tank.

• This aligns with the Make in India initiative aimed at reducing defense imports and achieving self-reliance in security infrastructure.

• Role of Integrated Battle Groups (IBGs):

• The exercise focused on the validation of Integrated Battle Groups (IBGs), which are agile, brigade-sized self-contained fighting units that can be mobilized rapidly for offensive operations.

• The IBGs are designed to be more versatile and responsive than traditional, larger divisions, incorporating infantry, artillery, and armour units.

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• Naval and Air Coordination:

• While Rajasthan provided the ground for land-air operations, the Gujarat coastline allowed the Indian Navy to practice amphibious landings and maritime security drills in the Arabian Sea.

• Coordination between the Western Air Command and the Western Naval Command was a crucial feature of this 2025 drill.

Important Points

• Chief of Defence Staff (CDS): The planning of Trishul 2025 was overseen by the Department of Military Affairs (DMA) under the CDS, emphasizing the mandate to promote jointness in procurement, training, and operations.

• Timeline and Logistics: The exercise spanned over 60 days (October–November), involving over 50,000 personnel and hundreds of aircraft and drones.

• Cyber and Electronic Warfare: For the first time in a major tri-services drill of this scale, electronic warfare (EW) and cyber defense capabilities were tested alongside traditional kinetic operations to prepare for Fifth-Generation Warfare.

• International Observation: Such exercises are often monitored by global observers and satellite reconnaissance, reflecting India's growing status as a net security provider in the Indian Ocean Region (IOR).

Q76. Answer: (a) 837

Shortcut Trick

=> 4 lines → 36 words => 1 line → 9 words

=> 93 lines → 93 × 9 = 837 words

Therefore Answer = 837

Alternate Method

Given:

4 lines → 36 words

Required → 93 lines

Concept Used:

Unitary method (Words prop. to lines)

Calculation:

=> Words per line = 36 ÷ 4 = 9

=> Words in 93 lines = 93 × 9

=> = 837

Therefore The correct answer is 837.

Additional Information

Unitary Method: Find value of 1 unit

Direct Proportion: More lines → more words

Exam Tip: Always reduce to per unit first

Q77. Answer: (d) 32.5

Shortcut Trick

=> Average of first n natural numbers = (n + 1) / 2

=> n = 64 => Average = (64 + 1) / 2 = 65 / 2 = 32.5

Therefore Answer = 32.5

Alternate Method

Given:

Numbers from 1 to 64

Formula Used:

Average = (First term + Last term) ÷ 2

Calculation:

=> First term = 1

=> Last term = 64

=> Average = (1 + 64) ÷ 2

=> = 65 ÷ 2

=> = 32.5

Therefore The correct answer is 32.5.

Additional Information

AP Concept: Natural numbers form an AP

Shortcut: (first + last)/2

Exam Tip: No need to sum all numbers

Q78. Answer: (d) Both statements I and II together (and not statement 1 alone or statement II alone) are sufficient to answe...

Given Statements:

I. N is shorter than only three trees among L, M, N, T and V.

II. N is taller than M but shorter than T.

Conclusions:

I. Which tree is the shortest among L, M, N, T and V → Not Determined (From Statement I, N is fixed at 4th position, but the identity of the 5th position is not directly known).

II. Which tree is the shortest among L, M, N, T and V → Not Determined (From Statement II alone, we only know T > N > M, but L and V are not placed, so the shortest cannot be identified).

So, Statement I alone is not sufficient and Statement II alone is not sufficient.

Combining both statements:

From Statement I, N is at the 4th position.

From Statement II, M is shorter than N.

So M must occupy the only remaining lower position (5th).

Thus, M is the shortest tree.

So, both statements I and II together are sufficient while neither statement alone is sufficient.

Hence, the correct answer is "Option 4".

Q79. Answer: (c) 21-23-25

The logic followed here is:

Logic: The numbers form a simple arithmetic progression where each term increases by a constant difference of +2.

For, 5 - 7 - 9

=> 5 + 2 = 7

=> 7 + 2 = 9

For, 11 - 13 - 15

=> 11 + 2 = 13

=> 13 + 2 = 15

Now, checking the options using the same pattern:

Option 1) 4 - 39 - 61

=> 4 + 2 = 6 ≠ 39

Option 2) 18 - 15 - 12

=> 18 − 3 = 15

=> 15 − 3 = 12

Option 3) 21 - 23 - 25

=> 21 + 2 = 23

=> 23 + 2 = 25

Option 4) 4 - 30 - 84

=> 4 → 30 (+26)

Hence, the correct answer is Option 3.

Q80. Answer: (b) ASO 30

The logic followed here is:

So, 'ASO 30' will replace the question mark in the given series.

Hence, the correct answer is "Option 2"

Q81. Answer: (a) Neither conclusion (I) nor (II) follows.

Given Statements:

All lions are monkeys.

Some monkeys are cats.

All pigs are cats.

The least possible Venn diagram for the given statement is:

Conclusions:

I. Some pigs are lions - False (Pigs are inside Cats, and Lions are inside Monkeys, but there is no necessary overlap between Pigs and Lions).

II. Some pigs are monkeys - False (Pigs are inside Cats and only some Monkeys are Cats, so no definite overlap between Pigs and Monkeys is given).

So, neither conclusion (I) nor (II) follows.

Hence, the correct answer is "Option 1".

Q82. Answer: (a) 360

The logic followed here is:

Logic: The second number is obtained by multiplying the first number with (first number + 2).

For, 10 → 120

=> 10 × (10 + 2)

=> 10 × 12 = 120

For, 12 → 168

=> 12 × (12 + 2)

=> 12 × 14 = 168

Now, applying the same logic:

18 → 18 × (18 + 2)

=> 18 × 20 = 360

Hence, the correct answer is Option 1.

Q83. Answer: (d) Dr. Mahbub-ul-Haq

The correct answer is Dr. Mahbub-ul-Haq.

Key Points

• The conceptual framework of Human Development was pioneered by Dr. Mahbub-ul-Haq, a renowned Pakistani economist, in the year 1990. He described human development as a process of enlarging people's choices and improving their well-being.

• Dr. Haq created the Human Development Index (HDI) to shift the focus of development economics from national income accounting to people-centered policies. He argued that the basic objective of development is to create an environment in which people can enjoy long, healthy, and creative lives. Hence, option 4 is correct.

• Prof. Amartya Sen, an Indian Nobel Laureate and economist, was a close collaborator with Dr. Haq. While he did not pioneer the index alone, his Capability Approach provided the philosophical foundation for the human development framework. He emphasized that development should be seen as the expansion of human capabilities and freedom. Hence, option 2 is incorrect as the primary pioneer.

• Dr. Abdus Salam was a world-renowned Pakistani theoretical physicist. He was the first Pakistani to receive a Nobel Prize in Physics in 1979 for his contribution to the electroweak unification theory. He had no direct role in the pioneering of the Human Development framework. Hence, option 1 is incorrect.

• Ellen C. Semple was a leading American geographer and a student of Friedrich Ratzel. she is best known for her work on environmental determinism and the influence of physical environment on human activity, which is a different field from development economics. Hence, option 3 is incorrect.

• The United Nations Development Programme (UNDP) adopted this framework and has been publishing the Human Development Report (HDR) annually since 1990 based on the work of these economists.

Additional Information

• Dimensions of HDI: The Human Development Index (HDI) is a composite statistic of three key dimensions:

• Long and healthy life: Measured by Life Expectancy at Birth.

• Knowledge: Measured by Mean Years of Schooling (for adults aged 25 years and older) and Expected Years of Schooling (for children of school entering age).

• Decent standard of living: Measured by Gross National Income (GNI) per capita at Purchasing Power Parity (PPP) in US Dollars.

• The Human Development Report (HDR): It is an annual report published by the Human Development Report Office of the UNDP. The first report was released in 1990. The report categorizes countries into four tiers of human development: Very High, High, Medium, and Low.

• India's Position: In the 2022/2023 Human Development Report, India was ranked 134th out of 193 countries with an HDI value of 0.644, placing it in the Medium Human Development category.

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• Other Related Indices: Apart from HDI, the UNDP publishes other indices such as the Inequality-adjusted HDI (IHDI), the Gender Inequality Index (GII), and the Multidimensional Poverty Index (MPI) to provide a broader view of development and disparities.

Important Points

• Shift in Paradigm: Before the 1990s, a country's progress was measured almost exclusively by its Gross Domestic Product (GDP) or economic growth. The Human Development framework shifted the focus from economics to people, establishing that people and their capabilities should be the ultimate criteria for assessing the development of a country.

• Equity and Sustainability: The framework emphasizes equity (access to opportunities for all), sustainability (opportunities for future generations), productivity (human resource investment), and empowerment (freedom to exercise choices).

• Dr. Mahbub-ul-Haq's Legacy: His work remains influential in global policy-making, prompting governments to invest more in health, education, and social safety nets rather than just focusing on industrial output.

Q84. Answer: (b) 7/1350

Shortcut Trick

=> a + b = 129, HCF = 3, LCM = 1350

=> ab = HCF × LCM = 3 × 1350 = 4050

=> (1/a − 1/b) = (b − a) / ab

=> Let a = 3x, b = 3y => x + y = 43, xy = 450

=> Solve => x = 18, y = 25 => a = 54, b = 75

=> (1/a − 1/b) = (75 − 54) / 4050 = 21 / 4050 = 7 / 1350

Therefore Answer = 7/1350

Alternate Method

Given:

a + b = 129

HCF = 3, LCM = 1350

Formula Used:

Product of two numbers = HCF × LCM

1/a − 1/b = (b − a) / ab

Calculation:

=> ab = 3 × 1350 = 4050

=> Let a = 3x, b = 3y

=> x + y = 43, xy = 450

=> Numbers => x = 18, y = 25

=> a = 54, b = 75

=> (1/a − 1/b) = (75 − 54) / 4050

=> = 21 / 4050 = 7 / 1350

Therefore The correct answer is 7/1350.

Additional Information

HCF × LCM: Always equals product of numbers

Substitution: Use multiples of HCF

Exam Tip: Reduce fraction at the end

Q85. Answer: (a) Two

Given: X, Y, Z, S, T and U 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, which is numbered 6.

X lives on an even numbered floor but not on floor number 4.

Only two people live between X and T.

S lives on an odd numbered floor but not on the lowermost floor.

Only two people live between S and Y.

Z lives immediately below S.

Floor	Person
6	X

5	S
4	Z
3	T
2	Y
1	U

Now, people between U and Z: 2 people

Hence, the correct answer is Option 1.

Q86. Answer: (c) Mother's father

Family Chart:

Decoding the Symbols:

Symbol	**•**	**−**	**×**	**÷**
Meaning	Husband	Mother	Wife	Father

Given: P + Q − R × S ÷ T

It means: P is the husband of Q, Q is the mother of R, R is the wife of S, S is the father of T.

So, P is the father of T's mother => Mother's father

Hence, the correct answer is Option 3.

Q87. Answer: (a) 659

BODMAS Table:

Given equation: 216 ÷ 3 + 1313 × 13 − 112 = ?

Now, interchanging the signs: ↔ − and × ↔ ÷

216 × 3 − 1313 ÷ 13 + 112

=> 216 × 3 − (1313 ÷ 13) + 112

=> 648 − 101 + 112

=> 547 + 112

=> 659

Hence, the correct answer is "Option 1".

Q88. Answer: (b) Rashtriya Vigyan Puraskar

The correct answer is Rashtriya Vigyan Puraskar.

Key Points

• The Rashtriya Vigyan Puraskar (RVP) was instituted by the Government of India to recognize and honor the outstanding contributions of scientists, technologists, and innovators in various fields of Science, Technology, and Innovation. Hence, the correct answer is Rashtriya Vigyan Puraskar.

• This award is considered one of the highest honors in the scientific community in India, replacing the diverse set of awards previously distributed by different departments to bring them under one umbrella.

• The award aims to recognize lifetime achievements, distinguished contributions, and young scientists' excellence, ensuring that the selection process is transparent and prestigious. Hence, the statement regarding its role in honoring excellence is correct.

• The awards are announced annually and cover 13 domains including Physics, Chemistry, Biological Sciences, Mathematics & Computer Science, Earth Sciences, Medicine, Engineering Sciences, Agricultural Science, Environmental Science, Technology & Innovation, Atomic Energy, Space Science and Technology, and Others.

• The Rashtriya Vigyan Puraskar comprises four distinct categories: Vigyan Ratna, Vigyan Shri, Vigyan Yuva–Shanti Swarup Bhatnagar, and Vigyan Team.

Additional Information

• Shanti Swarup Bhatnagar (SSB) Prize:

• Named after the founder-director of the Council of Scientific and Industrial Research (CSIR), Dr. Shanti Swarup Bhatnagar.

• Traditionally, it was the most prestigious award for scientists under the age of 45 years in India.

• Under the new system, it has been integrated into the Rashtriya Vigyan Puraskar as the Vigyan Yuva–SSB award to continue honoring young scientific talent. Hence, the statement regarding its transition is correct.

• Bharat Ratna:

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• This is the highest civilian award of the Republic of India, instituted in 1954.

• It is awarded in recognition of exceptional service or performance of the highest order in any field of human endeavor, not limited specifically to science and technology.

• Famous scientists like C.V. Raman and A.P.J. Abdul Kalam have been recipients of this honor. Hence, while it honors scientists, it is not the specific STI award announced for this purpose in 2025.

• Padma Vibhushan:

• It is the second-highest civilian award in India, after the Bharat Ratna.

• It is awarded for "exceptional and distinguished service" in various fields, including science and engineering. Hence, the statement describing its broad scope is correct.

• Vigyan Ratna and Vigyan Shri:

• The Vigyan Ratna award recognizes lifetime achievements and contributions made in any field of science and technology.

• The Vigyan Shri award recognizes distinguished contributions in any field of science and technology.

Important Points

• Announcement and Presentation Dates:

• The Rashtriya Vigyan Puraskar is typically announced on May 11 every year, which is observed as National Technology Day in India.

• The award ceremony is held on August 23, which is designated as National Space Day to commemorate the success of the Chandrayaan-3 mission.

• Eligibility:

• The awards are open to Scientists, Technologists, and Innovators working in government, private organizations, or individuals working independently.

• People of Indian Origin (PIOs) residing abroad who have made exceptional contributions benefiting Indian society are also eligible for these awards.

• Selection Committee:

• The winners are selected by the Rashtriya Vigyan Puraskar Committee (RVPC), which is headed by the Principal Scientific Adviser (PSA) to the Government of India.

Q89. Answer: (d) Uniform landform

The correct answer is Uniform landform.

Key Points

• Irrigation availability: The presence of diverse irrigation facilities such as Canals, Tube wells, and Drip irrigation allows farmers to grow a variety of crops throughout the year. For example, the Indira Gandhi Canal in Rajasthan has transformed the desert into a productive agricultural zone. Hence, this factor contributes to farming variety.

• Soil types: India features a diverse range of soils including Alluvial soil (found in Indo-Gangetic plains), Black soil (ideal for Cotton in the Deccan), Red and Yellow soil, and Laterite soil. Each soil type has unique chemical properties and fertility levels that determine the type of crops grown. Hence, this factor contributes to farming variety.

• Climate: India experiences a wide range of climatic conditions, from the Alpine climate in the Himalayas to the Tropical humid climate in the South. Variability in Temperature and Precipitation leads to the cultivation of diverse crops like Wheat in cooler regions and Rice or Spices in hotter, humid regions. Hence, this factor contributes to farming variety.

• Uniform landform: This term refers to a lack of geographical diversity (i.e., the entire country having the same topography). India, however, has heterogeneous landforms including Mountains, Plateaus, and Plains. A Uniform landform would actually reduce the variety of farming techniques and crop choices because different altitudes and slopes support different agricultural practices. Hence, this factor does not contribute to farming variety.

Additional Information

• Agricultural Seasons in India:

• Kharif Season: These crops are sown with the onset of Monsoon (June-July) and harvested in September-October. Major crops include Rice, Maize, Cotton, and Groundnut.

• Rabi Season: These crops are sown in Winter (October-December) and harvested in Spring (April-June). Major crops include Wheat, Barley, Gram, and Mustard.

• Zaid Season: A short season between Rabi and Kharif (March-July). It involves the cultivation of Watermelon, Cucumber, and Fodder crops.

• Major Crop Categories:

• Food Crops: These include staples like Rice, Wheat, Millets, and Pulses. India is one of the Top 3 producers of Rice and Wheat globally.

• Cash Crops: Crops grown for commercial profit rather than local consumption, such as Sugarcane, Oilseeds, Cotton, and Jute.

• Plantation Crops: Large-scale estates used for crops like Tea (majorly in Assam), Coffee (majorly in Karnataka), and Rubber

(majorly in Kerala).

• Geographical Factors: Relief and Altitude play a massive role. Terrace farming is practiced in hilly areas like Uttarakhand and Himachal Pradesh, while intensive Subsistence farming is dominant in the Indo-Gangetic plains.

Important Points

• Net Irrigated Area: According to recent data, approximately 49% of India's total net sown area is under Irrigation, while the rest depends on Rainfall.

• Soil Health Card Scheme: Launched by the Government of India in 2015 to help farmers understand Soil health and use appropriate fertilizers to maintain soil diversity and productivity.

• Green Revolution: Initiated in the 1960s by M.S. Swaminathan in India, it introduced High-Yielding Variety (HYV) seeds, which significantly changed the farming variety and intensity, particularly in Punjab and Haryana.

• Agro-Climatic Zones: The Planning Commission has divided India into 15 major Agro-Climatic Zones to better manage the regional farming variety based on local Climate and Landform characteristics.

Q90. Answer: (b) 24

The logic followed here is:

thus, "24" will replace the question mark in the given series.

Hence, the correct option is "Option 2".

Q91. Answer: (b) 1

Given: P, Q, R, S, T, U and V sit around a circular table facing the centre.

Only two people sit between P and U when counted from the right of P.

Only two people sit between U and V.

Only three people sit between P and T.

S sits to the immediate left of R.

So, only V lies between them => 1 person

Hence, the correct answer is Option 2.

Q92. Answer: (c) 1181

Shortcut Trick

=> $x^3 = 31 + 14\sqrt{3}$, $y^3 = 31 - 14\sqrt{3}$

=> $x^3 + y^3 = 62$

=> $x^3y^3 = (31 + 14\sqrt{3})(31 - 14\sqrt{3}) = 31^2 - (14\sqrt{3})^2 = 961 - 588 = 373$

=> Required = $62 + 3 \times 373 = 62 + 1119 = 1181$

Therefore Answer = 1181

Alternate Method

Given:

$x = \text{cbrt}(31 + 14\sqrt{3})$, $y = \text{cbrt}(31 - 14\sqrt{3})$

Formula Used:

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

Calculation:

=> $x^3 = 31 + 14\sqrt{3}$

=> $y^3 = 31 - 14\sqrt{3}$

=> $x^3 + y^3 = 62$

=> $x^3y^3 = (31 + 14\sqrt{3})(31 - 14\sqrt{3})$

=> $= 31^2 - (14\sqrt{3})^2$

=> $= 961 - 588 = 373$

=> Required value = $62 + 3 \times 373$

=> $= 62 + 1119 = 1181$

Therefore The correct answer is 1181.

Additional Information

Cube Roots: Simplify by cubing directly

Identity: $(a+b)(a-b) = a^2 - b^2$

Exam Tip: Avoid expanding roots directly

Q93. Answer: (a) Karnataka and Kerala

The correct answer is Karnataka and Kerala.

Key Points

• Mango Showers is a colloquial term used to describe the occurrence of pre-monsoon rainfall that happens towards the end of the summer season in India.

• These showers are most prominent in the states of Karnataka and Kerala, along the coastal areas. They occur during the months of March, April, and May.

• The name "Mango Showers" is derived from the fact that these rains are extremely beneficial for the early ripening of mangoes. Without these showers, the mango crop might fall from the trees prematurely.

• Meteorologically, these are caused by thunderstorms formed over the Bay of Bengal or the Arabian Sea, which move towards the land. The sudden increase in temperature during summer creates low-pressure areas that attract these moisture-laden winds.

• These rains are characterized by heavy thunderstorms and lightning, often providing much-needed relief from the intense Indian summer heat before the actual Southwest Monsoon arrives in June.

Additional Information

• Blossom Showers:

• In Kerala and nearby parts of Karnataka, these pre-monsoon rains are also known as Blossom Showers.

• They are specifically vital for the coffee plantations, as they help in the flowering or "blossoming" of coffee plants. This phenomenon is often called Cherry Blossoms in the coffee-growing tracts of Karnataka.

• Kal Baisakhi (Nor'westers):

• In the states of West Bengal and Odisha, similar pre-monsoon thunderstorms are known as Kal Baisakhi.

• The term literally means "calamity of the month of Baisakh" (April-May). These are violent storms accompanied by heavy rain and hail.

• In Assam, these storms are locally known as Bardoli Chheerha. These rains are very useful for the cultivation of Tea, Jute, and Rice.

• Loo:

• In the Northern and North-western parts of India, such as Punjab, Haryana, Delhi, and Uttar Pradesh, the pre-monsoon period is marked by hot, dry, and oppressive winds called Loo.

• Unlike the Mango Showers, the Loo is a dry wind and does not usually bring rain, often causing heatstrokes during the peak summer months.

• Southwest Monsoon:

• Following the pre-monsoon showers, the Southwest Monsoon typically hits the coast of Kerala around June 1st.

• The India Meteorological Department (IMD) monitors these pre-monsoon patterns to predict the onset and strength of the regular monsoon season, which accounts for nearly 75% of India's annual rainfall.

Important Points

• Geographical Impact: The Mango Showers are confined to South India due to the proximity of the Peninsular region to the Indian Ocean, Arabian Sea, and Bay of Bengal. The moisture required for these storms is easily available in coastal Kerala and Karnataka.

• Economic Significance: Agriculture in India is heavily dependent on these seasonal rains. The mango industry, which involves millions of farmers in India (the world's largest producer of mangoes), relies on the timing of these showers for a high-quality harvest.

• Climate Change: Recent data from environmental surveys suggest that the timing and intensity of Mango Showers have become erratic due to global warming, affecting the yield of Alphonso and Totapuri varieties of mangoes in the Konkan and Southern regions.

Q94. Answer: (a) Portuguese

The correct answer is Portuguese.

Key Points

• The Portuguese were the first European power to establish a direct sea route to India, marking the beginning of the early modern period of European colonial presence in Asia.

• In May 1498, the explorer Vasco da Gama reached Calicut (modern-day Kozhikode) on the Malabar Coast. He was received by the local ruler, the Zamorin.

• The first Portuguese factory (trading post) was established at Calicut, and later a more permanent fortified settlement was built at Cochin (Kochi) in 1503.

• Francisco de Almeida was appointed as the first Portuguese Viceroy in India in 1505. He implemented the Blue Water Policy (Cartaz system) to maintain Portuguese naval supremacy in the Indian Ocean.

• Alfonso de Albuquerque, the second Governor, is considered the real founder of Portuguese power in India. He captured Goa

from the Sultan of Bijapur in 1510, which became the headquarters of the Portuguese State of India (Estado da Índia).

Additional Information

• The Dutch (Netherlands):

• The Dutch East India Company (Vereenigde Oost-Indische Compagnie or VOC) was formed in 1602.

• They established their first factory at Masulipatnam (Andhra Pradesh) in 1605.

• The Dutch focused primarily on the spice trade and established major trading centers in Pulicat, Surat, Chinsurah, and Nagapatnam.

• Their influence in India declined after their defeat by the English in the Battle of Bedara in 1759.

• The English (Great Britain):

• The English East India Company was granted a Royal Charter by Queen Elizabeth I on December 31, 1600.

• Captain William Hawkins visited the court of the Mughal Emperor Jahangir in 1608 to seek permission for trade.

• The first permanent English factory was established at Surat in 1613 following the Battle of Swally (1612) where they defeated the Portuguese.

• Major settlements were later developed in Madras (Fort St. George, 1639), Bombay (1668), and Calcutta (Fort William, 1690).

• The French:

• The French East India Company (Compagnie des Indes Orientales) was the last major European power to arrive, formed by Jean-Baptiste Colbert in 1664 during the reign of Louis XIV.

• Their first factory was established at Surat in 1668 by Francois Caron.

• Francois Martin founded Pondicherry in 1674, which became the nerve center of French culture and administration in India.

Important Points

• Chronological Order of Arrival: The sequence of European powers arriving in India was: Portuguese (1498) → Dutch (1605) → English (1608) → Danish (1620) → French (1668).

• Trade Monopoly: For nearly a century (16th century), the Portuguese enjoyed a complete monopoly over the direct sea trade with India, primarily dealing in pepper, cinnamon, and other spices.

• Geographical Spread: While the Portuguese remained dominant on the West Coast (Goa, Daman, Diu), the English and French eventually shifted their focus to the East Coast and Bengal for textiles, indigo, and saltpeter.

• Decline of the Portuguese: Their power waned due to the rise of the English and Dutch, their religious intolerance, and the discovery of Brazil, which diverted their colonial interests. However, they remained in Goa until 1961, making them both the first to arrive and the last to leave India.

Q95. Answer: (b) Hindustan Aeronautics Limited

The correct answer is Hindustan Aeronautics Limited.

Key Points

• The Hindustan Aeronautics Limited (HAL) and Russia's United Aircraft Corporation (UAC) have entered into discussions and a memorandum of understanding to explore the production of the SJ-100 regional passenger jet in India.

• The SJ-100, also known as the Sukhoi Superjet 100 (New), is a "russified" version of the original Superjet, where foreign-made components have been replaced by Russian domestic systems, including the PD-8 engine.

• This strategic collaboration aims to establish a manufacturing base in India by October 2025 to cater to both the Indian domestic market and third-country exports, aligning with the 'Make in India' initiative.

• The aircraft is designed as a regional jet with a seating capacity of approximately 87 to 108 passengers, making it ideal for short-haul routes and regional connectivity schemes like UDAN in India.

• This partnership was highlighed during the 22nd India-Russia Annual Summit held in July 2024, where both nations agreed to deepen cooperation in the civil aviation sector.

Additional Information

• Hindustan Aeronautics Limited (HAL):

• HAL is an Indian state-owned aerospace and defence company headquartered in Bengaluru, Karnataka.

• Established on 23 December 1940 as Walchand Aircraft, it was later renamed and is now governed under the management of the Ministry of Defence.

• It is one of the oldest and largest aerospace and defence manufacturers in the world, involved in the design and manufacture of fighter jets, helicopters, and marine gas turbine engines.

• United Aircraft Corporation (UAC):

• UAC is a Russian joint-stock company that consolidates major Russian aircraft manufacturing companies such as Sukhoi, MiG, Tupolev, and Ilyushin.

• It was founded in February 2006 by Russian President Vladimir Putin to revitalize the domestic aviation industry.

• The SJ-100 project is a priority for UAC to ensure technological sovereignty following international sanctions on Russia.

• The SJ-100 Aircraft Features:

• The SJ-100 replaces over 40 foreign-made systems and components with indigenous Russian alternatives.

• It features updated avionics, a domestic auxiliary power unit, and the PD-8 engines developed by the United Engine Corporation.

• The aircraft is intended to compete in the regional jet market against manufacturers like Embraer and Bombardier.

• Significance for India:

• The production of SJ-100 in India would bolster the civilian aerospace manufacturing ecosystem, which is currently dominated by military production at HAL.

• It addresses the growing demand for narrow-body regional aircraft in India, which has one of the fastest-growing civil aviation markets globally.

• This move strengthens the bilateral trade relationship between India and Russia, targeting a trade turnover of $100 billion by 2030.

Important Points

• The SJ-100 production in India is expected to involve significant technology transfer from Russia to HAL.

• Bharat Electronics Limited (BEL), ISRO, and DRDO are other major Indian organizations, but their primary focus is electronics, space exploration, and defence R&D, respectively, whereas HAL is the primary entity for aircraft manufacturing.

• The first flight of the prototype SJ-100 with Russian systems took place in August 2023 in Komsomolsk-on-Amur.

• The target date of 2025 reflects the timeline for finalizing joint venture agreements and beginning local assembly lines.

Q96. Answer: (b) DGH

The logic followed here is based on the alphabetical position difference between consecutive letters in each cluster:

Option 1: NQS

Option 2: DGH

Option 3: BEG

Option 4: EHJ

Thus, DGH follows a different pattern.

Hence, the odd one out is Option 2.

Q97. Answer: (c) FIVE

Given: (Left) C P # A G = % B H * + D F ? E ! L M $ I O (Right)

Now,

Letters which are immediately preceded by a symbol and also immediately followed by another letter.

So, needed pattern is: Symbol - Letter - Letter

(Left) C P # A G = % B H * + D F ? E ! L M $ I O (Right)

Only five letters satisfy the condition.

Hence, the correct answer is 'Option 3'.

Q98. Answer: (c) 100°

Shortcut Trick

=> Area of sector = (θ/360) × πr²

=> 385 = (θ/360) × (22/7) × 21²

=> πr² = (22/7) × 441 = 1386

=> 385 = (θ/360) × 1386

=> θ = (385 × 360) ÷ 1386 = 100°

Therefore Answer = 100°

Alternate Method

Given:

Radius = 21 cm

Area of sector = 385 cm²

Formula Used:

Area of sector = (θ/360) × πr²

Calculation:

=> πr² = (22/7) × 21 × 21 = 1386

=> 385 = (θ/360) × 1386

=> θ = (385 × 360) ÷ 1386

=> θ = 100°

Therefore The correct answer is 100°.

Additional Information

Sector Formula: (θ/360) × πr²

Circle Area: πr²

Exam Tip: Calculate πr² first

Q99. Answer: (c) 88

Shortcut Trick

=> Mean = 40 => Take A = 40

=> Mid values: 15, 25, 35, 45, 55

=> Deviations (d): −25, −15, −5, +5, +15

=> Σfd = 42(−25) + 19(−15) + 23(−5) + 26(5) + X(15)

=> = −1050 − 285 − 115 + 130 + 15X

=> = −1320 + 15X

=> Mean = A + (Σfd / Σf)

=> 40 = 40 + (−1320 + 15X)/(110 + X)

=> => −1320 + 15X = 0

=> 15X = 1320 => X = 88

Therefore Answer = 88

Alternate Method

Given:

Mean = 40

Formula Used:

Mean = Σfx / Σf

Calculation:

=> Mid values: 15, 25, 35, 45, 55

=> Σfx = 42×15 + 19×25 + 23×35 + 26×45 + X×55

=> = 630 + 475 + 805 + 1170 + 55X

=> = 3080 + 55X

=> Σf = 42 + 19 + 23 + 26 + X = 110 + X

=> Mean = 40 => (3080 + 55X)/(110 + X) = 40

=> 3080 + 55X = 4400 + 40X

=> 15X = 1320 => X = 88

Therefore The correct answer is 88.

Additional Information

Mean Formula: Mean = Σfx / Σf

Assumed Mean: A = convenient central value

Deviation Method: Mean = A + (Σfd / Σf)

Exam Tip: Take A = given mean to simplify

Q100. Answer: (a) Chedi dynasty

The correct answer is Chedi dynasty.

Key Points

• King Kharavela was the most illustrious ruler of the Mahameghavahana dynasty, which is also commonly referred to as the Chedi dynasty of Kalinga.

• He ruled during the 1st or 2nd Century BCE (historians debate the exact dates, often citing 193 BCE to 170 BCE) over the region of Kalinga, which corresponds to modern-day Odisha, India.

• The primary and most authentic source of information regarding his life and reign is the Hathigumpha Inscription, also known as the Elephant Cave Inscription, found in the Udayagiri Hills near Bhubaneswar.

• The inscription is written in the Prakrit language using the Brahmi script and provides a chronological, year-by-year account of the first 13 years of his reign.

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• Kharavela was a staunch patron of Jainism, and he is credited with providing shelters and constructing residential caves for Jain monks at Udayagiri and Khandagiri hills.

Additional Information

• The Mahameghavahana (Chedi) Dynasty:

• The dynasty was established after the decline of the Mauryan Empire. It is believed to have been founded by a king named Mahameghavahana, who re-established the independence of Kalinga.

• Under Kharavela, Kalinga regained its lost military prestige. He took the title of Kalingachakravartin (Universal Monarch of Kalinga).

• He is famous for bringing back the Jina of Kalinga (an idol of the Jain Tirthankara) from Magadha, which had been taken away by the Nanda king centuries earlier.

• Other Dynasties Mentioned in Options:

• Satavahana Dynasty: This dynasty was founded by Simuka around the 1st Century BCE. Their core territory was the Deccan region (modern Maharashtra, Andhra Pradesh, and Telangana). They were major rivals of the Western Kshatrapas and flourished until the 3rd Century CE.

• Kanva Dynasty: This was a short-lived Brahmin dynasty founded by Vasudeva Kanva in 73 BCE. It replaced the Shunga dynasty in Magadha and ruled for about 45 years before being overthrown by the Satavahanas.

• Shunga Dynasty: Established by Pushyamitra Shunga in 185 BCE after the assassination of the last Maurya ruler, Brihadratha. They were known for their patronage of Brahmanism and ruled from Pataliputra and Vidisha.

Important Points

• Military Conquests: According to the Hathigumpha Inscription, in his second year, Kharavela sent an army to the west disregarding Satakarni I, the Satavahana king, and reached the river Krishna. He also defeated the Rathikas and Bhojakas of the Berar region.

• Public Welfare: In his fifth year, he is recorded to have extended a canal that was originally excavated by the Nanda King (around 300 years prior) from Tanasuli to his capital, Kalinganagara.

• Cultural Impact: Kharavela was a great patron of the arts; he repaired the gates and buildings of his capital that were damaged by a storm and organized various musical and dance performances to entertain his subjects.

• Geographical Reach: His expeditions reached as far north as Magadha and Mathura and as far south as the Pandyan Kingdom in the Tamil region, forcing the southern kings to pay tribute.

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