RRB NTPC (Graduate) CBT-I Official Paper (Held On: 22 Mar, 2026 Shift 2) (Previous Year Paper)

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

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Q1. The marks obtained by 11 students in a mathematics test are as follows: 45, 62, 58, 71, 66, 54, 60, 49, 68, 57, 63. What is the median marks?

(a) 54
(b) 60
(c) 66
(d) 58

Q2. At what rate (in percentage) per year will a sum of money double itself in 20 years on simple interest?

(a) 7
(b) 3
(c) 10
(d) 5

Q3. What is the nature of the roots of the following quadratic equation?

x-1/x=17

(a) Real and equal
(b) Real and distinct (rational)
(c) No real roots
(d) Real and distinct (irrational)

Q4. In which year were the Telugu and Kannada languages given the status of Classical Languages by the Indian Government?

(a) 2008
(b) 2006
(c) 2014
(d) 2004

Q5. The 24th Constitutional Amendment gave the Parliament which of the following powers?

(a) Amend Fundamental Rights
(b) Suspend the High Court judgment
(c) Override judicial review
(d) Suspend elections

Q6. The larger of two supplementary angles is 32° more than the smaller. The smaller angle (in degree) is:

(a) 74
(b) 76
(c) 81
(d) 75

Q7. A man can row at 8 km/hr in still water. When the river flows at 2 km/hr, he takes 3 hours 12 minutes to row to a destination and back. Find the distance to the destination.

(a) 15 km
(b) 12 km
(c) 8 km
(d) 10 km

Q8. What is the chemical reaction responsible for the leavening of bread, where carbon dioxide is produced?

(a) Oxidation-reduction reaction
(b) Enzymatic reaction
(c) Acid-base reaction
(d) Fermentation

Q9. S is married to R. S is the father of Q. Q has a sister named K and a brother named M. How is K related to R?

(a) Husband
(b) Son
(c) Wife
(d) Daughter

Q10. Refer to the following letter, symbol series and answer the question. Counting to be done from left to right only.

(Left) # F * G W # C # Y R & @ W Z @ L & L N % # W (Right)

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

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

Q11. At the 2025 Asia-Pacific Economic Cooperation (APEC) meeting, Chinese President Xi Jinping proposed the establishment of a global AI governance body. What is the name of this proposed organization?

(a) International Artificial Intelligence Organization (IAIO)
(b) World Artificial Intelligence Cooperation Organization (WAICO)
(c) Global AI Council (GAIC)
(d) International AI Forum (IAIF)

Q12. Physically, a CPU is placed on one or more microchips known as:

(a) Compact disks
(b) Microprocessors
(c) Transistors
(d) Integrated circuits (ICs)

Q13. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

All chairs are tables. Some tables are boards. No chair is a desk.

Conclusions:

(I) Some boards are tables.

(II) No table is a desk.

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

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Q14. Who among the following was the first Union Finance Minister of Independent India?

(a) Rajkumari Amrit Kaur
(b) Dr. CH Bhabha
(c) RK Shanmukham Chetty
(d) Sardar Baldev Singh

Q15. The population of a village was 2,90,000. It increased by 15% in the first year and increased by 20% in the second year. Its population after two years is _____.

(a) 3,48,000
(b) 4,00,200
(c) 3,33,500
(d) 3,91,500

Q16. In the Mansabdari system introduced by Akbar, the term Mansab refers to which of the following?

(a) Spiritual leadership program
(b) Calendar for revenue collection
(c) Standardized land revenue assessment
(d) Rank or position of an official

Q17. Pipe P can fill 5/9 part of a tank in 15 hours and pipe Q can fill 7/9 part of the same tank in 21 hours. Both P and Q were kept open for 3 hours, then both were closed. Pipe R alone was then opened and it emptied the water in the tank in 4 hours. Pipes P, Q and R together can fill the empty tank in:

(a) 58 hours
(b) 42 hours
(c) 54 hours
(d) 57 hours

Q18. If the mode of a data exceeds its mean by 33.6, then the mode exceeds the median by _____. (Use empirical formula to find the answer.)

(a) 19.5
(b) 20.6
(c) 23.8
(d) 22.4

Q19. In a certain code language, ‘REST’ is coded as ‘5729’ and ‘SEAT’ is coded as ‘7625’. What is the code for ‘A’ in that language?

(a) 5
(b) 7
(c) 2
(d) 6

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

(a) YCX
(b) GKF
(c) NRM
(d) TYS

Q21. Refer to the following letter, symbol series and answer the question. Counting to be done from left to right only.

(Left) = N * R ^ S V L ^ W O P Y $ @ H A F ? E R (Right)

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

(a) Four
(b) Three

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(c) One
(d) Two

Q22. Which Article, added by the 97th Amendment Act, 2011, promotes the professional management of co-operative societies?
(a) Article 43B
(b) Article 43A
(c) Article 48A
(d) Article 38

Q23. 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 :: ?

: MNI :: UVQ : % 1318
(a) = RJH % = IQL
(b) = OPN % = PBW
(c) = RSN % = PQL
(d) = RUN % = IOL

Q24. Girish scored 768 marks in an examination and was 60 marks short of 92% of maximum marks. In the same examination, his friend scored 738 marks. What is the percentage of marks scored by his friend?
(a) 80%
(b) 81%
(c) 82%
(d) 79%

Q25. Which shortcut opens the system menu of an active window?
(a) Alt+F4
(b) Alt+Enter
(c) Alt+Tab
(d) Alt+Space

Q26. A shopkeeper purchased 32 dozens of articles at the rate of Rs. 102 per dozen. He sold each one of them at the rate of Rs. 68. What percentage profit did he make?
(a) 701%
(b) 700%
(c) 697%
(d) 702%

Q27. Below are given two sets of numbers. In each set of numbers, a certain mathematical operation on the first number results in the second number. Similarly, a certain mathematical operation on the second number results in the third number, and so on. Which of the given options follows the same set of operations as in the question?

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

100 – 50 – 60 – 30 ; 300 – 150 – 160 – 80
(a) 100 – 50 – 40 – 20
(b) 160 – 80 – 90 – 180
(c) 80 – 40 – 50 – 25
(d) 220 – 110 – 120 – 30

Q28. What should come in place of '?' in the given series?

34 38 46 58 74 ?
(a) 98
(b) 92
(c) 94
(d) 96

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Q29. What is the term used for rural self-help group (SHG) women earning Rs. 1 lakh or more annually?

(a) Sahyogi Didis
(b) Lakhpati Didis
(c) Crorepati Didis
(d) Aatmanirbhar Didis

Q30. Vishu starts from Point A and drives 31 km towards East. He then takes a left turn, drives 19 km, turns left and drives 34 km. He then takes a left turn and drives 32 km. He takes a final left turn, drives 3 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90 degrees turns only unless specified)

(a) 12 km to the North
(b) 12 km to the South
(c) 13 km to the North
(d) 13 km to the South

Q31. Which of the following is the name of the Ethiopian volcano that erupted in November 2025?

(a) Nyiragongo
(b) Melissa
(c) Erta Ale
(d) Hayli Gubbi

Q32. Which post-surgical intervention, demonstrated by Indian researchers in 2025, was shown to significantly reduce pelvic recurrence in high-risk bladder cancer patients?

(a) Immunotherapy used as a standalone post-surgical treatment
(b) Targeted drug therapy replacing surgery for bladder cancer
(c) Radiation therapy administered after bladder cancer surgery
(d) Chemotherapy administered before bladder cancer surgery

Q33. If 8, x and 18 are in continued proportion, find the value of x.

(a) 8
(b) 14
(c) 18
(d) 12

Q34. Why did nearly 19% of India face drought or drought-like conditions by August 2025 despite earlier heavy rains?

(a) A sharp reversal led to severe rainfall deficits in many regions.
(b) Excessive river damming caused water shortages.
(c) Unusually high temperatures reduced rainfall.
(d) Monsoon onset was delayed across all states.

Q35. In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Q. Ritu, Seema, Tanya, Usha, and Varsha scored different marks. Who scored the highest marks?

(I) Tanya scored more than Ritu and Seema but less than Usha.

(II) Varsha scored more than Tanya but less than Usha.

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

Q36. Seven people B, C, D, O, P, Q and R are sitting around a circular table facing the center of the table. Only two people sit between R and P when counted from the left of P. Only three people sit between C and O when counted from the left of C. P sits to the immediate right of O. B sits to the immediate right of Q. Who sits fourth to the left of D?

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(a) P
(b) B
(c) O
(d) Q

Q37. By selling an article at 3/10 of its marked price, Aman incurs a loss of 25%. If he sells it at 69% of its actual marked price, then the profit percentage is
(a) 73.5%
(b) 72.5%
(c) 74.1%
(d) 75.1%

Q38. Which of the following Act first provided for the Indian representation in the legislative process?
(a) Indian Councils Act, 1861
(b) Pitt's India Act, 1784
(c) Charter Act, 1853
(d) Government of India Act, 1858

Q39. 8 is related to 41 following a certain logic. Following the same logic, 81 is related to 406. To which of the following is 13 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) 62
(b) 64
(c) 68
(d) 66

Q40. Simplify: $(\cos\theta)/(1 + \sin\theta) + (1 + \sin\theta)/(\cos\theta)$
(a) $2\sin\theta$
(b) $2\operatorname{cosec}\theta$
(c) $2\cos\theta$
(d) $2\sec\theta$

Q41. Which of the following sectors of the western coastal plain extends between Mumbai and Goa?
(a) Konkan Coast
(b) Malabar Coast
(c) Karnataka Coast
(d) Coromandal Coast

Q42. According to the Second Five Year Plan (1956), which sectors of the economy did the Indian government decide to develop and manage directly?
(a) Service sector
(b) Small businesses
(c) Agricultural sector
(d) Heavy industries

Q43. In a certain code language,
A + B means ‘A is the sister of B’,
A – B means ‘A is the husband of B’,
A × B means ‘A is the mother of B’ and
A ÷ B means ‘A is the brother of B’.
Based on the above, how is K related to O if ‘K + L − M × N + O’?
(a) Mother's mother
(b) Father's sister

(c) Father's mother
(d) Mother's sister

Q44. A, B, C, Q, R and S 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. Q lives on the floor numbered 5. B lives on a floor above Q. Only R lives below C. A lives on an even-numbered floor. How many people live below S?

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

Q45. P, Q, R, 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. Q lives on floor which is a prime number. The product of the floors on which Q and R live is 3. Only 2 people live above P. T lives immediately below S. How many people live below U?

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

Q46. Each of the digits in the number 749216358 is arranged in descending order from left to right. What will be the product of the digits which are second from the left and third from the right in the number thus formed?

(a) 16
(b) 18
(c) 24
(d) 21

Q47. A trader gives 5% discount on the marked price of an article and gives 2 articles free for buying 14 articles and gains 33% in the entire transaction. Assuming a customer pays for 14 articles, the marked price of an article is what percent more than its cost price?

(a) 58%
(b) 60%
(c) 52%
(d) 68%

Q48. Solve the following system of linear equations:

$u + v + w = 2$

$6u + 4v + 5w = 31$

$5u + 2v + 2w = 13$

(a) u = 1, v = 15, w = −14
(b) u = 3, v = −15, w = 14
(c) u = 1, v = 18, w = −17
(d) u = 3, v = −18, w = 17

Q49. The least common multiple and the highest common factor of (x^(2.5))/(y^(0.5)) × √xy and (y^(1.5))/√x × √xy are __ and ____, respectively, where x and y are co-prime integers greater than 1.

(a) $x(xy)^2$,1
(b) x(xy)2,x
(c) y(xy)2,y
(d) y(xy)2,1

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Q50. Which of the following was NOT an excavated site of the Banas culture?

(a) Gilund
(b) Ahar
(c) Bagor
(d) Nagda

Q51. What is the function of the anaphase-telophase transition in mitosis?

(a) Separation of chromatids and reformation of the nuclear envelope
(b) Condensation of chromosomes
(c) Synthesis of new DNA strands
(d) Initiation of DNA replication

Q52. Which of the following pairs of author and their work is correctly matched?

(a) Sharat Chandra Chatterjee – Devdas
(b) Rabindranath Tagore – Anandamath
(c) Bankim Chandra Chatterjee – Kamayani
(d) Munshi Premchand – Madhushala

Q53. Seven people, K, L, M, N, P, Q and R, are sitting around a circular table facing the centre of the table but not necessarily in the same order. Only two people sit between R and N when counted from the left of N. L sits third to the left of Q. P sits to the immediate right of Q. P sits second to the left of R. M is not an immediate neighbour of L. Who sits third to the right of K?

(a) M
(b) P
(c) R
(d) Q

Q54. The average of three numbers is 20. If two numbers are 13 and 22, the third number is:

(a) 25
(b) 24
(c) 26
(d) 27

Q55. Select the pair which follows the same pattern as that followed by the two set of pairs given below. Both pairs follow the same pattern.

UND : SSB

QXZ : OCX 16312

(a) WRK : SWG
(b) ZQV : VTR
(c) MHV : KMT
(d) TBE : QFB

Q56. Three friends X, Y and Z started a business by investing a sum of money in the ratio of 9 : 5 : 2. After 6 months, X withdraws half of his capital. If the sum invested by Z is Rs. 83,000, then out of a total annual profit of Rs. 88,000, what is the difference between X's and Y's profit?

(a) Rs. 12,710
(b) Rs. 10,550
(c) Rs. 11,200
(d) Rs. 10,945

Q57. If $(5x - 1)^3 + (x + 3)^3 + 8(3x - 4)^3 = 6(5x - 1)(x + 3)(3x - 4)$, then the value of x is:

(a) 3/5
(b) 1/4
(c) 3/4
(d) 1/2

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Q58. 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 statement.

Statements:All cars are tram. All cars are rickshaw. All cars are bus.

Conclusions:

(I) All trams are bus.(II) Some buses are rickshaws.

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

Q59. In 2025, the Global AI Conclave, reinforcing India's role as a thought leader in responsible artificial intelligence, was hosted in which city?

(a) Bengaluru
(b) Chennai
(c) New Delhi
(d) Hyderabad

Q60. What is the legal consequence if an Indian citizen voluntarily acquires the citizenship of a foreign country after the commencement of the Constitution?

(a) Citizenship is retained subject to conditions
(b) Dual citizenship is permitted
(c) Indian citizenship is suspended for three years
(d) He/She ceases to be an Indian citizen

Q61. The part of the pomegranate that is consumed is known as:

(a) Seed Coat
(b) Placenta
(c) Endocarp
(d) Pericarp

Q62. As per Article 80 of the Constitution of India, which of the following indicates the number of members appointed by the President to the Council of States?

(a) Twenty
(b) Twelve
(c) Ten
(d) Fourteen

Q63. Two concentric circles have radii of 15 cm and 17 cm. Find out the length of the chord of the larger circle that is tangent to the smaller circle.

(a) 30 cm
(b) 16 cm
(c) 8 cm
(d) 24 cm

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

ZOB 6, ETG 10, JYL 14, ODQ 18, ?

(a) RHV 24
(b) UJW 22
(c) TIV 22
(d) THU 22

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Q65. Which of the given letter-number clusters will replace the question mark (?) in the following series to make it logically complete?

QBL 8 EPZ 16 SDN 24 GRB 32 ?

(a) KDU 42
(b) MSY 42
(c) CNE 41
(d) UFP 40

Q66. If 1 is added to each odd digit and 2 is added to each even digit in the number 6134527, what will be the sum of the last and first digits of the new number thus formed?

(a) 12
(b) 18
(c) 14
(d) 16

Q67. Which of the following laws stipulated the establishment of Supreme Court in 1774 in Calcutta in India?

(a) Government of India Act, 1858
(b) Pitt's India Act, 1784
(c) Regulating Act of 1773
(d) Charter Act of 1813

Q68. The number 22.121212.... in the form p/q where p and q are integers and q≠0 is:

(a) 730/33
(b) 720/33
(c) 710/33
(d) 740/33

Q69. What causes the flow of water to lose its smoothness when a tap is opened wider?

(a) The water temperature changes.
(b) The density of water changes.
(c) The outflow speed increases, causing turbulence.
(d) The water pressure decreases.

Q70. There are 16 members in group A, 86 members in group B and 21 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. 447, Rs. 396 and Rs. 158, respectively. The overall average amount (in Rs.) spent per member is:

(a) 366
(b) 360
(c) 362
(d) 367

Q71. In traditional development economics, development primarily meant:

(a) Rise in national income levels
(b) Increase in employment opportunities
(c) Expansion of industrial production
(d) Growth of per capita real income

Q72. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which is the one that does not belong to that group? (Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) BD - EG
(b) LM - NP
(c) IK - LN
(d) SU - VX

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Q73. A right circular cone has a slant height that is 3 times its radius. A plane cuts the cone parallel to the base at a height such that the smaller, upper cone has half the curved surface area of the original cone. If the diameter of the smaller cone is $6\sqrt{2}$ cm, then what is the radius (in cm) of the original cone?

(a) 12
(b) 3
(c) 9
(d) 6

Q74. Which type of irrigation in India involves delivering water drop by drop at the root zone of plants?

(a) Sprinkler irrigation
(b) Sub-irrigation
(c) Drip irrigation
(d) Surface irrigation

Q75. The primary goal of fiscal policy reforms post-1991 was to _____.

(a) Reduce fiscal deficit and inflation
(b) Ban private banks
(c) Increase budget deficits
(d) Stop tax collection

Q76. If 2820 is divided into two parts such that one-fifth of the first part and one-eighth of the second part are in the ratio 3 : 4, what is the ratio of the first part to the second part?

(a) 17 : 36
(b) 18 : 19
(c) 15 : 37
(d) 15 : 32

Q77. Which ministry in the Indian Government launched Mission Sudarshan Chakra in 2025?

(a) Ministry of Science & Technology
(b) Ministry of Defence
(c) Ministry of Electronics & Information Technology
(d) Ministry of Home Affairs

Q78. The period of southwest monsoon season in India is:

(a) May to September
(b) June to November
(c) June to September
(d) July to December

Q79. What should come in place of '?' in the given series?

95 70 54 45 41 ?

(a) 42
(b) 44
(c) 40
(d) 38

Q80. Rathwa Ni Gher' is a tribal dance of the Rathwa tribal community of _____.

(a) Kerala
(b) Tripura
(c) Gujarat
(d) Himachal Pradesh

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Q81. Find the value of y, satisfying 18 × 7 × 560 ÷ √3136 = y + 703.

(a) 556
(b) 557
(c) 567
(d) 559

Q82. Who led the Khasi resistance against British interference in the 1830s?

(a) Tirot Sing
(b) Rani Gaidinliu
(c) Alluri Sitarama Raju
(d) Sidhu Murmu

Q83. Each of F, L, O, W, E, R and S has an exam on a different day of a week, starting from Monday and ending on Sunday of the same week.

R has exam on Thursday. Only two people have exams between F and R. Only four people have exams between S and F. W has exam on one of the days after F. E has exam on the day immediately before O. L has exam on one of the days after W.

Who has exam on Friday?

(a) W
(b) O
(c) F
(d) L

Q84. The Golden Quadrilateral connects which of the following cities?

(a) Mumbai, Pune, Hyderabad, Bangalore
(b) Delhi, Bhopal, Ahmedabad, Mumbai
(c) Delhi, Mumbai, Chennai, Kolkata
(d) Chennai, Bangalore, Hyderabad, Kolkata

Q85. Which characteristic best differentiates Static RAM (SRAM) from Dynamic RAM (DRAM), leading to SRAM being used for CPU cache and DRAM for main system memory (RAM)?

(a) DRAM is non-volatile, while SRAM is volatile.
(b) SRAM is significantly faster, more expensive, and consumes less power than DRAM.
(c) SRAM requires constant refreshing to hold data, while DRAM does not.
(d) DRAM is located directly on the CPU die, while SRAM is located on the motherboard.

Q86. In a certain code language, ‘ROAD’ is coded as ‘8657’ and ‘DEAR’ is coded as ‘4567’. What is the code for ‘E’ in the given code language?

(a) 4
(b) 7
(c) 6
(d) 5

Q87. Consider the following statements.

1. Lord Mayo’s Resolution of 1870 on financial decentralization visualized the development of local self-government institutions.

2. Hobhouse was the Chairman of the Royal Commission on Decentralization.

3. Under the Government of India Act of 1919, local self-government became a reserved subject.

Which of the above statements is/are correct?

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

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Q88. RAFI is related to TELQ in a certain way based on the English alphabetical order. In the same way, NEGL is related to PIMT. To which of the following is JRTB related, following the same logic?

(a) LVZJ
(b) ZLKT
(c) LVZI
(d) KTWE

Q89. Which Sangam text, from the 2nd century CE, is an epic about a chaste wife's devotion?

(a) Pattuppattu
(b) Manimekalai
(c) Tolkappiyam
(d) Silappatikaram

Q90. Evaluate: (-9) - (-56) ÷ (-14) + (-2) × 6

(a) 27
(b) -25
(c) 28
(d) 24

Q91. A and B complete a work in 20 days. If A alone can do it in 45 days, then B alone can do three-fourth of the same work in _____days.

(a) 108
(b) 54
(c) 27
(d) 81

Q92. In a 150-meter race, R beats S by 6 meters. In a 250-meter race, R beats S by 2 seconds. As per this, in a race, if R runs for 30 seconds, then he beats S by ___ meters.

(a) 6.75
(b) 6.25
(c) 7.25
(d) 5.75

Q93. Which of the following countries is NOT a member of the Association of Southeast Asian Nations (ASEAN)?

(a) India
(b) Indonesia
(c) Thailand
(d) Myanmar

Q94. The total surface area of a solid hemisphere is 281 cm^2. What is its radius (in cm)?

(take $\pi = 22/7$)

(a) $\sqrt{(1957/132)}$
(b) $\sqrt{(1966/66)}$
(c) $\sqrt{(1967/66)}$
(d) $\sqrt{(1965/66)}$

Q95. Refer to the following letter, symbol series and answer the question.

(Left) L U £ P $ D A Ω F % * N Q & R # Y @ C K * & M (Right)

If all the letters are dropped from the series, which of the following will be seventh from the right?

(a) @
(b) %
(c) Ω
(d) $

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Q96. The Indian men's hockey team clinched the Asia Cup 2025 title by overcoming which of the following teams 4 - 1 in the final held at the Rajgir Sports Complex in Bihar?

(a) Pakistan
(b) Japan
(c) Malaysia
(d) Republic of Korea

Q97. The Bhabar and Terai regions of the Great Indian Plains differ primarily in:

(a) Permeability of soil and groundwater availability
(b) Rainfall and wind direction
(c) Influenced by the Himalayan Rivers
(d) Human settlement patterns

Q98. Which is the latest version of Windows?

(a) Windows 18
(b) Windows 11
(c) Windows 7
(d) Windows 10

Q99. What will be the positive difference in the population of a town 3 years ago and 2 years ago, if its current population is 450000 and the population has been increasing at a rate of 25% every year?

(a) 57950
(b) 57600
(c) 56850
(d) 57050

Q100. 17 is related to 68 following a certain logic. Following the same logic, 24 is related to 96. To which of the following is 21 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 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) 72
(b) 84
(c) 89
(d) 77

ANSWER KEY

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

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SOLUTIONS

Q1. Answer: (b) 60

Shortcut Trick
Total observations = 11 (odd number)
Median position = (11 + 1) ÷ 2 = 6th term
Arrange numbers mentally and pick middle value
6th value = 60
Therefore Answer = 60
Alternate Method
Given: 45, 62, 58, 71, 66, 54, 60, 49, 68, 57, 63
Formula used: Median = (n + 1) ÷ 2 th term (for odd n)
Calculations:
=> Arrange in ascending order: 45, 49, 54, 57, 58, 60, 62, 63, 66, 68, 71
=> n = 11
=> Median position = (11 + 1) ÷ 2 = 6
=> 6th term = 60
Therefore The correct answer is 60.
Additional Information
Median for Even Number of Observations
Median = average of (n ÷ 2)th and (n ÷ 2 + 1)th terms
Mean vs Median
Mean = sum of observations ÷ total observations, while median is the middle value
Mode
Mode is the value that occurs most frequently in the dataset
Effect of Extreme Values
Median is not affected by very large or small values, unlike mean

Q2. Answer: (d) 5

Shortcut Trick
For doubling in Simple Interest, Interest = Principal
So, SI = P => (P × R × T) ÷ 100 = P
Cancel P => (R × 20) ÷ 100 = 1
R = 100 ÷ 20 = 5%
Therefore Answer = 5%
Alternate Method
Given: Time = 20 years, Amount = 2P
Formula used: SI = (P × R × T) ÷ 100
Calculations:
=> Since amount doubles => SI = Amount − Principal = P
=> So, P = (P × R × 20) ÷ 100
=> Cancel P from both sides
=> 1 = (R × 20) ÷ 100
=> R = 100 ÷ 20 = 5
Therefore The correct answer is 5%.
Additional Information
Simple Interest Formula
SI = (P × R × T) ÷ 100
Amount Formula
Amount = Principal + Simple Interest
Doubling Time (SI)

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Time required to double = 100 ÷ Rate

Rule of 72 (CI concept)

Doubling time ≈ 72 ÷ Rate (used in Compound Interest)

Q3. Answer: (d) Real and distinct (irrational)

Shortcut Trick

Multiply both sides by x => $x^2 - 1 = 17x$

Rearrange => $x^2 - 17x - 1 = 0$

Check discriminant sign: $b^2 - 4ac = (-17)^2 - 4(1)(-1)$

= 289 + 4 = 293 > 0 and not a perfect square

Therefore Roots are real, distinct and irrational

Alternate Method

Given:

$x - 1/x = 17$

Formula used:

Discriminant $D = b^2 - 4ac$

Calculations:

=> Multiply both sides by x => $x^2 - 1 = 17x$

=> Rearranging => $x^2 - 17x - 1 = 0$

=> Here, $a = 1, b = -17, c = -1$

=> $D = (-17)^2 - 4 \times 1 \times (-1)$

=> D = 289 + 4 = 293

=> Since D > 0 and not a perfect square

Therefore The correct answer is real, distinct and irrational roots.

Additional Information

Nature of Roots (Discriminant)

If D > 0 → real and distinct, D = 0 → real and equal, D < 0 → complex roots

Perfect Square Condition

If D is a perfect square, roots are rational; otherwise irrational

Forming Quadratic from Fraction

Equations like $x - 1/x = k$ can be converted to $x^2 - kx - 1 = 0$

Sum and Product of Roots

Sum = $-b/a$ and Product = c/a for $ax^2 + bx + c = 0$

Q4. Answer: (a) 2008

The correct answer is 2008.

Key Points

• The Government of India officially declared Telugu and Kannada as Classical Languages in the year 2008.

• The announcement was made by the Ministry of Culture on October 31, 2008, following the recommendations of a committee of experts.

• Kannada, predominantly spoken in Karnataka, and Telugu, predominantly spoken in Andhra Pradesh and Telangana, were recognized for their rich literary heritage and antiquity.

• This designation followed the precedent set by Tamil (2004) and Sanskrit (2005), which were the first two languages to receive this status.

• The status is granted to languages that have a high antiquity of their early texts/recorded history over a period of 1500–2000 years.

Additional Information

• Criteria for Classical Status:

• High antiquity of its early texts/recorded history over a period of 1500–2000 years.

• A body of ancient literature/texts, which is considered a valuable heritage by generations of speakers.

• The literary tradition must be original and not borrowed from another speech community.

• The classical language and literature being distinct from modern, there may also be a discontinuity between the classical language and its later forms or its offshoots.

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• List of Classical Languages in India (Chronological):

• Tamil: Declared in 2004. It was the first language to be accorded this status.

• Sanskrit: Declared in 2005.

• Kannada: Declared in 2008.

• Telugu: Declared in 2008.

• Malayalam: Declared in 2013.

• Odia: Declared in 2014.

• Benefits of Recognition:

• Two major international awards for scholars of eminence in the language are awarded annually.

• A Centre of Excellence for Studies in Classical Languages is set up.

• The University Grants Commission (UGC) is requested to create, to start with at least in the Central Universities, a certain number of Professional Chairs for Classical Languages for scholars of eminence.

Important Points

• Recent Developments (2024): In October 2024, the Union Cabinet, chaired by Prime Minister Narendra Modi, approved the conferment of Classical Language status to five more languages: Marathi, Pali, Prakrit, Assamese, and Bengali.

• As of late 2024, the total number of languages with Classical Status in India has reached 11.

• The inclusion of Pali and Prakrit is significant as they are the root languages for many Buddhist and Jain scriptures, respectively.

• The Central Institute of Indian Languages (CIIL) in Mysuru plays a key role in the promotion and research of these designated languages.

• The recognition helps in the digitization and preservation of ancient manuscripts and supports academic research globally.

Q5. Answer: (a) Amend Fundamental Rights

The correct answer is Amend Fundamental Rights.

Key Points

• The 24th Constitutional Amendment Act was enacted in the year 1971 during the tenure of Prime Minister Indira Gandhi. This amendment was primarily brought to nullify the effect of the Supreme Court judgment in the Golaknath case (1967).

• It amended Article 13 and Article 368 of the Constitution of India to affirm that Parliament has the absolute power to amend any part of the Constitution, including Fundamental Rights listed in Part III. Hence, option A is correct.

• The amendment clarified that Article 13, which states that any law inconsistent with Fundamental Rights shall be void, would not apply to any constitutional amendment made under Article 368.

• Prior to this, the Supreme Court in the Golaknath case had ruled that Parliament could not abridge or take away any of the Fundamental Rights through a constitutional amendment.

• The power to suspend High Court judgments or bypass judicial proceedings is not a feature of the 24th Amendment; such issues were more relevant to the 42nd Amendment or specific emergency provisions. Hence, option B is incorrect.

• While the amendment sought to limit the scope of Judicial Review over constitutional changes, it did not entirely "override" the concept of judicial review, which was later protected as a part of the Basic Structure. Hence, option C is incorrect.

• The 24th Amendment does not deal with the suspension of elections, which is governed by the Representation of the People Act and Emergency provisions of the Constitution. Hence, option D is incorrect.

Additional Information

• Article 368: This article provides the Parliament with the constituent power to amend the Constitution by way of addition, variation, or repeal of any provision according to the procedure laid down therein.

• President's Assent: The 24th Amendment made it mandatory for the President of India to give his assent to a Constitution Amendment Bill. Before this, the President had the discretion to withhold assent or return the bill.

• Golaknath v. State of Punjab (1967): In this landmark 6:5 majority judgment, the Supreme Court held that Fundamental Rights are "transcendental" and "immutable," meaning Parliament has no power to amend them. This created a legal deadlock that the 24th Amendment resolved.

• Article 13: It originally acted as a shield for Fundamental Rights, declaring that any "law" made by the state that takes away these rights is void. The 24th Amendment added a clause stating that "nothing in this article shall apply to any amendment of this Constitution made under Article 368."

• Legislative Supremacy: This amendment represented a period of intense conflict between the Judiciary and the Legislature in India, where the government sought to establish the supremacy of Parliament in matters of social and economic reform.

Important Points

• Kesavananda Bharati Case (1973): The validity of the 24th Amendment was challenged in this famous case. The Supreme Court upheld the amendment but introduced the Basic Structure Doctrine, stating that while Parliament can amend any part of the Constitution, it cannot alter its "basic structure" or "essential features."

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• Fundamental Rights vs. DPSP: The 24th Amendment was a precursor to the 25th Amendment, which sought to give Directive Principles of State Policy (DPSP) precedence over Fundamental Rights in certain cases (specifically Articles 39(b) and 39(c)).

• Constitutional Balance: Today, the power of Parliament to amend the Constitution is widely accepted, provided it respects the core values like Secularism, Democracy, Federalism, and Judicial Review as established by the 13-judge bench in 1973.

• The amendment effectively changed the status of Fundamental Rights from being unalterable to being amendable, ensuring that the Constitution remains a living document capable of adapting to the changing needs of the Indian people.

Q6. Answer: (a) 74

Shortcut Trick

Supplementary angles sum = 180°

Let smaller = x => larger = x + 32

So, x + (x + 32) = 180

2x = 148 => x = 74

Therefore Answer = 74°

Alternate Method

Given:

Sum of two supplementary angles = 180°, difference = 32°

Formula used:

Sum = 180°, Let angles be a and b such that a + b = 180

Calculations:

=> Let smaller angle = x

=> Larger angle = x + 32

=> x + (x + 32) = 180

=> 2x + 32 = 180

=> 2x = 148

=> x = 74

Therefore The correct answer is 74°.

Additional Information

Supplementary Angles

Two angles whose sum is 180° are called supplementary angles

Complementary Angles

Two angles whose sum is 90° are called complementary angles

Linear Pair

A linear pair of angles always adds up to 180°

General Formula

If difference is d, smaller angle = (180 − d) ÷ 2

Q7. Answer: (b) 12 km

Shortcut Trick

Downstream speed = 8 + 2 = 10 km/hr, Upstream speed = 8 − 2 = 6 km/hr

Total time = 3 hr 12 min = 3.2 hr

Round trip time formula: Time = 2D × (1/10 + 1/6)

=> 3.2 = 2D × (16/60) = 2D × (4/15)

D = 6 km

Therefore Answer = 6 km

Alternate Method

Given:

Speed in still water = 8 km/hr

Stream speed = 2 km/hr

Total time = 3 hr 12 min = 3.2 hr

Formula used:

Downstream speed = u + v

Upstream speed = u − v

Time = Distance ÷ Speed

Calculations:

=> Downstream speed = 8 + 2 = 10 km/hr

=> Upstream speed = 8 − 2 = 6 km/hr

=> Let distance = D km

=> Time downstream = D ÷ 10

=> Time upstream = D ÷ 6

=> Total time = D/10 + D/6 = 3.2

=> Taking LCM 30 => (3D + 5D) ÷ 30 = 3.2

=> 8D ÷ 30 = 3.2

=> 4D ÷ 15 = 3.2

=> D = (3.2 × 15) ÷ 4 = 48 ÷ 4 = 12

Therefore The correct answer is 12 km.

Additional Information

Downstream and Upstream Speed

Downstream = u + v, Upstream = u − v where u = still water speed and v = stream speed

Round Trip Time

Total time = Distance/Downstream + Distance/Upstream

LCM Method

Use LCM of denominators to simplify fractional equations quickly

Unit Conversion

Always convert minutes into hours: minutes ÷ 60

Q8. Answer: (d) Fermentation

The correct answer is Fermentation.

Key Points

• Fermentation is a metabolic process that produces chemical changes in organic substrates through the action of enzymes. In the context of bread making, it refers specifically to the process where yeast (primarily Saccharomyces cerevisiae) converts sugars (glucose, fructose, and sucrose) into ethanol and carbon dioxide (CO_2).

• The carbon dioxide gas produced during this reaction is trapped within the dough by the gluten network. As the gas expands, it causes the dough to rise, a process known as leavening. This creates the light, airy texture characteristic of bread.

• The chemical equation for this anaerobic process can be represented as: $C_6H_{12}O_6$ (glucose) → $2C_2H_5OH$ (ethanol) + $2CO_2$ (carbon dioxide). While ethanol is also produced, it mostly evaporates during the baking process at high temperatures.

• Fermentation is highly sensitive to temperature and moisture. Most bread yeasts work optimally between 25°C to 35°C. Temperatures above 50°C typically kill the yeast cells, stopping the fermentation process.

• Apart from leavening, fermentation contributes significantly to the flavor and aroma of the bread due to the production of organic acids and other by-products during the breakdown of sugars.

Additional Information

• Oxidation-Reduction Reaction: While redox reactions occur during dough mixing (impacting the disulfide bonds in gluten proteins), they are not the primary mechanism for leavening. Oxidation helps in strengthening the dough, but does not produce the gas required for rising.

• Enzymatic Reaction: In bread making, amylase enzymes are crucial as they break down starch into maltose and glucose. This provides the substrate (food) for the yeast to perform fermentation. However, the production of CO_2 itself is the result of the fermentation pathway rather than a simple enzymatic hydrolysis.

• Acid-Base Reaction: This is the mechanism used in chemical leavening rather than biological leavening. It involves the reaction between an acid (like buttermilk or cream of tartar) and a base (like sodium bicarbonate/baking soda) to release carbon dioxide quickly. This is common in cakes and biscuits but not traditional yeast bread.

• Role of Gluten: Gluten is a protein complex formed from gliadin and glutenin when flour is mixed with water. It provides the elasticity and extensibility necessary to hold the gas bubbles produced during fermentation. Without gluten, the CO_2 would escape, and the bread would remain flat.

Important Points

• Maillard Reaction: This is a chemical reaction between amino acids and reducing sugars that gives browned food its distinctive flavor. It occurs on the crust of the bread during baking at temperatures above 140°C, which is separate from the fermentation process occurring in the crumb.

• Proofing: This is the final rise of the dough after it has been shaped but before it is baked. During this stage, fermentation

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continues at a steady rate to ensure the final volume of the loaf.

• Historical Context: The use of yeast for fermentation dates back to Ancient Egypt (around 3000 BCE), where bakers discovered that leaving dough in the open air allowed wild yeast to settle and ferment the sugars.

• Biological vs. Chemical: Yeast fermentation is a biological process involving living organisms, whereas using baking powder is a chemical process. Traditional breads like sourdough rely on a symbiotic culture of yeast and lactic acid bacteria.

Q9. Answer: (d) Daughter

Family Chart:

Given:

S is married to R.

S is the father of Q.

Q has a sister named K and a brother named M.

So, K is the daughter of R

Hence, the correct answer is "Option 4".

Q10. Answer: (c) 3

Given: (Left) # F * G W # C # Y R & @ W Z @ L & L N % # W (Right)

Now,

Letters, which are immediately preceded by a symbol and also immediately followed by a symbol.

So, Needed pattern is: Symbol - Letter - Symbol

(Left) # F * G W # C # Y R & @ W Z @ L & L N % # W (Right)

So, total valid letters = 3

Hence, the correct answer is Option 3.

Q11. Answer: (b) World Artificial Intelligence Cooperation Organization (WAICO)

The correct answer is World Artificial Intelligence Cooperation Organization (WAICO).

Key Points

• During the Asia-Pacific Economic Cooperation (APEC) proceedings in late 2024 and leading into the 2025 agenda, Chinese President Xi Jinping proposed the establishment of the World Artificial Intelligence Cooperation Organization (WAICO) to foster global collaboration.

• The proposal aims to create a centralized body that facilitates international cooperation on AI technology, ensuring that the benefits of Artificial Intelligence are shared globally, particularly with developing nations in the Global South.

• President Xi Jinping emphasized that the WAICO should serve as a platform for policy coordination, technical exchange, and the development of international standards for AI ethics and safety.

• This initiative follows China's Global AI Governance Initiative, which was first introduced in October 2023 at the Third Belt and Road Forum, highlighting sovereignty and mutual respect in digital governance.

• The proposal at APEC reflects China's strategic move to take a leadership role in shaping the global governance framework for emerging technologies and addressing the digital divide.

Additional Information

• Global AI Governance Initiative:

• Launched by China in 2023, this initiative outlines eleven core principles for AI development, including equal rights for all countries to develop and use AI regardless of their political system.

• It opposes the creation of exclusive groups or technological blockades that hinder the development of AI in other nations.

• APEC (Asia-Pacific Economic Cooperation):

• Established in 1989, APEC is an inter-governmental forum for 21 member economies in the Pacific Rim that promotes free trade throughout the Asia-Pacific region.

• The 2024 APEC Summit was held in Lima, Peru, where leaders discussed sustainable growth, digital transformation, and inclusive trade.

• United Nations and AI:

• In March 2024, the UN General Assembly adopted its first global resolution on Artificial Intelligence, encouraged by the United States and co-sponsored by China and over 120 other nations.

• The resolution emphasizes the need for safe, secure, and trustworthy AI systems that respect human rights and international law.

• Technological Rivalry:

• The proposal for WAICO comes amidst a backdrop of technological competition between the United States and China,

particularly concerning semiconductors and AI infrastructure.

• While China promotes multilateral governance through organizations like WAICO, the USA often focuses on alliances with G7 partners and democratic nations to set AI norms.

Important Points

• Date of Proposal: The concept gained significant traction during the APEC meetings in November 2024 and is a key foreign policy objective for China for the year 2025.

• Core Objective: To prevent the monopolization of AI technologies by a few countries and to ensure that Global AI Governance is handled under a multilateral framework, potentially through the United Nations.

• Features of WAICO: It is intended to be an open and inclusive organization that welcomes participation from governments, international organizations, research institutions, and private enterprises.

• Administrative Focus: The organization would likely focus on data security, algorithmic transparency, and preventing AI from being used for interference in the internal affairs of other countries.

Q12. Answer: (d) Integrated circuits (ICs)

The correct answer is Integrated circuits (ICs).

Key Points

• A CPU (Central Processing Unit) is the primary component of any computer system that performs arithmetic, logic, and input/output operations. Physically, it is manufactured on a small piece of semiconductor material, typically silicon, which is known as an Integrated circuit (IC).

• An Integrated Circuit acts as a single unit containing thousands to billions of miniature electronic components like transistors, resistors, and capacitors. These are etched onto the silicon wafer through a process called photolithography.

• When an entire CPU is contained on a single Integrated Circuit, it is specifically referred to as a microprocessor. In modern computing, almost all CPUs are microprocessors, but the physical hardware category they belong to is ICs.

• The Integrated Circuit technology allowed for the miniaturization of computers. Before ICs, computers like the ENIAC used thousands of vacuum tubes and occupied entire rooms. The shift to silicon-based ICs significantly increased processing speed while reducing power consumption. Hence, the statement regarding Integrated circuits being the physical microchip for a CPU is correct.

Additional Information

• Evolution of ICs: The concept of the Integrated Circuit was first developed in 1958 by Jack Kilby of Texas Instruments and independently by Robert Noyce of Fairchild Semiconductor in 1959. This invention led to the third generation of computers.

• Microprocessors: The first commercially available microprocessor was the Intel 4004, released in 1971. It combined all the functions of a CPU onto a single chip, revolutionizing the personal computer industry.

• Scale of Integration: Modern ICs utilize Very Large Scale Integration (VLSI) or Ultra Large Scale Integration (ULSI), allowing developers to pack billions of MOSFET (Metal-Oxide-Semiconductor Field-Effect Transistor) devices into a space smaller than a fingernail.

• Moore's Law: Coined by Gordon Moore in 1965, this observation states that the number of transistors on a microchip doubles approximately every two years, though the cost of computers is halved. This trend has driven the rapid growth of computing power for decades.

Important Points

• Transistors: These are the fundamental building blocks of an IC. They act as switches or amplifiers. While a CPU is made of transistors, it is not "placed on" them; rather, the transistors are fabricated within the Integrated Circuit.

• Compact Disks (CDs): These are optical storage devices used to store data in a digital format. They have no role in the physical construction of a CPU and are used for secondary storage only.

• Semiconductor Material: Silicon is the most common element used for ICs due to its abundance and its unique ability to have its electrical conductivity modified by adding impurities (a process called doping).

• Form Factor: The CPU chip is usually protected by a ceramic or plastic housing and connected to the motherboard via a socket (such as LGA or PGA). This housing helps in heat dissipation and provides structural integrity to the delicate silicon die.

Q13. Answer: (a) Only conclusion (I) follows

Given Statements:

All chairs are tables.

Some tables are boards.

No chair is a desk.

The least possible Venn diagram shows:

Conclusions:

(I) Some boards are tables

Since “Some tables are boards”, it directly means there is an intersection between tables and boards.

So, this conclusion follows.

(II) No table is a desk

We only know that no chair is a desk, but tables (outside chairs) may or may not be desks.

So this conclusion does not necessarily follow.

Hence, only conclusion (I) follows.

Hence, the correct answer is "Option 1".

Q14. Answer: (c) RK Shanmukham Chetty

The correct answer is RK Shanmukham Chetty.

Key Points

• RK Shanmukham Chetty served as the first Finance Minister of independent India following the end of British rule in 1947.

• He held this prestigious designation from August 15, 1947, to August 1948, under the leadership of Prime Minister Jawaharlal Nehru.

• He has the distinction of presenting the first-ever Union Budget of independent India on November 26, 1947.

• The first budget presented by him was an interim budget that covered a period of 7.5 months, specifically from August 15, 1947, to March 31, 1948.

• RK Shanmukham Chetty was a distinguished lawyer, economist, and politician who had earlier served as the President of the Central Legislative Assembly between 1933 and 1935.

• Before Independence, he served as the Dewan of Cochin State from 1935 to 1941 and represented India at the Bretton Woods Conference in 1944.

Additional Information

• Rajkumari Amrit Kaur:

• She was the first Health Minister of independent India and served for 10 years in the cabinet.

• She was the first woman to hold a cabinet rank in India and played a fundamental role in the establishment of the All India Institute of Medical Sciences (AIIMS) in New Delhi in 1956.

• Dr. CH Bhabha:

• Cooverji Hormusji Bhabha served as the first Commerce Minister of independent India.

• In the Interim Government formed in 1946, he was initially assigned the portfolio of Works, Mines, and Power.

• Sardar Baldev Singh:

• He was the first Defence Minister of India and played a key role in the partition negotiations.

• He managed the Indian Army during the Indo-Pakistani War of 1947 and oversaw the integration of the armed forces.

• John Mathai:

• He succeeded RK Shanmukham Chetty as the Finance Minister and presented the first budget of the Republic of India in 1950.

• He was also instrumental in the nationalization of the State Bank of India in 1955.

Important Points

• Article 112: According to the Constitution of India, the Union Budget is officially referred to as the Annual Financial Statement.

• It represents the estimated receipts and expenditure of the Government for a financial year, which runs from April 1 to March 31.

• The Budget is presented in the Lok Sabha by the Union Finance Minister, usually after the President has recommended its introduction.

• Historically, the Railway Budget and the General Budget were presented separately following the Acworth Committee report of 1921, but they were merged back into a single budget in 2017.

Q15. Answer: (b) 4,00,200

Shortcut Trick

Successive increase formula: Final = Initial × (1 + a/100) × (1 + b/100)

Population = 2,90,000 × 1.15 × 1.20

= 2,90,000 × 1.38

= 4,00,200

Therefore Answer = 4,00,200

Alternate Method

Given:

Initial population = 2,90,000

Increase in first year = 15%

Increase in second year = 20%

Formula used:

New Value = Old Value × (1 + Rate/100)

Calculation:

=> After 1st year = 2,90,000 × (1 + 15/100)

=> = 2,90,000 × 1.15 = 3,33,500

=> After 2nd year = 3,33,500 × (1 + 20/100)

=> = 3,33,500 × 1.20 = 4,00,200

Therefore The correct answer is 4,00,200.

Additional Information

Successive Percentage Change

Net change = a + b + (ab/100). Used when two percentage changes are applied.

Population Growth Formula

Population after n years = $P \times (1 + r/100)^n$

Compound Growth Concept

Each year's increase is applied to the updated population, not the original.

Shortcut Net Increase

15% and 20% successive increase => Net = 15 + 20 + (15×20/100) = 38%

Q16. Answer: (d) Rank or position of an official

The correct answer is Rank or position of an official.

Key Points

• The term Mansab is derived from the Arabic language, which literally translates to rank, position, or status. In the context of the Mughal administration, it defined the grade of an officer in the imperial hierarchy.

• The Mansabdari system was a unique administrative framework introduced by the Mughal Emperor Akbar in the 19th year of his reign, approximately 1571-72. It was designed to organize the nobility and the military of the empire.

• A Mansabdar was an individual who held a Mansab. This system determined three specific things for the official: their rank in the administrative hierarchy, their fixed salary, and the military responsibility (number of cavalrymen they had to maintain).

• The rank of a Mansabdar was divided into two numerical representations: Zat and Sawar. Zat indicated the personal status and the salary of the officer, while Sawar indicated the number of cavalrymen (soldiers and horses) the official was required to bring for service.

• By standardizing the ranks, Akbar was able to create a centralized bureaucracy where every officer, whether civil or military, was part of a single service under the Emperor's direct control.

Additional Information

• Hierarchy and Ranks: The Mansabs were classified into various grades, ranging from a minimum of 10 to a maximum of 10,000. Ranks above 5,000 were usually reserved for the Princes of the Royal Blood. For instance, Raja Man Singh was one of the few non-royal officials to hold a high rank of 7,000.

• Appointment and Promotion: The Emperor held the absolute power to appoint, promote, or dismiss any Mansabdar. The Mir Bakshi was the head of the military department who presented candidates for appointment and maintained the records of the Mansabdars.

• Non-Hereditary Nature: The Mansabdari system was not hereditary. A Mansab was granted for the lifetime of the officer. Upon the death of a Mansabdar, their rank was abolished, and their property was often confiscated by the state under the Law of Escheat.

• Mode of Payment: Mansabdars were paid either in cash (Naqdi) or through land revenue assignments known as Jagirs. However, even if they held a Jagir, they did not have ownership of the land; they only had the right to collect the revenue equivalent to their salary.

• Evolution of the System: During the reign of Jahangir, the system was modified with the introduction of Du-aspa Sih-aspa, which allowed a Mansabdar to maintain a higher number of Sawar without increasing their Zat rank.

Important Points

• Military Obligations: Every Mansabdar had to bring their cavalrymen for review. To prevent corruption and cheating, the Mughals used the Dagh system (branding of horses) and the Chehra system (descriptive rolls of soldiers).

• Classification of Officers: Officials holding a rank below 500 were called Mansabdars. Those holding ranks between 500 and 2,500 were known as Amirs, and those above 2,500 were called Amir-i-Umda or Amir-al-Azam.

• Linguistic Basis: While the system was implemented in India, it had roots in Central Asian traditions and the Mongol military

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organization (the decimal system), which Akbar adapted to suit the Indian socio-political landscape.

• Administrative Impact: This system helped Akbar integrate the diverse Rajput, Turani, Irani, and Indian Muslim nobility into a unified administrative structure, ensuring the stability of the Mughal Empire for centuries.

Q17. Answer: (c) 54 hours

Shortcut Trick

Take total work = LCM(27,18) = 54 units

P = 2 units/hr, Q = 2 units/hr => Together = 4 units/hr

In 3 hours => work done = 12 units

R empties 12 units in 4 hrs => R = −3 units/hr

Net = 4 − 3 = 1 unit/hr

Therefore Answer = 54 hours

Alternate Method

Given:

Pipe P fills 5/9 in 15 hours

Pipe Q fills 7/9 in 21 hours

P and Q run for 3 hours

Pipe R empties water in 4 hours

Formula used:

Efficiency = Total Work ÷ Time

Pipe	Time	Total Work	Efficiency
P	15 hr	54	54 × (5/9) ÷ 15 = 2
Q	21 hr	54 × (7/9) ÷ 21 = 2	

Calculation:

=> Efficiency of P = 2 units/hr

=> Efficiency of Q = 2 units/hr

=> Combined (P + Q) = 4 units/hr

=> Work done in 3 hours = 3 × 4 = 12 units

=> R empties 12 units in 4 hrs => Efficiency of R = −3 units/hr

=> Net efficiency (P + Q + R) = 4 − 3 = 1 unit/hr

=> Time = Total Work ÷ Net Efficiency = 54 ÷ 1 = 54 hours

Therefore The correct answer is 54 hours.

Additional Information

LCM Method Advantage

Converts fractions into whole numbers, making calculations faster and simpler.

Efficiency Concept

Efficiency = Work done per unit time. Higher efficiency means faster completion.

Negative Work

Emptying pipes have negative efficiency and reduce total work.

Combined Work

Net efficiency = Sum of all individual efficiencies (taking sign into account).

Q18. Answer: (d) 22.4

Shortcut Trick

Empirical relation: Mode = 3Median − 2Mean

=> Mode − Mean = 3(Median − Mean)

Given Mode − Mean = 33.6

=> Median − Mean = 33.6 ÷ 3 = 11.2

=> Mode − Median = 33.6 − 11.2 = 22.4

Therefore Answer = 22.4

Alternate Method

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Given:
Mode − Mean = 33.6
Formula used:
Mode = 3Median − 2Mean
Calculation:
=> Mode − Mean = (3Median − 2Mean) − Mean
=> Mode − Mean = 3Median − 3Mean
=> Mode − Mean = 3(Median − Mean)
=> 33.6 = 3(Median − Mean)
=> Median − Mean = 11.2
=> Mode − Median = (Mode − Mean) − (Median − Mean)
=> = 33.6 − 11.2 = 22.4
Therefore The correct answer is 22.4.
Additional Information
Empirical Formula
Mode = 3Median − 2Mean. Used for moderately skewed distributions.
Relation Derived
Mode − Mean = 3(Median − Mean)
Difference Relation
Mode − Median = (Mode − Mean) − (Median − Mean)
Use Case
Applicable when exact data is not given but mean, median, and mode are related.

Q19. Answer: (d) 6

Given:
REST → 5729
SEAT → 7625
Thus, A = 6
Hence, the correct answer is Option 4.

Q20. Answer: (d) TYS

The logic followed here is based on the alphabetical position pattern:
Option 1: YCX
Option 2: GKF
Option 3: NRM
Option 4: TYS
Thus, YCX does not follow the pattern.
Hence, the odd one out is Option 1.

Q21. Answer: (d) Two

Given: (Left) = N * R ^ S V L ^ W O P Y $ @ H A F ? E R (Right)
Now,
Letters, which are immediately preceded by a symbol and also immediately followed by a symbol.
So, Needed pattern is: Symbol - Letter - Symbol
(1): (Left) [= N *] R ^ S V L ^ W O P Y $ @ H A F ? E R (Right)
(2): (Left) = N [* R ^] S V L ^ W O P Y $ @ H A F ? E R (Right)
So, total valid letters = 2
Hence, the correct answer is Option 4.

Q22. Answer: (a) Article 43B

The correct answer is Article 43B.
Key Points
• Article 43B was inserted into the Constitution of India by the 97th Constitutional Amendment Act, 2011. It specifically mandates

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the State to promote voluntary formation, autonomous functioning, democratic control, and professional management of cooperative societies. Hence, Option A is the correct answer.

• The inclusion of this article reflects the Directive Principles of State Policy (DPSP) under Part IV, which aims to establish a social and economic democracy.

• The 97th Amendment aimed to address the various problems faced by cooperative sectors, such as lack of professionalism, delayed elections, and excessive government interference.

• By making it a constitutional directive, the State is encouraged to create a favorable legal and administrative environment for cooperatives to thrive as effective economic units.

• This amendment also introduced Part IXB to the Constitution, which contains detailed provisions regarding the incorporation, terms of members, and audit of cooperative societies.

Additional Information

• Article 43A:

• This article was added by the 42nd Constitutional Amendment Act, 1976.

• It directs the State to take steps to secure the participation of workers in the management of undertakings, establishments, or other organizations engaged in any industry. Hence, Option B is incorrect.

• Article 48A:

• This article was also introduced by the 42nd Constitutional Amendment Act, 1976.

• It focuses on the protection and improvement of the environment and the safeguarding of forests and wildlife of the country. Hence, Option C is incorrect.

• Article 38:

• This is an original article of the Constitution that directs the State to secure a social order for the promotion of the welfare of the people.

• It was further bolstered by the 44th Amendment Act, 1978, which added a provision to minimize inequalities in income, status, facilities, and opportunities. Hence, Option D is incorrect.

• Part IXB of the Constitution:

• Introduced by the same 97th Amendment, it covers Articles 243ZH to 243ZT.

• It provides for the maximum number of directors (21), reservation of seats for SC/STs and women on boards, and the duration of the term (5 years) for elected members of cooperative societies.

Important Points

• Fundamental Right: The 97th Amendment also modified Article 19(1)(c) of the Constitution. It made the right to form cooperative societies a Fundamental Right for all citizens of India.

• Supreme Court Ruling: In 2021, in the case of Union of India v. Rajendra N. Shah, the Supreme Court of India struck down a portion of the 97th Amendment (specifically Part IXB) insofar as it applied to State Cooperative Societies because it was not ratified by the State Legislatures as required by Article 368(2). However, the court upheld the validity of the amendment regarding Multi-State Cooperative Societies and the insertion of Article 43B.

• Linguistic and Cultural Context: Cooperatives in India are vital for rural development and agricultural credit, with famous examples like AMUL (Gujarat Co-operative Milk Marketing Federation Ltd) showcasing the success of the cooperative model.

Q23. Answer: (c) = RSN % = PQL

Given: # : MNI :: UVQ : %

Option 1) # = RJH, % = IQL

For # (RJH) to MNI

For % (IQL) to UVQ

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

Option 2) # = OPN, % = PBW

For # (OPN) to MNI

For % (PBW) to UVQ

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

Option 3) # = RSN, % = PQL

For # (RSN) to MNI

For % (PQL) to UVQ

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

Option 4) # = RUN, % = IOL

For # (RUN) to MNI

For % (IOL) to UVQ

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

Hence, the correct answer is "Option 3".

Q24. Answer: (c) 82%

Shortcut Trick

Girish is 60 less than 92% => 768 + 60 = 828 = 92%

=> 1% = 828 ÷ 92 = 9

=> Total marks = 9 × 100 = 900

Friend % = (738 ÷ 900) × 100 = 82%

Therefore Answer = 82%

Alternate Method

Given:

Girish's marks = 768

He is 60 marks less than 92% of maximum marks

Friend's marks = 738

Formula used:

Percentage = (Obtained Marks ÷ Maximum Marks) × 100

Calculation:

=> Let maximum marks = M

=> 92% of M = 0.92M

=> Given: 0.92M − 60 = 768

=> 0.92M = 768 + 60 = 828

=> M = 828 ÷ 0.92 = 900

=> Friend's percentage = (738 ÷ 900) × 100

=> = 82%

Therefore The correct answer is 82%.

Additional Information

Percentage Concept

x% of a number = (x/100) × number

Reverse Percentage

If a value represents x%, divide by x and multiply by 100 to get total.

Marks Formula

Percentage = (Marks Obtained ÷ Total Marks) × 100

Shortcut Tip

When value is close to a percentage, adjust first (add/subtract) then find base.

Q25. Answer: (d) Alt+Space

The correct answer is Alt+Space.

Key Points

• The keyboard shortcut Alt+Space is used to open the System Menu (also known as the window menu) for the currently active window. This menu provides options such as Restore, Move, Size, Minimize, Maximize, and Close. Hence, option D is correct.

• Alt+F4 is a widely used shortcut in Windows OS to close the active item or exit the active application. If no program is open, it triggers the Shut Down Windows dialog box. Hence, option A is incorrect.

• Alt+Enter is primarily used in File Explorer to display the Properties dialog box for the selected file or folder. In some older applications or command prompts, it is used to toggle between windowed mode and full-screen mode. Hence, option B is incorrect.

• Alt+Tab is the standard shortcut for Task Switching. It allows the user to switch between open applications or windows by holding the Alt key and pressing Tab to cycle through the list. Hence, option C is incorrect.

• Using Alt+Space is particularly helpful for accessibility purposes or when a mouse is unavailable, allowing users to manage window placement and sizing entirely through the keyboard.

Additional Information

• Windows Operating System (OS): Developed by Microsoft, it relies heavily on Graphical User Interface (GUI) elements and Keyboard Shortcuts to enhance productivity and user experience.

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• System Menu Functions:

• Move: Allows the user to reposition the window using arrow keys.

• Size: Enables resizing of the window borders via the keyboard.

• Minimize/Maximize: Controls the visibility and scaling of the window on the Desktop.

• Alternative Shortcuts for Navigation:

• Ctrl+Shift+Esc: Directly opens the Task Manager to monitor system performance and background processes.

• Windows Key + D: Instantly minimizes all open windows to show the Desktop.

• Windows Key + L: Used to lock the computer or switch users securely.

• Alt + Esc: Cycles through windows in the order in which they were originally opened.

• History and Evolution: Most of these shortcuts, including Alt+Space and Alt+Tab, have been consistent features since the early versions of Windows 3.1 and Windows 95, maintaining legacy compatibility for professional users.

Important Points

• Keyboard Accessibility: Shortcuts like Alt+Space are essential for users with motor impairments, as they provide a way to interact with the Operating System without requiring precise mouse movements.

• Troubleshooting: If a window is "lost" off-screen (due to changing monitor resolutions), a user can press Alt+Space, select Move, and use the arrow keys to bring the window back into the visible area.

• Cross-Platform Compatibility: While these shortcuts are specific to Microsoft Windows, similar functionalities exist in macOS (using the Command key) and Linux distributions (like Ubuntu or Fedora).

Q26. Answer: (b) 700%

Shortcut Trick

CP per article = 102 ÷ 12 = 8.5

SP per article = 68

Profit per article = 68 − 8.5 = 59.5

Profit % = (59.5 ÷ 8.5) × 100 = 700%

Therefore Answer = 700% profit

Alternate Method

Given:

Number of dozens = 32

CP per dozen = Rs. 102

SP per article = Rs. 68

Formula used:

Profit % = (Profit ÷ Cost Price) × 100

Calculation:

=> Total articles = 32 × 12 = 384

=> Total CP = 32 × 102 = Rs. 3264

=> Total SP = 384 × 68 = Rs. 26112

=> Profit = 26112 − 3264 = Rs. 22848

=> Profit % = (22848 ÷ 3264) × 100

=> = 700%

Therefore The correct answer is 700% profit.

Additional Information

Dozen Concept

1 dozen = 12 articles. Convert to per article for easy comparison.

Profit Formula

Profit % = (SP − CP) ÷ CP × 100

Unit Method

Always reduce to per unit to avoid large calculations.

Quick Check

If SP is many times CP, expect very high profit percentage.

Q27. Answer: (c) 80 – 40 – 50 – 25

The logic followed here is:

Logic: Each step is obtained by dividing by 2, and then alternately adding 10 or multiplying by 2 in a fixed repeating pattern.

For, 100 – 50 – 60 – 30

=> 100 ÷ 2 = 50

=> 50 + 10 = 60

=> 60 ÷ 2 = 30

For, 300 – 150 – 160 – 80

=> 300 ÷ 2 = 150

=> 150 + 10 = 160

=> 160 ÷ 2 = 80

Now, checking the options using the same pattern:

Option 1) 100 – 50 – 40 – 20

=> 100 ÷ 2 = 50

=> 50 − 10 = 40

=> 40 ÷ 2 = 20

Option 2) 160 – 80 – 90 – 180

=> 160 ÷ 2 = 80

=> 80 + 10 = 90

=> 90 × 2 = 180

Option 3) 80 – 40 – 50 – 25

=> 80 ÷ 2 = 40

=> 40 + 10 = 50

=> 50 ÷ 2 = 25

Option 4) 220 – 110 – 120 – 30

=> 220 ÷ 2 = 110

=> 110 + 10 = 120

=> 120 ÷ 2 = 60 ≠ 30

Thus, 80 – 40 – 50 – 25 matches the given pattern.

Hence, the correct answer is Option 3.

Q28. Answer: (c) 94

The logic followed here is:

thus, "94" will replace the question mark in the given series.

Hence, the correct option is "Option 3".

Q29. Answer: (b) Lakhpati Didis

The correct answer is Lakhpati Didis.

Key Points

• The term Lakhpati Didis refers to women members of Self-Help Groups (SHGs) who have achieved a sustainable annual income of Rs. 1 lakh (one lakh rupees) or more through various livelihood interventions.

• This initiative was prominently announced by Prime Minister Narendra Modi during his 77th Independence Day speech on August 15, 2023, with the aim of empowering rural women economically.

• The program is a strategic part of the Deendayal Antyodaya Yojana - National Rural Livelihoods Mission (DAY-NRLM), which focuses on mobilizing rural poor households into SHGs and providing them with diversified livelihood opportunities.

• During the Interim Budget 2024-25, the Union Finance Minister Nirmala Sitharaman announced an increase in the target for Lakhpati Didis from 2 crore to 3 crore women.

• The initiative focuses on providing skills training in areas such as plumbing, LED bulb making, drone operation, and tailoring to help women establish micro-enterprises. Hence, the statement regarding the term used for SHG women earning Rs. 1 lakh or more is correct.

Additional Information

• Deendayal Antyodaya Yojana - National Rural Livelihoods Mission (DAY-NRLM):

• Launched in June 2011 by the Ministry of Rural Development, it is one of the world's largest initiatives to improve the livelihoods

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of the rural poor.

• As of 2024, the mission has mobilized more than 9 crore women into nearly 83 lakh Self-Help Groups.

• The mission provides Revolving Funds (RF) and Community Investment Funds (CIF) to these groups to facilitate internal lending and business startups.

• Livelihood Diversification:

• The Lakhpati Didi model encourages women to adopt at least two to three distinct livelihood activities to ensure a stable income throughout the year.

• Activities include organic farming, livestock rearing, handicrafts, and non-farm sectors like operating Common Service Centres (CSCs).

• Financial Inclusion:

• Under this initiative, the government facilitates bank linkages for SHGs to provide credit at affordable interest rates.

• Women are also encouraged to become Bank Sakhis (Business Correspondents) to provide banking services in remote rural areas.

Important Points

• Namo Drone Didi Scheme:

• A major sub-component of the empowerment plan is the Namo Drone Didi scheme, launched in November 2023.

• The government aims to provide 15,000 selected women SHGs with drones to offer rental services to farmers for agricultural purposes like spraying pesticides and fertilizers.

• This scheme provides an additional income stream of approximately Rs. 60,000 to Rs. 1,00,000 per year for the drone pilots.

• Monitoring and Support:

• The progress of the Lakhpati Didi initiative is tracked through a dedicated MIS portal to monitor the household-level income of SHG members across different States and Union Territories.

• Technical support is provided through Cluster Level Federations (CLFs) and State Rural Livelihood Missions (SRLMs) to ensure market access for products made by these women.

Q30. Answer: (c) 13 km to the North

Given:

Vishu starts from A and drives 31 km East.

He turns left → 19 km North.

He turns left → 34 km West.

He turns left → 32 km South.

He turns left → 3 km East and reaches P.

To reach A from P → move 13 km North.

Hence, the correct answer is Option 3.

Q31. Answer: (d) Hayli Gubbi

The correct answer is Hayli Gubbi.

Key Points

• Hayli Gubbi is a shield volcano located in the Afar Region of Ethiopia. It is the southernmost volcano of the Erta Ale volcanic range.

• The volcano is notably recognized for its eruption in November 2008. While the question mentions 2025, this is likely a typographical error in the source material referring to the 2008 event, which is a common subject in geographical examinations. Hence, Option D is the correct answer.

• During the 2008 eruption, significant seismic activity and lava flows were reported in the Danakil Depression, specifically within the Afar Triangle.

• The summit of Hayli Gubbi reaches an elevation of approximately 521 meters (1,709 feet) and contains a small caldera. Its volcanic activity is primarily basaltic, typical of volcanoes situated along tectonic rift zones.

• The Afar Depression, where Hayli Gubbi is situated, is a triple junction where three tectonic plates—the Arabian, Nubian, and Somali plates—are diverging, leading to high levels of volcanic and seismic activity.

Additional Information

• Erta Ale:

• Commonly known as the "Smoking Mountain" in the local Afar language, Erta Ale is one of the most active volcanoes in Ethiopia.

• It is famous for harboring a persistent lava lake, one of only a few in the world, which has been active since 1967. Hence, statement regarding Erta Ale being the answer for a specific Nov 2008 eruption is incorrect.

• Mount Nyiragongo:

• This is a large stratovolcano located in the Democratic Republic of the Congo (DRC), not Ethiopia.

• It is situated within the Virunga National Park and is notorious for its extremely fluid lava and its most recent major eruptions in 2002 and May 2021. Hence, statement regarding Nyiragongo being an Ethiopian volcano is incorrect.

• Volcanism in Ethiopia:

• Ethiopia is home to more than 60 volcanoes that have been active in the last 10,000 years. This is due to its position on the East African Rift System.

• Important volcanic peaks include Dabbahu (which had a major eruption in 2005), Dama Ali, and Alayta.

• Afar Triangle Significance:

• This region is not only geologically active but also archaeologically vital. It is the site where the famous 3.2 million-year-old hominin fossil "Lucy" was discovered in 1974.

• The Danakil Depression within this region is one of the lowest points on Earth and is known for its extreme heat and hydrothermal fields like Dallol.

Important Points

• Shield Volcano Characteristics: Hayli Gubbi is classified as a shield volcano, which means it is built almost entirely of fluid lava flows. These volcanoes have broad, gently sloping sides, resembling a warrior's shield.

• Rift Valley Tectonics: The East African Rift is a developing divergent plate boundary. As the plates move apart, the lithosphere thins, allowing magma to rise to the surface, creating the volcanic chains seen in Ethiopia, Kenya, and Tanzania.

• Monitoring: Most volcanoes in the Afar region are monitored via satellite remote sensing (such as InSAR and MODIS) due to the remote and harsh environment of the Danakil Desert, which makes ground-based monitoring difficult.

Q32. Answer: (c) Radiation therapy administered after bladder cancer surgery

The correct answer is Radiation therapy administered after bladder cancer surgery.

Key Points

• In 2025, researchers from the Tata Memorial Centre (TMC) in Mumbai, India, published the results of a landmark Phase III trial regarding bladder cancer treatment. The study focused on patients with Muscle-Invasive Bladder Cancer (MIBC) who are at high risk of recurrence after undergoing a Radical Cystectomy (surgical removal of the bladder).

• The intervention demonstrated to be highly effective is Adjuvant Radiation Therapy (Radiation therapy administered after bladder cancer surgery). The study showed that this intervention significantly reduces the rate of pelvic recurrence, which is a common site for the cancer to return. Hence, option C is correct.

• Immunotherapy used as a standalone post-surgical treatment (Option A) has been explored in various global trials (like CheckMate 274), but the specific 2025 breakthrough by Indian researchers highlighted in this context specifically validated the role of radiation. Hence, option A is incorrect.

• Targeted drug therapy replacing surgery (Option B) is currently not the standard of care for high-risk muscle-invasive bladder cancer, as Radical Cystectomy remains the primary curative surgical intervention. Hence, option B is incorrect.

• Chemotherapy administered before bladder cancer surgery (Option D), known as Neoadjuvant Chemotherapy (NAC), is a well-established standard treatment used to shrink tumors before surgery, but it was not the specific post-surgical intervention highlighted in the 2025 Indian study for reducing pelvic recurrence. Hence, option D is incorrect.

Additional Information

• Muscle-Invasive Bladder Cancer (MIBC): This is an aggressive form of cancer where the malignancy has spread into the detrusor muscle of the bladder wall. Patients with MIBC often require aggressive treatment including surgery, chemotherapy, and now, as per the latest findings, post-operative radiation.

• Radical Cystectomy: This is the gold standard surgical procedure for MIBC. It involves the removal of the entire urinary bladder, nearby lymph nodes, and part of the urethra. In men, it may include the removal of the prostate, and in women, the uterus and ovaries.

• Pelvic Recurrence: Despite successful surgery, nearly 25% to 45% of high-risk patients experience cancer returning in the pelvic region. The Indian study showed that Adjuvant Radiation can reduce this risk by approximately 50%.

• Intensity-Modulated Radiation Therapy (IMRT): The researchers used advanced IMRT technology, which allows for precise targeting of the pelvic nodes while minimizing damage to the surrounding intestines and bowels, thereby reducing side effects.

• Global Impact: This research is particularly significant for India and other Low and Middle-Income Countries (LMICs) because Radiation therapy is more cost-effective and accessible compared to expensive Immunotherapy drugs like Nivolumab.

Important Points

• The POBC Trial: The study, known as the Post-Operative Bladder Cancer (POBC) trial, enrolled over 200 patients at Tata Memorial Hospital. The lead researcher, Dr. Vedang Murthy, emphasized that this trial provides Level 1 evidence for a treatment that was previously controversial.

• Disease-Free Survival (DFS): The study reported a significant improvement in 3-year Disease-Free Survival for patients receiving radiation compared to those who only underwent surgery and observation.

• Year of Significance: While the trial recruitment happened over several years, the 2024-2025 period marks the global

dissemination of these results, influencing international clinical guidelines.

• Standard of Care: This finding is expected to change the Standard of Care globally, shifting Adjuvant Radiation from an "optional" or "investigational" status to a recommended treatment for high-risk bladder cancer patients post-surgery.

Q33. Answer: (d) 12

Shortcut Trick

In continued proportion: $x^2 = 8 \times 18$

=> $x^2 = 144$

=> $x = \sqrt{144} = 12$

Therefore Answer = 12

Alternate Method

Given:

8, x, 18 are in continued proportion

Formula used:

In continued proportion: $a : b = b : c \Rightarrow b^2 = a \times c$

Calculation:

=> $x^2 = 8 \times 18$

=> $x^2 = 144$

=> $x = \sqrt{144}$

=> $x = 12$

Therefore The correct answer is 12.

Additional Information

Continued Proportion

Three numbers a, b, c are in continued proportion if $a : b = b : c$.

Key Formula

$b^2 = a \times c$

Geometric Mean

The middle term in continued proportion is called the geometric mean.

Shortcut Tip

Directly multiply first and third term, then take square root.

Q34. Answer: (a) A sharp reversal led to severe rainfall deficits in many regions.

The correct answer is A sharp reversal led to severe rainfall deficits in many regions..

Key Points

• Monsoon variability: Despite earlier heavy rains, a sharp reversal in monsoon patterns occurred due to sudden changes in atmospheric circulation, leading to rainfall deficits in many regions. This phenomenon is often influenced by factors like the El Niño effect.

• Nearly 19% of India faced drought or drought-like conditions by August 2025. The rainfall deficit created challenges for agriculture, water availability, and overall economic stability in affected areas.

• Delayed monsoon retreat: The abrupt cessation of rains during critical periods, coupled with dry spells, exacerbated water stress and reduced soil moisture levels.

• Climate change: The reversal can also be linked to broader climate change effects, such as rising temperatures that disrupt normal monsoon patterns and intensify rainfall variability.

• Regional disparities: Some regions experienced above-normal rainfall initially, but others faced prolonged dry periods, leading to uneven impacts across the country.

Additional Information

• El Niño and La Niña:

• El Niño is characterized by warming of the Pacific Ocean waters, which typically leads to weaker monsoons and reduced rainfall in India.

• La Niña, on the other hand, often results in increased rainfall in India but can also lead to regional imbalances.

• Indian Monsoon Mechanism:

• The monsoon is driven by the temperature contrast between land and ocean, creating pressure gradients that drive moisture-laden winds inland.

• Disruptions in this mechanism, such as delayed onset or abrupt retreat, can create rainfall deficits in critical agricultural areas.

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• Impact on agriculture:

• A sharp reversal in rainfall patterns directly affects crop yields, particularly for water-intensive crops like rice and sugarcane.

• Reduced soil moisture and drying reservoirs further stress irrigation systems, impacting food security.

• Water resource management:

• India's dependence on monsoon rainfall makes effective water conservation strategies crucial during drought-like conditions.

• Excessive river damming or mismanagement of water resources can compound the effects of rainfall deficits.

• Climate change adaptation:

• Long-term solutions to address monsoon variability include afforestation, sustainable agriculture practices, and improved weather forecasting systems.

• India's National Action Plan on Climate Change (NAPCC) aims to mitigate climate change impacts through focused missions like the National Water Mission and Green India Mission.

Important Points

• Rainfall deficit statistics:

• By August 2025, rainfall deficits reached 19% across the country, severely impacting agricultural productivity.

• Regions like Maharashtra, Karnataka, and Rajasthan were most affected by drought-like conditions.

• Government initiatives:

• Programs like the Pradhan Mantri Krishi Sinchai Yojana aim to improve irrigation infrastructure and reduce dependency on monsoon rains.

• The National Adaptation Fund for Climate Change (NAFCC) provides financial support to mitigate climate change impacts on vulnerable sectors.

• Economic implications:

• Rainfall deficits lead to reduced agricultural output, impacting GDP and causing spikes in food prices.

• Increased reliance on water-intensive industries exacerbates the water crisis during such periods.

Q35. Answer: (d) Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answe...

Given Statements:

I. Tanya scored more than Ritu and Seema but less than Usha.

II. Varsha scored more than Tanya but less than Usha.

Question: Who scored the highest marks?

Analysis:

From Statement I:

Usha > Tanya > Ritu, Seema

But Varsha’s position is unknown, so highest cannot be confirmed.

So Statement I alone is not sufficient.

From Statement II:

Usha > Varsha > Tanya

But Ritu and Seema’s positions are unknown, so highest cannot be confirmed.

So Statement II alone is not sufficient.

Combining I and II:

Usha > Varsha > Tanya > Ritu, Seema

Now it is clear that Usha scored the highest marks.

Hence, both statements I and II together are sufficient, but neither statement alone is sufficient.

Hence, the correct answer is "Option 4".

Q36. Answer: (d) Q

The logic followed here is:

Given: Seven people B, C, D, O, P, Q and R are sitting around a circular table facing the center.

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

Only three people sit between C and O when counted from the left of C.

P sits to the immediate right of O.

B sits to the immediate right of Q.

Now, fourth to the left of D = Q

Hence, the correct answer is "Option 4".

Q37. Answer: (b) 72.5%

Shortcut Trick

Let MP = 100 => SP1 = 3/10 × 100 = 30

Loss 25% => SP1 = 75% of CP => CP = 30 ÷ 0.75 = 40

Now SP2 = 69% of MP = 69

Profit = 69 − 40 = 29

Profit% = (29 ÷ 40) × 100 = 72.5%

Therefore Answer = 72.5%

Alternate Method

Given:

First SP = (3/10) of MP

Loss = 25%

Second SP = 69% of MP

Formula used:

Loss% = (Loss ÷ CP) × 100

Profit% = (Profit ÷ CP) × 100

Calculation:

=> Let Marked Price (MP) = 100

=> First SP = 3/10 × 100 = 30

=> Loss 25% => SP = 75% of CP

=> 30 = 0.75 × CP

=> CP = 30 ÷ 0.75 = 40

=> Second SP = 69% of MP = 69

=> Profit = 69 − 40 = 29

=> Profit% = (29 ÷ 40) × 100

=> = 72.5%

Therefore The correct answer is 72.5%.

Additional Information

Assumption Method

Taking MP = 100 simplifies percentage calculations directly.

Loss Concept

If loss = x%, then SP = (100 − x)% of CP.

Profit Concept

Profit% = (SP − CP) ÷ CP × 100

Marked Price Relation

SP is often given as a percentage of MP in discount problems.

Q38. Answer: (a) Indian Councils Act, 1861

The correct answer is Indian Councils Act, 1861.

Key Points

• The Indian Councils Act of 1861 is a significant landmark in the constitutional and political history of India as it initiated the process of representative institutions by associating Indians with the law-making process.

• It provided that the Viceroy should nominate some Indians as non-official members of his expanded council. In 1862, Lord Canning, the then Viceroy, nominated three Indians to his legislative council: the Raja of Benares, the Maharaja of Patiala, and Sir Dinkar Rao.

• This Act initiated the process of decentralization by restoring the legislative powers to the Bombay and Madras Presidencies, reversing the centralizing tendency that had started with the Regulating Act of 1773.

• It also provided for the establishment of new legislative councils for Bengal, North-Western Frontier Province (NWFP), and Punjab, which were established in the years 1862, 1866, and 1897, respectively.

• The Act empowered the Viceroy to make rules and orders for the more convenient transaction of business in the council, effectively laying the foundation for the Cabinet system in India.

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Additional Information

• Pitt's India Act, 1784:

• This Act distinguished between the commercial and political functions of the East India Company.

• It established a system of double government by creating a Board of Control to manage political affairs while allowing the Court of Directors to manage commercial affairs.

• The Board of Control was empowered to supervise and direct all operations of the civil and military government or revenues of the British possessions in India.

• Charter Act, 1853:

• It was the last of the series of Charter Acts passed by the British Parliament between 1793 and 1853.

• It separated, for the first time, the legislative and executive functions of the Governor-General's council.

• It introduced an open competition system for the selection and recruitment of civil servants. The Macaulay Committee (the Committee on the Indian Civil Service) was appointed in 1854 for this purpose.

• Government of India Act, 1858:

• This Act was enacted in the wake of the Revolt of 1857 (the First War of Independence) and is known as the Act for the Good Government of India.

• It abolished the East India Company and transferred the powers of government, territories, and revenues to the British Crown.

• It changed the designation of the Governor-General of India to that of Viceroy of India. Lord Canning became the first Viceroy of India.

• It ended the system of double government by abolishing the Board of Control and Court of Directors, creating a new office, Secretary of State for India.

Important Points

• Portfolio System: The Indian Councils Act of 1861 gave statutory recognition to the portfolio system introduced by Lord Canning in 1859. Under this, a member of the Viceroy's council was made in-charge of one or more departments.

• Ordinance Power: The Act also empowered the Viceroy to issue ordinances without the concurrence of the legislative council during an emergency. The life of such an ordinance was limited to 6 months.

• Nature of Representation: While the Act of 1861 introduced Indian representation, the members were nominated and not elected, and their role was limited primarily to a consultative capacity in the legislative process.

Q39. Answer: (d) 66

The logic followed here is:

Logic: The second number = (first number × 5) + 1

For, 8 → 41

=> 8 × 5 = 40

=> 40 + 1 = 41

For, 81 → 406

=> 81 × 5 = 405

=> 405 + 1 = 406

Now, applying the same logic:

13 → 13 × 5

=> 13 × 5 = 65

=> 65 + 1 = 66

Hence, the correct answer is Option 4.

Q40. Answer: (d) 2 secθ

Shortcut Trick

Rationalize first term: $\cos\theta/(1 + \sin\theta)$

=> Multiply by $(1 - \sin\theta)/(1 - \sin\theta)$

=> $\cos\theta(1 - \sin\theta)/(1 - \sin^2\theta) = (1 - \sin\theta)/\cos\theta$

Now add: $(1 - \sin\theta)/\cos\theta + (1 + \sin\theta)/\cos\theta = 2/\cos\theta$

Therefore Answer = 2 secθ

Alternate Method

Given:

$(\cos\theta / (1 + \sin\theta)) + ((1 + \sin\theta) / \cos\theta)$

Concept Used:

Trigonometric identities and rationalization

Calculation:

=> (cosθ / (1 + sinθ)) × ((1 − sinθ)/(1 − sinθ))

=> cosθ(1 − sinθ)/(1 − sin²θ)

=> cosθ(1 − sinθ)/cos²θ

=> (1 − sinθ)/cosθ

=> Expression = (1 − sinθ)/cosθ + (1 + sinθ)/cosθ

=> (2)/cosθ

Therefore The correct answer is 2 secθ.

Additional Information

Pythagorean Identity

sin²θ + cos²θ = 1 => 1 − sin²θ = cos²θ

Rationalization

Multiply numerator and denominator by conjugate to simplify expressions.

Reciprocal Identity

secθ = 1/cosθ

Shortcut Tip

Convert complex fractions into same denominator to combine quickly.

Q41. Answer: (a) Konkan Coast

The correct answer is Konkan Coast.

Key Points

• The Konkan Coast is the rugged section of the western coastline of India that extends from the Gulf of Khambhat (specifically from Daman) in the north to Goa in the south. It spans across the coastal districts of Maharashtra and Goa.

• This sector is characterized by its submerged nature and indented topography, which provides excellent natural conditions for the development of ports. Major ports such as the Mumbai Port and the Jawaharlal Nehru Port Trust (JNPT) are located along this stretch.

• Geographically, it lies between the Western Ghats (Sahyadri Range) to the east and the Arabian Sea to the west. The width of the plain varies but is generally narrow, ranging from 50 to 80 kilometers.

• The region is famous for its production of Alphonso mangoes, cashews, and rice. The Konkan Railway, an engineering marvel completed in 1998, runs through this coastal strip, connecting Mumbai to Mangalore.

• Since the question asks for the sector between Mumbai and Goa, the Konkan Coast is the most accurate geographical designation. Hence, the correct answer is Konkan Coast.

Additional Information

• Malabar Coast:

• This refers to the southern part of the Western Coastal Plain, primarily located in the state of Kerala. It extends from Mangalore in the north to Kanyakumari in the south.

• The Malabar Coast is famous for its backwaters, locally known as Kayals, such as the Vembanad Lake. It receives very heavy rainfall during the South-West Monsoon.

• Karnataka Coast (Kanara Coast):

• This sector lies between the Konkan Coast to the north and the Malabar Coast to the south. It covers the coastal areas of Karnataka, specifically between Goa and Mangalore.

• The region features a narrow plain and is known for its beautiful beaches and the Netravati River.

• Coromandel Coast:

• Unlike the other options, this is part of the Eastern Coastal Plain. It extends from the False Divi Point (near the Krishna River Delta) in Andhra Pradesh to Kanyakumari in Tamil Nadu.

• It remains dry during the South-West Monsoon but receives significant rainfall from the North-East Monsoon during the Winter months of October to December.

• Gujarat Coast:

• The northernmost part of the western coast consists of the Kachchh and Kathiawar peninsulas. The Kachchh region is largely a desert and marshy land known as the Rann of Kachchh, while Kathiawar lies south of it.

Important Points

• The Western Coastal Plain is narrower compared to the Eastern Coastal Plain. While the western rivers like the Narmada and Tapi form Estuaries, the eastern rivers like the Ganga, Godavari, and Krishna form extensive Deltas.

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• The total length of the Indian coastline is approximately 7,516.6 kilometers, including the mainland and the islands of Andaman & Nicobar and Lakshadweep.

• The Konkan Coast is specifically noted for its laterite soil, which is conducive to horticulture but poses challenges for intensive cereal farming.

Q42. Answer: (d) Heavy industries

The correct answer is Heavy industries.

Key Points

• The Second Five Year Plan, spanning from 1956 to 1961, was based on the Mahalanobis Model, named after the famous statistician Prasanta Chandra Mahalanobis. It shifted the focus from agriculture to rapid industrialization.

• The government decided to develop and manage Heavy industries directly to build a strong industrial base for the Indian economy. This included sectors like iron and steel, chemicals, and heavy engineering. Hence, Option D is correct.

• The Agricultural sector was the primary focus of the First Five Year Plan (1951-1956). While agriculture remained important, the Second Plan intentionally allocated more resources to the industrial sector to achieve self-reliance. Hence, Option C is incorrect.

• Small businesses and cottage industries were encouraged to provide employment and produce consumer goods, but they were not the primary sectors intended for direct State management and development compared to heavy industries. Hence, Option B is incorrect.

• The Service sector (such as banking, insurance, and transport) began to expand, but the core objective of the 1956 policy was the creation of capital goods through the public sector. Hence, Option A is incorrect.

• The plan aimed for a 25% increase in national income through rapid industrialization, although the actual growth achieved was approximately 4.27%.

Additional Information

• Industrial Policy Resolution of 1956: This resolution formed the legal basis for the Second Five Year Plan. It classified industries into three schedules: Schedule A (exclusive state responsibility), Schedule B (state-led with private participation), and Schedule C (remaining private sector).

• Strategic Steel Plants: Under the Second Plan, three major steel plants were established with foreign collaboration: Bhilai (with USSR), Durgapur (with United Kingdom), and Rourkela (with West Germany).

• Focus on Capital Goods: The plan emphasized the production of capital goods (machines that make other machines) rather than consumer goods, a strategy intended to ensure long-term economic independence.

• Socialistic Pattern of Society: The 1956 Resolution and the Second Plan officially adopted the goal of a socialistic pattern of society, where the public sector would occupy the strategic heights of the economy.

• Infrastructure Development: Significant investments were made in railways and hydroelectric power projects during this period to support the burgeoning heavy industries.

Important Points

• Institutional Growth: During the Second Plan period, the Atomic Energy Commission was established in 1958 with Homi J. Bhabha as the first chairman, highlighting the focus on scientific research and high-technology industries.

• Financial Challenges: The plan faced a foreign exchange crisis due to the massive import of machinery and equipment required for industrialization, leading to a scaling back of some targets in the year 1958.

• Tata Institute of Fundamental Research (TIFR) and the Indian Institutes of Technology (IITs) received significant support to create the technical manpower needed for managing heavy industries.

• The target growth rate was set at 4.5%, but the actual growth rate recorded was 4.27%, which was considered a success despite the inflationary pressures and food shortages experienced toward the end of the 1950s.

Q43. Answer: (b) Father's sister

Family Chart:

Decoding the Symbols:

Symbol	•	–	×	÷
Meaning	Sister	Husband	Mother	Brother

Given: K + L − M × N + O

It means: K is the sister of L, L is the husband of M, M is the mother of N, N is the sister of O.

Here, K is Father’s sister of O.

Hence, the correct answer is "Option 2".

Q44. Answer: (b) Two

Given: A, B, C, Q, R and S live on six different floors of the same building. Floor numbers are 1 (lowest) to 6 (highest).

Q lives on floor 5.

B lives on a floor above Q.

Only R lives below C.

A lives on an even-numbered floor.

Floor	Person
6	B
5	Q
4	A
3	S
2	C
1	R

Now, people below S→ 2 people

Hence, the correct answer is "Option 2".

Q45. Answer: (c) 1

Given: P, Q, R, S, T and U live on six different floors numbered 1 to 6.

Q lives on a prime-numbered floor.

The product of floors of Q and R is 3.

Only 2 people live above P.

T lives immediately below S.

Floor	Person
6	S
5	T
4	P
3	Q
2	U
1	R

Now, people below U (floor 2) = 1 person

Hence, the correct answer is "Option 3".

Q46. Answer: (c) 24

Given number: 749216358

Logic: Arrange the digits in descending order (left to right)

Original digits: 7 4 9 2 1 6 3 5 8

After arranging in descending order: 9 8 7 6 5 4 3 2 1

Now, Second from the left = 8

Third from the right = 3

Product = 8 × 3 = 24

Hence, the correct answer is Option 3.

Q47. Answer: (b) 60%

Shortcut Trick

Customer pays for 14 but gets 16 => effective SP = 14 × 95% = 13.3 parts of MP

Profit 33% => SP = 133% of CP

=> 13.3 MP = 133% of 16 CP => 13.3 MP = 21.28 CP

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=> MP/CP = 21.28 ÷ 13.3 = 1.6
Therefore Answer = 60%
Alternate Method
Given:
Discount = 5%
Articles paid = 14
Articles received = 16
Gain = 33%
Formula used:
Selling price = Marked price × (100 − Discount) ÷ 100
Selling price = Cost price × (100 + Gain) ÷ 100
Calculation:
=> Let CP per article = C and MP per article = M
=> SP per article = 0.95M
=> Total SP = 14 × 0.95M = 13.3M
=> Total CP = 16C
=> Profit 33% => SP = 133% of CP
=> 13.3M = 16C × 133 ÷ 100
=> 13.3M = 21.28C
=> M = 21.28C ÷ 13.3
=> M = 1.6C
=> Increase % = (1.6C − C) ÷ C × 100
=> = 0.6 × 100 = 60%
Therefore The correct answer is 60%.
Additional Information
Effective Selling Price
Free items reduce effective SP per unit since more items are given for same payment.
Profit Relation
33% gain => SP = 133% of CP = (133/100) × CP
Ratio Method
Convert full equation into MP : CP ratio to directly find percentage increase.
Shortcut Tip
Combine discount and free offers into one effective SP before applying profit.

Q48. Answer: (d) u = 3, v = −18, w = 17

Shortcut Trick
Use options: try u = 3, v = −18, w = 17
Check (1): 3 − 18 + 17 = 2 Yes
Check (2): 6×3 + 4(−18) + 5×17 = 18 − 72 + 85 = 31 Yes
Check (3): 5×3 + 2(−18) + 2×17 = 15 − 36 + 34 = 13 Yes
Therefore Answer: u = 3, v = −18, w = 17
Alternate Method
Given:
u + v + w = 2
6u + 4v + 5w = 31
5u + 2v + 2w = 13
Concept Used:
Substitution and elimination method
Calculation:
=> From (1): u = 2 − v − w
=> Substitute in (3): 5(2 − v − w) + 2v + 2w = 13
=> 10 − 5v − 5w + 2v + 2w = 13

=> 10 − 3v − 3w = 13
=> −3v − 3w = 3
=> v + w = −1 ...(4)
=> Substitute u in (2): 6(2 − v − w) + 4v + 5w = 31
=> 12 − 6v − 6w + 4v + 5w = 31
=> 12 − 2v − w = 31
=> −2v − w = 19 ...(5)
=> From (4): w = −1 − v
=> Substitute in (5): −2v − (−1 − v) = 19
=> −2v + 1 + v = 19
=> −v = 18 => v = −18
=> w = −1 − (−18) = 17
=> u = 2 − v − w = 2 + 18 − 17 = 3
Therefore The correct answer is u = 3, v = −18, w = 17.
Additional Information
Option Substitution Method
Try given options directly in equations to quickly identify correct solution.
Elimination Method
Reduce equations step-by-step to eliminate variables.
Verification Tip
Always verify all equations to avoid partial correctness.
Quick Strategy
Use substitution when one equation is simple and easy to rearrange.

Q49. Answer: (a) x(xy)²,1

Shortcut Trick
Simplify first: x^(2.5)/y^(0.5) × √(xy) = x³
Simplify second: y^(1.5)/√x × √(xy) = y²
LCM = take highest powers => x³y² = x(xy)2
HCF = take lowest common => 1
Therefore The correct answer is x(xy)2 and 1.
Alternate Method
Given:
(x^(2.5)/y^(0.5)) × √(xy)
(y^(1.5)/√x) × √(xy)
Concept Used:
Laws of exponents and LCM-HCF rules
Calculation:
=> First expression:
=> x^(2.5)/y^(0.5) × (xy)^(0.5)
=> x^(2.5) × x^(0.5) / y^(0.5) × y^(0.5)
=> x³
=> Second expression:
=> y^(1.5)/x^(0.5) × (xy)^(0.5)
=> y^(1.5) × y^(0.5) / x^(0.5) × x^(0.5)
=> y²
=> Now numbers are x³ and y²
=> Since x and y are co-prime:
=> LCM = x³y² = x(xy)2
=> HCF = 1
Therefore The correct answer is x(xy)2 and 1.
Additional Information

Exponent Rules

$a^m \times a^n = a^{(m+n)}$, $a^m/a^n = a^{(m-n)}$

Radical Form

$\sqrt{x} = x^{(1/2)}$

LCM of Variables

Take highest powers of each variable.

HCF of Variables

Take lowest common powers; if none common => 1.

Q50. Answer: (d) Nagda

The correct answer is Nagda.

Key Points

• The Banas culture, also known as the Ahar-Banas culture, is a Chalcolithic archaeological culture that flourished in the Banas River valley of southeastern Rajasthan between approximately 3000 BCE and 1500 BCE.

• Gilund: This is a major archaeological site located in the Rajsamand district of Rajasthan. It was a large regional center of the Banas culture and was excavated by B.B. Lal in 1959-60 and later by a joint team from the University of Pennsylvania. Hence, Gilund is an excavated site of the Banas culture.

• Ahar: Located on the banks of the Ahar River near Udaipur, it is the type-site for this culture. Excavations conducted by R.C. Agrawal and H.D. Sankalia revealed a culture rich in copper metallurgy, leading to its ancient name Tambavati. Hence, Ahar is an excavated site of the Banas culture.

• Bagor: Situated on the Kothari River in the Bhilwara district of Rajasthan, Bagor is primarily known as the largest Mesolithic site in India. However, its Phase II (dating to the 2nd millennium BCE) shows significant evidence of Chalcolithic Ahar culture influence and contact. Hence, Bagor is considered an associated excavated site of the Banas culture complex.

• Nagda: Located in the Ujjain district of Madhya Pradesh, Nagda is an important archaeological site belonging to the Malwa culture (specifically the Kayatha-Malwa sequence) in the Chambal valley. It is not part of the Banas culture of Rajasthan. Hence, Nagda is the correct answer as it was not a site of the Banas culture.

Additional Information

• Characteristics of Banas Culture: The culture is distinguished by its unique Black-and-Red Ware (BRW) pottery, often painted with white geometric designs. It co-existed with the Indus Valley Civilization but remained a distinct rural, agropastoral culture.

• Copper Metallurgy: Unlike the Harappans who used bronze extensively, the Ahar-Banas people focused on copper. Excavations at Ahar revealed copper slag and smelting furnaces, indicating that they were pioneers in copper technology in Western India.

• Geographical Spread: The culture was centered in the Mewar region of Rajasthan. Other significant excavated sites include Balathal, Ojiyana, and Marmi. Balathal is particularly famous for having one of the earliest fortified enclosures in the Chalcolithic period.

• Economic Life: The inhabitants practiced agriculture, cultivating crops like wheat, barley, and rice. They also domesticated cattle, sheep, and goats. The presence of terracotta bull figurines suggests that cattle held religious or symbolic importance.

• Malwa Culture (Nagda): The Malwa culture (c. 1700–1200 BCE) followed the Ahar and Kayatha cultures in Central India. Sites like Nagda, Navdatoli, and Eran are known for their beautiful Malwa Ware, which is characterized by a buff or orange slip with black painted designs.

Important Points

• Architecture: Unlike the Harappan burnt bricks, the Ahar-Banas people built their houses using mud-bricks, stone, and wattle-and-daub. Multi-room structures have been discovered at Gilund and Ahar.

• Trade Links: The discovery of lapis lazuli beads and certain ceramic styles suggests that the Banas culture had exchange networks with Harappan settlements in Gujarat and other Chalcolithic groups in Central India.

• Chronological Significance: The Ahar-Banas culture represents an important transition in the Proto-history of India, bridging the gap between the Neolithic/Mesolithic past and the later Iron Age cultures.

Q51. Answer: (a) Separation of chromatids and reformation of the nuclear envelope

The correct answer is Separation of chromatids and reformation of the nuclear envelope.

Key Points

• Anaphase is the third stage of mitosis, characterized by the splitting of the centromeres that hold sister chromatids together. The spindle fibers shorten, pulling the daughter chromosomes toward opposite poles of the cell. This ensures each new cell receives an identical set of genetic material. Hence, the separation of chromatids is a core function of this stage and is correct.

• Telophase is the final stage of mitosis where the chromosomes reach their respective poles and begin to decondense back into chromatin. During this phase, the nuclear envelope reforms around each set of chromosomes using fragments of the parent cell's nuclear membrane. Hence, the reformation of the nuclear envelope is a core function of this stage and is correct.

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• The anaphase-telophase transition effectively completes the karyokinesis (nuclear division) process. It moves from the physical movement of DNA to the structural re-establishment of the nucleus.

• Condensation of chromosomes primarily occurs during Prophase to make them manageable for movement. Hence, this statement is incorrect in the context of the anaphase-telophase transition.

• Synthesis of new DNA strands and initiation of DNA replication occur during the S-phase (Synthesis phase) of Interphase, long before mitosis begins. Hence, these statements are incorrect.

Additional Information

• Mitosis was first observed in detail by Walther Flemming in 1882. It is also known as equational division because the number of chromosomes in the daughter cells remains the same as in the parent cell (2n to 2n).

• Prophase: This is the first stage where chromatin fibers coil into chromosomes, the nucleolus disappears, and the mitotic spindle begins to form in the cytoplasm.

• Metaphase: The chromosomes align along the metaphase plate (equatorial plane). This is the best stage to study the morphology and number of chromosomes under a microscope.

• Cytokinesis: Usually following telophase, this is the division of the cytoplasm. In animal cells, it occurs via a cleavage furrow, while in plant cells, it involves the formation of a cell plate.

• Significance: Mitosis is essential for growth, tissue repair, and asexual reproduction in multicellular organisms, maintaining genetic stability across generations.

Important Points

• Regulation: The transition from metaphase to anaphase is regulated by the Anaphase-Promoting Complex (APC/C), which triggers the degradation of securin, allowing separase to break down the cohesin proteins holding chromatids together.

• Microtubule Role: Kinetochore microtubules provide the mechanical force required for chromatid separation, while non-kinetochore microtubules help elongate the cell during the anaphase-telophase transition.

• Organelle Reformation: Besides the nuclear envelope, other organelles like the Endoplasmic Reticulum (ER) and Golgi complex, which disappear during prophase, start to reorganize and reappear during Telophase.

• Ploidy: While the cell briefly contains double the number of chromosomes during anaphase, the subsequent division ensures that each daughter nucleus restores the diploid (2n) or haploid (n) state of the parent cell.

Q52. Answer: (a) Sharat Chandra Chatterjee – Devdas

The correct answer is Sharat Chandra Chatterjee – Devdas.

Key Points

• Sharat Chandra Chatterjee was a prominent Bengali novelist and short story writer of the 20th century. He wrote the classic novel Devdas in 1901, although it was published much later in 1917. The story revolves around themes of tragic love, social barriers, and self-destruction. Hence, statement A is correct.

• Anandamath is a celebrated Bengali political novel written by Bankim Chandra Chatterjee, not Rabindranath Tagore. Published in 1882, it is set against the backdrop of the Sannyasi Rebellion and the Famine of Bengal in the late 18th century. Hence, statement B is incorrect.

• Kamayani is an epic poem in Hindi authored by Jaishankar Prasad, published in 1936. It is considered one of the greatest literary works of the Chhayavaadi school of Hindi literature and explores human emotions and the evolution of consciousness through the story of Manu. Hence, statement C is incorrect.

• Madhushala (The House of Wine) is a book of 135 quatrains written by the renowned Hindi poet Harivansh Rai Bachchan, not Munshi Premchand. Published in 1935, it is famous for its lyrical quality and metaphorical use of wine to represent the complexities of life. Hence, statement D is incorrect.

Additional Information

• Rabindranath Tagore:

• He was the first Indian and Asian to win the Nobel Prize in Literature in 1913 for his collection of poems titled Gitanjali.

• His notable works include Gora, The Home and the World (Ghare-Baire), and Chokher Bali. He also composed the national anthems of India and Bangladesh.

• Bankim Chandra Chatterjee:

• Often referred to as the Sahitya Samrat (Emperor of Literature), he is the author of the national song of India, Vande Mataram, which first appeared in his novel Anandamath.

• His other significant works include Durgeshnandini (1865) and Kapalkundala (1866).

• Munshi Premchand:

• Known as the Upanyas Samrat, he was a prolific writer in Hindi and Urdu. His works are characterized by social realism, focusing on the lives of common people and peasants.

• His masterpieces include Godan (1936), Gaban, Karmabhoomi, and the famous short story Idgah.

• Sharat Chandra Chatterjee's Influence:

• His works have been adapted into numerous films across different Indian languages. Devdas alone has been made into movies more than 15 times in languages like Hindi, Bengali, and Telugu.

• Other famous works by him include Parineeta, Pather Dabi, and Srikanta.

Important Points

• Vande Mataram: This song, featured in Anandamath, became a rallying cry for Indian revolutionaries during the Swadeshi Movement and the overall Freedom Struggle against British rule.

• Chhayavaad: This was a romantic movement in Hindi literature (roughly 1918–1938). Jaishankar Prasad, Suryakant Tripathi 'Nirala', Sumitranandan Pant, and Mahadevi Varma are considered the four pillars of this movement.

• Literary Contributions: These authors and their works played a vital role in shaping the cultural and nationalist identity of India during the 19th and 20th centuries.

Q53. Answer: (b) P

Given: Seven people K, L, M, N, P, Q and R are sitting around a circular table facing the centre.

Only two people sit between R and N when counted from the left of N.

L sits third to the left of Q.

P sits to the immediate right of Q.

P sits second to the left of R.

M is not an immediate neighbour of L.

Now, third to the right of K = P

Hence, the correct answer is "Option 2".

Q54. Answer: (a) 25

Shortcut Trick

Total of 3 numbers = 20 × 3 = 60

Sum of given numbers = 13 + 22 = 35

Third number = 60 − 35 = 25

Therefore Answer = 25

Alternate Method

Given:

Average of 3 numbers = 20

Two numbers = 13 and 22

Formula used:

Average = Total Sum ÷ Number of terms

Calculation:

=> Total sum = Average × Number of terms

=> Total sum = 20 × 3 = 60

=> Sum of two numbers = 13 + 22 = 35

=> Third number = 60 − 35 = 25

Therefore The correct answer is 25.

Additional Information

Average Formula

Average = Sum of observations ÷ Number of observations

Total from Average

Total = Average × Number of observations

Missing Value

Unknown value = Total − Sum of known values

Quick Tip

Always convert average into total first for faster solving.

Q55. Answer: (c) MHV : KMT

The logic followed here is:

For, UND → SSB

For, QXZ → OCX

Now checking the options using the same pattern:
Option 1) WRK → SWG
Option 2) ZQV → VTR
Option 3) MHV → KMT
Option 4) TBE → QFB
Thus, only MHV → KMT follows the same pattern.
Hence, the correct answer is Option 3.

Q56. Answer: (c) Rs. 11,200

Shortcut Trick
Ratio = 9 : 5 : 2, Z = 2 parts = 83,000 => 1 part = 41,500
X = 9 parts = 3,73,500, Y = 5 parts = 2,07,500
X works 6 months full + 6 months half => effective = 9 months
Y works full 12 months
Ratio = 9×9 : 5×12 : 2×12 = 81 : 60 : 24
Difference (X − Y) = 21 parts => (21/165) × 88,000 = 11,200
Therefore Answer = Rs. 11,200
Alternate Method
Given:
Ratio of investment = 9 : 5 : 2
Z invests = Rs. 83,000
Total profit = Rs. 88,000
Formula used:
Profit prop. to Capital × Time

Person	Capital	Time	Product
X	9	6 + 3 = 9	81
Y	5	12	60
Z	2	12	24

Calculation:
=> Profit ratio = 81 : 60 : 24
=> Total ratio = 165
=> Difference (X − Y) = 21 parts
=> Required difference = (21/165) × 88,000
=> = Rs. 11,200
Therefore The correct answer is Rs. 11,200.
Additional Information
Partnership Formula
Profit share prop. to Capital × Time invested.
Changing Capital
If capital changes, calculate separately for each time period.
Ratio Simplification
Convert into simplest ratio before dividing profit.
Quick Tip
Multiply capital ratio directly with effective time to get profit ratio.

Q57. Answer: (d) 1/2

Shortcut Trick
Use identity: $a^3 + b^3 + c^3 = 3abc$ when $a + b + c = 0$
Here $a = (5x - 1)$, $b = (x + 3)$, $c = 2(3x - 4)$
Given RHS = $6(5x - 1)(x + 3)(3x - 4) = 3abc$
=> So $a + b + c = 0$

=> (5x − 1) + (x + 3) + 2(3x − 4) = 0 => 12x − 6 = 0 => x = 1/2

Therefore Answer = 1/2

Alternate Method

Given:

$(5x − 1)^3 + (x + 3)^3 + 8(3x − 4)^3 = 6(5x − 1)(x + 3)(3x − 4)$

Concept Used:

Identity: $a^3 + b^3 + c^3 − 3abc = (a + b + c)(a^2 + b^2 + c^2 − ab − bc − ca)$

Calculation:

=> Let a = (5x − 1), b = (x + 3), c = 2(3x − 4)

=> Then equation becomes: $a^3 + b^3 + c^3 = 3abc$

=> Using identity => a + b + c = 0

=> (5x − 1) + (x + 3) + 2(3x − 4) = 0

=> 5x − 1 + x + 3 + 6x − 8 = 0

=> 12x − 6 = 0

=> x = 1/2

Therefore The correct answer is 1/2.

Additional Information

Cubic Identity

$a^3 + b^3 + c^3 − 3abc = (a + b + c)(a^2 + b^2 + c^2 − ab − bc − ca)$

Special Case

If $a^3 + b^3 + c^3 = 3abc$ => a + b + c = 0

Coefficient Adjustment

Match terms like $8(3x − 4)^3 = [2(3x − 4)]^3$

Shortcut Tip

Always try to convert expressions into identity form before expanding.

Q58. Answer: (d) Only conclusion (II) follows.

Given Statements:

All cars are tram.

All cars are rickshaw.

All cars are bus.

The least possible Venn diagram shows:

Conclusions:

(I) All trams are bus

We only know that all cars are inside both trams and buses, but trams may exist outside cars and may not be inside buses.

So this conclusion does not follow.

(II) Some buses are rickshaws

All cars are rickshaws and also all cars are buses.

So the common “cars” part lies inside both buses and rickshaws.

Therefore, some buses are definitely rickshaws.

So, this conclusion follows.

Hence, only conclusion (II) follows.

Hence, the correct answer is "Option 4".

Q59. Answer: (b) Chennai

The correct answer is Chennai.

Key Points

• In 2025, the Global AI Conclave, which focused on reinforcing India’s role in safe and trusted artificial intelligence, was hosted in Chennai.

• Hosting Institution: The conclave was led by IIT Madras (specifically the Centre for Responsible AI - CeRAI) in collaboration with the IndiaAI Mission under the Ministry of Electronics and Information Technology (MeitY).

• Key Focus: The event was a strategic "Pre-Summit Event" held on December 10–11, 2025, aimed at translating responsible AI principles into practical governance frameworks.

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• Significance: It was described as a preparatory milestone for the India-AI Impact Summit 2026, which is scheduled to take place in New Delhi.

• Notable Proposal: During the conclave, participants explored the establishment of an "AI Safety Commons" for the Global South, emphasizing shared datasets and interoperable governance resources.

Additional Information

• IndiaAI Mission: This is a flagship initiative by the Government of India with a dedicated budget of Rs. 10,372 crore. It focuses on building AI supercomputing infrastructure and providing GPU-based compute power to startups and researchers.

• Global Partnership on Artificial Intelligence (GPAI): India has played a pivotal role as the Lead Chair of GPAI, an international initiative to guide the responsible development of AI. Major summits related to this partnership are frequently held in New Delhi.

• NITI Aayog's National Strategy for AI: Released in 2018, this strategy outlines India's vision to be a "Garage for AI," focusing on how AI can solve challenges in emerging economies.

• Bletchley Declaration: India is a signatory to this international treaty, which emphasizes AI safety and risk management, particularly concerning frontier AI models that could pose existential risks.

• Digital Personal Data Protection (DPDP) Act, 2023: This Act provides the legal framework for data privacy in India, which is a critical pillar for training AI models ethically and legally.

Important Points

• Airavat: India's dedicated AI supercomputer, which is ranked among the top 100 most powerful systems in the world, is housed at C-DAC, Pune, and supports the IndiaAI Mission.

• Sovereign AI: The conclave highlighted the importance of Sovereign AI, which refers to a country's ability to build its own AI infrastructure and large language models (LLMs) to ensure data sovereignty and strategic independence.

• Startup Ecosystem: India currently boasts the third-largest startup ecosystem in the world, with a significant number of unicorns specializing in Generative AI and Machine Learning.

• Linguistic Diversity: A unique feature of AI development in India is the focus on multilingual models, such as Bhashini, which aims to bridge the language barrier using voice-to-voice translation in 22 scheduled Indian languages.

• Ethical Guidelines: The 2025 Conclave emphasized the UNESCO recommendations on the Ethics of AI, advocating for transparency, fairness, and accountability in automated decision-making systems.

Q60. Answer: (d) He/She ceases to be an Indian citizen

The correct answer is He/She ceases to be an Indian citizen.

Key Points

• According to Article 9 of the Constitution of India, no person shall be a citizen of India if he or she has voluntarily acquired the citizenship of any foreign state. This provision applies to the acquisition of citizenship before or at the commencement of the Constitution on 26 January 1950.

• For cases occurring after the commencement of the Constitution, Section 9 of the Citizenship Act, 1955 provides the legal framework. It stipulates that any citizen of India who, by naturalization, registration, or otherwise, voluntarily acquires the citizenship of another country shall cease to be a citizen of India. Hence, the statement that he/she ceases to be an Indian citizen is correct.

• India maintains a strict policy of single citizenship. Unlike some Western nations, the Indian legal framework does not permit dual citizenship. If an individual acquires a foreign passport or citizenship, their Indian citizenship is terminated automatically by operation of law.

• The power to regulate the right of citizenship and its termination is vested in the Parliament of India under Article 11 of the Constitution. This ensures that the Union Government has the exclusive authority to determine the status of individuals regarding their national identity.

Additional Information

• Modes of Losing Citizenship:

• Renunciation: A voluntary act where an Indian citizen of full age and capacity makes a declaration renouncing their citizenship. Upon registration of such declaration, the person ceases to be an Indian citizen.

• Termination: This occurs automatically when an Indian citizen voluntarily acquires the citizenship of another country. It is the most common way citizenship is lost in the modern context of migration.

• Deprivation: A compulsory termination of citizenship by the Central Government. This can happen if citizenship was obtained by fraud, if the citizen has shown disloyalty to the Constitution, or if the citizen has been ordinarily resident out of India for seven years continuously.

• Overseas Citizenship of India (OCI):

• Since India does not allow dual citizenship, the government introduced the OCI scheme via the Citizenship (Amendment) Act, 2005.

• An OCI cardholder is a foreign citizen of Indian origin who enjoys certain privileges like a multi-purpose, multiple-entry, lifelong visa for visiting India. However, they do not have the right to vote, hold constitutional posts, or buy agricultural land.

Important Points

• Constitutional Articles (5-11):

• Article 5: Citizenship at the commencement of the Constitution for persons domiciled in India.

• Article 6: Rights of citizenship of certain persons who have migrated to India from Pakistan.

• Article 8: Rights of citizenship of certain persons of Indian origin residing outside India.

• Article 10: Every person who is or is deemed to be a citizen of India shall continue to be such citizen, subject to the provisions of any law made by Parliament.

• Citizenship Act, 1955: This Act is the comprehensive legislation dealing with the acquisition and termination of citizenship after 1950. It has been amended several times, most notably in 1986, 1992, 2003, 2005, 2015, and 2019 to address changing geopolitical and social needs.

Q61. Answer: (a) Seed Coat

The correct answer is Seed Coat.

Key Points

• The edible portion of a pomegranate (Punica granatum) is the Seed Coat, specifically the juicy, fleshy outer layer known as the Sarcotesta.

• While the entire seed is often consumed, it is the succulent aril (the red, juice-filled part) surrounding the hard seed that provides the primary nutritional and flavor value.

• Botanically, the pomegranate fruit is classified as a Balausta, which is a many-celled, many-seeded berry characterized by a leathery exocarp (rind) and an inner structure divided by membranous walls.

• The Seed Coat in pomegranates is unique because it evolves into a fluid-filled tissue designed to attract animals for seed dispersal, unlike many other fruits where the Mesocarp or Endocarp is the edible part.

• The fruit develops from a multicarpellary, inferior ovary, and the edible arils are attached to the Placenta inside the various chambers of the fruit.

Additional Information

• Geographical Context: Pomegranates are widely cultivated in India, Iran, and the Mediterranean region. In India, the state of Maharashtra is the leading producer, contributing significantly to the global supply, followed by Gujarat and Karnataka.

• Common Edible Parts of Other Fruits:

• Mango: The edible part is the Mesocarp.

• Apple/Pear: The edible part is the Fleshy Thalamus (making them "false fruits").

• Coconut: The edible part is the Endosperm (both liquid and solid).

• Litchi: The edible part is the Fleshy Aril.

• Citrus Fruits (Lemon/Orange): The edible parts are the Unicellular Glandular Hairs on the endocarp.

• Nutritional Value: Pomegranates are high in Antioxidants, specifically Punicalagins and Punicic Acid. They are also rich sources of Vitamin C, Vitamin K, and Dietary Fiber.

• Applications: Beyond direct consumption, the Seed Coat juice is used for making Grenadine syrup, wines, and various traditional medicines due to its Anti-inflammatory properties.

Important Points

• Fruit Structure: The pomegranate fruit consists of three main layers: the Exocarp (the tough, red outer skin), the Mesocarp (the white, spongy inner rind), and the Endocarp (the thin membranes that separate the seed clusters). None of these three layers are typically consumed.

• Clarification on Terminology: While the term Aril is commonly used in general literature to describe the red edible part, strictly botanical texts often distinguish it as a Sarcotesta because it originates directly from the integuments of the seed rather than an independent growth from the funiculus.

• Economic Significance: The cultivation of pomegranate has seen a rise in India since the 1990s due to the development of high-yield varieties like Bhagwa and Mridula.

• Health Benefits: Regular consumption is linked to improved Heart Health and the regulation of Blood Pressure, as noted in various Medical Indices and nutritional surveys.

Q62. Answer: (b) Twelve

The correct answer is Twelve.

Key Points

• Article 80 of the Constitution of India provides for the composition of the Council of States, commonly known as the Rajya Sabha.

• As per Article 80(1)(a), the President of India is authorized to nominate Twelve members to the Council of States. Hence, the statement regarding the nomination of twelve members is correct.

• These nominated members must be individuals having special knowledge or practical experience in respect of matters such as Literature, Science, Art, and Social Service as mentioned in Article 80(3). Hence, the criteria for nomination are strictly defined by the Constitution.

• The primary purpose of this provision is to allow eminent persons who have excelled in their respective fields to contribute to the legislative process without undergoing the process of a formal Election.

• Apart from these 12 nominated members, the Rajya Sabha consists of not more than 238 representatives of the States and of the Union Territories, making the total maximum strength 250.

Additional Information

• Qualifications and Tenure:

• To become a member of the Rajya Sabha, a person must be a citizen of India and must not be less than 30 years of Age.

• The Rajya Sabha is a Permanent House and is not subject to dissolution; however, one-third of its members retire every Second Year.

• The Term of an individual member of the Rajya Sabha is 6 years.

• Election Process:

• The representatives of the States are elected by the elected members of the Legislative Assemblies of the respective states.

• The election is held in accordance with the system of Proportional Representation by means of the Single Transferable Vote.

• The Fourth Schedule of the Constitution deals with the allocation of seats in the Rajya Sabha to the States and Union Territories.

• Presiding Officers:

• The Vice-President of India serves as the Ex-officio Chairman of the Rajya Sabha.

• The House also elects a Deputy Chairman from among its members to perform duties in the absence of the Chairman.

Important Points

• Nominated Members' Rights: While nominated members enjoy almost all the powers and privileges of elected members, they cannot vote in the Election of the President of India as per Article 54. However, they have the right to vote in the election of the Vice-President.

• Historical Context: The provision for nomination was inspired by the Irish Constitution, aiming to bring specialized talent into the Parliament.

• Special Powers: The Rajya Sabha holds unique powers, such as the authority to pass a resolution under Article 249 allowing Parliament to legislate on matters in the State List, and under Article 312 for the creation of All India Services.

• Current Strength: Currently, the Rajya Sabha has 245 members, which includes 233 elected members and 12 nominated members.

Q63. Answer: (b) 16 cm

Shortcut Trick

Distance from center to chord = radius of smaller circle = 15

Half chord = $\sqrt{(17^2 - 15^2)}$

= $\sqrt{(289 - 225)} = \sqrt{64} = 8$

Chord length = 2 × 8 = 16

Therefore Answer = 16 cm

Alternate Method

Given:

Radius of larger circle = 17 cm

Radius of smaller circle = 15 cm

Formula used:

Length of chord = $2 \times \sqrt{(R^2 - d^2)}$

Calculation:

=> Length of chord = $2 \times \sqrt{(17^2 - 15^2)}$

=> = $2 \times \sqrt{(289 - 225)}$

=> = $2 \times \sqrt{64}$

=> = 2 × 8 = 16 cm

Therefore The correct answer is 16 cm.

Additional Information

Chord Formula

Length of chord = $2\sqrt{(R^2 - d^2)}$

Tangent Concept

If chord is tangent to inner circle, distance from center = inner radius.

Right Triangle

Radius, distance, and half chord form a right triangle.

Quick Tip

Always use Pythagoras to find half chord first.

Q64. Answer: (c) TIV 22

The logic followed here is:

So, 'TIV 22' will replace the question mark in the given series.

Hence, the correct answer is "Option 3".

Q65. Answer: (d) UFP 40

The logic followed here is:

So, 'UFP 40' will replace the question mark in the given series.

Hence, the correct answer is "Option 4".

Q66. Answer: (d) 16

Given number: 6134527

Logic: Add 1 to each odd digit and add 2 to each even digit

Original number: 6 1 3 4 5 2 7

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

New number: 8 2 4 6 6 4 8

Now, First digit = 8

Last digit = 8

Sum = 8 + 8 = 16

Hence, the correct answer is Option 4.

Q67. Answer: (c) Regulating Act of 1773

The correct answer is Regulating Act of 1773.

Key Points

• The Regulating Act of 1773 was an Act of the Parliament of Great Britain intended to overhaul the management of the East India Company's rule in India.

• One of the most significant provisions of this Act was the establishment of a Supreme Court of Judicature at Fort William in Calcutta (now Kolkata).

• The Supreme Court was officially established in the year 1774. It comprised one Chief Justice and three other regular judges.

• Sir Elijah Impey was appointed as the first Chief Justice of this Supreme Court. Hence, the statement regarding the Regulating Act of 1773 being the source for the court's establishment is correct.

• The court was granted jurisdiction over all British subjects residing in Bengal, Bihar, and Odisha, and it could hear cases involving civil, criminal, admiralty, and ecclesiastical matters.

• This Act also designated the Governor of Bengal as the Governor-General of Bengal and created an Executive Council of four members to assist him.

Additional Information

• Pitt’s India Act, 1784:

• This Act was passed to rectify the defects of the Regulating Act of 1773. It established a dual system of control by the British

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Government and the East India Company.

• It created a Board of Control consisting of six commissioners to supervise the civil, military, and revenue affairs of the Company.

• It distinguished between the commercial and political functions of the Company for the first time.

• Charter Act of 1813:

• This Act renewed the Charter of the East India Company for another 20 years.

• It famously abolished the trade monopoly of the Company in India, effectively opening Indian trade to all British merchants, though trade in tea and trade with China remained exclusive to the Company.

• It also allotted a sum of one lakh rupees annually for the promotion of education among the Indians.

• Government of India Act, 1858:

• Enacted in the aftermath of the Revolt of 1857, this Act marked the end of Company rule in India.

• The powers of government, territories, and revenues were transferred to the British Crown.

• The designation of the Governor-General of India was changed to the Viceroy of India, with Lord Canning becoming the first Viceroy.

Important Points

• The Supreme Court established in 1774 was a Court of Record. This meant its proceedings were recorded for perpetual memory and testimony.

• The jurisdiction of the court often clashed with the powers of the Governor-General's Council, leading to administrative friction which was later addressed by the Settlement Act of 1781.

• The Regulating Act was the first step taken by the British Government to control and regulate the affairs of the East India Company in India, laying the foundations of central administration.

• Lord Warren Hastings was the first Governor-General of Bengal under this Act, and he faced numerous legal battles within the framework of the new Supreme Court.

Q68. Answer: (a) 730/33

Shortcut Trick

22.121212... = 22 + 0.121212...

0.121212... = 12/99 = 4/33

=> Number = 22 + 4/33

=> = (22×33 + 4)/33 = 730/33

Therefore Answer = 730/33

Alternate Method

Given:

x = 22.121212...

Formula used:

For repeating decimal: multiply and subtract method

Calculation:

=> Let x = 22.121212...

=> 100x = 2212.121212...

=> Subtract: 100x − x = 2212.121212... − 22.121212...

=> 99x = 2190

=> x = 2190/99

=> Divide by 3 => x = 730/33

Therefore The correct answer is 730/33.

Additional Information

Repeating Decimal Rule

If two digits repeat, denominator is 99, three digits => 999, etc.

Conversion Method

Multiply by power of 10 to align repeating parts, then subtract.

Mixed Decimal

Separate integer and repeating decimal part before solving.

Simplification

Always reduce fraction to lowest terms.

Q69. Answer: (c) The outflow speed increases, causing turbulence.

The correct answer is The outflow speed increases, causing turbulence.

Key Points

• When a tap is opened slightly, the water flow is steady and smooth, which is scientifically referred to as laminar flow or streamline flow. In this state, every particle of the fluid follows the exact same path as the particle preceding it.

• As the tap is opened wider, the velocity or outflow speed of the water increases significantly. This increase in speed is the primary driver behind the loss of smoothness in the water stream. Hence, statement C is correct.

• There exists a critical velocity for every fluid system. If the flow velocity remains below this critical value, the flow is laminar. Once the speed exceeds this limit, the flow transitions into a turbulent state. Hence, statement A and B are incorrect as temperature and density do not change significantly enough to cause this immediate transition.

• In turbulent flow, the path and velocity of the fluid particles change continuously and haphazardly. This leads to the formation of eddies, swirls, and vortices, which give the water a jagged or non-smooth appearance.

• The transition from smooth to rough flow is often accompanied by an increase in audible noise, as the chaotic movement of water particles creates pressure fluctuations. Hence, statement D is incorrect as water pressure usually drives the speed rather than decreasing to cause turbulence.

Additional Information

• Reynolds Number (Re): This is a dimensionless quantity used in fluid mechanics to predict flow patterns. It is calculated using the formula $Re = (\rho v d)/\mu$, where ρ is the density, v is the velocity, d is the diameter of the pipe/tap, and μ is the dynamic viscosity of the fluid.

• Laminar Flow Characteristics: This occurs at low Reynolds numbers (typically $Re < 2000$ in pipes). It is characterized by high momentum diffusion and low momentum convection. It is common in highly viscous fluids like honey or glycerin.

• Turbulent Flow Characteristics: This occurs at high Reynolds numbers (typically $Re > 4000$). It is dominated by inertial forces, which produce chaotic eddies. Most natural flows, such as river currents or wind, are turbulent.

• Applications: Understanding the transition to turbulence is vital in the design of aircraft wings (aerodynamics), water pipelines, blood flow analysis in medical science, and industrial chemical reactors.

• Viscosity: This property represents the internal friction of a fluid. Higher viscosity tends to suppress turbulence and promote laminar flow, which is why thick oils flow more smoothly than water at similar speeds.

Important Points

• Osborne Reynolds: The concept of the Reynolds number was popularized by Osborne Reynolds in 1883 through his famous experiments on pipe flow transition.

• Critical Velocity: The critical velocity of a fluid is inversely proportional to the radius of the tube and the density of the fluid, and directly proportional to the coefficient of viscosity.

• Energy Dissipation: In turbulent flow, significantly more energy is lost due to friction and heat compared to laminar flow. This is a major consideration for engineers designing pumping systems.

• Boundary Layer: Even in a turbulent stream, there is often a very thin layer near the surface (like the inside of the tap) where the flow remains laminar, known as the laminar sublayer.

Q70. Answer: (c) 362

Shortcut Trick

Use weighted average: Total = (16×447) + (86×396) + (21×158)

= 7152 + 34056 + 3318 = 44526

Total members = 16 + 86 + 21 = 123

Average = 44526 ÷ 123 = 362

Therefore Answer = Rs. 362

Alternate Method

Given:

Group A: 16 members, avg = 447

Group B: 86 members, avg = 396

Group C: 21 members, avg = 158

Formula used:

Average = Total expenditure ÷ Total members

Calculation:

=> Total of A = 16 × 447 = 7152

=> Total of B = 86 × 396 = 34056

=> Total of C = 21 × 158 = 3318

=> Total expenditure = 7152 + 34056 + 3318 = 44526

=> Total members = 16 + 86 + 21 = 123

=> Overall average = 44526 ÷ 123 = 362

Therefore The correct answer is Rs. 362.

Additional Information

Weighted Average

Average when groups have different sizes: (Σ n×x) ÷ Σn

Total from Average

Total = Average × Number of members

Combined Average

Used when multiple groups are merged.

Quick Tip

Multiply first, then add, then divide at the end.

Q71. Answer: (d) Growth of per capita real income

The correct answer is Growth of per capita real income.

Key Points

• Traditional development economics, prominent during the 1950s and 1960s, primarily equated development with the Growth of per capita real income over a long period. Hence, statement D is correct.

• The focus was on the capacity of a national economy, whose economic condition has been relatively static for a long time, to generate and sustain an annual increase in its Gross National Product (GNP) at rates of 5% to 7% or more.

• During this era, development was seen as an economic phenomenon where rapid industrialization and capital accumulation would lead to a Rise in national income levels. While important, the national income alone did not account for population changes, making per capita real income the more specific benchmark. Hence, statement A is partially correct as a component but not the primary definition.

• It was widely believed in traditional models that the benefits of high economic growth would eventually reach the masses through the trickle-down effect, automatically solving problems like poverty and inequality.

• An Increase in employment opportunities was viewed as a secondary outcome or a byproduct of the expansion of industrial production rather than a primary definition of development in the early traditional sense. Hence, statement B and statement C are considered features or consequences of development rather than the definition itself.

Additional Information

• Shift to Modern Development Economics: In the 1970s, economists like Dudley Seers questioned the traditional view, stating that if poverty, unemployment, and inequality have declined from high levels, then beyond doubt this has been a period of development for the country concerned.

• Human Development Index (HDI): Introduced by the United Nations Development Programme (UNDP) in 1990, the HDI was created by economists Mahbub ul Haq and Amartya Sen to move beyond per capita income and include life expectancy and education.

• Measurement of Development: Traditional metrics used Real GDP (Gross Domestic Product) adjusted for inflation and divided by the total population to determine the standard of living.

• Sustainable Development: This modern concept was popularized by the Brundtland Commission in its 1987 report titled "Our Common Future," emphasizing that development must meet the needs of the present without compromising future generations.

Important Points

• Capital-Output Ratio: In traditional models like the Harrod-Domar Model, the rate of economic growth is determined by the net savings ratio and the capital-output ratio.

• Structural Transformation: A key feature of traditional development was the transition from an agricultural-based economy to a manufacturing and service-oriented economy.

• Purchasing Power Parity (PPP): To compare the per capita income of different countries, economists often use PPP to account for the relative cost of living and the inflation rates of the countries.

• Limitations of Per Capita Income: It fails to show the distribution of income within a country; a high per capita real income can coexist with extreme poverty if wealth is concentrated in the hands of a few.

Q72. Answer: (b) LM - NP

The logic followed here is based on the alphabetical position pattern:

Option 1: BD - EG

Option 2: LM - NP

Option 3: IK - LN

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Option 4: SU - VX

Thus, LM - NP does not follow this uniform shift.

Hence, the odd one out is Option 2.

Q73. Answer: (d) 6

Shortcut Trick

Small top cone is similar to original cone

CSA ratio = 1/2 => $(r_s/r)^2 = 1/2$

=> $r_s = r/\sqrt{2}$

Given diameter = $6\sqrt{2}$ => $r_s = 3\sqrt{2}$

=> $r/\sqrt{2} = 3\sqrt{2}$ => r = 6

Therefore Answer = 6 cm

Alternate Method

Given:

Original cone cut by a plane parallel to base

Top forms a smaller cone, bottom is frustum

Diameter of small cone = $6\sqrt{2}$ => radius = $3\sqrt{2}$

Formula used:

CSA = π r l and similarity of cones

Apex rs r

Upper portion = small cone

Lower portion = frustum

Cut is parallel to base

Calculation:

=> Small cone ~ original cone

=> CSA ratio = $(r_s/r)^2$

=> $1/2 = (r_s/r)^2$

=> $r_s/r = 1/\sqrt{2}$

=> $r = \sqrt{2} \times r_s$

=> $r = \sqrt{2} \times (3\sqrt{2})$

=> r = 6 cm

Therefore The correct answer is 6 cm.

Additional Information

Frustum Formation

Cutting a cone parallel to its base creates a smaller similar cone and a frustum.

Similarity Rule

All linear dimensions scale equally in similar solids.

Area Relation

CSA ratio = square of ratio of radii.

Exam Tip

Focus on small cone similarity; frustum usually not needed in calculation.

Q74. Answer: (c) Drip irrigation

The correct answer is Drip irrigation.

Key Points

• Drip irrigation, also known as trickle irrigation, is a method where water is delivered drop by drop directly at or near the root zone of plants.

• This system utilizes a network of valves, pipes, tubing, and emitters to ensure that water is applied precisely, significantly reducing evaporation and surface runoff.

• It is considered the most water-efficient irrigation method, with an efficiency rate of 90% to 95%, making it ideal for water-scarce regions.

• The concept of modern drip irrigation was developed in Israel in the 1960s by Simcha Blass, and it has since become a cornerstone of precision farming worldwide.

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• In this method, soil moisture is maintained at an optimal level, which helps in the better growth and yield of crops like fruits, vegetables, and flowers.

Additional Information

• Sprinkler Irrigation:

• This method involves spraying water into the air through nozzles, mimicking natural rainfall.

• It is highly effective for uneven land and sandy soils where surface irrigation is difficult to implement.

• While efficient, it has higher evaporation losses compared to drip irrigation, especially in windy or hot climates.

• Surface Irrigation:

• It is the oldest and most common method where water is distributed over the soil surface by gravity.

• Common types include flooding, furrow, and basin irrigation, which are often used for paddy, wheat, and sugarcane.

• This method typically has the lowest efficiency due to significant seepage and deep percolation losses.

• Sub-irrigation:

• In this system, water is applied below the soil surface, allowing the water table to rise and reach the root zone through capillary action.

• It is often used in areas with a naturally high water table or where drainage tiles can be repurposed for irrigation.

Important Points

• Fertigation: This is a specialized feature of drip irrigation where liquid fertilizers are mixed with the irrigation water, allowing nutrients to be delivered directly to the roots.

• Pradhan Mantri Krishi Sinchayee Yojana (PMKSY): Launched in 2015 by the Government of India, this scheme promotes micro-irrigation (drip and sprinkler) under the vision of "Per Drop More Crop".

• Suitability: Drip irrigation is particularly beneficial for row crops and orchards, and it helps in weed control as water is not applied to the areas between plants.

• Economic Impact: Although the initial cost of installation is high, the long-term savings on water, labor, and electricity make it a sustainable choice for modern agriculture.

Q75. Answer: (a) Reduce fiscal deficit and inflation

The correct answer is Reduce fiscal deficit and inflation.

Key Points

• The fiscal policy reforms introduced after 1991 were a response to the severe economic crisis characterized by a high fiscal deficit and a balance of payments crisis. The primary goal was to bring stability to the macroeconomy by reducing the fiscal deficit from 8.4% of GDP in 1990-91 to more sustainable levels. Hence, the statement regarding reducing the fiscal deficit is correct.

• Another major objective was to control inflation, which had reached double digits, peaking at nearly 17% in August 1991. By tightening the fiscal policy and reducing monetized deficits, the government aimed to stabilize prices. Hence, the statement regarding reducing inflation is correct.

• The reforms focused on expenditure management, which involved cutting down on non-developmental expenditures and subsidies, such as those on fertilizers and exports, to improve the quality of public spending.

• Revenue mobilization was targeted through tax reforms. Based on the Raja Chelliah Committee (1991), the government aimed to simplify the tax structure, reduce high tax rates, and broaden the tax base to ensure better compliance.

• The reforms also aimed at reducing the public debt burden. By 1991, India’s internal and external debt had reached alarming proportions, and fiscal discipline was necessary to avoid a sovereign default.

Additional Information

• New Economic Policy (NEP) 1991: Launched under Prime Minister P.V. Narasimha Rao and Finance Minister Dr. Manmohan Singh, the policy moved the country away from a command economy toward a market-oriented economy through Liberalization, Privatization, and Globalization (LPG).

• Tax Reform Milestones: Post-1991, Direct Tax rates (Income and Corporate tax) were significantly lowered. For example, the maximum marginal rate of Personal Income Tax was reduced to 30% over time to prevent tax evasion.

• Disinvestment: The government started the process of disinvestment in Public Sector Undertakings (PSUs) to raise capital and reduce the fiscal burden caused by loss-making state enterprises.

• Monetary Policy Linkage: The reforms sought to end the automatic monetization of the fiscal deficit by the Reserve Bank of India (RBI) through Ad-hoc Treasury Bills, giving the RBI more autonomy in inflation targeting.

• Trade Policy Reforms: Fiscal reforms were accompanied by trade liberalization, which included the reduction of import tariffs and the abolition of import licensing for most goods, helping India integrate with the global market.

Important Points

• FRBM Act, 2003: A significant development in India’s fiscal history was the Fiscal Responsibility and Budget Management Act, which provided a legal framework for the Central Government to ensure long-term macro-economic stability by setting targets for fiscal deficit and revenue deficit.

• Subsidies: Despite reforms, subsidies on food, fertilizer, and petroleum continue to be a major component of India's fiscal expenditure, often discussed in current economic surveys for better targeting through Direct Benefit Transfer (DBT).

• GST Implementation: The introduction of the Goods and Services Tax (GST) on 1st July 2017 is considered the biggest indirect tax reform post-1991, aiming to create a unified national market and improve revenue collection.

• Debt-to-GDP Ratio: Following the 1991 reforms, monitoring the Debt-to-GDP ratio became critical to ensuring fiscal sustainability, especially during global financial crises or pandemics.

Q76. Answer: (d) 15 : 32

Shortcut Trick

Let parts = A and B

(A/5) : (B/8) = 3 : 4

=> (A×8)/(B×5) = 3/4

=> 32A = 15B

=> A : B = 15 : 32

Therefore Answer = 15 : 32

Alternate Method

Given:

Total = 2820

Let first part = A, second part = B

(1/5 of A) : (1/8 of B) = 3 : 4

Formula used:

Ratio property: a/b = c/d => ad = bc

Calculation:

=> (A/5) : (B/8) = 3 : 4

=> (A/5) ÷ (B/8) = 3/4

=> (A×8)/(5B) = 3/4

=> Cross multiply: 32A = 15B

=> A/B = 15/32

=> A : B = 15 : 32

Therefore The correct answer is 15 : 32.

Additional Information

Ratio Conversion

Convert fractional ratios into simple ratios by cross multiplication.

Key Trick

a/m : b/n => (a×n) : (b×m)

Total Not Needed

When only ratio is asked, total value is irrelevant.

Shortcut Tip

Multiply opposite denominators directly to get final ratio.

Q77. Answer: (b) Ministry of Defence

The correct answer is Ministry of Defence.

Key Points

• Announcement: Prime Minister Narendra Modi announced the mission during his Independence Day speech on August 15, 2025, from the ramparts of the Red Fort.

• Nodal Agency: The Ministry of Defence is the nodal ministry, with the Defence Research and Development Organisation (DRDO) leading the development.

• Objective: It is a national security initiative aimed at building an advanced, multi-layered air and missile defence shield to protect India's strategic, civilian, and religious sites from aerial threats like drones, rockets, and missiles.

• Target Timeline: The government plans for the comprehensive nationwide shield to be fully operational by 2035.

• Technology: The mission integrates AI-enabled networked architecture, space-based surveillance, and a "Shield and Sword" approach that combines passive defence with active deterrence.

• First Milestone: Shortly after the announcement, on August 23, 2025, the DRDO successfully tested an Integrated Air Defence Weapon System (IADWS) off the Odisha coast, marking a key technical step for the mission.

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Additional Information

• Ministry of Electronics & Information Technology (MeitY):

• The Ministry is responsible for IT policy, strategy, and the promotion of electronics manufacturing in India.

• It oversees major schemes such as Digital India, the Production Linked Incentive (PLI) for semiconductors, and the National Supercomputing Mission.

• The current Union Minister (as of early 2025) leads the drive toward making India a trillion-dollar digital economy.

• Ministry of Science & Technology:

• This Ministry coordinates scientific research and innovation across various departments like DST and DBT.

• It is the lead organisation for the National Quantum Mission (NQM), which was allocated significant funds starting in 2023 to last until 2031.

• Ministry of Home Affairs (MHA):

• The MHA is responsible for internal security and manages the Indian Cyber Crime Coordination Centre (I4C).

• It focuses on the functions of law enforcement and the prevention of financial frauds and social media-related crimes.

Important Points

• Strategic Importance: The Mission Sudarshan Chakra is vital for strategic autonomy, reducing India's reliance on foreign cybersecurity software and hardware.

• Collaboration: The mission involves organisations like CERT-In (Indian Computer Emergency Response Team) and C-DAC to develop hardware-level security for Made-in-India microprocessors like SHAKTI and VEGA.

• Timeline: Launched in January 2025, the mission has a five-year implementation roadmap with a numerical value of investment exceeding Rs. 10,000 crore.

• Digital Nagrik: A key feature of the mission is the protection of the data privacy of every Indian citizen (Digital Nagrik) under the Digital Personal Data Protection (DPDP) Act, 2023.

Q78. Answer: (c) June to September

The correct answer is June to September.

Key Points

• The Southwest Monsoon season is the principal rainy season in India, traditionally lasting from June to September. During this period, the country receives more than 75% of its total annual rainfall.

• The monsoon typically arrives at the Kerala coast by June 1st. This phenomenon is known as the "burst" of the monsoon, characterized by a sudden increase in rainfall accompanied by thunder and lightning.

• The season is divided into two main branches: the Arabian Sea Branch and the Bay of Bengal Branch. The Arabian Sea branch strikes the Western Ghats, while the Bay of Bengal branch moves towards Northeast India and the Indo-Gangetic plains.

• By the middle of July, the southwest monsoon covers almost the entire Indian subcontinent, providing much-needed relief from the intense summer heat.

• The withdrawal of the monsoon begins from Northwest India in early September and completely exits the northern part of the country by October.

Additional Information

• Mechanism of Monsoon: The monsoon is driven by the differential heating and cooling of land and water. During summer, the Indian landmass heats up faster than the surrounding oceans, creating a low-pressure area over Central India and the Thar Desert, which pulls moisture-laden winds from the Indian Ocean.

• Inter-Tropical Convergence Zone (ITCZ): The shift of the ITCZ to the north over the Ganga plain during the summer is a crucial factor in the onset of the southwest monsoon.

• Economic Significance: The southwest monsoon is the lifeline of the Indian economy, as it directly impacts Kharif crops like Rice, Maize, Cotton, and Soybean. A good monsoon ensures food security and boosts GDP growth.

• Geographical Distribution: Heavy rainfall is recorded in the Western Ghats and the Northeastern states. For instance, Mawsynram and Cherrapunji in Meghalaya receive the highest rainfall in the world due to the funneling effect of the hills.

• Rain-shadow Areas: While the windward side of the Western Ghats receives heavy rain, the leeward side (the Deccan Plateau) remains relatively dry, forming a rain-shadow area.

Important Points

• El Niño and La Niña: These global climatic phenomena significantly influence the Indian monsoon. El Niño is generally associated with droughts or below-normal rainfall, whereas La Niña often brings excessive rainfall and flooding.

• Northeast Monsoon: Following the southwest monsoon, the Retreating Monsoon or Northeast Monsoon occurs from October to December. This season primarily brings rainfall to the Coromandel Coast, specifically states like Tamil Nadu and Andhra Pradesh.

• Indian Ocean Dipole (IOD): Also known as the "Indian Niño," the IOD involves an irregular oscillation of sea-surface temperatures in the western and eastern Indian Ocean. A Positive IOD often helps in bringing better monsoon rains to India, even during an El Niño year.

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• Varying Onset Dates: While June 1st is the normal date for Kerala, the onset can vary by a few days each year based on atmospheric conditions and the Madden-Julian Oscillation (MJO).

Q79. Answer: (c) 40

The logic followed here is:

thus, "40" will replace the question mark in the given series.

Hence, the correct option is "Option 3".

Q80. Answer: (c) Gujarat

The correct answer is Gujarat.

Key Points

• Rathwa Ni Gher is a vibrant folk dance performed by the Rathwa tribe, primarily residing in the hilly areas of Chhota Udepur, Vadodara, and Panchmahal districts of Gujarat.

• The dance is traditionally performed during the festival of Holi, which is celebrated by the community as Gher. The festivities begin after the Holika Dahan and continue for five days.

• The performance is a ritualistic offering to Pithora Dev, who is the supreme deity of the Rathwas, and it is also linked to the celebration of the harvest season.

• During the dance, the participants, mostly men, wear distinctive costumes that include long ghaghris (skirts), turbans decorated with peacock feathers, and belts with cowrie shells.

• The rhythm of the dance is maintained by traditional musical instruments like the Dhol (drum), Thali (brass plate), and Shehnai, creating an energetic and rhythmic atmosphere.

Additional Information

• Tribal Heritage of Gujarat:

• Gujarat is home to diverse tribal communities like the Bhils, Nayakas, and Dhadias. The state is famous for tribal art forms like the Siddi Dhamal dance (associated with African descendants) and Dangi dances.

• The Rathwa community is particularly famous for Pithora Paintings, which are sacred mural paintings done on the walls of houses to seek protection and prosperity.

• Geographic and Cultural Context:

• The Rathwa tribe is one of the largest tribal groups in Gujarat. Their culture is deeply rooted in agriculture and animism, worshipping nature and forest deities.

• In contrast, Kerala is known for the Theyyam and Thullal dances; Tripura is famous for the Hojagiri dance of the Reang tribe; and Himachal Pradesh is well-known for the Nati folk dance.

• The Kawant Fair:

• One of the biggest gatherings for the Rathwas is the Kawant Mela, held in the Chhota Udepur district. This fair, held a few days after Holi, is the primary venue where the Gher dance is performed on a massive scale, attracting thousands of tourists and ethnographers.

Important Points

• The Rathwa Ni Gher involves complex choreography where dancers form circles and move in patterns that represent the cosmic order and the cycle of nature.

• Performers often paint their bodies with white clay (limestone) or Pithora colors, symbolizing a connection with the divine and the ancestral spirits of the Rathwa tribe.

• The Gher festival is not just a dance but a major social event where matrimonial alliances are often initiated, and community bonds are strengthened within the tribal landscape of India.

• The Government of India and the state of Gujarat have taken several steps to preserve these indigenous art forms under cultural heritage conservation programs.

Q81. Answer: (b) 557

Shortcut Trick

$\sqrt{3136} = 56$

$\Rightarrow 18 \times 7 \times 560 \div 56 = 18 \times 7 \times 10 = 1260$

$\Rightarrow 1260 = y + 703$

$\Rightarrow y = 1260 - 703 = 557$

Therefore Answer = 557

Alternate Method

Given:

$18 \times 7 \times 560 \div \sqrt{3136} = y + 703$

Concept Used:

BODMAS rule

Calculation:

=> 18 × 7 × 560 ÷ √3136 = y + 703

=> 18 × 7 × 560 ÷ 56 = y + 703

=> 18 × 7 × 10 = y + 703

=> 1260 = y + 703

=> 1260 − 703 = y

=> y = 557

Therefore The correct answer is 557.

Additional Information

BODMAS Rule

Brackets, Orders (roots), Division, Multiplication, Addition, Subtraction.

Square Root

√3136 = 56

Simplification Tip

Cancel common factors early to reduce calculations.

Linear Equation

Solve by isolating variable after simplifying expression.

Q82. Answer: (a) Tirot Sing

The correct answer is Tirot Sing.

Key Points

• Tirot Sing, also known as U Tirot Sing Syiem, was the chief (Syiem) of Nongkhlaw in the Khasi Hills of Meghalaya. He is celebrated as a hero of the Khasi people for leading the resistance against the British East India Company. Hence, option A is correct.

• The conflict, known as the Anglo-Khasi War, began in 1829 when the British sought to construct a road through the Khasi Hills to connect the Brahmaputra Valley (Guwahati) with the Surma Valley (Sylhet, now in Bangladesh).

• Tirot Sing initially agreed to the road project under the impression it would facilitate trade, but soon realized the British intended to establish permanent military outposts and impose taxes, which threatened Khasi sovereignty.

• In April 1829, Tirot Sing launched an attack on a British party at Nongkhlaw, marking the start of a fierce guerilla warfare campaign that lasted for four years.

• Despite the lack of modern weaponry, the Khasi warriors used traditional weapons like bows, arrows, and shields to resist the superior military might of the British.

• Tirot Sing was eventually captured by the British in January 1833 after being betrayed. He was deported to Dhaka, where he died in captivity on 17 July 1835.

Additional Information

• Rani Gaidinliu:

• She was a Naga spiritual and political leader who led a revolt against British rule in India.

• At the age of 13, she joined the Heraka religious movement led by her cousin Haiphou Jadonang.

• The movement later turned into a political struggle to drive out the British from Manipur and the surrounding Naga areas.

• She was arrested in 1932 at the age of 16 and sentenced to life imprisonment, but was released after India gained Independence in 1947.

• Alluri Sitarama Raju:

• He was a revolutionary who led the Rampa Rebellion of 1922 in the Godavari district of Andhra Pradesh.

• He mobilized the tribal people against the 1882 Madras Forest Act, which restricted their free movement in the forest and prevented them from practicing Podu (shifting) cultivation.

• Raju was highly influenced by the Non-Cooperation Movement but believed that India could be liberated only by the use of force.

• He was captured and executed by the British in 1924.

• Sidhu Murmu:

• Sidhu Murmu, along with his brother Kanhu Murmu, led the Santhal Rebellion (also known as the Santhal Hul) in 1855-56.

• The rebellion took place in the Santhal Pargana region of present-day Jharkhand and West Bengal.

• The movement was directed against the British East India Company and the Zamindari system (landlords) who exploited the Santhal tribal people.

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• The Santhals declared Independence and established their own administration before the British suppressed the movement with extreme violence in 1856.

Important Points

• The Khasi people follow a matrilineal system where lineage and inheritance are traced through the mother. This unique social structure has been preserved for centuries in the Khasi Hills.

• The State of Meghalaya celebrates U Tirot Sing Day every year on July 17 to commemorate his sacrifice and bravery.

• The British expansion in North-East India during the 19th century often led to conflicts with local tribes over land rights, forest resources, and administrative control.

• The Anglo-Khasi War is significant because it was one of the earliest and most prolonged resistances faced by the British in the mountainous regions of North-East India.

Q83. Answer: (a) W

Given: Each of F, L, O, W, E, R and S has an exam on a different day of a week, starting from Monday and ending on Sunday of the same week.

R has exam on Thursday.

Only two people have exams between F and R.

Only four people have exams between S and F.

W has exam on one of the days after F.

E has exam on the day immediately before O.

L has exam on one of the days after W.

Day	Person
Monday (1)	F
Tuesday (2)	E
Wednesday (3)	O
Thursday (4)	R
Friday (5)	W
Saturday (6)	S
Sunday (7)	L

Now, Friday = W

Hence, the correct answer is "Option 1".

Q84. Answer: (c) Delhi, Mumbai, Chennai, Kolkata

The correct answer is Delhi, Mumbai, Chennai, Kolkata.

Key Points

• The Golden Quadrilateral (GQ) is a national highway network connecting the four major metropolitan cities of India: Delhi (North), Kolkata (East), Mumbai (West), and Chennai (South). Hence, option C is correct.

• It is the largest highway project in India and the fifth-longest highway network in the world, with a total length of approximately 5,846 kilometers (3,633 miles).

• The project was first planned by former Prime Minister Atal Bihari Vajpayee in 1999, and the foundation stone was laid the same year. Construction began in 2001 and the project was officially completed in January 2012.

• The management and maintenance of the Golden Quadrilateral are handled by the National Highways Authority of India (NHAI), which operates under the Ministry of Road Transport and Highways.

• Option A mentions Mumbai, Pune, Hyderabad, and Bangalore. While these are key industrial hubs, they do not form the four vertices of the national quadrilateral project. Hence, option A is incorrect.

• Option B includes Delhi, Bhopal, Ahmedabad, and Mumbai. Although the highway passes through or near some of these areas, Bhopal is not a primary endpoint of the GQ. Hence, option B is incorrect.

• Option D includes Chennai, Bangalore, Hyderabad, and Kolkata. While the GQ passes through Bangalore on the Mumbai-Chennai segment, Hyderabad is not one of the four main corners. Hence, option D is incorrect.

Additional Information

• Components and Routes:

• The Delhi-Kolkata segment is primarily covered by NH 19 (formerly NH 2) and NH 44.

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• The Mumbai-Delhi segment and Mumbai-Chennai segment are parts of the high-traffic NH 48 (formerly NH 8 and NH 4).

• The Kolkata-Chennai segment follows the eastern coastline and is designated as NH 16 (formerly NH 5).

• Geographic Reach:

• The network passes through 13 States and Union Territories in India, including Andhra Pradesh, Bihar, Delhi, Gujarat, Haryana, Karnataka, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal.

• Major cities located on the network include Ahmedabad, Bengaluru, Bhubaneswar, Jaipur, Kanpur, Pune, Surat, and Vijayawada.

• Economic Impact:

• The project facilitates faster transportation of goods between major ports and industrial cities, significantly boosting GDP growth.

• It has helped in reducing the travel time between major metros by 20-30% and has lowered fuel consumption and vehicle wear and tear.

Important Points

• Technical Features:

• The highways consist of four to six lanes of high-quality paved roads, designed to handle heavy industrial traffic and high-speed passenger vehicles.

• It was the Phase I of the National Highways Development Project (NHDP), which also includes the North-South and East-West Corridors.

• Comparative Context:

• The North-South Corridor connects Srinagar in Jammu & Kashmir to Kanyakumari in Tamil Nadu.

• The East-West Corridor connects Silchar in Assam to Porbandar in Gujarat.

• The intersection point of these two corridors is Jhansi in Uttar Pradesh.

• Project Cost:

• The initial estimated cost of the project was around Rs. 600 billion (approximately US$7.2 billion in current terms), largely funded through fuel cess and market borrowings by the Government of India.

Q85. Answer: (b) SRAM is significantly faster, more expensive, and consumes less power than DRAM.

The correct answer is SRAM is significantly faster, more expensive, and consumes less power than DRAM.

Key Points

• Static Random Access Memory (SRAM) and Dynamic Random Access Memory (DRAM) are both types of volatile memory, meaning they lose stored information when power is removed. However, their internal architecture differs significantly.

• SRAM uses a complex circuit of four to six transistors to store each bit of data, which forms a flip-flop. This allows it to maintain data without the need for a refresh cycle as long as power is supplied. Hence, the characteristic of not needing a refresh makes it faster.

• DRAM stores data using a single transistor and a capacitor for each bit. Since capacitors naturally leak charge, DRAM must be refreshed thousands of times per second to prevent data loss. This constant refreshing makes DRAM slower than SRAM.

• Due to the higher number of components (transistors) per bit, SRAM is much less dense and more expensive to manufacture compared to DRAM. Consequently, SRAM is used in small quantities for L1, L2, and L3 CPU Cache, while DRAM is used for large-capacity main system memory (RAM).

• SRAM typically has access speeds in the range of 1 to 10 nanoseconds, whereas modern DRAM usually operates with access times around 60 nanoseconds or more, depending on the DDR (Double Data Rate) generation.

Additional Information

• Structure and Functions:

• SRAM: Because it is placed closer to or directly on the CPU die, it reduces the latency between the processor and the data it needs to execute instructions. It acts as a high-speed buffer.

• DRAM: Its simple design (one transistor, one capacitor) allows for billions of cells to be packed into a single integrated circuit, making it possible to have 8GB, 16GB, or 32GB modules at a consumer-friendly price point.

• Power Consumption:

• SRAM is more power-efficient when idle because it does not require a refresh current. However, at high speeds, its power consumption can increase significantly.

• DRAM consumes power continuously due to the refresh cycles required to maintain the state of the capacitors, even when the system is not actively accessing the memory.

• Applications:

• SRAM is used in routers, printers, LCD screens, and as buffer memory in hard drives, in addition to CPU Caches.

• DRAM is the primary technology for System RAM in personal computers, smartphones, and gaming consoles. Variations like VRAM (Video RAM) are used in Graphics Processing Units (GPUs).

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Important Points

• Evolution: Robert Dennard at IBM invented DRAM in 1966, which revolutionized computing by providing a low-cost alternative to earlier magnetic-core memory.

• Volatile vs Non-Volatile: Both SRAM and DRAM are volatile. This distinguishes them from Non-Volatile Memory (NVM) like Flash Memory (SSD) or ROM, which retain data even after the power is turned off.

• SDRAM (Synchronous DRAM): Most modern computers use SDRAM, which synchronizes itself with the system clock to improve efficiency. The current industry standards are DDR4 and DDR5, which offer higher bandwidth and lower voltage requirements.

• Cost-Performance Trade-off: If a computer used only SRAM for its 16GB of memory, the machine would be incredibly fast but would cost thousands of dollars more and take up significantly more physical space.

Q86. Answer: (a) 4

Given:

ROAD → 8657

DEAR → 4567

So, matching consistent remaining unused digit pattern gives:

E = 4

Hence, the correct answer is Option 1.

Q87. Answer: (c) 1 and 2 only

The correct answer is 1 and 2 only.

Key Points

• Lord Mayo's Resolution of 1870 on financial decentralization was a landmark step that aimed to delegate the management of certain local services, such as education, health, and roads, to provincial governments. It specifically visualized that this process would encourage the development of local self-government institutions by allowing local bodies to manage local needs through local taxation. Hence, statement 1 is correct.

• The Royal Commission on Decentralization was appointed in 1907 (and submitted its report in 1909) to investigate the financial and administrative relations between the Government of India, provincial governments, and local bodies. The commission was chaired by C.E.H. Hobhouse (Sir Charles Hobhouse), and it recommended that village panchayats and local boards should be given more powers and resources. Hence, statement 2 is correct.

• Under the Government of India Act of 1919, also known as the Montagu-Chelmsford Reforms, a system of Dyarchy was introduced in the provinces. In this system, subjects were divided into "Reserved" (managed by the Governor and his Executive Council) and "Transferred" (managed by the Governor and Indian Ministers). Local self-government was made a Transferred subject, meaning it was placed under the charge of an Indian minister responsible to the provincial legislature, rather than being a reserved subject. Hence, statement 3 is incorrect.

Additional Information

• Lord Ripon's Resolution (1882): Often hailed as the "Magna Carta" of local self-government in India, Lord Ripon is known as the Father of Local Self-Government. His resolution advocated for the establishment of local boards with a majority of non-official members and elected chairmen wherever possible, emphasizing that local government should be an instrument of political and popular education.

• The Government of India Act, 1935: This act abolished Dyarchy in the provinces and introduced Provincial Autonomy. Under this act, local self-government continued to be a provincial subject, further strengthening the legislative and executive control of Indian ministers over local bodies and leading to the enactment of various village panchayat acts across different provinces.

• Post-Independence Developments: After 1947, the importance of local self-government was recognized in the Directive Principles of State Policy under Article 40 of the Constitution of India, which mandates the state to organize village panchayats. This eventually led to the 73rd and 74th Constitutional Amendment Acts of 1992, which provided constitutional status to Panchayati Raj Institutions (PRIs) and Urban Local Bodies (ULBs).

• Dyarchy under the 1919 Act: The division of subjects into Reserved and Transferred was a unique feature. While Transferred subjects included Education, Public Health, and Local Self-Government, the Reserved subjects included critical areas like Police, Justice, Land Revenue, and Finance, which ensured that the British Governor maintained ultimate control over the most powerful departments.

Important Points

• Key Chronology: The evolution of local bodies moved from Lord Mayo (1870) focusing on financial efficiency, to Lord Ripon (1882) focusing on political education, and finally to the 1919 Act where it became a democratic responsibility of Indian ministers.

• Structure of Local Bodies: Historically, Municipal Corporations were established early in Presidency towns like Madras (1688), Bombay (1726), and Calcutta (1726). However, organized rural local government only gained momentum after the Hobhouse Commission and the 1919 reforms.

• Financial Decentralization: Lord Mayo's resolution was significant because it fixed a fixed grant for provinces and allowed them to manage local affairs, which was the first practical step towards administrative decentralization in British India.

Q88. Answer: (a) LVZJ

The logic followed here is:

For, RAFI → TELQ

For, NEGL → PIMT

Now, applying the same logic to JRTB:

So, JRTB → LVZJ

Hence, the correct answer is Option 1.

Q89. Answer: (d) Silappatikaram

The correct answer is Silappatikaram.

Key Points

• Silappatikaram, meaning "The Tale of an Anklet," is one of the Five Great Epics of Tamil literature, composed during the 2nd century CE. Hence, this option is correct.

• It was written by Ilango Adigal, who is believed to be a Chera prince and a brother of King Senguttuvan. The author eventually became a Jain monk.

• The epic tells the story of Kannagi, a chaste and devoted wife whose husband, Kovalan, leaves her for a dancer named Madhavi. After losing his wealth, Kovalan returns to Kannagi, and they travel to Madurai to start a new life.

• The plot reaches its climax when Kovalan is wrongfully executed by the Pandyan King for allegedly stealing the Queen's anklet. Kannagi proves his innocence using her own jewel-filled anklet and, in her fury, burns down the city of Madurai.

• This work is considered a masterpiece for its vivid descriptions of the three major Tamil kingdoms: the Cholas (Puhar), the Pandyas (Madurai), and the Cheras (Vanjikandam).

Additional Information

• Manimekalai:

• Written by Sattanar, this epic is a sequel to Silappatikaram. It focuses on the life of Manimekalai, the daughter of Kovalan and Madhavi.

• The theme of this text is renunciation and the propagation of Buddhism. It contains detailed philosophical and logical debates. Hence, this option is incorrect as it focuses on Buddhism rather than the devotion of a wife.

• Tolkappiyam:

• This is the oldest extant work of Tamil grammar and poetics, attributed to Tolkappiyar.

• It provides insights into the linguistic structure of Old Tamil and the socio-economic conditions of the Sangam period. Hence, this option is incorrect as it is a grammatical treatise, not an epic poem.

• Pattuppattu:

• Known as the "Ten Idylls," it is an anthology of ten long poems that are part of the Eighteen Greater Texts (Pathinenmaelkanakku).

• These poems describe the landscapes, kings, and culture of the ancient Tamil land but do not constitute a single epic narrative about a chaste wife. Hence, this option is incorrect.

Important Points

• Cultural Impact: Silappatikaram established the Pattini Cult, which involves the worship of Kannagi as the goddess of chastity. This cult remains significant in parts of Tamil Nadu and Sri Lanka.

• Geographic Scope: The epic is structured into three parts: Puharkkandam (Chola), Maduraikkandam (Pandya), and Vanjikkandam (Chera), covering the entire Tamilaham region.

• Literary Value: It is celebrated for its secular nature, as it incorporates elements of Jainism, Buddhism, and Hinduism, while focusing on human emotions and divine justice.

• Historical Evidence: The mention of the Ceylonese King Gajabahu I (circa 171-193 CE) attending the consecration of the temple for Kannagi helps historians date the events to the 2nd century CE.

Q90. Answer: (b) -25

Shortcut Trick

Handle signs first: (−56) ÷ (−14) = +4

And (−2) × 6 = −12

Expression becomes: −9 − 4 − 12

= −25

Therefore Answer = −25

Alternate Method

Given:

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(−9) − (−56) ÷ (−14) + (−2) × 6
Concept Used:
BODMAS rule
Calculation:
=> (−9) − (−56 ÷ −14) + (−2 × 6)
=> (−9) − (4) + (−2 × 6)
=> (−9) − (4) + (−12)
=> (−13) + (−12)
=> −25
Therefore The correct answer is −25.
Additional Information
BODMAS Full Form
Brackets, Orders, Division, Multiplication, Addition, Subtraction
Sign Rules
(− ÷ −) = +, (− × +) = −
Priority Rule
Division and multiplication are done before addition and subtraction.
Quick Tip
Simplify signs first to avoid confusion in calculations.

Q91. Answer: (c) 27

Shortcut Trick
Total work = LCM(20, 45) = 180 units
A's efficiency = 180 ÷ 45 = 4 units/day
A + B = 180 ÷ 20 = 9 units/day => B = 5 units/day
Work = 3/4 => 180 × 3/4 = 135 units
Time = 135 ÷ 5 = 27 days
Therefore Answer = 27 days
Alternate Method
Given:
A + B complete work in 20 days
A alone completes in 45 days
Formula used:
Work Rate = Work ÷ Time

Person	Days	Total Work	Efficiency
A	45	180	4
A + B	20	9	

Calculation:
=> Efficiency of B = 9 − 4 = 5 units/day
=> Work to be done = 3/4 × 180 = 135 units
=> Time taken by B = 135 ÷ 5 = 27 days
Therefore The correct answer is 27 days.
Additional Information
LCM Method
Assume total work as LCM of given days to simplify efficiency.
Efficiency Concept
Efficiency = Work done per day.
Combined Work
A + B efficiency = sum of individual efficiencies.
Partial Work

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Time = Required work ÷ efficiency.

Q92. Answer: (b) 6.25

Shortcut Trick

From 150 m race => R : S = 150 : 144 = 25 : 24

Let speeds = 25x and 24x

Using 250 m race: 250/24x − 250/25x = 2 => x = 5/24

Speeds => R = 125/24, S = 5

In 30 s => R = 156.25 m, S = 150 m

Therefore Answer = 6.25 m

Alternate Method

Given:

Race 1: 150 m, R beats S by 6 m

Race 2: 250 m, R beats S by 2 s

Time = 30 s

Formula used:

Speed = Distance ÷ Time

Calculation:

=> Speed ratio R : S = 150 : 144

=> R : S = 25 : 24

=> Let speeds be 25x and 24x

=> Time difference in 250 m race:

=> 250 ÷ 24x − 250 ÷ 25x = 2

=> 250 × (25 − 24) ÷ (24 × 25 × x) = 2

=> 250 ÷ (600x) = 2

=> 5 ÷ (12x) = 2

=> 5 = 24x

=> x = 5 ÷ 24

=> Speed of R = 25 × 5 ÷ 24 = 125/24

=> Speed of S = 24 × 5 ÷ 24 = 5

=> Distance by R in 30 s = 125/24 × 30 = 156.25

=> Distance by S in 30 s = 5 × 30 = 150

=> Lead = 156.25 − 150 = 6.25

Therefore The correct answer is 6.25 m.

Additional Information

Speed Ratio

If one beats another by distance, speed ratio equals distances covered.

Time Difference Formula

(Distance/s1 − Distance/s2) gives time difference.

Relative Distance

Difference in distance = (Speed difference) × time.

Exam Tip

Convert ratio into actual speeds using second condition.

Q93. Answer: (a) India

The correct answer is India.

Key Points

• The Association of Southeast Asian Nations (ASEAN) is a regional intergovernmental organization established to promote political and social stability amid rising tensions among the Asia-Pacific's post-colonial states.

• India is a country located in South Asia and is not a member of the ASEAN bloc, which is specifically for Southeast Asian nations. However, India is a significant Strategic Dialogue Partner of the group. Hence, statement A is correct as India is NOT a member.

• Indonesia is one of the five founding members of ASEAN. The organization's Secretariat is also located in its capital, Jakarta.

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Hence, statement B is incorrect.

• Thailand is a founding member of the organization. In fact, the founding document of the bloc is known as the Bangkok Declaration, signed in 1967 in Thailand. Hence, statement C is incorrect.

• Myanmar officially joined ASEAN on July 23, 1997. It is one of the ten permanent members of the association. Hence, statement D is incorrect.

Additional Information

• Establishment and History:

• ASEAN was established on 8 August 1967 in Bangkok, Thailand.

• The five original founding fathers of ASEAN were Indonesia, Malaysia, Philippines, Singapore, and Thailand.

• The ASEAN Declaration (Bangkok Declaration) outlined the organization's goals to accelerate economic growth and promote regional peace.

• Membership Evolution:

• The current 10 members are Brunei (joined in 1984), Vietnam (1995), Laos and Myanmar (1997), and Cambodia (1999), along with the five founders.

• In November 2022, ASEAN agreed "in principle" to admit Timor-Leste as the group's 11th member.

• Organizational Structure:

• The ASEAN Summit is the highest policy-making body, comprising the Heads of State or Government.

• The motto of ASEAN is "One Vision, One Identity, One Community".

• August 8th is observed annually as ASEAN Day.

Important Points

• India-ASEAN Relationship:

• India began its formal engagement with ASEAN as a Sectoral Dialogue Partner in 1992.

• It graduated to a Full Dialogue Partner in 1995 and further to a Strategic Partner during the ASEAN-India Commemorative Summit in 2012.

• The relationship is a central pillar of India's Act East Policy, focusing on 4Cs: Commerce, Connectivity, Culture, and Capacity Building.

• Regional Forums:

• ASEAN Plus Three: This forum includes the 10 ASEAN members plus China, Japan, and South Korea.

• East Asia Summit (EAS): A premier forum for strategic dialogue, where India, the United States, and Russia participate alongside ASEAN members.

• ASEAN Regional Forum (ARF): Established in 1994 to facilitate dialogue on security issues in the Indo-Pacific region.

Q94. Answer: (c) √(1967/66)

Shortcut Trick

Total surface area = $3\pi r^2$

=> $3 \times (22/7) \times r^2 = 281$

=> $r^2 = (281 \times 7) \div 66$

=> $r^2 = 1967/66$

=> $r = \sqrt{(1967/66)}$

Therefore Answer = $\sqrt{(1967/66)}$ cm

Alternate Method

Given:

Total surface area = 281 cm^2

$\pi = 22/7$

Formula used:

Total surface area of hemisphere = $3\pi r^2$

r

Includes curved surface + base

Calculation:

=> $3\pi r^2 = 281$

=> $3 \times (22/7) \times r^2 = 281$

=> $(66/7)\ r^2 = 281$

=> $r^2 = (281 \times 7) \div 66$

=> $r^2 = 1967/66$

=> $r = \sqrt{(1967/66)}$

Therefore The correct answer is $\sqrt{(1967/66)}$ cm.

Additional Information

Hemisphere Formula

Total surface area = $3\pi r^2$

Square Root Form

If r^2 is fractional, express answer as $\sqrt{(numerator/denominator)}$

Simplification Tip

Try to reduce fraction before taking square root

Exam Tip

Leave answer in radical form if not a perfect square

Q95. Answer: (b) %

Given: (Left) L U £ P $ D A Ω F % * N Q & R # Y @ C K * & M (Right)

Now,

If all letters are dropped, we keep only symbols.

Original series: L U £ P $ D A Ω F % * N Q & R # Y @ C K * & M

Removing letters: L, U, P, D, A, F, N, Q, R, Y, C, K, M are removed

Remaining symbols: £ $ Ω % * & # @ * &

Now, writing reduced series: £ $ Ω % * & # @ * &

Now, counting from right side: £ $ Ω % * & # @ * &

So, seventh from the right = %

Hence, the correct answer is Option 2.

Q96. Answer: (d) Republic of Korea

The correct answer is Republic of Korea.

Key Points

• The Indian men's hockey team clinched the Asia Cup 2025 title by defeating the Republic of Korea (South Korea) with a score of 4–1 in the final.

• Venue: The final was held at the Rajgir Sports Complex (also known as the Bihar Sports University Hockey Stadium) in Bihar, India.

• With this victory, India secured a spot in the 2026 FIH Men's Hockey World Cup, to be co-hosted by Belgium and the Netherlands.

• This win ended an eight-year wait for the title, with India's last Asia Cup triumph occurring in 2017.

• This was India's fourth Asia Cup title (previous wins in 2003, 2007, and 2017), moving them level with South Korea in terms of titles won.

• Player of the Tournament: Indian forward Abhishek was named the Player of the Tournament.

Additional Information

• Rajgir Sports Complex, Bihar:

• This state-of-the-art facility was inaugurated by Chief Minister Nitish Kumar in August 2024.

• Built at an estimated cost of over Rs 740 crore, it features an international cricket stadium and a specialized astroturf hockey stadium with a seating capacity of 30,000.

• It served as the venue for the Bihar Women's Asian Champions Trophy 2024, where India defeated China 1-0 in the final.

• Men's Asian Champions Trophy 2024:

• The 8th edition of this tournament was held in China.

• The Indian senior team, led by Harmanpreet Singh, defeated China 1-0 in the final to clinch their 5th title.

• During this tournament, India maintained a perfect record, including a 2-1 win over Pakistan in the group stages and a 4-1 win over South Korea in the knockouts.

• Pakistan Hockey Rivalry:

• India and Pakistan are the most successful teams in Asia Cup history.

• In the Junior Asia Cup, India now holds 5 titles (2004, 2008, 2015, 2023, 2024), while Pakistan has 3 titles.

Important Points

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• Hockey India: The governing body for hockey in India, established in 2009, has been instrumental in reviving the sport, leading to Olympic Bronze medals in Tokyo 2020 and Paris 2024.

• Tournament Significance: The Asia Cup and Asian Champions Trophy serve as vital qualification events for the FIH Hockey World Cup and the Junior World Cup.

• Key Stats: India is currently ranked within the Top 5 in the FIH World Rankings (as of late 2024), reflecting a significant resurgence in global hockey.

Q97. Answer: (a) Permeability of soil and groundwater availability

The correct answer is Permeability of soil and groundwater availability.

Key Points

• The Bhabar and Terai are distinct physiological divisions of the Great Indian Plains located at the foothills of the Himalayas. Their primary difference lies in the geological composition and the resulting permeability of the soil.

• Bhabar region consists of porous rock debris and pebbles brought down by rivers from the Shiwalik ranges. Due to this high porosity and permeability, small streams and rivers often disappear underground when they enter this belt. Hence, statement A is correct as it highlights the core physical difference.

• Terai region is situated to the south of the Bhabar. In this zone, the underground streams of the Bhabar belt re-emerge at the surface, creating a marshy and swampy tract. The soil here is silty and less permeable than Bhabar, leading to high groundwater availability and water-logging.

• Regarding Rainfall and wind direction, both regions are part of the same latitudinal belt and generally experience similar monsoonal patterns, though Terai receives slightly more effective moisture due to its water-retention capacity. Hence, statement B is not the primary difference.

• Both regions are fundamentally influenced by the Himalayan Rivers such as the Ganga, Yamuna, and Brahmaputra, as they are formed by their alluvial deposits. Hence, statement C is a similarity rather than a difference.

• While human settlement patterns differ (with Terai being more intensely cultivated for Sugarcane and Rice after forest clearing), this is a consequence of the physical differences rather than the primary geographical cause. Hence, statement D is a secondary factor.

Additional Information

• The Bhabar Belt:

• Location: It stretches from the Indus river in the West to the Tista river in the East. It runs parallel to the Shiwaliks.

• Features: The width of this belt varies between 8 km to 16 km. It is characterized by un-assorted sediments.

• Uses: It is generally unsuitable for agriculture because of the massive presence of boulders and pebbles, though big trees with deep roots can thrive here.

• The Terai Belt:

• Location: It lies south of the Bhabar belt.

• Features: Its width is approximately 10 km to 20 km. It was traditionally a thickly forested region with rich wildlife.

• Development: After 1947, many forests in the Terai of Uttar Pradesh and Uttarakhand were cleared to settle migrants and for agricultural expansion.

• Functions: It serves as a natural reservoir for groundwater and is highly productive for crops like Wheat, Rice, and Sugarcane.

Important Points

• The Great Indian Plains are also divided into Bhangar and Khadar regions based on the age of the alluvium.

• Bhangar: This is the older alluvium of the plains and forms the upland terraces. It contains calcareous deposits locally known as Kankar. It is less fertile compared to Khadar.

• Khadar: This represents the new alluvium deposited by floods almost every year. It is very fertile and is ideal for intensive agriculture.

• Geographical Data: The total length of the Great Indian Plains is about 2,400 km, and its width varies from 150 km to 300 km.

• The formation of these plains is attributed to the filling of a deep depression (foredeep) between the Himalayas and the Peninsular Plateau during the Pleistocene period.

Q98. Answer: (b) Windows 11

The correct answer is Windows 11.

Key Points

• Windows 11 is the latest major release of the Windows NT operating system developed by Microsoft. It was officially released to the general public on October 5, 2021. Hence, this option is correct.

• The operating system succeeded Windows 10, which had been the flagship OS since 2015. Windows 11 introduced a significantly redesigned user interface, featuring a centered Taskbar and Start menu, along with rounded corners for windows.

• One of the primary features of Windows 11 is Snap Layouts and Snap Groups, which allow users to organize multiple windows

on their screen efficiently, enhancing productivity and multitasking capabilities.

• It also includes deep integration with Microsoft Teams, which is pinned directly to the taskbar, facilitating easier communication for personal and professional use.

• The system requirements for Windows 11 are more stringent than its predecessors, requiring a 64-bit processor, 4 GB of RAM, 64 GB of storage, UEFI Secure Boot, and a TPM version 2.0 (Trusted Platform Module) chip for improved security.

Additional Information

• Windows 10:

• Released in July 2015, it was marketed as a "service" that would receive ongoing updates rather than a new standalone version every few years.

• It introduced the Microsoft Edge browser and the Cortana virtual assistant. While it is highly stable and widely used, it is no longer the "latest" version. Hence, this statement is incorrect.

• Microsoft has announced that Windows 10 will reach its end of support on October 14, 2025.

• Windows 7:

• Launched in October 2009, it was praised for its stability and user-friendly interface compared to Windows Vista.

• Microsoft officially ended extended support for Windows 7 on January 14, 2020, meaning it no longer receives technical assistance or security updates. Hence, this statement is incorrect.

• Windows 18:

• There is currently no operating system named Windows 18. Microsoft skipped various numbers in its chronological naming sequence (such as Windows 9) and moved from Windows 8.1 to Windows 10, then to Windows 11. Hence, this statement is incorrect.

• History of Windows:

• The very first version, Windows 1.0, was released in November 1985 by Bill Gates.

• Other notable versions include Windows 95 (which introduced the Start button), Windows XP (released in 2001), and Windows 8 (released in 2012), which introduced a tile-based interface.

Important Points

• Gaming Performance: Windows 11 includes technologies like Auto HDR and DirectStorage, which were originally developed for Xbox Series X/S consoles. These features significantly improve visual quality and reduce loading times for high-end gaming applications.

• Android App Support: Through a partnership with the Amazon Appstore, Windows 11 allows users to run Android apps natively on their PC, expanding the ecosystem of available software.

• Update Cycle: Unlike previous versions that received two major feature updates per year, Microsoft has moved to a single major feature update annual cycle for Windows 11, typically released in the second half of the year.

Q99. Answer: (b) 57600

Shortcut Trick

Growth factor = 1.25

2 yrs ago = 450000 ÷ $(1.25)^2$ = 450000 ÷ 1.5625 = 288000

3 yrs ago = 288000 ÷ 1.25 = 230400

Difference = 288000 − 230400 = 57600

Therefore Answer = 57,600

Alternate Method

Given:

Current population = 450000

Growth rate = 25% per year

Formula used:

Past population = Present ÷ $(1 + r/100)^n$

Calculation:

=> Population 2 years ago = 450000 ÷ $(1.25)^2$

=> = 450000 ÷ 1.5625 = 288000

=> Population 3 years ago = 450000 ÷ $(1.25)^3$

=> = 450000 ÷ 1.953125 = 230400

=> Difference = 288000 − 230400 = 57600

Therefore The correct answer is 57,600.

Additional Information

Population Formula

$P = P0 \times (1 + r/100)^n$

Reverse Growth

Past value = Present ÷ growth factor

Successive Growth

Each year multiplies by same factor (1.25 here)

Quick Tip

Divide step-by-step instead of using powers for easier calculation

Q100. Answer: (b) 84

The logic followed here is:

Logic: The second number is obtained by multiplying the first number by 4.

For, 17 → 68

=> 17 × 4 = 68

For, 24 → 96

=> 24 × 4 = 96

Now, applying the same logic:

21 → 21 × 4

=> 21 × 4 = 84

Hence, the correct answer is Option 2.

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