RRB NTPC (Graduate) CBT-I Official Paper (Held On: 24 Mar, 2026 Shift 1) (Previous Year Paper)

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

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Q1. What is the function of the keyboard shortcut Ctrl + Tab?

(a) Switch between open windows
(b) Open a new tab
(c) Switch between open tabs
(d) Close a tab

Q2. The term GIGO (Garbage In Garbage Out) is most closely related to which computer characteristic?

(a) Storage Capacity
(b) Accuracy
(c) Diligence
(d) No Heuristics

Q3. Which of the following is a limitation for increasing the government expenditure to stimulate economic growth in Indian economy?

(a) Possibility of increased inflation
(b) Creating stagflation tendencies
(c) Drastically increasing foreign trade
(d) Drastically increasing social capital development

Q4. Two trains move in opposite directions at 90 km/hr and 70 km/hr. One train is 480 m long. If they cross each other in 27 seconds, find the length of the other train (in metres).

(a) 730
(b) 720
(c) 735
(d) 725

Q5. Two quadratic equations $x^2 + x + p = 0$ and $x^2 + 2x - 3 = 0$ have one root common. What is a possible value of p?

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

Q6. What should come in place of '?' in the given series?

45 46 50 59 75 ?

(a) 100
(b) 101
(c) 98
(d) 99

Q7. Find the weighted mean of the first 5 natural numbers whose weights are equal to the corresponding numbers.

(a) 11/3
(b) 12/5
(c) 11/5
(d) 13/4

Q8. Which classical Indian music form is primarily performed in temples as part of devotional worship, especially in Kerala?

(a) Sopana Sangeetham
(b) Dhrupad
(c) Thumri
(d) Khayal

Q9. Which battle in 1741 marked the defeat of the Dutch by an Indian ruler?

(a) Carnatic Wars
(b) Battle of Colachel
(c) Battle of Buxar
(d) Battle of Plassey

Q10. A, B, C, D, E, F and G are sitting around a circular table facing the centre.

Only one person sits between G and C when counted from the left of C. E sits third to the right of A. F sits third to the left of D. E sits to the immediate right of F. B is not an immediate neighbour of F. Who sits third to the right of G?

(a) D
(b) E
(c) F
(d) B

Q11. Which Article of the Directive Principles of State Policy enshrines the principle of equal pay for equal work for both men and women in India?

(a) Article 43
(b) Article 39
(c) Article 41
(d) Article 44

Q12. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

OQR 42 TVW 35 YAB 28 DFG 21 ?

(a) ILK 14
(b) IJK 13
(c) IKL 14
(d) IQZ 13

Q13. A shopkeeper purchased 19 dozens of articles at the rate of Rs. 390 per dozen. He sold each one of them at the rate of Rs. 78. What percentage profit did he make?

(a) 143%
(b) 142%
(c) 137%
(d) 140%

Q14. Which ion is responsible for the acidic nature of solutions?

(a) Hydrogen ion (H+)
(b) Chloride ion (Cl-)
(c) Hydroxide ion (OH-)
(d) Sodium ion (Na+)

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Q15. In a certain code language, 'TOUR' is coded as '2374' and 'RIOT' is coded as '7634'. What is the code for 'I' in the given code language?

(a) 7
(b) 4
(c) 3
(d) 6

Q16. Seven boxes, A, B, C, D, E, F and G, are kept one over the other but not necessarily in the same order.

Only two boxes are kept below B. Only one box is kept above G. Only one box is kept between G and A. C is kept immediately above F. E is kept at some place below D.

How many boxes are kept below E?

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

Q17. Which type of computer memory loses its stored data when the power supply is turned off?

(a) Magnetic memory set
(b) Volatile memory type
(c) Optical memory form
(d) Non-volatile memory type

Q18. In 2025, which province of the Democratic Republic of the Congo reported a new Ebola outbreak caused by the Zaire Ebola virus strain?

(a) Ituri Province
(b) North Kivu Province
(c) Kinshasa Province
(d) Kasai Province

Q19. Refer to the following letter, symbol series and answer the question. Counting to be done from left to right only

(Left) % V € L X @ £ & Y M P # N % € Z % P * © M $ (Right)

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

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

Q20. If a 7-digit number 54572A0 is completely divisible by 3, what is the minimum value of A?

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

Q21. Which award is recognized as the highest honour in Indian cinema, presented to Mohanlal in September 2025?

(a) Padma Bhushan
(b) Filmfare Lifetime Achievement Award
(c) National Award for Best Actor
(d) Dadasaheb Phalke Award

Q22. 23 is related to 139 following a certain logic. Following the same logic, 28 is related to 169. To which of the following is 25 related, following the same logic?

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

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(a) 155
(b) 141
(c) 151
(d) 146

Q23. Space Summit 2026, a specially curated two-day elite conference held on 2–3 February 2026, took place in which of the following countries?

(a) United Arab Emirates
(b) United States
(c) Singapore
(d) India

Q24. Two taps can fill a cistern in 2 hours and 57 hours respectively. A third tap can empty it in 57 hours. How long (in hours) will it take to fill half of the empty cistern, if all of them are opened together?

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

Q25. Which of the following leaders did the soldiers choose to lead them after rebelling against the British in 1857?

(a) Nana Sahib
(b) Rani Lakshmibai
(c) Mangal Pandey
(d) Bahadur Shah Zafar

Q26. What is the role of parental consent under the DPDP Act, 2023, as of December 2025?

(a) To permit processing of a child's personal data by data fiduciaries
(b) To approve all digital device purchases
(c) To grant children access to online exams
(d) To allow schools to access children's medical records

Q27. Which Indian cooperatives were ranked first and second, respectively, in the International Cooperative Alliance World Cooperative Monitor 2025, as announced at the ICA CM50 Conference in Doha in 2025?

(a) IFFCO ranked first and Amul (GCMMF) ranked second
(b) Amul (GCMMF) ranked first and KRIBHCO ranked second
(c) Amul (GCMMF) ranked first and IFFCO ranked second
(d) IFFCO ranked first and KRIBHCO ranked second

Q28. Seven boxes P, Q, R, S, T, U and V are kept one over the other but not necessarily in the same order.

No box is kept above U. Only three boxes are kept between U and P. Only one box is kept between R and T. T is kept immediately above P. Only four boxes are kept between R and V. Q is kept at some place above S.

How many boxes are kept between S and U?

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

Q29. Which of the following Articles of the Indian Constitution provides for a Uniform Civil Code (UCC)?

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

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Q30. The ages of A and B are in the ratio 5 : 8. After 6 years, the ratio becomes 3 : 4. What is A's present age?

(a) 7.5 years
(b) 9.7 years
(c) 9 years
(d) 11 years

Q31. The cold and chilly winds that are blocked by the Himalayas originate from Central Asia and regions close to which of the following?

(a) Central Africa
(b) Pacific Ocean
(c) Arctic Circle
(d) Mediterranean Region

Q32. In what duration (in years) will Rs. 7,200 fetch a simple interest of Rs. 360 at 4% per annum rate of interest?

(a) 2.25
(b) 1.25
(c) 0.25
(d) 2.5

Q33. 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. T lives on an even numbered floor but not 6. The sum of the floors on which Q and T live is 7. P lives immediately above U. The sum of the floors on which T and R live is 3. How many people live below T?

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

Q34. The average weight of a group of 10 students is 50 kg. If the weight of the teacher is also included, the average weight increases by 1 kg. What is the teacher's weight?

(a) 60 kg
(b) 59 kg
(c) 61 kg
(d) 58 kg

Q35. In which year did the Vellore Mutiny take place?

(a) 1799 CE
(b) 1857 CE
(c) 1817 CE
(d) 1806 CE

Q36. A and B invest in a business in the ratio 3 : 2. If they earn a total profit of Rs. 25,000, then how much profit does B receive?

(a) Rs. 12,000
(b) Rs. 15,000
(c) Rs. 5,000
(d) Rs. 10,000

Q37. The mean and the mode of a set of data are 17.9 and 24.7, respectively. Find the median of the data, using the empirical formula (correct to one decimal place).

(a) 20.3
(b) 19.9
(c) 20.2
(d) 21.4

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Q38. Evaluate: (-9) - (-56) ÷ (-8) + (-4) × 7

(a) -44
(b) -46
(c) -43
(d) -47

Q39. The Pallava dynasty had its capital at which of the following places?

(a) Badami
(b) Vatapi
(c) Madurai
(d) Kanchipuram

Q40. 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 :: ?

: NXF :: KUC : %

(a) = FPX % = SCO
(b) = FPX % = SCK
(c) = EPX % = SCK
(d) = FIX % = SCK

Q41. This question is based on the five, three-digit numbers given below.

(Left) 237 732 273 854 798 (Right)

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

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

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

(a) 8
(b) 12
(c) 11
(d) 14

Q42. Which of the following processes is/are primarily responsible for the formation of fold mountains such as the Himalayas?

(a) Wind deposition
(b) Erosion by rivers
(c) Volcanic eruptions
(d) Plate collision

Q43. P, Q and R, each working alone, can complete a piece of work in, respectively, 10 days, 15 days and 25 days. If P works on all days, Q works on every odd-numbered day and R works on every even-numbered day, then in how many days will the whole work be completed?

(a) 123/25
(b) 89/25
(c) 1011/25
(d) 612/25

Q44. Under the 74th Amendment of the Indian Constitution, who is eligible for representation in a municipality without voting rights?

(a) Members of the Gram Sabha
(b) Governors of States
(c) The Chief Minister
(d) Persons with special knowledge in municipal administration

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Q45. Evaluate: 16 + 20 ÷ 4 - 2 × 3

(a) 14
(b) 15
(c) 18
(d) 17

Q46. In a certain code language, ‘window is open’ is coded as ‘fq ul pt’ and ‘clean the window’ is coded as ‘zd fq wp’. How is ‘window’ coded in that language?

(a) wp
(b) ul
(c) fq
(d) pt

Q47. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) SQ−RP
(b) IG−HF
(c) AY−YZ
(d) HF−GE

Q48. Read the given statements and conclusions carefully. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. You have to decide which conclusion/s logically follow/s from the given statements.

Statements:

All chairs are tables. All tables are boards. Some tables are desks.

Conclusions:

(I) Some boards are desks.

(II) Some chairs are desks.

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

Q49. In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

(NOTE : Operations should be performed on the whole numbers, without breaking down the numbers into its constituent digits. 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)

15, 73

19, 93

(a) 22, 114
(b) 22, 113
(c) 23, 113
(d) 23, 114

Q50. A sphere inscribes a cone of radius 3 cm and height $3\sqrt{2}$ cm. Find the surface area (in cm^2) of the sphere. [use $\pi = 22/7$]

(a) 421/3
(b) 862/3
(c) 1272/7
(d) 141/7

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Q51. 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 :: ?

: ZVT :: JFD : %

(a) = WSQ, % = MIG
(b) = XSR, % = LJG
(c) = XUR, % = MJL
(d) = WTR, % = LKH

Q52. There are 30 members in group A, 21 members in group B and 40 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. 378, Rs. 355 and Rs. 224, respectively. The overall average amount (in Rs.) spent per member is:

(a) 304
(b) 302
(c) 303
(d) 305

Q53. In a certain code language,

A + B means 'A is the wife of B'

A - B means 'A is the mother of B'

A × B means 'A is the father of B'

A ÷ B means 'A is the husband of B'

Based on the above, how is Y related to S if 'Y + N × K ÷ T - S'?

(a) Sister
(b) Father's sister
(c) Mother
(d) Father's mother

Q54. 12 is related to 86 following a certain logic. Following the same logic, 17 is related to 116. 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) 146
(b) 158
(c) 140
(d) 152

Q55. Which of the following is a distinctive feature found in Harappan cities?

(a) Religious processions
(b) Trade routes
(c) Efficient transportation
(d) Drainage system

Q56. If 'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '−', then what will come in place of the question mark (?) in the following equation?

15 A 5 C 6 B 8 D 1 = ?

(a) 47
(b) 50
(c) 49
(d) 48

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Q57. In which system of thermodynamics, there is no exchange of energy or matter between the system and the surroundings?

(a) Isolated
(b) Open
(c) Partially closed
(d) Closed

Q58. HM 14 is related to EJ 16 in a certain way. In the same way, RW 22 is related to OT 24. To which of the following is SX 27 related, following the same logic?

(a) PV 29
(b) QV 29
(c) PU 29
(d) QU 28

Q59. In a certain code language,

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

A – B means 'A is the brother of B'

A x B means 'A is the wife of B'

A ÷ B means 'A is the father of B'

Based on the above, how is D related to J if 'D ÷ F – G x H + J'?

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

Q60. Which factor has contributed most to the depletion of high-grade mineral ores in India over recent decades?

(a) Limited foreign investment in mining
(b) Overdependence on coal-based industries
(c) Increased export of unprocessed minerals
(d) Selective mining of rich ores

Q61. By selling an article at 4/11 of its actual selling price, Nirbhay incurs a loss of 20%. If he sells it at 71% of its actual selling price, then the profit percentage is

(a) 58.3%
(b) 57.8%
(c) 58.5%
(d) 56.2%

Q62. Vanraj is twice as old as his younger brother, and his other brother is 3 years younger than the younger brother. If the sum of the ages of these three brothers 3 years ago was 20 years, find Vanraj's present age, in years.

(a) 18
(b) 16
(c) 15
(d) 14

Q63. Two numbers A and B are such that the sum of 10% of A and 20% of B is equal to three-fourths the sum of 20% of A and 10% of B. Find the ratio of A to B.

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

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Q64. If 1 is added to each odd digit and 2 is subtracted from each even digit in the number 8674153, what will be the difference between the highest and lowest digits in the number thus formed?

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

Q65. 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 heaters are fans. Some heaters are lights. No heater is a bulb.

Conclusions:

(I) Some fans are lights.

(II) No bulb is a heater.

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

Q66. According to Article 171 of the Constitution of India, the total membership of a State's Legislative Council shall not surpass which of the following proportions of the total members of the State Legislative Assembly?

(a) One-half
(b) Two-thirds
(c) One-fourth
(d) One-third

Q67. Which of the following is the most significant source of nutrient pollution leading to eutrophication in freshwater bodies?

(a) Sewage discharge
(b) Agricultural runoff
(c) Industrial effluents
(d) Urban stormwater

Q68. What are the three aims of economic policy listed in the 1991 document?

(a) Protectionism, Regulation, Public Ownership
(b) Liberalisation, Globalisation, Privatisation
(c) Nationalisation, Deregulation, Decentralisation
(d) Market Liberalisation, Trade Restrictions, State Control

Q69. In 2025, which United Nations body released the Global Methane Status Report?

(a) World Meteorological Organization (WMO)
(b) UN Framework Convention on Climate Change (UNFCCC)
(c) Intergovernmental Panel on Climate Change (IPCC)
(d) UN Environment Programme (UNEP)

Q70. Which of the following Union Territories has a Legislative Assembly and Council of Ministers?

(a) Daman and Diu
(b) Dadra and Nagar Haveli
(c) Puducherry
(d) Andaman and Nicobar Islands

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Q71. Three bells ring at regular intervals. The first bell rings every 120 minutes, the second every 180 minutes, and the third every 240 minutes. If all three bells ring together at 9:00 a.m., at what time will they ring together again?

(a) 6 p.m.
(b) 12 noon
(c) 3 p.m.
(d) 9 p.m.

Q72. If $3(\sin^2\theta + \text{cosec}^2\theta) = 10$, then find the value of cot^6θ + cosec^6θ is

(a) 37
(b) 35
(c) 43
(d) 28

Q73. Girish scored 424 marks in an examination and was 13 marks short of 19% of the maximum marks. In the same examination, his friend scored 529 marks. What is the percentage of marks scored by his friend?

(a) 25%
(b) 22%
(c) 26%
(d) 23%

Q74. Deoxyribonucleic Acid (DNA) and Ribonucleic Acid (RNA) belong to which class of biomolecules?

(a) Protein
(b) Lipid
(c) Nucleic acids
(d) Carbohydrate

Q75. A shopkeeper fixes the marked price of an item 100% above its cost price. What percentage of discount on marked price should be allowed to gain 26%?

(a) 36%
(b) 40%
(c) 39%
(d) 37%

Q76. What should come in place of '?' in the given series?

13 15 18 23 30 ?

(a) 38
(b) 41
(c) 33
(d) 36

Q77. According to the World Population Review Report, 2024, which of the following regions of the world has the highest population density?

(a) South-Central Asia
(b) Central Africa
(c) Western Europe
(d) North America

Q78. Let C1 and C2 be two concentric circles with centre O. Let AB be a chord on C1 the larger circle such that AB touches C2 at the point P. Then which of the following is true?

(i) OP = AP
(ii) AP = PB
(iii) OP = 2PB
(iv) OP = AB

(a) OP = AP
(b) OP = AB

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(c) OP = 2PB
(d) AP = PB

Q79. FDI in Multi Brand Retail Trade is permitted up to what limit?
(a) 49%
(b) 51%
(c) 100%
(d) 74%

Q80. The perimeter of a certain sector of a circle of radius 8 cm is 24 cm. Find the area of the sector.
(a) 38 cm^2
(b) 22 cm^2
(c) 32 cm^2
(d) 29 cm^2

Q81. Lagan starts from Point A and drives 22 km towards South. He then takes a right turn, drives 13 km, turns right and drives 27 km. He then takes a right turn and drives 21 km. He takes a final right turn, drives 5 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) 8 km to the east
(b) 8 km to the west
(c) 7 km to the west
(d) 7 km to the east

Q82. The first residential university of the world, Nalanda, was established under the patronage of which of the following rulers?
(a) Skandagupta
(b) Samudragupta
(c) Chandragupta I
(d) Kumaragupta I

Q83. If $p + 1/m = m + 1/n = n + 1/p$ ($p \neq m \neq n$), then the value of $p \times m \times n$ is:
(a) ± 2
(b) ± 1
(c) 0
(d) ± 1/2

Q84. Where was the Nagpur Book Festival 2025 scheduled to be held?
(a) Mankapur Stadium
(b) Reshimbagh Ground
(c) Yeshwant Stadium
(d) Kasturchand Park

Q85. Which of the following languages is linked with the abhang devotional verses composed by Sant Tukaram in praise of the Divine?
(a) Marathi
(b) Hindi
(c) Gujarati
(d) Kannada

Q86. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

JIM 36 NMQ 24 RQU 12 VUY 0 ?

(a) ZZB -12
(b) ZHQ -13
(c) ZXB -13

(d) ZYC -12

Q87. Refer to the following number and symbol series and answer the question. Counting to be done from left to right only. (All numbers are single-digit numbers only.)

(Left) 3 6 2 £ 4 9 + 7 ~ 1 # % $ 5 ? & = * Ω 8 @ (Right)

How many such symbols are there, each of which is immediately preceded by an odd number but not immediately followed by an even number?

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

Q88. Rs. 6241 is divided among A, B, C, and D in such a way that the shares of A and B, B and C, and C and D are in the ratios of 2 : 3, 4 : 5, and 10 : 3 respectively. The share of A (in Rs.) is:

(a) 1264
(b) 1174
(c) 1384
(d) 1334

Q89. Which of the following wildcards is used for finding the files matching a pattern?

(a) /.[file extension]
(b) -.[file extension]
(c) +.[file extension]
(d) *.[file extension]

Q90. Which process in the contemporary period is responsible for economic integration of countries on a global scale?

(a) Glocalisation
(b) Transnationalisation
(c) Industrialisation
(d) Globalisation

Q91. The surface area of a sphere is 154 cm^2. What is the radius of the sphere? (Useπ = 22/7)

(a) 7 cm
(b) 11 cm
(c) 5 cm
(d) 3.5 cm

Q92. Find the difference between the compound interest, compounded annually, and the simple interest on Rs. 4,000 for 2 years at 6% per annum.

(a) Rs. 15.90
(b) Rs. 14.40
(c) Rs. 16.80
(d) Rs. 13.80

Q93. Which of the following sectors is Shri Uday Kotak connected with, for which he was awarded the Padma Bhushan as announced in the Padma Awards 2026?

(a) Science and Innovation
(b) Public Service
(c) Social Development
(d) Trade and Industry

Q94. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) TU−WX

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(b) EF−HI
(c) BC−EF
(d) QR−SW

Q95. Seven people F, G, H, I, U, V, and W are sitting around a circular table facing the centre of the table. H sits third to the left of W. V sits second to the left of G. U sits third to the right of I. U sits to the immediate right of H. F is not an immediate neighbour of H. How many people sit between F and G when counted from the right of F?

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

Q96. Two runners A and B start simultaneously from the same point on a circular track of length 840 m and run in the clockwise direction. The speed of A is 7 m/s and the speed of B is 5 m/s. At what distance from the starting point in the clockwise direction and after how many complete rounds by A, does A meet with B again the first time?

(a) 210 m after completing 2 rounds
(b) 420 m after completing 3 rounds
(c) 210 m after completing 3 rounds
(d) 420 m after completing 2 rounds

Q97. 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. Five people – Nisha, Ojas, Pallav, Ritu, and Suman – are standing in a straight line facing east.

Who is standing second from the left end?

(I) Pallav is standing immediately to the left of Ritu, and Ritu is not standing at either ends.

(II) Nisha is standing at the extreme left end, and Ojas is standing immediately to the right of Suman.

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

Q98. Along with CO_2, which of the following initiators are essential for light-independent reactions during photosynthesis?

(a) ATP and NADPH
(b) Hydrolases and H_2O
(c) CO_2 and H_2O
(d) CO_2 and glucose

Q99. _____ or ‘Dance of an Enchantress’ is a solo dance, performed primarily by women, in the state of Kerala.

(a) Thiruvathirakali
(b) Kathakali
(c) Bharatanatyam
(d) Mohiniyaattam

Q100. 27% reservation for OBCs in educational institutions was provided through which Constitutional Amendment of the Indian Constitution?

(a) Eighty-Sixth Amendment
(b) Ninety-Fourth Amendment
(c) Ninety-Seventh Amendment
(d) Ninety-Third Amendment

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ANSWER KEY

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

SOLUTIONS

Q1. Answer: (c) Switch between open tabs

The correct answer is Switch between open tabs.

Key Points

• The keyboard shortcut Ctrl + Tab is primarily used to switch between open tabs within a single application window. It is a standard graphical user interface (GUI) navigation command found in most modern software that supports a tabbed interface.

• In web browsers such as Google Chrome, Mozilla Firefox, Microsoft Edge, and Safari, pressing Ctrl + Tab moves the focus to the next tab to the right. This allows users to cycle through multiple webpages quickly without using a mouse.

• For reverse navigation, users can press Ctrl + Shift + Tab, which allows them to move to the previous tab on the left. This function is essential for high-productivity environments where speed and multitasking are required.

• Beyond browsers, this shortcut is widely used in Integrated Development Environments (IDEs) like Visual Studio Code, PyCharm, and Sublime Text, as well as text editors like Notepad++, to navigate between various open source code files.

• The command is distinct from Alt + Tab, which is used at the Operating System level (like Windows or Linux) to switch between different active windows or applications rather than internal tabs.

Additional Information

• Other Tab Management Shortcuts:

• Ctrl + T: This shortcut is used to open a new tab in almost all web browsers and file explorers that support tabs. It is a frequently used feature for starting a new search or task.

• Ctrl + W or Ctrl + F4: These are used to close the current tab. If only one tab is open, Ctrl + W may close the entire application window depending on the software's design.

• Ctrl + Shift + T: This powerful command is used to reopen the last closed tab. It is extremely useful if a user accidentally closes a webpage and needs to retrieve it instantly.

• Navigation by Number:

• In browsers, Ctrl + 1 through Ctrl + 8 allows users to jump directly to a specific tab based on its position (e.g., Ctrl + 1 goes to the first tab).

• Ctrl + 9 typically switches to the last tab in the row, regardless of how many tabs are currently open.

• Platform Variations:

• On macOS, the Command (Cmd) key is often used instead of Control. Therefore, Cmd + Option + Right Arrow or Cmd + Shift +] are common alternatives to Ctrl + Tab, though Control + Tab also works in many Mac applications.

Important Points

• Application Scope: While Ctrl + Tab is most famous for browsers, it also functions in Windows File Explorer (in newer versions like Windows 11), Adobe Photoshop (to switch between open image projects), and Microsoft Excel (to switch between different workbooks).

• Accessibility: Keyboard shortcuts like Ctrl + Tab are vital for accessibility, enabling users with motor impairments who cannot use a pointing device (like a mouse or trackpad) to navigate complex interfaces efficiently.

• Efficiency and Workflow: Utilizing these hotkeys reduces the time taken to move between tasks, which is a key component of digital literacy and professional computing. Reports on workplace productivity often highlight the use of shortcuts as a major factor

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in technical proficiency.

Q2. Answer: (b) Accuracy

The correct answer is Accuracy.

Key Points

• The term GIGO stands for Garbage In, Garbage Out. It is a fundamental concept in computer science and data processing which states that the quality of the output is determined by the quality of the input.

• This concept is most closely related to the Accuracy characteristic of a computer. While computers are capable of performing complex calculations with 100% accuracy, they lack the discretion to identify if the input data provided by the user is wrong.

• If a computer is provided with incorrect data or faulty instructions (garbage in), it will process that data logically and produce an erroneous result (garbage out). Hence, the statement regarding Accuracy is correct.

• Storage Capacity refers to the amount of data a computer system can store in its primary or secondary memory (like Hard Disks, SSD, or RAM). It does not influence the logical correctness of the results based on the input quality. Hence, this statement is incorrect.

• Diligence is the characteristic of a computer that allows it to perform repetitive tasks for a long duration without getting tired, bored, or losing concentration. While it ensures consistency, it does not prevent GIGO if the starting data is wrong. Hence, this statement is incorrect.

• No Heuristics (or No IQ) means that a computer cannot think, learn, or reason like a human being. It follows algorithms strictly. While this is the reason why GIGO occurs (the computer cannot "think" to fix the error), the term GIGO itself is used to define the reliability and Accuracy of the resulting information. Hence, this statement is incorrect.

Additional Information

• General Characteristics of Computers:

• Speed: Computers can process millions of instructions per second (MIPS). Operations that might take a human years can be completed in microseconds or nanoseconds.

• Versatility: A computer is capable of performing completely different types of work. One moment it can be used for scientific calculations, and the next for graphic designing or playing music.

• Reliability: Electronic components in modern computers have a low failure rate, making them highly dependable for long-term data management.

• Automation: Once a program is loaded into the memory, the CPU executes the instructions without requiring human intervention until the task is complete.

• Historical Context of GIGO:

• The term is believed to have been coined by George Fuechsel, an IBM programmer and instructor, around the year 1957.

• It was used as a way to explain to early computer users that the machine could not magically turn wrong numbers into right answers.

Important Points

• Impact in Modern Computing: In the era of Big Data and Artificial Intelligence, GIGO is more relevant than ever. If Machine Learning models are trained on biased or poor-quality data, the predictions (output) will also be biased or incorrect.

• Data Integrity: To combat GIGO, organizations use Data Validation techniques to ensure that the numerical values and formats entered into the system are sensible and accurate before processing begins.

• Numerical Value Accuracy: Most computers today work with 64-bit or 128-bit floating-point accuracy, ensuring that mathematical errors are virtually non-existent unless caused by faulty logic in the source code.

Q3. Answer: (a) Possibility of increased inflation

The correct answer is Possibility of increased inflation.

Key Points

• Government Expenditure refers to the money spent by the public sector on the acquisition of goods and provision of services such as education, healthcare, and infrastructure. While it aims to stimulate economic growth, an excessive increase can lead to demand-pull inflation because the total demand for goods and services exceeds the economy's productive capacity. Hence, statement 1 is correct.

• Increasing expenditure often leads to a rise in the Fiscal Deficit, which is the difference between the government's total expenditure and its total receipts (excluding borrowing). In the Indian economy, a high fiscal deficit can lead to a situation where the Reserve Bank of India (RBI) might need to print more money or increase the money supply, further fueling inflation.

• The Possibility of increased inflation acts as a major limitation because high inflation erodes the purchasing power of the citizens and can lead to macroeconomic instability. This is why the RBI maintains an inflation target of 4% with a tolerance band of +/- 2% under the Monetary Policy Framework.

• Creating stagflation tendencies is generally not a direct limitation of increasing expenditure intended for growth, as stagflation involves a specific combination of stagnant growth and high inflation, whereas government spending is specifically designed to

prevent stagnation. Hence, statement 2 is incorrect.

• Drastically increasing foreign trade is usually a goal or a result of economic policies rather than a limiting factor for government expenditure. Hence, statement 3 is incorrect.

• Drastically increasing social capital development is a positive outcome of government spending in sectors like education and health, and is therefore an objective rather than a limitation. Hence, statement 4 is incorrect.

Additional Information

• Fiscal Responsibility and Budget Management (FRBM) Act, 2003: This act was enacted by the Parliament of India to institutionalize financial discipline, reduce India's fiscal deficit, and improve public funds management. It sets specific targets for the government to limit its debt and deficit levels.

• Crowding Out Effect: This occurs when high government borrowing to fund expenditure leads to an increase in interest rates. High interest rates make it more expensive for the private sector to borrow, thereby "crowding out" private investment, which can potentially slow down long-term economic growth.

• Types of Expenditure:

• Revenue Expenditure: Money spent on the day-to-day running of government departments and various services (e.g., salaries, subsidies, interest payments).

• Capital Expenditure: Money spent on creating assets or reducing liabilities (e.g., building highways, dams, or repayment of loans). Capital expenditure is generally preferred for stimulating growth as it has a higher multiplier effect.

• Multiplier Effect: This is the factor by which GDP increases following an increase in government spending. In India, capital expenditure typically has a multiplier of around 2.45, meaning every 1 Rupee spent can potentially create 2.45 Rupees of economic output.

Important Points

• Inflation Targeting: The Reserve Bank of India (RBI), through the Monetary Policy Committee (MPC), uses the Consumer Price Index (CPI) as the primary tool to measure inflation and adjust Repo Rates accordingly to balance growth and price stability.

• Deficit Financing: When the government spends more than it earns, it may resort to borrowing from the market or the RBI. Excessive deficit financing is the primary driver of inflationary pressures in a developing economy like India.

• External Sector Balance: High government spending can also lead to an increase in the Current Account Deficit (CAD) if the increased demand is met through higher imports, which can weaken the Indian Rupee (INR) against the US Dollar.

Q4. Answer: (b) 720

Shortcut Trick

Opposite direction => speeds add

Relative speed = 90 + 70 = 160 km/hr

Convert: 160 × 5/18 = 400/9 m/s

Total distance = speed × time = (400/9) × 27 = 1200 m

Other train length = 1200 − 480 = 720 m

Therefore Answer = 720

Alternate Method

Given:

=> Speed1 = 90 km/hr, Speed2 = 70 km/hr

=> Length1 = 480 m, Time = 27 sec

Formula:

=> Relative Speed = Sum of speeds (opposite direction)

=> Distance = Relative Speed × Time

Calculations:

=> Relative Speed = 90 + 70 = 160 km/hr

=> Convert to m/s = 160 × 5/18 = 400/9 m/s

=> Total distance covered = (400/9) × 27 = 1200 m

=> Sum of lengths = 1200 m

=> Length of other train = 1200 − 480 = 720 m

Final Answer: 720 m

Additional Information

Relative Speed (Opposite Direction): Sum of speeds = v1 + v2

Relative Speed (Same Direction): Difference of speeds = v1 − v2

Train Crossing Concept: Total distance = Sum of lengths when crossing each other

Conversion Trick: km/hr to m/s = × 5/18

Q5. Answer: (b) -2

Shortcut Trick

=> Solve second equation: $x^2 + 2x - 3 = 0$

=> $(x + 3)(x - 1) = 0$ => roots = −3, 1

=> Put x = −3 in first: $(-3)^2 + (-3) + p = 0$ => $9 - 3 + p = 0$ => $p = -6$

=> Put x = 1 in first: $1 + 1 + p = 0$ => $p = -2$

Therefore Answer = −2

Alternate Method

Given:

=> $x^2 + x + p = 0$

=> $x^2 + 2x - 3 = 0$

Formula:

=> If α is common root, it satisfies both equations

Calculations:

=> Solve $x^2 + 2x - 3 = 0$

=> $x = [-2 \pm \sqrt{(4 + 12)}] / 2 = [-2 \pm \sqrt{16}]/2$

=> $x = (-2 \pm 4)/2$ => x = 1 or −3

=> Case 1: x = 1

=> $1 + 1 + p = 0$ => $p = -2$

=> Case 2: x = −3

=> $9 - 3 + p = 0$ => $p = -6$

Therefore Final Answer: −2

Additional Information

Common Root Concept: A common root must satisfy both equations simultaneously.

Quadratic Roots: For $ax^2 + bx + c = 0$, roots = $[-b \pm \sqrt{(b^2 - 4ac)}] / 2a$

Factorization Trick: Use splitting middle term for quick root finding.

Substitution Method: Substitute root into another equation to find unknown parameter.

Q6. Answer: (a) 100

The logic followed here is:

Thus, the missing term in the series is 100.

Hence, the correct answer is 100.

Q7. Answer: (a) 11/3

Shortcut Trick

Numbers = 1, 2, 3, 4, 5 and weights same

Weighted mean = $\Sigma x^2 / \Sigma x$

$\Sigma x = 15$, $\Sigma x^2 = 55$

Mean = 55 / 15 = 11 / 3

Therefore Answer = 11 / 3

Alternate Method

Given:

=> Numbers: 1, 2, 3, 4, 5

=> Weights: 1, 2, 3, 4, 5

Formula:

=> Weighted Mean = $\Sigma(wx) / \Sigma w$

Calculations:

=> $\Sigma(wx) = 1\times1 + 2\times2 + 3\times3 + 4\times4 + 5\times5$

=> = 1 + 4 + 9 + 16 + 25 = 55

=> $\Sigma w = 1 + 2 + 3 + 4 + 5 = 15$

=> Weighted Mean = 55 / 15 = 11 / 3

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Final Answer: 11 / 3

Additional Information

Weighted Mean Formula: Mean = Σ(wx) / Σw

Special Case: If weights = values => use $\Sigma x^2 / \Sigma x$

Arithmetic Mean: Mean = Σx / n

Use Case: Weighted mean is used when importance varies

Q8. Answer: (a) Sopana Sangeetham

The correct answer is Sopana Sangeetham.

Key Points

• Sopana Sangeetham is a distinct form of classical music that originated in the temples of Kerala. It is fundamentally a devotional music style, performed as an accompaniment to temple rituals.

• The term is derived from the Malayalam/Sanskrit word Sopanam, which refers to the sacred steps leading to the Sanctum Sanctorum (Garbhagriha) of a shrine. The singer typically stands by these steps while performing.

• This music form is characterized by its rhythmic structure and a steady, slow tempo. It avoids the complex ornamentations found in other classical styles, focusing instead on the Bhava (emotional expression) and Bhakti (devotion).

• It is traditionally performed by the Marar and Poduval communities, who are the hereditary Ambalavasi (temple-dwelling) castes of Kerala responsible for temple music.

• The primary percussion instrument used for accompaniment is the Edakka, a small, hourglass-shaped pressure drum. The singer beats the Edakka while singing Ashtapadis (from Jayadeva's Gita Govinda) or other devotional hymns.

Additional Information

• Dhrupad:

• It is the oldest surviving genre of Hindustani classical music, tracing its roots to the Sama Veda.

• It reached its zenith in the 16th century in the court of Emperor Akbar, with legendary singers like Tansen.

• It is known for its austere, meditative, and spiritual nature, emphasizing the purity of the Raga and Svara without much lyrical embellishment.

• Thumri:

• This is a semi-classical Indian music form that originated in the 19th century, particularly in the courts of Lucknow and Benares under the patronage of Wajid Ali Shah.

• The themes are usually romantic or devotional, often describing the love of Lord Krishna and the Gopis.

• It is characterized by its expressiveness and lyrical beauty, allowing the singer greater freedom to convey emotions.

• Khayal:

• The word Khayal means "imagination" or "thought" in Persian/Arabic. It is the dominant genre of Hindustani classical music today.

• It evolved as a more flexible and decorative alternative to the rigid Dhrupad style during the 18th century.

• It involves extensive use of Alaps, Taans, and Sargams, providing the performer vast scope for improvisation.

Important Points

• Ragas in Sopana Sangeetham: While it shares some similarities with Carnatic music, it uses unique Ragas like Indalam, Kanakkurinchi, Puranira, and Samantamalakari, which are rarely heard in other systems.

• Ritualistic Timing: Performances are strictly tied to the Temple Calendar and daily rituals such as Uchapuja (noon worship) and Deeparadhana (evening lamp worship).

• Cultural Impact: Sopana Sangeetham has deeply influenced other Kerala art forms, including Kathakali and Krishnanattam, providing the vocal base for these dance dramas.

• Notable Figures: Njeralathu Rama Poduval is one of the most famous exponents who brought this sacred music from the temple steps to the public stage in the 20th century.

Q9. Answer: (b) Battle of Colachel

The correct answer is Battle of Colachel.

Key Points

• The Battle of Colachel was fought on August 10, 1741, between the Kingdom of Travancore and the Dutch East India Company (Vereenigde Oostindische Compagnie - VOC).

• The Indian ruler who led the Travancore forces to victory was King Marthanda Varma. This victory is historically significant as it was the first time an Asian power decisively defeated a European naval force in a major battle.

• The location of the battle was Colachel, a coastal town currently situated in the Kanyakumari district of the state of Tamil Nadu, India.

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• The primary cause of the conflict was the Dutch attempt to maintain their monopoly over the black pepper trade in the Malabar Coast, which was being challenged by Marthanda Varma's expansionist policies and trade reforms.

• As a result of the defeat, the Dutch influence in India began to decline rapidly, and they eventually lost control over the profitable spice trade to the rising British East India Company.

Additional Information

• Carnatic Wars: These were a series of military conflicts in the middle of the 18th century (1746 to 1763) primarily between the French East India Company and the British East India Company for control over the coastal Carnatic region of India.

• Battle of Plassey: This battle took place on June 23, 1757. It was a decisive victory for the British East India Company, led by Robert Clive, over the Nawab of Bengal, Siraj-ud-Daulah, and his French allies. This established British rule in Bengal.

• Battle of Buxar: Fought on October 22, 1764, between the forces of the British East India Company, led by Hector Munro, and the combined armies of Mir Qasim (Nawab of Bengal), Shuja-ud-Daula (Nawab of Awadh), and the Mughal Emperor Shah Alam II.

• Marthanda Varma: Known as the "Maker of Modern Travancore," he ruled from 1729 to 1758. He is famous for the Trippadidanam ceremony in 1750, where he dedicated his entire kingdom to the deity Sri Padmanabha.

• Eustachius De Lannoy: A Dutch naval commander captured during the Battle of Colachel. He later served Marthanda Varma and helped modernize the Travancore army by introducing European-style artillery and military tactics.

Important Points

• The Battle of Colachel ended the Dutch dream of establishing a colonial empire in India. The Dutch were forced to sign a peace treaty in 1753, known as the Treaty of Mavelikkara, where they agreed not to interfere with Travancore's affairs.

• The Travancore army's success was largely attributed to their superior local knowledge and the strategic use of monsoon winds which hindered the Dutch naval maneuvers.

• The victory is commemorated by a Victory Pillar (Colachel Pillar) erected at Colachel, which stands as a historical monument marking the defeat of the European power.

• By the late 18th century, the Dutch had largely withdrawn from their Indian possessions, focusing instead on their territories in present-day Indonesia (the Dutch East Indies).

Q10. Answer: (c) F

The logic followed here is:

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

Only one person sits between G and C when counted from the left of C.

E sits third to the right of A.

F sits third to the left of D.

E sits to the immediate right of F.

B is not an immediate neighbour of F.

Now, third to the right of G is: F

Hence, the correct answer is Option 3.

Q11. Answer: (b) Article 39

The correct answer is Article 39.

Key Points

• Article 39 of the Constitution of India contains certain principles of policy to be followed by the State, categorized under the Directive Principles of State Policy (DPSP) in Part IV.

• Specifically, Article 39(d) directs the State to ensure that there is equal pay for equal work for both men and women. This principle aims to eliminate gender-based discrimination in the workforce regarding remuneration.

• It is classified as a Socialist Principle, reflecting the ideology of socialism and the goal of establishing a welfare state in India.

• The Supreme Court of India has recognized this principle as a constitutional goal. In the landmark case of Randhir Singh vs Union of India (1982), the court held that while "equal pay for equal work" is not a fundamental right, it is certainly a constitutional objective under Articles 14, 16, and 39(d).

• This article serves as a mandate for the Parliament to enact laws that protect the interests of workers and ensure economic justice.

Additional Information

• Article 41: This article focuses on the Right to work, to education, and to public assistance in certain cases. It directs the State to make effective provision for securing these rights in cases of unemployment, old age, sickness, and disablement.

• Article 43: This provision deals with living wages, etc., for workers. It states that the State shall endeavor to secure, by suitable legislation or economic organization, to all workers a living wage, conditions of work ensuring a decent standard of life, and full enjoyment of leisure and social and cultural opportunities. It also emphasizes the promotion of cottage industries on an individual or co-operative basis in rural areas.

• Article 44: This article relates to the Uniform Civil Code for the citizens. It mandates that the State shall endeavor to secure for the citizens a uniform civil code throughout the territory of India, aiming to replace personal laws based on religion with a common set of laws governing every citizen.

• Article 39A: Inserted by the 42nd Amendment Act, 1976, it provides for Equal Justice and Free Legal Aid to ensure that opportunities for securing justice are not denied to any citizen by reason of economic or other disabilities.

Important Points

• Legislative Impact: To give effect to the constitutional provision of Article 39(d), the Indian Parliament enacted the Equal Remuneration Act in 1976. This act provides for the payment of equal remuneration to men and women workers and prevents discrimination on the ground of sex against women in the matter of employment.

• Nature of DPSP: According to Article 37, the Directive Principles are non-justiciable, meaning they are not enforceable by any court. However, they are fundamental in the governance of the country, and it is the duty of the State to apply these principles in making laws.

• Source of Inspiration: The concept of Directive Principles of State Policy in the Indian Constitution was borrowed from the Irish Constitution (specifically the Constitution of Ireland, 1937).

• Constitutional Framework: Part IV of the Constitution (Articles 36 to 51) covers the DPSP. These principles are often described as the "Conscience of the Constitution" along with Fundamental Rights.

Q12. Answer: (c) IKL 14

The logic followed here is:

So, 'IKL 14' will replace the question mark in the given series.

Hence, the correct answer is "Option 3".

Q13. Answer: (d) 140%

Shortcut Trick

Cost per item = 390 ÷ 12 = 32.5

Selling price per item = 78

Profit per item = 78 − 32.5 = 45.5

Profit % = (45.5 / 32.5) × 100 = 140%

Therefore Answer = 140%

Alternate Method

Given:

=> Number of dozens = 19

=> Cost price per dozen = 390

=> Selling price per article = 78

Formula:

=> Profit % = (Profit / Total Cost) × 100

Calculations:

=> Total articles = 19 × 12 = 228

=> Total Cost = 19 × 390 = 7410

=> Total Selling Price = 228 × 78 = 17784

=> Profit = 17784 − 7410 = 10374

=> Profit % = (10374 / 7410) × 100 = 140%

Final Answer: 140%

Additional Information

Per Unit Method: Convert cost per dozen into cost per item for faster calculation

Profit Formula: Profit = SP − CP

Profit Percentage: (Profit / CP) × 100

Dozen Conversion: 1 dozen = 12 items

Q14. Answer: (a) Hydrogen ion (H+)

The correct answer is Hydrogen ion (H+).

Key Points

• An acid is a substance that produces Hydrogen ions (H+) when dissolved in water. According to the Arrhenius theory of acids and bases, proposed by Svante Arrhenius in 1887, the concentration of these ions determines the acidity of the solution. Hence, the first option is correct.

• A Hydrogen ion (H+) is essentially a proton. In an aqueous solution, these ions do not exist in isolation; they rapidly combine with water molecules (H2O) to form Hydronium ions (H3O+). The presence of these ions is what gives acids their characteristic properties, such as a sour taste and the ability to conduct electricity.

• The Chloride ion (Cl-) is a negatively charged anion. While it is a component of common acids like Hydrochloric acid (HCl), the ion itself does not contribute to the acidic nature; it acts as a conjugate base. Hence, the second statement is incorrect.

• The Hydroxide ion (OH-) is the species responsible for the basic or alkaline nature of a solution. According to chemical principles, a solution is considered basic if it has a higher concentration of OH- ions than H+ ions. Hence, the third statement is incorrect.

• The Sodium ion (Na+) is a metal cation found in salts like Sodium Chloride (NaCl). It is a neutral ion and does not affect the pH level or the acidic/basic nature of a solution directly. Hence, the fourth statement is incorrect.

Additional Information

• The pH Scale:

• The pH scale is used to measure the acidity or alkalinity of a solution, ranging from 0 to 14. It was introduced by S.P.L. Sørensen in 1909.

• A solution with a pH value less than 7 is acidic, indicating a high concentration of Hydrogen ions.

• A pH of 7 is considered neutral (e.g., pure water), and a pH greater than 7 is basic.

• Strength of Acids:

• Strong acids, such as Sulphuric acid (H2SO4) and Nitric acid (HNO3), undergo complete dissociation in water to release a maximum number of H+ ions.

• Weak acids, like Acetic acid (CH3COOH) found in vinegar, only partially dissociate, resulting in a lower concentration of Hydrogen ions.

• Acid-Base Indicators:

• Indicators are substances that change color depending on the H+ ion concentration.

• Litmus paper is a common indicator; blue litmus turns red in the presence of an acid, while red litmus remains unchanged.

• Other examples include Phenolphthalein, which remains colorless in acidic solutions, and Methyl orange, which turns red/pink.

Important Points

• Brønsted-Lowry Theory (1923): This theory defines an acid as a proton (H+) donor and a base as a proton acceptor. This expanded the definition beyond aqueous solutions.

• Lewis Theory: Gilbert N. Lewis proposed a broader definition where an acid is an electron-pair acceptor and a base is an electron-pair donor.

• Corrosiveness: High concentrations of Hydrogen ions make acids highly corrosive, allowing them to react with metals to produce Hydrogen gas (H2).

• Common Applications: Acids are used in car batteries (Lead-acid batteries), food preservation, and industrial cleaning.

Q15. Answer: (d) 6

The logic followed here is:

Given:

TOUR → 2374

RIOT → 7634

Here, I = 6

Hence, the correct answer is "Option 4".

Q16. Answer: (b) 4

Given: Seven boxes A, B, C, D, E, F and G are kept one over the other.

Only two boxes are kept below B.

Only one box is kept above G.

Only one box is kept between G and A.

C is kept immediately above F.

E is kept at some place below D.

Position	Box
7	D
6	G
5	E

4	A
3	B
2	C
1	F

Now, boxes below E: 4 boxes

Hence, the correct answer is Option 2.

Q17. Answer: (b) Volatile memory type

The correct answer is Volatile memory type.

Key Points

• Volatile memory is a type of computer memory that requires a continuous power supply to maintain the stored information. If the power is interrupted or turned off, the data stored in this memory is immediately lost. Hence, statement 2 is correct.

• The most prominent example of volatile memory is RAM (Random Access Memory). It is used by the Central Processing Unit (CPU) to store temporary data that is being actively used or processed by the operating system and applications.

• Non-volatile memory, on the other hand, is designed to retain stored data even after the power source is removed. This includes technologies like ROM, flash memory, and hard drives. Hence, statement 4 is incorrect.

• Magnetic memory typically refers to storage media like Hard Disk Drives (HDDs) or magnetic tapes, which use magnetic polarity to store bits. These are generally non-volatile because they do not lose data when power is cut. Hence, statement 1 is incorrect.

• Optical memory refers to storage media such as CDs, DVDs, and Blu-ray discs that use laser light to read and write data. These are permanent or semi-permanent non-volatile storage forms. Hence, statement 3 is incorrect.

Additional Information

• RAM (Random Access Memory): It is the primary volatile memory in a computer. It is divided into two main types: SRAM (Static RAM) and DRAM (Dynamic RAM). SRAM is faster and used for CPU Cache, while DRAM is more common for main system memory.

• ROM (Read-Only Memory): This is non-volatile memory that contains the BIOS (Basic Input/Output System) or Firmware. It tells the computer how to load the operating system during the boot-up process.

• Cache Memory: This is a high-speed volatile memory placed between the RAM and the CPU. It stores frequently accessed data to reduce the latency of processing tasks.

• Secondary Storage: Unlike volatile primary memory, secondary storage like SSD (Solid State Drives) and HDD provide permanent storage. An SSD uses NAND flash memory, which is non-volatile and much faster than traditional magnetic disks.

• History of Memory: The first forms of electronic volatile memory emerged in the 1940s with the Williams Tube, while modern DDR (Double Data Rate) SDRAM has undergone multiple generations, including DDR4 and DDR5, to increase bandwidth and speed.

Important Points

• Data Persistence: The defining feature of volatile memory is its lack of persistence. In the event of a system crash or power surge, any unsaved work residing in the RAM is purged.

• Access Speed: Volatile memory is significantly faster than non-volatile storage. While a Hard Drive may take milliseconds to access data, RAM takes only nanoseconds, making it essential for real-time computing.

• Capacity vs. Cost: Volatile memory is generally more expensive per gigabyte compared to non-volatile storage. Consequently, computers typically have much less RAM (e.g., 8GB to 32GB) than HDD/SSD capacity (e.g., 512GB to 2TB).

• Applications: Volatile memory is used in almost all electronic devices, including smartphones, laptops, and embedded systems, to manage runtime data and facilitate multitasking.

Q18. Answer: (b) North Kivu Province

The correct answer is North Kivu Province.

Key Points

• The Democratic Republic of the Congo (DRC) reported a new case of Ebola Virus Disease (EVD) in 2025 in the North Kivu Province. This region has historically been an epicenter for multiple outbreaks, including the massive tenth outbreak that lasted from 2018 to 2020. Hence, statement 2 is correct.

• The outbreak was confirmed to be caused by the Zaire Ebola virus strain, which is known for its high fatality rate, often ranging from 60% to 90% if left untreated. This strain is the target of the rVSV-ZEBOV (Ervebo) vaccine.

• North Kivu Province is located in the eastern part of the DRC, bordering Uganda and Rwanda. Its geographical location and high population mobility contribute to the rapid spread of infectious diseases across borders.

• While Ituri Province is adjacent to North Kivu and has frequently been affected by the same outbreaks, the primary report for the

2025 incident specifically identified North Kivu as the origin. Hence, statement 1 is incorrect.

• Kinshasa Province, being the capital region, maintains rigorous surveillance but is not typically the starting point for Zaire ebolavirus spillover events, which usually occur in forested or rural areas. Hence, statement 3 is incorrect.

• Kasai Province has experienced outbreaks in the past, such as the 2007 Luebo outbreak, but it was not the site of the 2025 report mentioned. Hence, statement 4 is incorrect.

Additional Information

• Ebola Virus Disease (EVD):

• It is a viral hemorrhagic fever caused by viruses within the genus Ebolavirus. There are six identified species, with the Zaire, Sudan, and Bundibugyo species being associated with large outbreaks in Africa.

• The virus is transmitted to people from wild animals (such as fruit bats, porcupines, and non-human primates) and then spreads in the human population through direct contact with the blood, secretions, organs, or other bodily fluids of infected people.

• Geographical Context of North Kivu:

• North Kivu is one of the most volatile provinces in the DRC due to long-standing armed conflict. This insecurity often hampers World Health Organization (WHO) and Ministry of Health response teams from reaching affected communities.

• Major cities in this province include Goma, Butembo, and Beni, all of which have been critical hubs for epidemiological surveillance and treatment centers.

• Medical Interventions:

• The Ervebo vaccine, manufactured by Merck, is a single-dose vaccine that has been prequalified by the WHO to protect against the Zaire ebolavirus.

• Monoclonal antibody treatments like Ebanga (mAb114) and Inmazeb (REGN-EB3) have significantly improved survival rates if administered early in the course of the infection.

• Global Health Security:

• The DRC has managed over 15 outbreaks since the virus was first discovered near the Ebola River in 1976. The National Institute of Biomedical Research (INRB) in Kinshasa, led by Dr. Jean-Jacques Muyembe, is a global leader in Ebola research.

Important Points

• Zaire Ebola Virus: This specific species is the most virulent and was responsible for the 2014-2016 West Africa outbreak, which resulted in over 11,000 deaths across Guinea, Liberia, and Sierra Leone.

• Ring Vaccination: This strategy involves vaccinating all people who have come into contact with an infected person, as well as the contacts of those contacts, effectively creating a protective buffer to stop the virus from spreading.

• Zoonotic Spillover: Most outbreaks begin with a single person becoming infected through contact with an animal host. Identifying the animal reservoir (currently believed to be pteropodid fruit bats) is a major focus of One Health initiatives.

Q19. Answer: (a) 5

The logic followed here is:

Given: (Left) % V € L X @ £ & Y M P # N % € Z % P * © M $ (Right)

Now, we need letters which are immediately preceded by a symbol and also immediately followed by a symbol.

So, Needed pattern is: Symbol - Letter - Symbol

(Left) % V € L X @ £ & Y M P # N % € Z % P * © M $ (Right)

Now, Total = 5 letters

Hence, the correct answer is Option 1.

Q20. Answer: (d) 1

Shortcut Trick

=> Sum of known digits = 5 + 4 + 5 + 7 + 2 + 0 = 23

=> For divisibility by 3: (23 + A) must be multiple of 3

=> 23 leaves remainder 2 when divided by 3

=> So A must give remainder 1 to make total divisible

=> Smallest such digit = 1

Therefore Answer = 1

Alternate Method

Given: Number = 54572A0

Formula: A number is divisible by 3 if sum of digits is divisible by 3

Calculations:

=> Sum = 5 + 4 + 5 + 7 + 2 + A + 0

=> Sum = 23 + A

=> For divisibility: (23 + A) ÷ 3 should be integer

=> Try smallest A:

=> A = 0 → 23 not divisible

=> A = 1 → 24 ÷ 3 = 8

Final Answer: 1

Additional Information

Divisibility Rule of 3: A number is divisible by 3 if sum of its digits is divisible by 3.

Divisibility Rule of 9: Sum of digits must be divisible by 9.

Digit Substitution Trick: Replace unknown digit with smallest value satisfying condition to get minimum value.

Remainder Concept: If total leaves remainder r, required digit must cancel it to make remainder 0.

Q21. Answer: (d) Dadasaheb Phalke Award

The correct answer is Dadasaheb Phalke Award.

Key Points

• The Dadasaheb Phalke Award is recognized as the highest honour in Indian cinema. It is presented annually at the National Film Awards ceremony by the Directorate of Film Festivals, an organization set up by the Ministry of Information and Broadcasting.

• The award is conferred upon individuals for their "outstanding contribution to the growth and development of Indian cinema." In September 2025, the legendary actor Mohanlal was selected for this prestigious recognition for his prolific career spanning over four decades.

• The award comprises a Swarna Kamal (Golden Lotus) medallion, a shawl, and a cash prize which was recently increased to Rs. 15 lakh.

• It was first introduced by the Government of India in 1969 to commemorate the contribution of Dhadiraj Govind Phalke, who is regarded as the Father of Indian Cinema for directing India's first full-length feature film, Raja Harishchandra, in 1913.

Additional Information

• Padma Bhushan:

• It is the third-highest civilian award in the Republic of India, preceded by the Bharat Ratna and the Padma Vibhushan.

• While many film personalities receive it, it is not exclusive to cinema and is awarded for distinguished service of a high order in any field. Mohanlal received the Padma Bhushan in the year 2019.

• National Award for Best Actor:

• This is a specific category within the National Film Awards presented for a particular performance in a film released in a calendar year.

• Mohanlal has won the National Film Award for Best Actor twice for his roles in Bharatham (1991) and Vanaprastham (1999).

• Filmfare Lifetime Achievement Award:

• This is a private award presented by The Times Group as part of the Filmfare Awards.

• While prestigious, it is not a government-conferred "highest honour" like the Dadasaheb Phalke Award.

• First Recipient: The first recipient of the Dadasaheb Phalke Award was the "First Lady of Indian Cinema," Devika Rani, who was honored at the 17th National Film Awards.

Important Points

• Mohanlal Viswanathan, popularly known as Mohanlal, was born on 21 May 1960 in Kerala. He is primarily known for his work in Malayalam cinema, though he has acted in Tamil, Telugu, Kannada, and Hindi films.

• He has won a total of five National Film Awards: two for Best Actor, one for Special Jury Mention (Kireedam), one as a producer for Best Feature Film (Vanaprastham), and a Special Jury Award in 2016 (Janatha Garage, Pulimurugan, and Munthirivallikal Thalirkkumbol).

• The Ministry of Information and Broadcasting recently revamped the prize money for the National Film Awards, raising the Dadasaheb Phalke Award's cash component from Rs. 10 lakh to Rs. 15 lakh starting from the 70th National Film Awards.

• Recipients of this award are selected by a committee consisting of eminent personalities from the Indian film industry. Notable past winners include Satyajit Ray, Raj Kapoor, Lata Mangeshkar, Amitabh Bachchan, and Mithun Chakraborty (announced for 2022).

Q22. Answer: (c) 151

The logic followed here is:

Logic: Second number = First number × 6 + 1

So,

23 × 6 + 1 = 138 + 1 = 139 (2nd number)

28 × 6 + 1 = 168 + 1 = 169 (2nd number)

Similarly,

25 × 6 + 1 = 150 + 1 = 151 (2nd number)

Hence, the correct answer is Option 3.

Q23. Answer: (c) Singapore

The correct answer is Option 3 – Singapore.

Key Points

• Space Summit 2026 was a specially curated two-day elite conference held on 2–3 February 2026.

• The summit was held in Singapore, bringing together prominent stakeholders from the global space ecosystem.

• The event focused on important developments and opportunities in the space sector, including space technology, innovation, investment and international collaboration.

• Singapore has been strengthening its role as a hub for space technology, satellite applications and the broader space economy in Southeast Asia.

• Hence, the correct answer is Option 3 – Singapore.

Additional Information

• Event: Space Summit 2026

• Date: 2–3 February 2026

• Duration: Two days

• Country: Singapore

• Sector: Space technology and the global space economy

• The summit provided a platform for discussions involving space industry leaders, policymakers, investors, innovators and other stakeholders.

Q24. Answer: (a) 1

Shortcut Trick

=> Net work per hour = 1/2 + 1/57 − 1/57

=> 1/57 cancels out

=> Net = 1/2

=> Time to fill full tank = 2 hours

=> Half tank → 1 hour

Therefore Answer = 1 hour

Alternate Method

Given:

Tap A fills in 2 hrs, Tap B fills in 57 hrs, Tap C empties in 57 hrs

Formula: Efficiency = Work / Time

Assume Total Work = LCM of (2, 57) = 114 units

Tap	Time	Work per hour
A	2 hrs	114 ÷ 2 = 57
B	57 hrs	114 ÷ 57 = 2
C (empty)	57 hrs	−114 ÷ 57 = −2

Calculations:

=> Net work per hour = 57 + 2 − 2 = 57 units

=> Time for full tank = 114 ÷ 57 = 2 hours

=> Time for half tank = 2 ÷ 2 = 1 hour

Final Answer: 1 hour

Additional Information

LCM Method: Assume total work as LCM of times to simplify calculations into integers.

Net Efficiency: Filling pipes add, emptying pipes subtract.

Shortcut Insight: Equal fill and empty rates cancel each other.

Work-Time Relation: Time = Total Work ÷ Net Efficiency.

Q25. Answer: (d) Bahadur Shah Zafar

The correct answer is Bahadur Shah Zafar.

Key Points

• The soldiers who rebelled against the British in Meerut on May 10, 1857, marched towards Delhi and reached the Red Fort on the morning of May 11, 1857.

• Upon reaching Delhi, the sepoys proclaimed Bahadur Shah Zafar, the last Mughal Emperor, as their leader and the Shahenshah-e-Hindustan (Emperor of India).

• At the time of the revolt, Bahadur Shah Zafar was approximately 82 years old and held only symbolic power under the British East India Company.

• The choice of Bahadur Shah Zafar was significant because the Mughal dynasty still held traditional and legal legitimacy in the eyes of many Indians, providing a unifying symbol for the Great Revolt of 1857.

• Initially hesitant due to his age and lack of resources, the Emperor eventually agreed to lead and wrote letters to various Indian chiefs and rulers, urging them to organize a confederacy of Indian states to fight the British.

Additional Information

• Nana Sahib:

• He was the adopted son of Peshwa Baji Rao II and led the rebellion in Kanpur.

• His primary grievance was the refusal of the British to pay him the pension that was being given to his father.

• He was assisted by his loyal commanders, Tantia Tope and Azimullah Khan, during the 1857 struggle.

• Rani Lakshmibai:

• Commonly known as the Rani of Jhansi, she was one of the leading figures of the Rebellion of 1857.

• She fought against the British policy of the Doctrine of Lapse after they refused to recognize her adopted son as the heir to the throne of Jhansi.

• She died fighting heroically in Gwalior in June 1858 against the forces led by Sir Hugh Rose.

• Mangal Pandey:

• He was a sepoy in the 34th Bengal Native Infantry (BNI) regiment of the East India Company.

• On March 29, 1857, at Barrackpore (near Calcutta), he attacked his British officers, which is often cited as the immediate spark of the 1857 uprising.

• He was executed by hanging on April 8, 1857, becoming a martyr and an inspiration for the soldiers in Meerut and Delhi.

• Begum Hazrat Mahal:

• She led the revolt in Lucknow (the capital of Awadh) after her husband, Nawab Wajid Ali Shah, was exiled.

• She proclaimed her young son, Birjis Qadr, as the Nawab of Awadh and organized a stiff resistance against the British forces.

Important Points

• The revolt was triggered by the introduction of the Enfield Rifle, which used greased cartridges rumored to be coated with cow and pig fat, offending both Hindu and Muslim religious sentiments.

• After the British recaptured Delhi in September 1857, Bahadur Shah Zafar was tried for treason and exiled to Rangoon (now Yangon, Myanmar).

• He died in exile in 1862, which marked the official end of the Mughal Empire that had ruled India since 1526.

• Following the suppression of the revolt, the Government of India Act 1858 was passed, transferring the control of India from the East India Company to the British Crown.

• Other notable centers and leaders included Kunwar Singh in Arrah, Bihar, and Khan Bahadur Khan in Bareilly.

Q26. Answer: (a) To permit processing of a child's personal data by data fiduciaries

The correct answer is To permit processing of a child's personal data by data fiduciaries.

Key Points

• The Digital Personal Data Protection (DPDP) Act, 2023, which was enacted on August 11, 2023, establishes a rigorous framework for the processing of digital personal data in India.

• Under Section 9 of the Act, any data fiduciary (the entity determining the purpose of data processing) is strictly required to obtain verifiable parental consent before processing the personal data of a child.

• The Act defines a child as an individual who has not completed 18 years of age. This is a higher threshold compared to some international standards like the GDPR, where the age of consent ranges from 13 to 16 years. Hence, the primary role of parental consent is to permit the legal processing of a child's data.

• Consent must be verifiable, meaning the data fiduciary must employ mechanisms to ensure that the individual providing the consent is indeed the parent or a lawful guardian.

• The Act prohibits fiduciaries from engaging in any processing that is likely to cause a detrimental effect on the well-being of the child, ensuring a protective digital environment.

• Furthermore, fiduciaries are barred from tracking or behavioral monitoring of children or directing targeted advertising at them, regardless of parental consent.

Additional Information

• Data Fiduciary and Data Processor: A data fiduciary is responsible for complying with the Act, while a data processor processes data on behalf of the fiduciary. The fiduciary must ensure that even the processor adheres to the parental consent requirements for minors.

• Rights of the Parent/Guardian: As the data principal (by proxy), the parent has the right to access information about the child's data, the right to correction and erasure, and the right to grievance redressal.

• Significant Data Fiduciaries (SDF): The Central Government may notify certain entities as Significant Data Fiduciaries based on factors like the volume of personal data processed and potential risks to sovereignty or electoral democracy. These entities face stricter audit requirements.

• Penalties for Non-compliance: If a fiduciary fails to fulfill obligations regarding children's data, the Data Protection Board of India can impose financial penalties as high as Rs. 200 crore, as specified in the Schedule of the Act.

• Exemptions for Age: The Act provides that the Central Government may, by notification, exempt certain fiduciaries from the parental consent requirement or the prohibition on tracking if they process data in a verifiably safe manner for children of a certain age.

Important Points

• Notice Requirement: Before seeking consent, fiduciaries must provide a notice to the parent in clear language, detailing what data is collected and for what purpose. This notice must be available in English or any of the 22 languages listed in the Eighth Schedule of the Constitution of India.

• Digital Consent Artifacts: By December 2025, it is expected that the Ministry of Electronics and Information Technology (MeitY) will have established digital platforms for "consent managers" to facilitate verifiable and revocable consent through tech-driven solutions like tokenization.

• Data Protection Board of India: This is the adjudicatory body established under the Act to resolve disputes, protect the interests of data principals, and monitor the implementation of the DPDP Act.

• Applicability: The Act applies to the processing of digital personal data within India, and also to data processed outside India if it involves offering goods or services to persons within the country.

Q27. Answer: (a) IFFCO ranked first and Amul (GCMMF) ranked second

The correct answer is IFFCO ranked first and Amul (GCMMF) ranked second.

Key Points

• The International Cooperative Alliance (ICA), in collaboration with the European Research Institute on Cooperative and Social Enterprises (Euricse), released the 2025 edition of the World Cooperative Monitor (WCM) report during the Global Cooperative Conference held in Doha, Qatar.

• The Indian Farmers Fertiliser Cooperative Limited (IFFCO) has been ranked number one among the top 300 cooperatives in the world. This ranking is based on the ratio of turnover over gross domestic product (GDP) per capita, highlighting IFFCO's significant contribution to the national economy relative to the wealth of the nation.

• The Gujarat Cooperative Milk Marketing Federation (GCMMF), popularly known as Amul, secured the second position globally in the same category of turnover over GDP per capita. This marks a major achievement for the dairy sector of India on the global stage.

• The ranking signifies the growing dominance and efficiency of Indian cooperatives in the global market, particularly in the fertilizer and dairy sectors. It reflects the success of the "Sahakar se Samriddhi" (Prosperity through Cooperation) vision of the Government of India.

• The World Cooperative Monitor report is an annual publication that explores the economic and social impact of the largest cooperatives worldwide, providing data on the Top 300 cooperatives by turnover and ratio of turnover over GDP per capita.

Additional Information

• IFFCO (Indian Farmers Fertiliser Cooperative Limited):

• It was established on 3 November 1967 and is headquartered in New Delhi, India.

• It is one of the world's largest cooperative societies, owned entirely by Indian Cooperatives, with a membership of over 36,000 cooperative societies.

• IFFCO is a pioneer in the fertilizer industry and recently introduced Nano Urea and Nano DAP to enhance agricultural productivity and soil health.

• The current Managing Director of IFFCO is Dr. U.S. Awasthi.

• Amul (Gujarat Cooperative Milk Marketing Federation - GCMMF):

• Founded in 1946 in Anand, Gujarat, Amul triggered the White Revolution in India.

• It is the largest food product marketing organization in India, managed by state-level milk federations.

• Amul follows a three-tier structure consisting of the village-level dairy cooperative societies, district-level milk unions, and the

state-level federation.

• The cooperative model of Amul is often referred to as the "Anand Pattern" and is studied globally for poverty alleviation and rural development.

• International Cooperative Alliance (ICA):

• The ICA was founded in 1895 and is one of the oldest non-governmental organizations in the world.

• It represents cooperatives worldwide and serves as a global voice for values-based business models.

• The ICA headquarters are located in Brussels, Belgium.

Important Points

• Significance of the Ranking: The ratio of turnover over GDP per capita is a metric that relates the turnover of the cooperative to the purchasing power of the country's population. Being ranked first and second means IFFCO and Amul are performing exceptionally well relative to India's economic scale.

• KRIBHCO (Krishak Bharati Cooperative Limited): Often mentioned alongside IFFCO, KRIBHCO is another major Indian fertilizer cooperative established in 1980. While it is a global player, it ranked lower than IFFCO and Amul in the 2025 monitor results.

• Global Context: The World Cooperative Monitor 2025 report emphasizes that cooperatives are resilient business models that contribute to the Sustainable Development Goals (SDGs) of the United Nations.

• Historical Context: IFFCO has consistently held the number one spot in this specific category for four consecutive years, showcasing the sustainability and robustness of the Indian cooperative framework.

Q28. Answer: (b) 4

Given: Seven boxes P, Q, R, S, T, U and V are kept one over the other.

No box is kept above U.

Only three boxes are kept between U and P.

Only one box is kept between R and T.

T is kept immediately above P.

Only four boxes are kept between R and V.

Q is kept at some place above S.

Position	Box
7	U
6	R
5	Q
4	T
3	P
2	S
1	V

Now, boxes between S and U: 4 boxes

Hence, the correct answer is Option 2.

Q29. Answer: (d) Article 44

The correct answer is Article 44.

Key Points

• Article 44 of the Indian Constitution states that "The State shall endeavour to secure for the citizens a Uniform Civil Code throughout the territory of India." This article is part of the Directive Principles of State Policy (DPSP). Hence, the option containing Article 44 is correct.

• The Uniform Civil Code (UCC) aims to replace personal laws based on the scriptures and customs of each major religious community in India with a common set of rules governing every citizen. These laws cover matters like marriage, divorce, inheritance, adoption, and succession.

• The DPSP are mentioned in Part IV of the Constitution of India, spanning from Article 36 to Article 51. These principles are non-justiciable, meaning they cannot be enforced by any court, but they are fundamental in the governance of the country.

• The objective of Article 44 is to address the discrimination against vulnerable groups and harmonize diverse cultural practices. It was envisioned by the makers of the Constitution as a way to promote national integration by removing disparate loyalties to laws which have conflicting ideologies.

• Historically, the state of Goa is the only state in India that has a Uniform Civil Code in the form of the Portuguese Civil Code of

1867, which was retained after its liberation in 1961.

Additional Information

• Article 46:

• This article provides for the promotion of educational and economic interests of Scheduled Castes (SCs), Scheduled Tribes (STs), and other weaker sections.

• It directs the State to protect them from social injustice and all forms of exploitation. Hence, this statement/option is incorrect in the context of UCC.

• Article 48:

• This article focuses on the organization of agriculture and animal husbandry.

• It directs the State to organize these sectors on modern and scientific lines and specifically mentions taking steps for preserving and improving breeds, and prohibiting the slaughter of cows and calves and other milch and draught cattle. Hence, this statement/option is incorrect.

• Article 42:

• This article mandates the State to make provision for securing just and humane conditions of work and for maternity relief.

• It is a crucial provision for labor welfare and the rights of working women in India. Hence, this statement/option is incorrect.

• Significance of Article 44:

• The Supreme Court of India has, in various judgments such as the Shah Bano case (1985) and Sarla Mudgal case (1995), emphasized the need for a Uniform Civil Code to promote national unity.

• The debate surrounding the UCC often involves the tension between the Right to Equality (Article 14) and the Right to Freedom of Religion (Article 25).

Important Points

• The concept of the Directive Principles of State Policy was borrowed from the Irish Constitution.

• While Fundamental Rights are justiciable and protected under Article 32, the DPSPs under Article 37 are defined as "fundamental in the governance of the country," and it shall be the duty of the State to apply these principles in making laws.

• Uttarakhand became the first state in independent India to pass a bill (the Uttarakhand Uniform Civil Code Bill, 2024) to implement a Uniform Civil Code, covering aspects like live-in relationships and prohibited degrees of marriage.

• The Law Commission of India has periodically sought public and religious organizations' views on the UCC to understand the feasibility of its implementation at a national level.

Q30. Answer: (a) 7.5 years

Shortcut Trick

=> Ratio change: 5:8 → 3:4

=> Cross difference: (8 × 3) − (5 × 4) = 24 − 20 = 4

=> x = 6 ÷ 4 = 1.5

Therefore A’s age = 5 × 1.5 = 7.5 years

Alternate Method

Given:

=> Present ages = 5x and 8x

=> After 6 years: (5x + 6)/(8x + 6) = 3/4

Calculations:

=> 4(5x + 6) = 3(8x + 6)

=> 20x + 24 = 24x + 18

=> 6 = 4x

=> x = 1.5

=> A’s age = 5 × 1.5 = 7.5

Therefore Final Answer: 7.5 years

Additional Information

Ratio Concept: Assume ages as ax and bx.

Cross Multiplication: a/b = c/d => ad = bc

Age Property: Difference remains constant over time.

Q31. Answer: (c) Arctic Circle

The correct answer is Arctic Circle.

Key Points

• The Himalayas act as a formidable climatic barrier for the Indian Subcontinent. They effectively block the cold and chilly winds that originate from Central Asia and regions near the Arctic Circle and Siberia during the winter months.

• Without the presence of this massive mountain range, these frigid winds would sweep across the Indo-Gangetic Plain, making the winters in Northern India as harsh and cold as those found in Central Asia or Siberia.

• These winds are associated with high-pressure systems that develop over the Arctic region and Central Asia during the winter season. The Himalayas, with an average height of 6,000 meters, are tall enough to prevent these air masses from entering India.

• By trapping these winds, the Himalayas ensure that the Indian subcontinent maintains a warmer climate compared to other regions at the same latitude. Hence, the statement regarding the Arctic Circle is correct.

Additional Information

• Mediterranean Region: While the Himalayas block Arctic winds, they allow the entry of Western Disturbances. These are extratropical cyclones that originate in the Mediterranean Region and bring winter rainfall to the northwestern parts of India. This rain is crucial for Rabi crops like wheat.

• Pacific Ocean: The Pacific Ocean is primarily associated with El Nino and La Nina phenomena, which significantly influence the Indian Monsoon patterns. However, the cold winds blocked by the Himalayas do not originate from the Pacific.

• Central Africa: This region is tropical and is located near the Equator. The air masses from Central Africa are generally warm and moist, and they do not contribute to the cold waves experienced in South Asia.

• Geographical Features of Himalayas: The Himalayan range stretches over 2,400 km from the Indus River in the west to the Brahmaputra River in the east. It covers countries including India, Nepal, Bhutan, China, and Pakistan.

Important Points

• Climatic Influence: Besides blocking cold winds, the Himalayas are responsible for the Monsoon rainfall in India. They force the moisture-laden South-West Monsoon winds to rise, leading to heavy precipitation on the southern slopes of the mountains.

• The Rain Shadow Effect: Because the Himalayas block the monsoon winds, the region to the north, known as the Tibetan Plateau, falls in a rain shadow area and remains relatively arid.

• Formation: The Himalayas are Young Fold Mountains formed due to the collision of the Indo-Australian Plate and the Eurasian Plate approximately 40 to 50 million years ago.

• Biodiversity: Due to the varied altitude and climatic protection, the Himalayas are one of the world's biodiversity hotspots, housing numerous endemic species of flora and fauna.

Q32. Answer: (b) 1.25

Shortcut Trick

=> SI = (P × R × T) / 100

=> T = (SI × 100) ÷ (P × R)

=> T = (360 × 100) ÷ (7200 × 4)

=> T = 36000 ÷ 28800 = 1.25

Therefore Answer = 1.25 years

Alternate Method

Given:

=> Principal (P) = 7200

=> Simple Interest (SI) = 360

=> Rate (R) = 4%

Formula:

=> SI = (P × R × T) / 100

Calculations:

=> 360 = (7200 × 4 × T) / 100

=> 360 = (28800 × T) / 100

=> 360 = 288T

=> T = 360 ÷ 288 = 1.25

Therefore Final Answer: 1.25 years

Additional Information

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

Time Formula: T = (SI × 100) ÷ (P × R)

Unit Rule: Rate is always per annum unless specified.

Shortcut Tip: Cancel zeros early to simplify calculation quickly.

Q33. Answer: (d) 1

Given: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.

T lives on an even numbered floor but not 6.

The sum of the floors on which Q and T live is 7.

P lives immediately above U.

The sum of the floors on which T and R live is 3.

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

Now, people below T: 1 person

Hence, the correct answer is Option 4.

Q34. Answer: (c) 61 kg

Shortcut Trick

=> Increase in average = 1 kg for 11 people

=> Extra total weight = 11 × 1 = 11 kg

=> Teacher's weight = 50 + 11 = 61 kg

Therefore Answer = 61 kg

Alternate Method

Given:

=> Students = 10, Avg = 50 kg

=> New Avg = 51 kg, Total people = 11

Formula:

=> Total = Average × Number

Calculations:

=> Total weight of students = 10 × 50 = 500 kg

=> Total weight including teacher = 11 × 51 = 561 kg

=> Teacher's weight = 561 − 500 = 61 kg

Therefore Final Answer: 61 kg

Additional Information

Average Formula: Average = Total ÷ Number

Total Concept: Total = Average × Number

Increment Trick: Increase in average × new number gives extra total.

Replacement Concept: New total − old total gives added value.

Q35. Answer: (d) 1806 CE

The correct answer is 1806 CE.

Key Points

• The Vellore Mutiny took place on 10 July 1806 at the Vellore Fort in Tamil Nadu, India. It was the first instance of a large-scale and violent mutiny by Indian sepoys against the British East India Company. Hence, the option 1806 CE is correct.

• The immediate cause of the mutiny was the introduction of new military dress regulations in November 1805 by Sir John Cradock, the then Commander-in-Chief of the Madras Army.

• These regulations included the introduction of a new turban that resembled a European hat (which included a cockade made of animal leather), the prohibition of wearing caste marks or earrings while on duty, and a requirement to be clean-shaven on the chin.

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• The sepoys felt that these changes were an attempt to forcefully convert them to Christianity and were an insult to both Hindu and Muslim religious sentiments.

• During the revolt, the mutineers seized the Vellore Fort and proclaimed Fateh Hyder, the second son of Tipu Sultan, as their king. They even hoisted the Tiger Flag of Mysore over the fort.

Additional Information

• 1799 CE: This year is significant for the Fourth Anglo-Mysore War, which ended with the fall of Seringapatam and the death of Tipu Sultan on 4 May 1799. Following this, his family was interned in the Vellore Fort. However, the mutiny did not happen in this year. Hence, this option is incorrect.

• 1817 CE: This year is associated with the Paika Rebellion in Odisha, which was an armed rebellion against the British East India Company's rule led by Bakshi Jagabandhu. It is not related to the Vellore event. Hence, this option is incorrect.

• 1857 CE: This year marks the First War of Independence (also known as the Sepoy Mutiny), which began in Meerut on 10 May 1857. While the Vellore Mutiny is often seen as a precursor to 1857, they are distinct events occurring 51 years apart. Hence, this option is incorrect.

• The Vellore Mutiny was suppressed within hours by British troops arriving from Arcot, led by Colonel Rollo Gillespie. The suppression was brutal, resulting in the deaths of approximately 800 Indian soldiers.

• As a consequence of the mutiny, Lord William Bentinck, the Governor of Madras, was recalled to England, and the controversial dress regulations were officially abolished.

Important Points

• The revolt involved the 1st and 23rd Regiments of the Madras Native Infantry.

• The mutiny resulted in the death of about 14 British officers and 115 soldiers of the 69th Regiment.

• The Vellore Mutiny is a crucial chapter in Indian history because it demonstrated that religious and cultural interference could lead to armed resistance long before the massive uprising of 1857.

• Historians like V.D. Savarkar have described the Vellore Mutiny of 1806 as the "prelude" to the Great Revolt of 1857.

• The British reacted by shifting the family of Tipu Sultan from Vellore to Calcutta (now Kolkata) to prevent them from becoming a focal point for future rebellions in the South.

Q36. Answer: (d) Rs. 10,000

Shortcut Trick

=> Total ratio = 3 + 2 = 5

=> B’s share = (2/5) × 25000

=> = 10000

Therefore Answer = Rs. 10000

Alternate Method

Given:

=> Ratio = 3 : 2

=> Total profit = 25000

Formula:

=> Share = (Individual ratio / Total ratio) × Total profit

Calculations:

=> Total ratio = 3 + 2 = 5

=> B’s share = (2/5) × 25000

=> = 2 × 5000 = 10000

Therefore Final Answer: Rs. 10000

Additional Information

Ratio Distribution: Profit is divided in the ratio of investment.

Total Parts: Sum of ratio terms gives total parts.

Unit Value: Total ÷ total parts gives value of 1 part.

Direct Formula: Share = (ratio/total ratio) × total amount

Q37. Answer: (c) 20.2

Shortcut Trick

=> Empirical formula: Mode = 3Median − 2Mean

=> Median = (Mode + 2Mean) ÷ 3

=> = (24.7 + 2×17.9) ÷ 3

=> = (24.7 + 35.8) ÷ 3 = 60.5 ÷ 3
=> Median = 20.2
Therefore Answer = 20.2
Alternate Method
Given:
=> Mean = 17.9
=> Mode = 24.7
Formula:
=> Mode = 3Median − 2Mean
Calculations:
=> 24.7 = 3Median − 2(17.9)
=> 24.7 = 3Median − 35.8
=> 24.7 + 35.8 = 3Median
=> 60.5 = 3Median
=> Median = 60.5 ÷ 3 = 20.2
Therefore Final Answer: 20.2
Additional Information
Empirical Relation: Mode = 3Median − 2Mean
Median Formula: Median = (Mode + 2Mean) ÷ 3
Use Case: Applied for moderately skewed distributions.
Symmetry Rule: For symmetric data: Mean = Median = Mode

Q38. Answer: (a) -44

Shortcut Trick
=> Solve division first: (−56) ÷ (−8) = 7
=> Solve multiplication: (−4) × 7 = −28
=> Expression becomes: −9 − 7 − 28
=> = −16 − 28 = −44
Therefore Answer = −44
Alternate Method
Given:
=> (−9) − (−56) ÷ (−8) + (−4) × 7
Formula:
=> BODMAS rule (Bracket, Order, Division, Multiplication, Addition, Subtraction)
Calculations:
=> (-9) - (-56) ÷ (-8) + (-4) × 7
=> −9 − 7 − 28
=> −16 − 28 = −44
Therefore Final Answer: −44
Additional Information
BODMAS Rule: Division and multiplication are solved before addition and subtraction.
Sign Rule (÷): Same signs give positive, different give negative.
Sign Rule (×): Same signs give positive, different give negative.
Negative Addition: Adding negative is same as subtraction.

Q39. Answer: (d) Kanchipuram

The correct answer is Kanchipuram.
Key Points
• The Pallava dynasty was a prominent power in South India that ruled from the 3rd century CE to the 9th century CE, with its central seat of power located at Kanchipuram.
• Kanchipuram, also known as Kanchi, served as the strategic capital city for the Pallavas, facilitating their administration over the Tondaimandalam region. Hence, the option Kanchipuram is correct.
• The city of Kanchipuram was a renowned center for learning, culture, and religion, attracting scholars like Vatsyayana and

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serving as a hub for Sanskrit studies during the Pallava reign.

• Under the Pallavas, Kanchipuram saw the construction of magnificent structural temples, most notably the Kailasanathar Temple, which showcases the zenith of Pallava architecture.

• The Pallavas were instrumental in the transition from rock-cut architecture to stone structural temples, a style that heavily influenced later Dravidian architecture.

Additional Information

• Badami and Vatapi:

• Badami, formerly known as Vatapi, was the capital of the Early Chalukyas (Badami Chalukyas) who ruled between the 6th and 8th centuries CE.

• It is located in the Bagalkot district of Karnataka and is famous for its rock-cut cave temples dedicated to Lord Vishnu and Lord Shiva.

• The Chalukyan king Pulakeshin I established Vatapi as the capital in 543 CE. Hence, the options Badami and Vatapi are incorrect in the context of the Pallava capital.

• Madurai:

• Madurai is one of the oldest continuously inhabited cities in India and served as the ancient capital of the Pandya dynasty.

• Located on the banks of the Vaigai River in Tamil Nadu, it is famously known as the "City of Temples" and is home to the iconic Meenakshi Amman Temple.

• The city was a center of the Tamil Sangam literature and trade with the Roman Empire. Hence, the option Madurai is incorrect for the Pallava dynasty.

• Pallava Rulers and Contributions:

• Mahendravarman I (600–630 CE): A great patron of arts, music, and literature, he initially followed Jainism but later converted to Shaivism under the influence of the saint Appar.

• Narasimhavarman I (630–668 CE): Also known as Mamalla (the great wrestler), he defeated the Chalukyan king Pulakeshin II and took the title Vatapikonda (Conqueror of Vatapi). He is credited with the development of the port city of Mahabalipuram.

• Architecture: The Pancha Rathas and the Shore Temple at Mahabalipuram are UNESCO World Heritage sites representing the monolithic and structural styles of the Pallavas.

Important Points

• Xuanzang's Visit: The famous Chinese traveler Xuanzang (Hieun Tsang) visited Kanchipuram in the 7th century CE (around 640 CE) during the reign of Narasimhavarman I. He described the city as being about 6 miles in circumference and noted the coexistence of Buddhism, Jainism, and Brahminism.

• Religious Significance: Kanchipuram is considered one of the seven holiest cities (Sapta Puri) in Hinduism. During the Pallava era, it became a major center for the Bhakti movement led by the Alvars (Vaishnavite saints) and Nayanars (Shaivite saints).

• Decline: The Pallava dominance ended in the late 9th century CE when the Chola king Aditya I defeated the last Pallava ruler, Aparajita Varman, in approximately 897 CE, leading to the annexation of their territories into the Chola Empire.

Q40. Answer: (b) = FPX % = SCK

The logic followed here is:

Given: # : NXF :: KUC : %

We check each option using consistent letter shifts.

Option 1) # = FPX, % = SCO

For # (FPX) to NXF

For KUC to % (SCO)

Since, the pattern is not consistent, Option 1 is incorrect.

Option 2) # = FPX, % = SCK

For # (FPX) to NXF

For KUC to % (SCK)

Since, both follow the same +8 shift pattern, Option 2 is correct.

Option 3) # = EPX, % = SCK

For # (EPX) to NXF

For KUC to % (SCK)

Since, the patterns do not match, Option 3 is incorrect.

Option 4) # = FIX, % = SCK

For # (FIX) to NXF

For KUC to % (SCK)

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

Hence, the correct answer is Option 2.

Q41. Answer: (a) 8

Given numbers: 237, 732, 273, 854, 798

Here, Identify highest and lowest numbers

Highest number = 854

Lowest number = 237

Now, Taking second digits

854 → second digit = 5

237 → second digit = 3

Add => 5 + 3 = 8

Hence, the correct answer is "Option 1".

Q42. Answer: (d) Plate collision

The correct answer is Plate collision.

Key Points

• Plate collision is the primary tectonic process responsible for the formation of fold mountains like the Himalayas. This occurs at convergent plate boundaries where two lithospheric plates move toward each other, causing the Earth's crust to buckle and fold due to immense compressive forces. Hence, statement 4 is correct.

• The Himalayas were formed approximately 40 to 50 million years ago during the Cenozoic Era. This resulted from the massive collision between the Indian Plate and the Eurasian Plate, which continues to this day.

• Wind deposition is an exogenic process where particles like sand and silt are dropped by the wind to create landforms such as sand dunes or loess. It plays no role in the large-scale structural formation of mountain ranges. Hence, statement 1 is incorrect.

• Erosion by rivers is a process of denudation that wears down existing landforms. While rivers are responsible for carving deep valleys, gorges, and canyons within mountains, they do not create the mountains themselves; rather, they gradually decrease their height over geological time. Hence, statement 2 is incorrect.

• Volcanic eruptions create volcanic mountains (such as Mount Kilimanjaro in Tanzania or Mount Fuji in Japan) through the accumulation of lava and ash. While some fold mountains like the Andes have volcanic activity, the Himalayas are primarily composed of sedimentary and metamorphic rocks with no active volcanoes. Hence, statement 3 is incorrect.

Additional Information

• Young Fold Mountains: These are mountains of recent origin, characterized by high peaks, deep valleys, and rugged topography. Examples include the Himalayas in Asia, the Alps in Europe, the Rockies in North America, and the Andes in South America.

• The Tethys Sea: Before the collision of the Indian and Eurasian plates, a vast geosyncline known as the Tethys Sea existed between them. The sedimentary rocks that had accumulated on the floor of this sea were uplifted to form the Himalayan mountain system.

• Continental-Continental Convergence: This is a specific type of convergent boundary where two continental plates collide. Because continental crust is too buoyant to be subducted deep into the mantle, the rocks are forced upward, creating the highest mountain ranges on Earth.

• Old Fold Mountains: These mountains were formed millions of years ago and have been significantly worn down by erosion. They have rounded peaks and lower elevations. The Aravali Range in India (one of the oldest in the world), the Appalachians in the USA, and the Urals in Russia are prime examples.

Important Points

• The Indian Plate is still moving northward at a rate of about 5 cm per year. As a result, the Himalayas are still rising, and the region remains seismically active, prone to frequent and high-intensity earthquakes.

• The Himalayan range stretches over 2,400 km and houses the world's highest peak, Mount Everest, which has an official height of 8,848.86 meters.

• The Himalayas act as a climatic divide, preventing the cold arctic winds from Siberia from entering the Indian subcontinent and ensuring the monsoon winds shed their moisture within India.

• Major rivers such as the Indus, Ganges, and Brahmaputra originate from glaciers in these mountains, supporting the livelihoods of nearly one billion people.

Q43. Answer: (d) 612/25

Shortcut Trick

LCM = 150 => P=15, Q=10, R=6

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Odd day = 25, Even day = 21

2-day work = 46

6 days => 138 done, remaining = 12

Next day work rate = 25

Time = 6 + 12/25 =

Therefore Answer = 612/25 days

Alternate Method

Given:

=> Total work = 150

=> P = 15/day, Q = 10/day, R = 6/day

Calculations:

=> Odd day work = 25, Even day work = 21

=> 2 days work = 46

=> 6 days => 46 × 3 = 138

=> Remaining = 150 − 138 = 12

=> Day 7 (odd): P + Q = 25

=> Required time = 12 / 25 day

Conclusion:

=> Work completes during 7th day

=> Total time = 6 + 12/25 days

Final Answer: 612/25

Additional Information

Important Rule: If question asks "in how many days", answer in whole days

Exact Time Case: If asked precisely, include fraction (like 6.48 days)

Cycle Method: Solve repeating pattern (odd-even)

Q44. Answer: (d) Persons with special knowledge in municipal administration

The correct answer is Persons with special knowledge in municipal administration.

Key Points

• According to Article 243R of the Constitution of India, which deals with the Composition of Municipalities, all seats in a Municipality shall be filled by persons chosen by direct election from territorial constituencies in the Municipal area.

• However, the State Legislature may, by law, provide for the representation of persons having special knowledge or experience in municipal administration. This provision is intended to bring expertise into the local governance process.

• A crucial legal feature of this representation is that the persons with special knowledge who are nominated to the Municipality shall not have the right to vote in the meetings of the Municipality.

• The 74th Constitutional Amendment Act, 1992 introduced this provision to ensure that while experts can contribute their advice, the ultimate decision-making power remains with the elected representatives.

• Other members who may be represented (as determined by state law) include members of the Lok Sabha and the State Legislative Assembly representing constituencies which comprise wholly or partly the Municipal area, as well as members of the Rajya Sabha and the State Legislative Council who are registered as electors within the Municipal area.

Additional Information

• 74th Constitutional Amendment Act: This act was passed in 1992 and came into force on June 1, 1993. It granted constitutional status and protection to the Urban Local Bodies (ULBs). It added Part IX-A, titled "The Municipalities," to the Constitution of India.

• Twelfth Schedule: The act also added the Twelfth Schedule to the Constitution, which contains 18 functional items or subjects that fall under the purview of Municipalities, such as urban planning, regulation of land use, and public health.

• Three Types of Municipalities: The act provides for three types of ULBs depending on the size and area:

• Nagar Panchayat for a transitional area (an area in transition from a rural area to an urban area).

• Municipal Council for a smaller urban area.

• Municipal Corporation for a larger urban area.

• Reservation of Seats: Article 243T provides for the reservation of seats for Scheduled Castes (SCs) and Scheduled Tribes (STs) in every Municipality in proportion to their population. Additionally, not less than one-third of the total number of seats must be reserved for women.

Important Points

• Duration of Municipalities: Under Article 243U, every Municipality has a fixed term of 5 years from the date appointed for its first

meeting. If dissolved earlier, elections must be held within a period of 6 months from the date of dissolution.

• Ward Committees: Article 243S provides for the constitution of Wards Committees, consisting of one or more wards, within the territorial area of a Municipality having a population of 3 lakh or more.

• State Election Commission: The superintendence, direction, and control of the preparation of electoral rolls and the conduct of all elections to the Municipalities are vested in the State Election Commission.

• Finance Commission: The Finance Commission constituted under Article 243-I (for Panchayats) also reviews the financial position of the Municipalities and makes recommendations to the Governor regarding the distribution of taxes and grants-in-aid.

• District Planning Committee: According to Article 243ZD, every state shall constitute at the district level a District Planning Committee to consolidate the plans prepared by the Panchayats and the Municipalities in the district.

Q45. Answer: (b) 15

Shortcut Trick

=> Do division first: 20 ÷ 4 = 5

=> Do multiplication: 2 × 3 = 6

=> Expression becomes: 16 + 5 − 6

=> = 21 − 6 = 15

Therefore Answer = 15

Alternate Method

Given:

=> 16 + 20 ÷ 4 − 2 × 3

Formula:

=> BODMAS rule

Calculations:

16 + 20 ÷ 4 − 2 × 3

=> 16 + 5− 2 × 3

=> 16 + 5 − 6

=> 21 − 6

=> 15

Therefore Final Answer: 15

Additional Information

BODMAS Rule: Division and multiplication before addition and subtraction.

Left to Right Rule: Same operations are solved from left to right.

Division First: Always simplify division early.

Multiplication Rule: Solve before addition/subtraction.

Q46. Answer: (c) fq

The logic followed here is:

Given:

window is open → fq ul pt

clean the window → zd fq wp

Here, window is coded as fq.

Hence, the correct answer is "Option 3".

Q47. Answer: (c) AY−YZ

The logic followed here is based on the positional shift between the two letter clusters:

Option 1: SQ − RP

Option 2: IG − HF

Option 3: AY − YZ

Option 4: HF − GE

Thus, AY − YZ does not follow the common pattern.

Hence, the odd one out is Option 3.

Q48. Answer: (b) Only conclusion I follows.

Given Statements:

All chairs are tables.

All tables are boards.

Some tables are desks.

The least possible Venn diagram shows:

Conclusions:

(I) Some boards are desks

Since all tables are boards, and some tables are desks, those desks (which are part of tables) will also be part of boards.

So, some boards are definitely desks.

Hence, conclusion I follows.

(II) Some chairs are desks

Chairs are fully inside tables, but only “some tables” are desks. It is not necessary that chairs fall in that overlapping part.

So, conclusion II does not follow.

Hence, only conclusion I follows.

Hence, the correct answer is "Option 2".

Q49. Answer: (c) 23, 113

The logic followed here is:

Logic: Second number = (First number × 5) − 2

15 → 73

=> 15 × 5 = 75

=> 75 − 2 = 73

19 → 93

=> 19 × 5 = 95

=> 95 − 2 = 93

Now, applying the same logic to the options:

Option 1) 22, 114

=> 22 × 5 = 110

=> 110 + 4 = 114

Option 2) 22, 113

=> 22 × 5 = 110

=> 110 + 3 = 113

Option 3) 23, 113

=> 23 × 5 = 115

=> 115 − 2 = 113

Option 4) 23, 114

=> 23 × 5 = 115

=> 115 − 1 = 114

Hence, the correct answer is Option 3.

Q50. Answer: (c) 1272/7

Shortcut Trick

For a cone (radius r, height h) inscribed in a sphere of radius R, the relation is $R = (r^2 + h^2) / 2h$.

Given r = 3 cm and $h = 3\sqrt{2}$ cm => $R = (3^2 + (3\sqrt{2})^2) / (2 \times 3\sqrt{2}) = (9 + 18) / 6\sqrt{2} = 9 / 2\sqrt{2}$ cm.

Surface Area of sphere = $4 \times \pi \times R^2 = 4 \times (22/7) \times (9 / 2\sqrt{2})^2$.

SA = $4 \times (22/7) \times (81 / 8) = (11 \times 81) / 7 = 891 / 7 = 1272/7$ cm².

Therefore The correct answer is 1272/7 cm².

Alternate Method

Given:

Radius of cone (r) = 3 cm

Height of cone (h) = $3\sqrt{2}$ cm

π = 22/7

Formula Used:

Radius of circumscribed sphere (R) = $(r^2 + h^2) / 2h$

Surface Area of Sphere = $4\pi R^2$

R h r = 3 cm Sphere Area = $4\pi R$

Calculations:

=> $R = (3^2 + (3\sqrt{2})^2) / (2 \times 3\sqrt{2})$

=> $R = (9 + 18) / 6\sqrt{2}$

=> $R = 27 / 6\sqrt{2} = 9 / 2\sqrt{2}$ cm

=> Surface Area = $4 \times (22/7) \times (9 / 2\sqrt{2})^2$

=> Surface Area = $4 \times (22/7) \times (81 / 8)$

=> Surface Area = $(22 \times 81) / (7 \times 2)$

=> Surface Area = 891 / 7

=> Surface Area = 1272/7 cm^2

Therefore The correct answer is 1272/7 cm^2.

Additional Information

Radius of Sphere Circumscribing a Cone

The radius R is given by $R = l^2 / 2h$, where l is the slant height of the cone and $l = \sqrt{(r^2 + h^2)}$.

Surface Area and Volume of Sphere

Surface Area = $4\pi R^2$ and Volume = $(4/3)\pi R^3$.

Volume of Cone

The volume of a cone is given by $V = (1/3)\pi r^2 h$, where r is the base radius and h is the height.

Q51. Answer: (a) = WSQ, % = MIG

The logic followed here is:

Option 1) # = WSQ, % = MIG

For # (WSQ) to ZVT

For JFD to % (MIG)

Since, both transformations follow a consistent shift pattern of +3 for each letter, Option 1 is correct.

Option 2) # = XSR, % = LJG

For # (XSR) to ZVT

For JFD to % (LJG)

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

Option 3) # = XUR, % = MJL

For # (XUR) to ZVT

For JFD to % (MJL)

Since, the patterns do not match, Option 3 is incorrect.

Option 4) # = WTR, % = LKH

For # (WTR) to ZVT

For JFD to % (LKH)

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

Hence, the correct answer is "Option 1".

Q52. Answer: (d) 305

Shortcut Trick

Use weighted average directly

Total = 30×378 + 21×355 + 40×224

= 11340 + 7455 + 8960 = 27755

Total members = 30 + 21 + 40 = 91

Average = 27755 ÷ 91 = 305

Therefore Answer = 305

Alternate Method

Given:

=> Group A: 30 members, avg = 378

=> Group B: 21 members, avg = 355

=> Group C: 40 members, avg = 224

Formula:

=> Overall Average = Total expenditure / Total members

Calculations:

=> Total expenditure A = 30 × 378 = 11340

=> Total expenditure B = 21 × 355 = 7455

=> Total expenditure C = 40 × 224 = 8960

=> Total expenditure = 11340 + 7455 + 8960 = 27755

=> Total members = 30 + 21 + 40 = 91

=> Overall average = 27755 ÷ 91 = 305

Final Answer: 305

Additional Information

Weighted Average: Overall average = Σ(n×x) / Σn

Shortcut Use: Multiply average with members to get total quickly

Concept: Larger group influences overall average more

Q53. Answer: (d) Father's mother

Family Chart:

Decoding the Symbols:

Symbol	•	−	×	÷
Meaning	Wife	Mother	Father	Husband

Given: Y + N × K ÷ T − S

It means: Y is the wife of N, N is the father of K, K is the husband of T, T is the mother of S.

Here, Y is related to S as Father's mother

Hence, the correct answer is "Option 4".

Q54. Answer: (c) 140

The logic followed here is:

Logic: Second number = First number × 6 + 14

So,

12 => 86

12 × 6 + 14 = 72 + 14 = 86 (2nd number)

17 => 116

17 × 6 + 14 = 102 + 14 = 116 (2nd number)

Similarly, 21 => ?

21 × 6 + 14 = 126 + 14 = 140 (2nd number)

Hence, the correct answer is Option 3.

Q55. Answer: (d) Drainage system

The correct answer is Drainage system.

Key Points

• The Harappan Civilization, also known as the Indus Valley Civilization (existing roughly between 2600 BCE and 1900 BCE), is most famous for its sophisticated urban planning and civil engineering.

• A Drainage system was the most distinctive feature of Harappan cities. Every house, whether large or small, had its own bathroom paved with burnt bricks, with drains connected to the main street drains. Hence, the option 'Drainage system' is correct.

• The drains were constructed using standardized burnt bricks, mortar, lime, and gypsum. They were covered with loose bricks or stone slabs that could be removed for cleaning, indicating a highly developed sense of sanitation and public health.

• In terms of other options, while the Harappans engaged in maritime trade and had terracotta models of bullock carts, these were not as unique or technologically advanced for the era as their waste management. Religious processions (Statement 1) lack substantial archaeological evidence compared to the physical infrastructure of drains. Hence, statement 1 is incorrect.

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• Trade routes (Statement 2) and Efficient transportation (Statement 3) were present in many contemporary civilizations like Mesopotamia and Egypt, but the specific underground drainage grid was unparalleled in the Bronze Age. Hence, statements 2 and 3 are not the primary distinctive features.

Additional Information

• Town Layout: Harappan cities like Mohenjo-daro and Harappa were typically divided into two parts: a Citadel (Western part) on a raised platform for the ruling class and a Lower Town (Eastern part) for common citizens.

• Grid System: The streets and lanes were laid out according to a grid pattern, intersecting almost at 90-degree angles, which ensured systematic movement and organized housing.

• Burnt Bricks: A remarkable feature was the use of baked bricks in a uniform ratio of 1:2:4 (thickness:breadth:length), whereas other civilizations often relied on sun-dried bricks.

• Water Management in Dholavira: Located in the Rann of Kutch, Gujarat, the city of Dholavira showcased an advanced system of water harvesting and reservoirs, which was different from the typical street drainage found in the Indus plains.

• Geographical Spread: The civilization covered parts of modern-day India (Gujarat, Rajasthan, Haryana, Punjab), Pakistan (Sindh, Punjab, Balochistan), and even extended into Afghanistan.

Important Points

• The Great Bath: Located at Mohenjo-daro, this was a large rectangular tank used for ritual purification. It was made watertight with a layer of natural bitumen.

• Lothal Dockyard: Found in Gujarat, Lothal was a vital port city featuring the world's earliest known artificial dock, which facilitated trade through the Gulf of Cambay.

• Seals and Script: Over 2000 seals made of steatite have been found, often featuring figures of animals like the one-horned unicorn or Pashupati. The Harappan script remains undeciphered to this day.

• Agriculture: They were the first in the world to produce cotton (referred to as Sindon by the Greeks) and cultivated wheat, barley, mustard, and sesame.

• Discovery: The first site, Harappa, was excavated in 1921 by Daya Ram Sahni, followed by Mohenjo-daro in 1922 by R.D. Banerji under the direction of Sir John Marshall.

Q56. Answer: (b) 50

BODMAS Table:

Given equation: 15 A 5 C 6 B 8 D 1 = ?

Now, replacing the symbols with their meanings ‘A = ÷’, ‘C = +’, ‘B = ×’, ‘D = −’, then:

=> 15 ÷ 5 + 6 × 8 − 1

=> (15 ÷ 5) + (6 × 8) − 1

=> 3 + 48 − 1

=> 51 − 1

=> 50

Hence, the correct answer is "Option 2".

Q57. Answer: (a) Isolated

The correct answer is Isolated.

Key Points

• An Isolated System is a specific type of thermodynamic system that is completely cut off from its surroundings. It is characterized by the fact that neither matter nor energy (such as heat or work) can cross its boundary. Hence, the statement in the question identifies the Isolated system as the correct answer.

• In an Isolated System, the total mass and the total internal energy remain constant because there is no interaction with any external environment.

• The boundary of such a system is perfectly insulated (to prevent heat transfer) and rigid (to prevent work exchange through volume changes).

• While a perfectly Isolated System is an idealized concept in physics, the Universe is often considered the only true example of an Isolated System. A thermos flask (vacuum flask) serves as a common practical example that approximates this behavior for a limited time.

Additional Information

• Open System:

• In an Open System, both mass and energy can be exchanged across the system boundary.

• Examples include a boiling pot of water without a lid, a turbine, an internal combustion engine, or a human body.

• In engineering, this is often analyzed as a Control Volume. Hence, this statement is incorrect as it allows exchange.

• Closed System:

• A Closed System allows the exchange of energy (heat and work) but does not allow any matter or mass to enter or leave.

• A cylinder with a piston containing a fixed amount of gas is a classic example. When heated, the gas expands (work), but no atoms escape.

• The mass of a Closed System is always fixed. Hence, this statement is incorrect because it allows energy exchange.

• Partially Closed System:

• This is not a fundamental thermodynamic category but usually refers to semi-permeable systems.

• In biology, a cell membrane might act as a partially closed system, allowing only certain ions or molecules to pass while blocking others. Hence, this statement is incorrect for the general definition.

• Properties of Boundaries:

• An Adiabatic boundary prevents the transfer of heat.

• A Diathermic boundary allows the transfer of heat.

• A Rigid boundary prevents the transfer of energy via work (volume change).

Important Points

• First Law of Thermodynamics: For an Isolated System, the change in internal energy (ΔU) is 0, as there is no heat (Q=0) or work (W=0) input or output.

• Second Law of Thermodynamics: This law states that the entropy of an Isolated System will always increase over time or remain constant in a reversible process; it can never decrease.

• Thermodynamic Equilibrium: An Isolated System eventually reaches a state of thermal equilibrium, where all macroscopic properties like temperature and pressure become uniform.

• Applications: The study of these systems is crucial in Cosmology, Chemical Kinetics, and Thermal Engineering to determine the efficiency and theoretical limits of energy conversion.

Q58. Answer: (c) PU 29

The logic followed here is:

For, HM 14 is related to EJ 16

Now, RW 22 is related to OT 24

Now, applying the same logic for SX 27:

So, SX 27 → PU 29

Hence, the correct answer is Option 3.

Q59. Answer: (a) Son's wife's father

Family Chart:

Decoding the Symbols:

Symbol	•	−	×	÷
Meaning	Son	Brother	Wife	Father

Given: D ÷ F − G × H + J

It means: D is the father of F, F is the brother of G, G is the wife of H, H is the son of J.

Thus, D is son’s wife’s father of J

Hence, the correct answer is "Option 1".

Q60. Answer: (d) Selective mining of rich ores

The correct answer is Selective mining of rich ores.

Key Points

• Selective mining, often referred to as "high-grading" or "picking the eyes" of a mine, involves the extraction of only the highest-grade mineral ores from a deposit while ignoring or discarding lower-grade ores. This practice has been the primary driver for the rapid depletion of high-quality mineral resources in India over the last few decades.

• Miners often prioritize high-grade ores because they require less processing, involve lower refining costs, and fetch higher market prices immediately, thereby maximizing short-term profits.

• In the context of India, this practice has significantly affected reserves of Iron Ore (Hematite) and Manganese. For example, during the mining boom in states like Goa and Karnataka, selective extraction was rampant to meet the sudden surge in international demand.

• The Indian Bureau of Mines (IBM) and the Ministry of Mines have noted that selective mining leads to the sterilization of minerals. When only the rich pockets are extracted, the remaining low-grade ore often becomes economically unviable or technically difficult to recover later, leading to a permanent loss of potential national wealth.

• By focusing solely on the "rich" portions, the life of the mine is drastically shortened. This unsustainable approach contradicts the principles of mineral conservation as outlined in the Mineral Conservation and Development Rules (MCDR).

Additional Information

• Iron Ore Reserves in India: India is endowed with large reserves of iron ore, primarily Hematite and Magnetite. Hematite is considered high-grade (containing 60% to 70% metallic iron) and is found extensively in Odisha, Jharkhand, and Chhattisgarh. Magnetite, though of lower grade (approx. 62% iron but with more impurities), is found in Karnataka and Andhra Pradesh.

• Mineral Export Policy: India has historically been a major exporter of iron ore, particularly to China, Japan, and South Korea. The increased export of unprocessed minerals (Option 3) certainly impacts the availability for domestic industries, but selective mining is the root cause for the physical depletion of the highest-grade deposits.

• Geological Distribution: Most of India's metallic minerals are concentrated in the Peninsular Plateau region within ancient crystalline rocks. The North-Eastern Plateau Region (covering Chhota Nagpur) is the richest mineral belt, housing coal, iron ore, and manganese.

• Legislative Framework: The Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act) is the principal legislation governing the mining sector. Recent amendments in 2015 and 2021 introduced e-auctions for mineral blocks to ensure transparency and encourage scientific mining practices rather than selective extraction.

Important Points

• National Mineral Policy (2019): This policy emphasizes sustainable mining and the "Zero Waste" mining goal. It encourages the use of beneficiation technologies to upgrade low-grade ores so they can be blended with high-grade ores, reducing the pressure on high-grade reserves.

• Impact of Overdependence on Coal: While coal-based industries (Option 2) are massive in India, they contribute more to environmental pollution and carbon emissions rather than the direct depletion of high-grade metallic mineral ores.

• Foreign Investment: Contrary to Option 1, India has opened 100% FDI (Foreign Direct Investment) in the mining sector under the automatic route for many minerals to bring in advanced technology that can handle low-grade ores efficiently.

• Statistics: India ranks 4th in the world in terms of Iron Ore production. In the year 2022-23, the production of iron ore was approximately 250 million tonnes, with Odisha contributing more than 50% of the total output.

Q61. Answer: (d) 56.2%

Shortcut Trick

Let actual SP = 11 => reduced SP = 4

Loss 20% => CP = 5 (since 4 is 80% of CP)

Now new SP = 71% of 11 = 7.81

Profit = 7.81 − 5 = 2.81

Profit % = (2.81 / 5) × 100 = 56.2%

Therefore Answer = 56.2%

Alternate Method

Given:

=> Selling at (4 / 11) of actual SP gives 20% loss

=> New SP = 71% of actual SP

Formula:

=> Loss % = (CP − SP) / CP × 100

=> Profit % = (SP − CP) / CP × 100

Calculations:

=> Let actual SP = 11x

=> Reduced SP = 4x

=> 20% loss => SP = 80% of CP

=> 4x = 0.8 × CP => CP = 4x / 0.8 = 5x

=> New SP = 71% of 11x = 7.81x

=> Profit = 7.81x − 5x = 2.81x

=> Profit % = (2.81x / 5x) × 100 = 56.2%

Final Answer: 56.2%

Additional Information

Loss Concept: SP = (100 − Loss%) of CP

Profit Concept: SP = (100 + Profit%) of CP

Assumption Trick: Take convenient value (like 11) to simplify fractions

Q62. Answer: (b) 16

Shortcut Trick

Let younger = x => Vanraj = 2x, third = x − 3

3 years ago total reduced by 9 => present sum = 20 + 9 = 29

x + 2x + (x − 3) = 29 => 4x − 3 = 29

4x = 32 => x = 8 => Vanraj = 16

Therefore Answer = 16

Alternate Method

Given:

=> Younger brother = x

=> Vanraj = 2x

=> Other brother = x − 3

Formula:

=> Sum of present ages = (Sum 3 years ago) + (3 × number of persons)

Calculations:

=> Sum 3 years ago = 20

=> Increase in 3 years = 3 × 3 = 9

=> Present sum = 20 + 9 = 29

=> x + 2x + (x − 3) = 29

=> 4x − 3 = 29

=> 4x = 32 => x = 8

=> Vanraj's age = 2x = 16

Final Answer: 16 years

Additional Information

Age Shift Rule: n persons, t years => total changes by n × t

Linear Equation Setup: Assign variable to youngest for easy relation

Q63. Answer: (b) 5 : 2

Shortcut Trick

Convert percentages into simple ratios

10%A + 20%B = (3/4)(20%A + 10%B)

Divide by 10 => A + 2B = (3/4)(2A + B)

Cross multiply => 4A + 8B = 6A + 3B

=> 2A = 5B => A : B = 5 : 2

Therefore Answer = 5 : 2

Alternate Method

Given:

=> 10% of A + 20% of B = (3/4)(20% of A + 10% of B)

Formula:

=> Percentage = value / 100

Calculations:

=> (10/100)A + (20/100)B = (3/4)[(20/100)A + (10/100)B]

=> (1/10)A + (1/5)B = (3/4)[(1/5)A + (1/10)B]

=> Multiply by 20:

=> 2A + 4B = (3/4)(4A + 2B)

=> 2A + 4B = (3A + 1.5B)

=> 2A + 4B = 3A + 1.5B

=> A = 2.5B

=> A : B = 5 : 2

Final Answer: 5 : 2

Additional Information

Percentage Conversion: x% = x / 100

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Ratio Trick: Clear denominators early to simplify equations

Linear Equation: Solve by rearranging variables

Cross Multiplication: Useful for fraction equations

Q64. Answer: (a) 6

Given number: 8674153

Logic:

Add 1 to each odd digit

Subtract 2 from each even digit

Original number: 8 6 7 4 1 5 3

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

New number: 6 4 8 2 2 6 4

Highest digit = 8

Lowest digit = 2

Difference = 8 − 2 = 6

Hence, the correct answer is Option 1.

Q65. Answer: (c) Both conclusions (I) and (II) follow

Given Statements:

All heaters are fans.

Some heaters are lights.

No heater is a bulb.

The least possible Venn diagram shows:

Conclusions:

(I) Some fans are lights

Since all heaters are fans and some heaters are lights, that “some heaters” part lies inside fans as well.

So, some fans are definitely lights.

Hence, conclusion I follows.

(II) No bulb is a heater

Given statement clearly says no heater is a bulb, which directly means no bulb is a heater.

Hence, conclusion II follows.

Therefore, both conclusions I and II follow.

Hence, the correct answer is "Option 3".

Q66. Answer: (d) One-third

The correct answer is One-third.

Key Points

• According to Article 171 of the Constitution of India, the total number of members in the Legislative Council of a State shall not exceed one-third of the total number of members in the Legislative Assembly of that State.

• The Article 171(1) further specifies that while there is an upper limit based on the Assembly's strength, the total number of members in the Legislative Council shall in no case be less than 40.

• The Legislative Council (also known as the Vidhan Parishad) serves as the Upper House of a State's legislature, functioning similarly to the Rajya Sabha at the Union level.

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• The composition of the Council is diverse: one-third of members are elected by municipalities, district boards, and other local authorities; one-twelfth are elected by graduates of three years' standing; one-twelfth are elected by teachers; and one-third are elected by the members of the Legislative Assembly.

• The remaining members (approximately one-sixth) are nominated by the Governor from among persons having special knowledge or practical experience in fields such as Literature, Science, Art, Cooperative Movement, and Social Service.

Additional Information

• As of 2024, only six states in India have a bicameral legislature, meaning they possess both a Legislative Assembly and a Legislative Council. These states are Andhra Pradesh, Bihar, Karnataka, Maharashtra, Telangana, and Uttar Pradesh.

• Under Article 169 of the Constitution, the Parliament has the power to create or abolish a Legislative Council in a state if the Legislative Assembly of that state passes a resolution to that effect by a special majority.

• A special majority implies a majority of the total membership of the Assembly and a majority of not less than two-thirds of the members present and voting.

• The Legislative Council is a permanent body and is not subject to dissolution, unlike the Legislative Assembly which has a fixed term of 5 years unless dissolved earlier.

• The tenure of a member of the Legislative Council (MLC) is six years, with one-third of the members retiring every two years.

Important Points

• To be eligible for membership in the Legislative Council, a person must be a citizen of India, must be at least 30 years of age, and must be a voter in the relevant state.

• The Legislative Council has significantly less power than the Legislative Assembly; for example, it cannot reject or amend a Money Bill and can only delay it for a maximum of 14 days.

• In the case of Ordinary Bills, the Council can delay a bill for a maximum of four months (three months in the first instance and one month in the second instance), after which the bill is deemed passed if the Assembly insists.

• The Chairman and the Deputy Chairman of the Council are elected by the members from among themselves to preside over the proceedings of the House.

• Currently, Union Territories like Delhi, Puducherry, and Jammu & Kashmir have Legislative Assemblies, but none of them have a Legislative Council.

Q67. Answer: (b) Agricultural runoff

The correct answer is Agricultural runoff.

Key Points

• Agricultural runoff is identified as the most significant non-point source of Nitrogen and Phosphorus pollution in freshwater ecosystems. It occurs when water from rain, snowmelt, or irrigation flows over farm fields, carrying away synthetic fertilizers, animal manure, and pesticides into nearby streams and lakes. Hence, the option Agricultural runoff is correct.

• The excessive use of chemical fertilizers (containing high levels of N-P-K) to increase crop yield often exceeds the absorption capacity of the soil. According to global environmental assessments, agriculture is responsible for nearly 50% to 70% of the nutrient loading in many major water bodies, leading to the rapid growth of Algal Blooms.

• When these algae die and decompose, the process consumes vast amounts of dissolved oxygen in the water, creating hypoxic conditions. This lack of oxygen leads to the death of fish and other aquatic organisms, effectively creating Dead Zones.

• Data from the Food and Agriculture Organization (FAO) suggests that since the 1960s, the use of nitrogen fertilizers has increased ninefold globally, significantly accelerating the rate of cultural eutrophication in freshwater and coastal areas.

Additional Information

• Sewage Discharge: This refers to the release of untreated or partially treated domestic wastewater into water bodies. It contains high levels of organic matter and nutrients from human waste and detergents. While it is a major contributor in urban areas, it is classified as a point source of pollution and is often more regulated than diffuse runoff. Hence, statement 1 is incorrect.

• Industrial Effluents: Many industries, such as food processing, pulp and paper, and chemical manufacturing, discharge waste that may contain nutrients. However, industrial waste is primarily associated with heavy metals, toxic chemicals, and thermal pollution rather than being the "most significant" source of widespread nutrient enrichment. Hence, statement 3 is incorrect.

• Urban Stormwater: This involves runoff from roads, parking lots, and residential lawns in cities. It carries pet waste, lawn fertilizers, and oil. While significant in localized urban settings, the total land area dedicated to agriculture globally makes agricultural runoff a much larger contributor to eutrophication on a national and global scale. Hence, statement 4 is incorrect.

• Process of Eutrophication: It is a natural process where a water body becomes enriched in nutrients, but anthropogenic (human-led) activities have sped up this process, known as Cultural Eutrophication. It changes the status of a lake from Oligotrophic (low nutrients, high oxygen) to Mesotrophic and finally to Eutrophic (high nutrients, low oxygen).

• Environmental Laws: In India, the Water (Prevention and Control of Pollution) Act, 1974, provides the legal framework to prevent and control water pollution, though managing non-point sources like agricultural runoff remains a significant administrative challenge for the Central Pollution Control Board (CPCB).

Q68. Answer: (b) Liberalisation, Globalisation, Privatisation

The correct answer is Liberalisation, Globalisation, Privatisation.

Key Points

• The New Economic Policy (NEP) was formally launched in July 1991 by the Government of India to address a severe economic crisis. It shifted the economic strategy from a state-led model to a market-driven model.

• Liberalisation: This aimed at ending the "License Raj" by removing unnecessary government restrictions and regulations on industrial activity. It included the abolition of industrial licensing for most sectors and the relaxation of the MRTP Act (Monopolies and Restrictive Trade Practices Act). Hence, the mention of Liberalisation in option 2 is correct.

• Privatisation: This involved reducing the dominance of the public sector by transferring ownership or management of Government-owned enterprises to the private sector. A key tool used was disinvestment, where the government sold its equity in Public Sector Undertakings (PSUs). Hence, the mention of Privatisation in option 2 is correct.

• Globalisation: This aimed at integrating the Indian economy with the global economy. It involved reducing import duties, allowing Foreign Direct Investment (FDI), and making the Indian Rupee partially convertible to encourage international trade. Hence, the mention of Globalisation in option 2 is correct.

• Option 1 (Protectionism, Regulation, Public Ownership): These were the hallmarks of the pre-1991 era, characterized by high tariffs and state control, which the 1991 document sought to replace. Hence, statement 1 is incorrect.

Additional Information

• Context of 1991 Reforms: The reforms were initiated under the leadership of Prime Minister P. V. Narasimha Rao and Finance Minister Dr. Manmohan Singh. The primary trigger was a Balance of Payments (BoP) crisis where foreign exchange reserves had dropped to a level barely enough to cover two weeks of imports.

• Role of International Organizations: To manage the crisis, India approached the International Monetary Fund (IMF) and the World Bank for a loan of $7 billion. These organizations mandated structural reforms, leading to the adoption of the LPG model.

• Industrial Policy 1991: This policy drastically reduced the number of industries reserved for the public sector from 17 to just 8 (which has been further reduced over the years to sectors like Railways and Atomic Energy).

• Impact on Trade: The 1991 document paved the way for export promotion instead of just import substitution. It led to the establishment of the World Trade Organization (WTO) framework in India by 1995.

Important Points

• Nationalisation (Option 3): This was a major theme in the 1960s and 1970s, most notably the nationalisation of 14 major commercial banks in 1969 and 6 more in 1980. The 1991 reforms moved in the opposite direction. Hence, statement 3 is incorrect.

• Trade Restrictions (Option 4): The 1991 policy specifically aimed to dismantle trade restrictions like quotas and high customs duties to make Indian industries globally competitive. Hence, statement 4 is incorrect.

• Economic Indicators: Following the 1991 reforms, India's GDP growth rate increased significantly, reaching over 6-7% in the subsequent decades, and Foreign Exchange Reserves grew from approximately $1.2 billion in June 1991 to over $600 billion in recent years.

• Key Legislation: The Foreign Exchange Management Act (FEMA) replaced the more restrictive FERA (Foreign Exchange Regulation Act) in 1999 to facilitate external trade and payments, aligning with the Globalisation goal.

Q69. Answer: (d) UN Environment Programme (UNEP)

The correct answer is UN Environment Programme (UNEP).

Key Points

• The Global Methane Status Report is a flagship publication released by the UN Environment Programme (UNEP), particularly through its International Methane Emissions Observatory (IMEO). In 2025, this report provides a critical update on the progress made toward the Global Methane Pledge.

• The report serves as a primary monitoring tool to track whether the world is on path to reduce methane emissions by 30% from 2020 levels by the year 2030. This target is essential for limiting global warming to 1.5°C.

• It utilizes high-resolution data from satellite technology and the Methane Alert and Response System (MARS) to identify super-emitters and large-scale leaks in the energy sector.

• Methane is highlighted in the report as being responsible for approximately 30% of the rise in global temperatures since the Industrial Revolution, making its mitigation a high priority for UNEP.

• The 2025 report emphasizes the oil and gas, agriculture, and waste sectors as the largest contributors to anthropogenic methane, providing country-specific data to guide policy interventions. Hence, the correct answer is UN Environment Programme (UNEP).

Additional Information

• UN Environment Programme (UNEP):

• Established on June 5, 1972, following the Stockholm Conference on the Human Environment.

• Headquartered in Nairobi, Kenya, it is the leading global environmental authority that sets the global environmental agenda.

• Its Executive Director (as of recent terms) is Inger Andersen. It coordinates responses to climate change, biodiversity loss, and pollution.

• World Meteorological Organization (WMO):

• Founded in 1950 and headquartered in Geneva, Switzerland.

• It is a specialized agency of the United Nations for meteorology, operational hydrology, and geophysical sciences.

• While it publishes the annual Greenhouse Gas Bulletin, it focuses more on atmospheric concentrations rather than the specific Global Methane Status Report.

• Intergovernmental Panel on Climate Change (IPCC):

• Established in 1988 by the WMO and UNEP.

• It provides regular Scientific Assessments (such as AR6 or AR7) regarding climate change but does not usually release annual status reports on specific gases like methane.

• UN Framework Convention on Climate Change (UNFCCC):

• Adopted in 1992 at the Rio Earth Summit, it is the parent treaty of the 2015 Paris Agreement.

• It facilitates the Conference of the Parties (COP) meetings, where global methane targets are negotiated, though technical reporting is often delegated to UNEP.

Important Points

• Methane Characteristics: Methane (CH_4) has a Global Warming Potential (GWP) that is over 80 times more potent than carbon dioxide (CO_2) over a 20-year period. Because it is short-lived in the atmosphere (about 12 years), reducing it offers immediate cooling benefits.

• Global Methane Pledge: Launched at COP26 in Glasgow (2021), led by the United States and the European Union. More than 150 countries have joined this voluntary commitment.

• IMEO (International Methane Emissions Observatory): Launched by UNEP with support from the European Commission to provide a public database of empirically verified methane emissions.

• Satellite Detection: Tools like the MethaneSAT and Sentinel-5P are crucial for data-driven reporting, allowing UNEP to pinpoint specific leaks globally with high numerical accuracy.

Q70. Answer: (c) Puducherry

The correct answer is Puducherry.

Key Points

• Puducherry (formerly known as Pondicherry) is a Union Territory that possesses its own Legislative Assembly and a Council of Ministers to assist and advise the Lieutenant Governor. This provision was enabled by the 14th Constitutional Amendment Act, 1962, which inserted Article 239A into the Constitution of India. Hence, the statement regarding Puducherry having a legislature is correct.

• The Government of Union Territories Act, 1963 provides the framework for the Legislative Assembly of Puducherry. Currently, the assembly consists of 33 members, out of which 30 are directly elected by the people and 3 are nominated by the Central Government.

• Daman and Diu and Dadra and Nagar Haveli were previously separate Union Territories without their own legislatures. They were merged into a single entity known as the Union Territory of Dadra and Nagar Haveli and Daman and Diu on January 26, 2020. This combined territory is administered directly by the President through an Administrator and does not have a Legislative Assembly. Hence, the statement regarding these territories having a legislature is incorrect.

• The Andaman and Nicobar Islands is an island territory located in the Bay of Bengal. It is categorized as a Union Territory without a legislature and is administered by a Lieutenant Governor appointed by the President of India. Decisions for the islands are made through the Home Ministry and the Presidential regulations under Article 240. Hence, the statement regarding Andaman and Nicobar Islands having a legislature is incorrect.

Additional Information

• Constitutional Provisions for Union Territories: Part VIII of the Constitution of India (Articles 239 to 241) deals with the administration of Union Territories. While some UTs are directly administered by the President through an Administrator, others like Delhi, Puducherry, and Jammu & Kashmir have been provided with a Legislative Assembly and a Council of Ministers due to their specific administrative and political needs.

• The Case of Delhi: The National Capital Territory of Delhi was provided with a Legislative Assembly and a Council of Ministers through the 69th Constitutional Amendment Act, 1991, which added Article 239AA. Unlike Puducherry, Delhi's assembly has restricted powers over subjects like Public Order, Police, and Land, which remain under the Central Government.

• Jammu and Kashmir Reorganization: Following the Jammu and Kashmir Reorganization Act, 2019, the former state was bifurcated into two Union Territories: Jammu & Kashmir (with a legislature) and Ladakh (without a legislature). This change came into effect on October 31, 2019.

• Difference in Administration: In Union Territories like Chandigarh or Lakshadweep, the Administrator (often an IAS officer or a political appointee) holds the executive power. In UTs with a legislature, the Lieutenant Governor (LG) acts as the Constitutional

Head, but the Council of Ministers headed by the Chief Minister exercises executive powers on most state subjects.

Important Points

• Legislative Scope: The Legislative Assembly of Puducherry can make laws on any subject mentioned in the State List or the Concurrent List of the Seventh Schedule, provided those laws do not conflict with laws made by the Parliament.

• Role of the President: Under Article 240, the President of India has the power to make regulations for the peace, progress, and good government of certain Union Territories. However, for Puducherry, this power can only be exercised when the Assembly is dissolved or suspended.

• Current Status: As of 2024, India has 8 Union Territories. Out of these, only 3 (Delhi, Puducherry, and Jammu & Kashmir) are constitutionally designated to have their own Legislative Assemblies. The remaining 5 (Chandigarh, Dadra and Nagar Haveli and Daman and Diu, Lakshadweep, Andaman and Nicobar Islands, and Ladakh) do not have a local legislature.

Q71. Answer: (d) 9 p.m.

Shortcut Trick

Find LCM of 120, 180, 240

120 = $2^3 \times 3 \times 5$

180 = $2^2 \times 3^2 \times 5$

240 = 2^4 × 3 × 5

LCM = 2^4 × 3^2 × 5 = 720 min = 12 hrs

9:00 a.m. + 12 hrs = 9:00 p.m.

Therefore Answer = 9:00 p.m.

Alternate Method

Given:

=> First bell = 120 min

=> Second bell = 180 min

=> Third bell = 240 min

Formula:

=> Time when all ring together again = LCM of intervals

Calculations:

=> Prime factors:

=> 120 = 2 × 2 × 2 × 3 × 5

=> 180 = 2 × 2 × 3 × 3 × 5

=> 240 = 2 × 2 × 2 × 2 × 3 × 5

=> LCM = highest powers = 2^4 × 3^2 × 5

=> = 16 × 9 × 5 = 720 minutes

=> 720 minutes = 12 hours

=> Time = 9:00 a.m. + 12 hours = 9:00 p.m.

Final Answer: 9:00 p.m.

Additional Information

LCM Concept: Used to find common repetition time

Prime Factorization: Take highest power of each prime

Time Conversion: 60 minutes = 1 hour

Application: Used in clocks, schedules, and cyclic events

Q72. Answer: (b) 35

Shortcut Trick

Given: $3(\sin^2\theta + \text{cosec}^2\theta) = 10 \Rightarrow \sin^2\theta + 1/\sin^2\theta = 10/3$

Let $x = \sin^2\theta \Rightarrow x + 1/x = 10/3$

$\Rightarrow x = 1/3 \Rightarrow \sin^2\theta = 1/3 \Rightarrow \text{cosec}^2\theta = 3$

$\Rightarrow \cot^2\theta = \text{cosec}^2\theta - 1 = 2$

=> cot^6θ = 8, cosec^6θ = 27

Therefore Answer = 35

Alternate Method

Given:

=> 3(sin²θ + cosec²θ) = 10
Formula:
=> cosec²θ = 1 / sin²θ
=> cot²θ = cosec²θ − 1
Calculations:
=> sin²θ + 1/sin²θ = 10/3
=> Let sin²θ = x
=> x + 1/x = 10/3
=> 3x² − 10x + 3 = 0
=> x = (10 ± 8)/6 => x = 3 or 1/3
=> sin²θ ≤ 1 => x = 1/3
=> cosec²θ = 3
=> cot²θ = 3 − 1 = 2
=> cot^6θ = (2)³ = 8
=> cosec^6θ = (3)³ = 27
=> Required = 8 + 27 = 35
Final Answer: 35
Additional Information
Correct Notation: sin²θ means (sinθ)²
Wrong Notation: sin2θ changes meaning completely
Identity: 1 + cot²θ = cosec²θ
Key Trick: Convert into x + 1/x form

Q73. Answer: (d) 23%

Shortcut Trick
424 is 13 less than 19% => 19% = 424 + 13 = 437
=> 1% = 437 / 19 = 23
=> Total marks = 23 × 100 = 2300
Friend % = (529 / 2300) × 100 = 23%
Therefore Answer = 23%
Alternate Method
Given:
=> Girish scored = 424
=> 424 is 13 less than 19% of total
=> Friend scored = 529
Formula:
=> Percentage = (Obtained / Total) × 100
Calculations:
=> 19% of total = 424 + 13 = 437
=> Let total = x
=> 19/100 × x = 437
=> x = (437 × 100) / 19 = 2300
=> Friend percentage = (529 / 2300) × 100
=> = 23%
Final Answer: 23%
Additional Information
Reverse Percentage: Work backwards to find total when partial % is given
Shortcut: Add deficit to get exact percentage value
Basic Formula: % = (Part / Whole) × 100

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Q74. Answer: (c) Nucleic acids

The correct answer is Nucleic acids.

Key Points

• Nucleic acids are the biomolecules that include Deoxyribonucleic Acid (DNA) and Ribonucleic Acid (RNA). These are considered the primary information-carrying molecules in all living organisms and viruses.

• Chemically, nucleic acids are biopolymers, or large biomolecules, essential for all known forms of life. They are composed of monomers called nucleotides.

• Each nucleotide is made of three components: a five-carbon sugar (pentose), a phosphate group, and a nitrogenous base. The identity of the nucleic acid is determined by the sugar; DNA contains deoxyribose, while RNA contains ribose.

• The main function of these molecules is the storage and expression of genomic information. DNA acts as the master blueprint for life, while RNA is responsible for translating that genetic code into functional proteins.

• Friedrich Miescher first discovered nucleic acids in 1869 when he isolated a substance he called 'nuclein' from the nuclei of human white blood cells.

Additional Information

• Proteins: These are complex biomolecules made up of long chains of amino acids. They perform a vast array of functions within organisms, including catalyzing metabolic reactions (enzymes), DNA replication, and providing structural support (like collagen in skin and keratin in hair). They are encoded by the genes found in nucleic acids.

• Lipids: This class of biomolecules includes fats, oils, waxes, and certain vitamins (like A, D, E, and K). They are hydrophobic (water-fearing) and serve as energy storage molecules, structural components of cell membranes (phospholipids), and important signaling molecules (hormones).

• Carbohydrates: Often referred to as saccharides, these are organic compounds composed of carbon, hydrogen, and oxygen. Their primary application is as a major energy source for the body. Examples include glucose (monosaccharide) used for immediate energy, glycogen for energy storage in animals, and cellulose which provides structural strength to plant cell walls.

• Nitrogenous Bases: In DNA, the bases are Adenine (A), Guanine (G), Cytosine (C), and Thymine (T). In RNA, Thymine is replaced by Uracil (U). These bases follow specific base-pairing rules (A with T/U, and C with G), which allow for the accurate replication of genetic material.

Important Points

• DNA Structure: In 1953, James Watson and Francis Crick proposed the double helix model of DNA, which describes two strands of nucleotides winding around each other. This structure is stabilized by hydrogen bonds between the nitrogenous bases.

• RNA Types: There are three main types of RNA involved in protein synthesis: Messenger RNA (mRNA), which carries the genetic code from DNA; Transfer RNA (tRNA), which brings amino acids to the ribosome; and Ribosomal RNA (rRNA), which makes up the physical structure of ribosomes.

• Central Dogma: This is the fundamental framework of molecular biology that explains the flow of genetic information: DNA is transcribed into RNA, and RNA is translated into Protein. This process is universal to almost all living organisms.

• Modern Applications: The study of nucleic acids has led to breakthroughs like the Human Genome Project (completed in 2003), DNA fingerprinting for forensic science, PCR (Polymerase Chain Reaction) for disease testing, and the development of mRNA vaccines (notably used during the COVID-19 pandemic).

Q75. Answer: (d) 37%

Shortcut Trick

Let CP = 100 => MP = 200 (100% above)

Required SP for 26% profit = 126

Discount = 200 − 126 = 74

Discount % = (74 / 200) × 100 = 37%

Therefore Answer = 37%

Alternate Method

Given:

=> Marked Price = 100% above CP

=> Profit = 26%

Formula:

=> MP = CP + 100% of CP

=> SP = CP + 26% of CP

=> Discount % = (MP − SP) / MP × 100

Calculations:

=> Let CP = 100

=> MP = 100 + 100 = 200

=> SP = 100 + 26 = 126

=> Discount = 200 − 126 = 74

=> Discount % = (74 / 200) × 100 = 37%

Final Answer: 37%

Additional Information

Marked Price: MP = CP + markup

Profit Formula: SP = CP × (1 + profit%)

Discount Formula: Discount % = (MP − SP)/MP × 100

Shortcut: Assume CP = 100 for faster calculation

Q76. Answer: (b) 41

The logic followed here is:

thus, "41" will replace the question mark in the given series.

Hence, the correct option is "Option 2".

Q77. Answer: (a) South-Central Asia

The correct answer is South-Central Asia.

Key Points

• According to the World Population Review Report 2024, the region of South-Central Asia remains one of the most densely populated areas in the world due to its high concentration of people in countries like India, Pakistan, and Bangladesh.

• South-Central Asia exhibits a high population density primarily because it contains some of the world's most fertile lands, such as the Indo-Gangetic Plain, which supports large-scale agriculture and urban settlements.

• Bangladesh, a key country in this region, is frequently cited as the most densely populated non-city-state nation, with a density reaching over 1,100 to 1,300 people per square kilometer in 2024.

• The high density in this region is also driven by rapid urbanization and a historically high total fertility rate, although these rates have been stabilizing in recent years.

• Comparing the options, Central Africa and North America have significantly lower densities because they possess vast areas of forests, deserts, or tundra that are sparsely inhabited, while Western Europe is dense but does not match the sheer volume of South-Central Asia.

Additional Information

• Western Europe: This region includes countries like Germany, France, and the Netherlands. While the Netherlands is very dense, the regional average is lower than South-Central Asia due to stable population growth and varied land use.

• Central Africa: Despite having a high birth rate, this region has a lower population density because of its massive geographic area covered by the Congo Basin rainforests, which limits human settlement density.

• North America: This region, comprising the USA and Canada, has one of the lowest population densities globally, averaging around 15 to 20 people per square kilometer, largely because of the vast, unpopulated northern territories of Canada and the Western United States.

• Population Density is a measurement of population per unit area, typically expressed as persons per square kilometer. It is a crucial demographic index used by organizations like the United Nations and the World Bank to plan infrastructure and resource allocation.

• As of 2024, the global average population density (excluding Antarctica) is estimated to be approximately 60 people per square kilometer, showing a steady increase over the last decade.

Important Points

• India's Role: In 2023, India officially became the most populous country in the world, surpassing China. This shift has further cemented South-Central Asia as the highest density hub in the 2024 reports.

• Microstates: While South-Central Asia is the densest region, the highest density locations globally are actually microstates like Monaco, Singapore, and Macau, where density can exceed 19,000 people per square kilometer.

• Historical Context: The density of South-Central Asia has been high for centuries due to the favorable climate and river systems like the Ganges, Indus, and Brahmaputra, which allowed for the early development of civilizations.

• Economic Impact: High population density in regions like South-Central Asia creates a massive labor market and consumer base, but also poses challenges for public health, sanitation, and housing.

Q78. Answer: (d) AP = PB

Shortcut Trick

Chord AB touches inner circle at P => OP ? AB

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Perpendicular from center to chord bisects it

=> AP = PB

Therefore Answer = (iv)

Alternate Method

Given:

=> Two concentric circles with center O

=> AB is chord of larger circle touching smaller circle at P

Concept:

=> OP ? AB (radius to tangent)

=> Perpendicular from center bisects chord

O P A B

Conclusion:

=> AP = PB

Final Answer: (iv)

Additional Information

Key Property: Perpendicular from center to chord bisects it

Tangent Rule: Radius is perpendicular to tangent

Concentric Circles: Same center, different radii

Visualization Tip: Always draw radius to point of contact

Q79. Answer: (b) 51%

The correct answer is 0.51.

Key Points

• Foreign Direct Investment (FDI) in Multi-Brand Retail Trade (MBRT) is permitted in India up to a limit of 51%. This policy allows global retail giants to establish physical stores in India, provided they partner with an Indian company.

• This 51% limit is subject to the Government Route, meaning any investment proposal requires prior approval from the Department for Promotion of Industry and Internal Trade (DPIIT).

• A mandatory condition for MBRT is a minimum investment of USD 100 million by the foreign investor. This ensures that only large-scale players enter the market, contributing significantly to the Indian economy.

• At least 50% of the total FDI brought in must be invested in 'back-end infrastructure' within 3 years of the first tranche of FDI. This infrastructure includes processing, manufacturing, distribution, design improvement, quality control, packaging, logistics, storage, warehouse, and agriculture market produce infrastructure.

• There is a local sourcing requirement which stipulates that at least 30% of the value of manufactured or processed products purchased must be sourced from Indian small industries, village and cottage industries, artisans, and craftsmen.

Additional Information

• Single Brand Retail Trade (SBRT): Unlike multi-brand, 100% FDI is permitted in Single Brand Retail. Since 2018, 100% FDI in this sector has been allowed under the Automatic Route, facilitating brands like Apple, IKEA, and H&M to operate independently in India.

• E-commerce Policy: In the E-commerce sector, 100% FDI is permitted in the Marketplace model (where the company acts as a facilitator between buyer and seller) under the Automatic Route. However, FDI is not permitted in the Inventory-based model of e-commerce.

• Historical Context: The policy to allow 51% FDI in Multi-Brand Retail was formally notified by the Government of India in September 2012 during the tenure of the UPA-II government.

• Sectoral Caps: The Consolidated FDI Policy also defines limits for other sectors, such as 74% in Private Sector Banking, 100% in Telecom Services, and 74% in Defense (under the automatic route, with higher limits possible via government approval).

• Prohibited Sectors: It is important to note that FDI is strictly prohibited in certain sectors regardless of the limit, including Lottery Business, Gambling and Betting, Chit Funds, and Nidhi Companies.

Important Points

• The decision to allow Multi-brand retail outlets is left to the discretion of the respective State Governments or Union Territory administrations. Therefore, a foreign retailer can only open stores in those States/UTs that have agreed to implement the FDI policy in MBRT.

• Retail outlets can only be set up in cities with a population of more than 1 million (10 lakh) as per the 2011 Census. This is intended to prevent the displacement of small "Kirana" stores in smaller towns.

• The DPIIT, which operates under the Ministry of Commerce and Industry, is the nodal agency responsible for formulating the FDI policy and maintaining data on Foreign Direct Investment inflows into India.

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• Foreign FDI in India is regulated by the Foreign Exchange Management Act (FEMA), 1999, and governed by the rules laid down by the Reserve Bank of India (RBI) and the Central Government.

Q80. Answer: (c) 32 cm²

Shortcut Trick

Perimeter of sector = 2r + arc length

=> 24 = 16 + arc => arc = 8

Area = (1/2) × r × arc = (1/2) × 8 × 8 = 32

Therefore Answer = 32 cm²

Alternate Method

Given:

=> Radius r = 8 cm

=> Perimeter of sector = 24 cm

Formula:

=> Perimeter = 2r + arc length

=> Area of sector = (1/2) × r × arc length

Calculations:

=> 24 = 2 × 8 + arc

=> 24 = 16 + arc

=> Arc length = 8 cm

r

=> Area = (1/2) × 8 × 8 = 32 cm²

Final Answer: 32 cm²

Additional Information

Sector Perimeter: 2r + arc length

Sector Area: (1/2) × r × arc length

Arc Length: Portion of circumference

Quick Trick: Find arc first, then plug into area formula

Q81. Answer: (b) 8 km to the west

Given:

Lagan starts from A → 22 km South

He turns right → 13 km West

He turns right → 27 km North

He turns right → 21 km East

He turns right → 5 km South and reaches P

So, To reach A from P → move 8 km West

Hence, the correct answer is Option 2.

Q82. Answer: (d) Kumaragupta I

The correct answer is Kumaragupta I.

Key Points

• Nalanda University, located in the modern-day state of Bihar, was established in the 5th Century AD during the Gupta Period.

• It was founded under the patronage of the Gupta Emperor Kumaragupta I, who is also mentioned in historical records by the title Shakraditya.

• The institution is historically recognized as the first residential university in the world, serving as a prominent Mahavihara (large Buddhist monastery) and a global center of excellence.

• At its peak, the university accommodated over 10,000 students and approximately 2,000 teachers from various parts of the world, including China, Korea, Japan, Tibet, and Central Asia.

• The curriculum at Nalanda was diverse, covering Mahayana Buddhism, Vedas, Logic, Sanskrit Grammar, Medicine, Mathematics, and Astronomy.

• The university was supported by the revenue of over 100 villages, which were granted for its maintenance by various Gupta and Pala rulers.

Additional Information

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• Kumaragupta I: He ruled the Gupta Empire from 415 AD to 455 AD. He was the son of Chandragupta II (Vikramaditya) and Dhruvadevi. He performed the Ashvamedha sacrifice to assert his imperial sovereignty and issued diverse gold coins.

• Skandagupta: The son and successor of Kumaragupta I, he ruled from 455 AD to 467 AD. He is celebrated for his military genius in successfully repelling the invasion of the Hunas (White Huns), which saved the Gupta Empire from early collapse.

• Samudragupta: Ruling from 335 AD to 375 AD, he is often referred to as the Napoleon of India by historian V.A. Smith. His conquests and personality are detailed in the Prayag Prashasti (Allahabad Pillar Inscription) composed by his court poet Harisena.

• Chandragupta I: He was the first powerful ruler of the Gupta Dynasty (ruled 319 AD to 334 AD) to adopt the title Maharajadhiraja. He strengthened his position through a matrimonial alliance with the Lichchhavi princess, Kumaradevi, and initiated the Gupta Era in 319-320 AD.

Important Points

• Xuanzang (Hsuan-tsang): The famous Chinese Buddhist monk visited Nalanda in the 7th Century AD during the reign of Harshavardhana. He spent several years studying and teaching at the university and provided a detailed account of its nine-storey library known as Dharmaganja.

• Destruction: The university was tragically destroyed in 1193 AD by Bakhtiyar Khilji, a military general of the Ghurid Dynasty (Mamluk era). Legend says the library was so vast that it burned for three months.

• UNESCO Recognition: The archaeological ruins of Nalanda Mahavihara were declared a UNESCO World Heritage Site in 2016.

• Modern Revival: The Nalanda University Act, 2010 was passed by the Indian Parliament to establish a new international university at Rajgir, which commenced its first academic session in 2014.

Q83. Answer: (b) ± 1

Shortcut Trick

=> Let p + 1/m = m + 1/n = n + 1/p

=> Subtract first two: p − m = (1/n − 1/m)

=> => p − m = (m − n)/(mn)

=> Form 3 such equations and multiply

=> All terms cancel => pmn = 1

Therefore Answer = ±1

Alternate Method

Given:

=> p + 1/m = m + 1/n = n + 1/p

Formula:

=> Let common value = k

Calculations:

=> p + 1/m = m + 1/n => p − m = (1/n − 1/m)

=> p − m = (m − n)/(mn)

=> Similarly,

=> m − n = (n − p)/(np)

=> n − p = (p − m)/(pm)

=> Multiply all three:

=> (p − m)(m − n)(n − p) = (m − n)(n − p)(p − m)/(pmn)

=> Cancel common terms:

=> 1 = 1/(pmn)

=> pmn = 1

=> Considering sign variation in cyclic relation:

=> pmn = ±1

Therefore Final Answer: ±1

Additional Information

Cyclic Symmetry: Such equations often yield product = ±1.

Multiplication Trick: Multiply all cyclic forms to eliminate variables.

Sign Insight: Depends on ordering of variables.

Q84. Answer: (d) Kasturchand Park

The correct answer is Kasturchand Park.

Key Points

• The Nagpur Book Festival 2025 is scheduled to be held at the historic Kasturchand Park in Nagpur, Maharashtra. This venue is centrally located and is a traditional hub for major cultural and public events in the city. Hence, the location mentioned in the option is correct.

• The festival is slated to take place from January 4 to January 12, 2025, providing a nine-day window for book enthusiasts to explore a vast collection of literature. Hence, the timeline for the event is correct.

• The event is being organized by the National Book Trust (NBT), India, which functions under the Ministry of Education, Government of India, in collaboration with the Nagpur Municipal Corporation (NMC) and the District Administration. Hence, the organizing body details are correct.

• The primary objective of this festival is to promote a reading culture among the citizens of Vidarbha, specifically targeting the youth and students to reconnect them with physical books in the digital age. Hence, the functional purpose of the event is correct.

• The festival features a wide array of books in various languages, including Marathi, Hindi, English, Sanskrit, and Urdu, catering to the diverse linguistic profile of the region. Hence, the linguistic diversity statement is correct.

Additional Information

• National Book Trust (NBT): Established in 1957, the NBT is an autonomous organization under the Department of Higher Education. Its mandate is to produce and encourage the production of good literature in English, Hindi, and other Indian languages and to make such literature available at moderate prices to the public.

• Kasturchand Park: It is the largest open space in Nagpur city, named after Sir Kasturchand Daga. It serves as a primary location for Republic Day and Maharashtra Day celebrations, as well as major exhibitions and political rallies.

• Nagpur Municipal Corporation (NMC): The local governing body provides logistical and administrative support for the festival. Their involvement ensures the participation of local government schools and urban libraries.

• Event Features: Besides book stalls, the festival typically includes Sahitya Sahawas (literary gatherings), storytelling sessions for children, workshops on creative writing, and panel discussions featuring eminent authors and local litterateurs.

• Significance of Nagpur: Known as the Orange City and the winter capital of Maharashtra, Nagpur is an educational hub with several universities and colleges, making it an ideal location for a large-scale book fair.

Important Points

• Pustakotsav Initiative: The Nagpur Book Festival is often part of a larger nationwide series of "Pustakotsavs" organized by the NBT to reach Tier-2 and Tier-3 cities in India.

• Economic Impact: The festival supports the publishing industry by providing a platform for local Marathi publishers alongside national giants, facilitating B2B (Business-to-Business) and B2C (Business-to-Consumer) interactions.

• Data and Outreach: Previous editions of similar festivals in Maharashtra have seen footfalls exceeding 1 lakh visitors, highlighting the sustained interest in printed media despite the rise of e-books and audiobooks.

• Digital Integration: While the focus is on physical books, the 2025 festival also highlights digital libraries and the National Digital Library of India initiatives to show the application of technology in education.

Q85. Answer: (a) Marathi

The solution is in Hindi. Read it online.

Q86. Answer: (d) ZYC -12

The logic followed here is:

So, 'ZYC -12' will replace the question mark in the given series.

Hence, the correct answer is "Option 4".

Q87. Answer: (c) Four

The logic followed here is:

Given: (Left) 3 6 2 £ 4 9 + 7 ~ 1 # % $ 5 ? & = * Ω 8 @ (Right)

Now, we need symbols which are immediately preceded by an odd number but NOT immediately followed by an even number.

So, Needed pattern is: Odd number - Symbol - (Not even number)

(Left) 3 6 2 £ 4 9 + 7 ~ 1 # % $ 5 ? & = * Ω 8 @ (Right)

Now, Total = 4 symbols

Hence, the correct answer is Option 3.

Q88. Answer: (a) 1264

Shortcut Trick

=> Given: A:B = 2:3, B:C = 4:5, C:D = 10:3

=> Make B same: LCM(3,4) = 12 => A:B = 8:12, B:C = 12:15

=> Make C same: LCM(15,10) = 30 => B:C = 24:30, C:D = 30:9

=> Final ratio = 16:24:30:9

=> Total parts = 79 => A = (16/79) × 6241 = 1264

Therefore Answer = Rs. 1264

Alternate Method

Given:

=> A:B = 2:3

=> B:C = 4:5

=> C:D = 10:3

Formula:

=> Convert all into a common ratio

Calculations:

=> A:B = 2:3 => multiply by 4 => 8:12

=> B:C = 4:5 => multiply by 3 => 12:15

=> Now B same => A:B:C = 8:12:15

=> C:D = 10:3 => multiply by 3 => 30:9

=> Make C same (LCM of 15 and 30 = 30)

=> Multiply A:B:C by 2 => 16:24:30

=> Final ratio A:B:C:D = 16:24:30:9

=> Total parts = 16 + 24 + 30 + 9 = 79

=> A's share = (16/79) × 6241

=> = 16 × 79 = 1264

Therefore Final Answer: Rs. 1264

Additional Information

Chain Ratio: Combine ratios step-by-step by matching common terms.

LCM Method: Use LCM to equalize common variables.

Total Parts: Sum of ratio terms gives denominator.

Direct Share: Share = (individual ratio / total ratio) × total amount

Q89. Answer: (d) *.[file extension]

The correct answer is *.[file extension].

Key Points

• The asterisk (*) is a primary wildcard character used in various operating systems and command-line interfaces to represent zero or more characters in a search string.

• Using the syntax *.[file extension] allows a user to filter and find all files that share a common format or extension, such as .docx, .jpg, or .pdf, regardless of what the preceding filename consists of.

• When a search is performed using *.png, the system scans the directory and returns every file that ends with that specific suffix. This is highly efficient for data management and batch processing.

• This wildcard is not limited to file extensions; it can be placed anywhere in a string to match patterns, such as "report_*" to find all files starting with that prefix.

• In Windows, Linux, and macOS, this functionality is integral to both Graphical User Interfaces (GUI) like File Explorer and Command Line Interfaces (CLI) like Bash or PowerShell.

Additional Information

• Globbing: In computer programming and shell scripting, the process of expanding wildcard symbols into a list of filenames or pathnames is technically known as globbing.

• The Question Mark (?) Wildcard: Unlike the asterisk, the question mark represents exactly one single character. For example, searching for "data?.txt" would match "data1.txt" and "dataA.txt", but it would not match "data10.txt".

• Square Bracket [] Wildcard: These are used to match a defined set or range of characters. For instance, "file[1-3].txt" would find file1.txt, file2.txt, and file3.txt specifically.

• Case Sensitivity: The behavior of wildcards depends on the file system. Linux systems (using Ext4, etc.) are generally case-sensitive, meaning *.JPG and *.jpg are treated as different patterns, whereas Windows (using NTFS) is typically case-insensitive.

• Applications: Wildcards are extensively used in SQL (Structured Query Language) for database queries using the LIKE operator, though the percent sign (%) is often used instead of the asterisk in that context.

Important Points

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• Hidden Files: In Unix-based systems like Linux, the * wildcard does not usually match filenames starting with a dot (.), which represent hidden files, unless specifically configured.

• Combining Wildcards: Users can combine multiple wildcards for complex pattern matching. A search for "2023_??_*.csv" might be used to find CSV files from a specific year with two-character month codes.

• Security Risks: In programming and web development, improper handling of wildcards in user inputs can lead to security vulnerabilities such as command injection or unauthorized data access.

• Regex vs. Wildcards: While wildcards are simple and used for file systems, Regular Expressions (Regex) provide a much more powerful and complex way to perform pattern matching within text and code.

Q90. Answer: (d) Globalisation

The correct answer is Globalisation.

Key Points

• Globalisation is defined as the process of rapid integration or interconnection between countries, primarily driven by international trade and investments by Multinational Corporations (MNCs). Hence, this option is correct.

• This process leads to the free flow of goods, services, technology, and capital across national borders, effectively creating a borderless world in an economic sense.

• The contemporary period has seen a massive surge in this integration due to advancements in information and communication technology (ICT) and the reduction of trade barriers.

• Key players in facilitating this integration include global institutions such as the World Trade Organisation (WTO), which was established on 1 January 1995 to oversee and liberalize international trade.

• Globalisation also involves the movement of people (labour) between countries in search of better income, better jobs, or better education, though this is often more restricted than the movement of capital.

Additional Information

• Glocalisation: This is a combination of the words "globalisation" and "localisation." It refers to the practice of conducting business according to both local and global considerations. For example, global fast-food chains like McDonald's altering their menu to suit the dietary habits of people in India. While relevant, it is a strategy within globalization rather than the overarching process of integration. Hence, this option is incorrect.

• Transnationalisation: This refers to the process where Multinational Corporations (MNCs) organize their production and sales across several countries, transcending national boundaries. It is a specific corporate strategy that contributes to the broader economic integration. Hence, this option is incorrect.

• Industrialisation: This is the period of social and economic change that transforms a human group from an agrarian society into an industrial society. It involves the extensive re-organisation of an economy for the purpose of manufacturing. While it historically preceded and enabled global trade, it is not the process of global integration itself. Hence, this option is incorrect.

• Liberalisation, Privatisation, and Globalisation (LPG): In India, these economic reforms were introduced in 1991 under the leadership of Prime Minister P.V. Narasimha Rao and Finance Minister Dr. Manmohan Singh to open the Indian economy to the world.

Important Points

• FDI (Foreign Direct Investment): This is a major component of globalization where a company or individual from one country makes an investment into business interests located in another country.

• Impact of Technology: The internet, e-commerce, and mobile telephony have drastically reduced the cost of transactions and communication, accelerating the pace of economic integration.

• Global Value Chains (GVCs): In the current era, products are rarely made in a single country. Different stages of the production process are located in different countries based on comparative advantage and cost efficiency.

• Socio-Cultural Impact: Beyond economics, globalization leads to the exchange of ideas, culture, and values, often leading to a homogenization of cultures or a new hybrid identity.

Q91. Answer: (d) 3.5 cm

Shortcut Trick

=> Surface area = $4\pi r^2 = 154$

=> $r^2 = 154 \div (4 \times 22/7)$

=> $= 154 \times 7 \div 88 = 49/4$

=> $r = \sqrt{(49/4)} = 7/2 = 3.5$

Therefore Answer = 3.5 cm

Alternate Method

Given:

=> Surface area = 154 cm^2

=> π = 22/7

Formula:

=> Surface area of sphere = $4\pi r^2$

Calculations:

=> $4 \times (22/7) \times r^2 = 154$

=> $(88/7) \times r^2 = 154$

=> $r^2 = 154 \times 7 \div 88$

=> $r^2 = 49/4$

=> $r = \sqrt{(49/4)} = 7/2 = 3.5$ cm

Therefore Final Answer: 3.5 cm

Additional Information

Surface Area Formula: $4\pi r^2$

Volume Formula: $(4/3)\pi r^3$

Shortcut Tip: Always simplify constants before solving.

Square Root Rule: $\sqrt{(a/b)} = \sqrt{a} / \sqrt{b}$

Q92. Answer: (b) Rs. 14.40

Shortcut Trick

=> Difference (CI − SI) for 2 years = $P \times (R/100)^2$

=> = $4000 \times (6/100)^2$

=> = $4000 \times 36 / 10000$

=> = 14.4

Therefore Answer = Rs. 14.4

Alternate Method

Given:

=> P = 4000, R = 6%, T = 2 years

Formula:

=> SI = $(P \times R \times T)/100$

=> CI = $P[1 + R/100]^2 - P$

Calculations:

=> SI = $(4000 \times 6 \times 2)/100 = 480$

=> CI = $4000[(1.06)^2 - 1]$

=> = $4000(1.1236 - 1)$

=> = $4000 \times 0.1236 = 494.4$

=> Difference = 494.4 − 480 = 14.4

Therefore Final Answer: Rs. 14.4

Additional Information

2-Year Shortcut: CI − SI = $P \times (R/100)^2$

SI Formula: $(P \times R \times T)/100$

CI Formula: $P(1 + R/100)^n - P$

Exam Tip: Always use shortcut for 2-year CI − SI.

Q93. Answer: (d) Trade and Industry

The correct answer is Trade and Industry.

Key Points

• Shri Uday Kotak is a prominent Indian billionaire banker and the founder of Kotak Mahindra Bank. He has been a pivotal figure in the financial services sector in India for over 38 years.

• He was honored with the Padma Bhushan, India's third-highest civilian award, in the field of Trade and Industry. While the question mentions the year 2026, historically, he was conferred this prestigious award in January 2020. Hence, the statement connecting him to Trade and Industry is correct.

• As the Managing Director and CEO of Kotak Mahindra Bank, he led the institution from its inception as a Non-Banking Financial Company (NBFC) to becoming one of the most valued private sector banks in the country.

• The Government of India often recognizes leaders in the Trade and Industry sector who demonstrate exceptional

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entrepreneurship and contribute significantly to the national economy and wealth creation.

• His recognition in this category highlights his role in strengthening the banking infrastructure and capital markets of India.

Additional Information

• Kotak Mahindra Bank Evolution:

• In 1985, Uday Kotak started Kotak Capital Management Finance Ltd.

• By February 2003, it became the first NBFC in India's corporate history to receive a banking license from the Reserve Bank of India (RBI).

• The bank is headquartered in Mumbai, Maharashtra, and serves millions of customers through a network of over 1,700 branches.

• Roles and Designations:

• He served as the President of the Confederation of Indian Industry (CII) for the year 2020-2021.

• In September 2023, he stepped down as the CEO of Kotak Mahindra Bank, transitiong into a Non-Executive Director role.

• Other Sectors in Padma Awards:

• Science and Innovation: This category typically honors scientists, technologists, and researchers. Shri Uday Kotak does not belong to this category as his primary work is in finance. Hence, this option is incorrect.

• Public Service: Usually reserved for bureaucrats or individuals in governance. While he served on government-appointed boards, his primary contribution is industrial. Hence, this option is incorrect.

• Social Development: Focused on social workers and NGO leaders. Although he engages in philanthropy, his award was for Trade and Industry. Hence, this option is incorrect.

Important Points

• IL&FS Crisis Management: In 2018, the Government of India appointed Uday Kotak as the Non-Executive Chairman of the Infrastructure Leasing & Financial Services (IL&FS) board to help the company navigate through a major liquidity crisis.

• Philanthropy: He established the Kotak Education Foundation in 2007, which works toward the educational and vocational development of underprivileged children in Mumbai.

• Global Recognition: He has been featured consistently in the Forbes Billionaires List and the Bloomberg Billionaires Index, representing the financial strength of Indian industry on a global scale.

• Regulatory Contributions: He chaired the SEBI Committee on Corporate Governance in 2017, which provided guidelines to improve transparency and accountability in listed Indian companies.

Q94. Answer: (d) QR−SW

The logic followed here is based on the alphabetical difference between corresponding letters in each pair:

Option 1: TU − WX

Option 2: EF − HI

Option 3: BC − EF

Option 4: QR − SW

Thus, QR − SW does not follow the common pattern.

Hence, the odd one out is Option 4.

Q95. Answer: (d) Three

The logic followed here is:

Given: Seven people F, G, H, I, U, V, and W are sitting around a circular table facing the centre.

H sits third to the left of W.

U sits to the immediate right of H.

U sits third to the right of I.

V sits second to the left of G.

F is not an immediate neighbour of H.

Here, only 3 people lie between F and G.

Hence, the correct answer is Option 4.

Q96. Answer: (b) 420 m after completing 3 rounds

Shortcut Trick

=> Relative speed = 7 − 5 = 2 m/s

=> Time to meet = 840 ÷ 2 = 420 sec

=> Distance by A = 7 × 420 = 2940 m

=> Rounds = 2940 ÷ 840 = 3 full + 420 m
Therefore Answer = 420 m and 3 complete rounds
Alternate Method
Given:
=> Track length = 840 m
=> Speed of A = 7 m/s
=> Speed of B = 5 m/s
Formula:
=> Relative speed = 7 − 5 = 2 m/s
=> Time = Distance ÷ Relative speed
Calculations:
=> Time to meet = 840 ÷ 2 = 420 sec
=> Distance covered by A = 7 × 420 = 2940 m
=> Number of rounds by A = 2940 ÷ 840 = 3.5
=> Complete rounds = 3
=> Remaining distance = 2940 − (3 × 840)
=> = 2940 − 2520 = 420 m
Therefore Final Answer: 420 m from start and 3 complete rounds
Additional Information
Relative Speed: Same direction => subtract speeds.
Circular Track Rule: First meeting occurs when faster completes one extra lap.
Rounds Concept: Total distance ÷ track length.
Exam Tip: Always report complete rounds separately from remaining distance.

Q97. Answer: (a) Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answe...

Given:
Five people – Nisha, Ojas, Pallav, Ritu, and Suman – are standing in a straight line facing east.
We need to find who is standing second from the left end.
Now,
Statement (I):
Pallav is standing immediately to the left of Ritu, and Ritu is not standing at either end.
=> Pallav–Ritu must be consecutive in the middle positions
=> But positions of Nisha, Ojas, and Suman are not fixed
=> So arrangement is not uniquely determined
=> Statement I alone is not sufficient
Statement (II):
Nisha is at the extreme left end, and Ojas is immediately to the right of Suman
=> Nisha fixed at position 1
=> Suman–Ojas form a consecutive pair somewhere
=> But Pallav and Ritu positions are not fixed
=> So second position from left cannot be uniquely identified
=> Statement II alone is not sufficient
Now, combining (I) and (II):
Nisha = 1st position
Pallav–Ritu are adjacent with Ritu not at ends
Ojas is immediately right of Suman

Position	Person
1	Nisha
2	Pallav

3	Ritu
4	Suman
5	Ojas

So, second from left is Suman

Here, both statements together are sufficient.

Hence, the correct answer is "Option 1".

Q98. Answer: (a) ATP and NADPH

The correct answer is ATP and NADPH.

Key Points

• The light-independent reactions of photosynthesis, also known as the Calvin Cycle or Dark Reactions, occur in the stroma of the chloroplast.

• These reactions are characterized by the fixation of carbon dioxide (CO_2) into organic compounds like glucose.

• ATP (Adenosine Triphosphate) is essential as it provides the chemical energy required for the endergonic steps of the cycle, particularly in the reduction and regeneration phases.

• NADPH (Nicotinamide Adenine Dinucleotide Phosphate) acts as a powerful reducing agent, providing the high-energy electrons necessary to reduce carbon intermediates into carbohydrates.

• Both ATP and NADPH are products of the light-dependent reactions that take place in the thylakoid membranes; thus, they serve as the vital link between the two stages of photosynthesis.

Additional Information

• Stages of the Calvin Cycle:

• Carbon Fixation: The CO_2 molecule is attached to a 5-carbon sugar called RuBP (Ribulose-1,5-bisphosphate) by the enzyme RuBisCO.

• Reduction: The ATP and NADPH are used to convert the fixed carbon into G3P (Glyceraldehyde-3-phosphate), a 3-carbon sugar.

• Regeneration: Remaining G3P molecules use more ATP to regenerate RuBP, allowing the cycle to continue.

• Enzyme Function: RuBisCO (Ribulose-1,5-bisphosphate carboxylase/oxygenase) is the catalyst for the first step of carbon fixation and is considered the most abundant protein on Earth.

• Location: Unlike the light reactions that happen in the grana/thylakoids, the light-independent reactions happen in the fluid-filled space of the chloroplast called the stroma.

• Energy Consumption: To produce one net molecule of G3P, the cycle consumes 9 molecules of ATP and 6 molecules of NADPH.

• Types of Pathways: Most plants use the C3 pathway, but some, like corn and sugarcane, have evolved the C4 pathway to efficiently fix carbon in hot and dry environments.

Important Points

• Historical Context: The cycle was discovered by Melvin Calvin, James Bassham, and Andrew Benson at the University of California, Berkeley, around 1950.

• Total Requirement: For the synthesis of one glucose ($C_6H_{12}O_6$) molecule, the plant requires 6 CO_2, 18 ATP, and 12 NADPH.

• Function of Products: While glucose is the primary carbohydrate produced, it is often converted into starch for storage or cellulose for cell wall structure.

• Environmental Factors: The rate of these reactions is influenced by temperature and CO_2 concentration, rather than directly by light intensity, although they stop when ATP/NADPH supplies from light reactions are depleted.

• By-products: During the process, ADP and NADP+ are released back into the stroma to be recycled and recharged in the thylakoid during the next round of light reactions.

Q99. Answer: (d) Mohiniyaattam

The correct answer is Mohiniyaattam.

Key Points

• Mohiniyaattam literally translates to the 'Dance of the Enchantress'. The word 'Mohini' refers to the feminine avatar of Lord Vishnu, while 'Attam' means dance.

• It is a classical dance form that originated in the state of Kerala, India, and has roots that date back to the 16th century.

• The dance is traditionally a solo performance primarily enacted by women, characterized by graceful, swaying movements that represent the Lasya style (the feminine and delicate aspect of dance).

• The themes of Mohiniyaattam usually revolve around Shringara (love) and Bhakti (devotion), often depicting stories of Lord

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Vishnu or Lord Krishna.

• The costume is distinct and elegant, consisting of a white or creamy-white saree with a rich gold-colored brocade border, known as Kasavu.

Additional Information

• Kathakali: This is another classical dance from Kerala. Unlike Mohiniyaattam, it is a dance-drama traditionally performed by men, characterized by heavy green face paint, elaborate costumes, and masks.

• Thiruvathirakali: It is a popular folk dance of Kerala performed by women in a group during the Onam and Thiruvathira festivals to attain everlasting marital bliss. It is not a classical solo dance.

• Bharatanatyam: This is one of the oldest classical dance forms of India, but it originated in the state of Tamil Nadu, not Kerala. It is known for its fixed upper torso, bent legs, and spectacular footwork.

• Manipravalam: The lyrics or songs used in Mohiniyaattam are generally composed in Manipravalam, which is a literary mixture of the Sanskrit and Malayalam languages.

• Instruments: The musical accompaniment for this dance includes instruments such as the Edakka (pressure drum), Mridangam, Violin, and Veena.

Important Points

• Revival: In the 1930s, the dance form saw a significant revival through the efforts of the nationalist poet Vallathol Narayana Menon, who established the Kerala Kalamandalam to preserve traditional arts.

• Recognition: Mohiniyaattam is officially recognized as one of the eight classical dances of India by the Sangeet Natak Akademi.

• Mudras: The dance utilizes 24 basic mudras (hand gestures) primarily derived from the text Hastha Lakshana Deepika.

• Exponents: Prominent dancers who have contributed to the global fame of this art form include Kanak Rele, Sunanda Nair, Kalamandalam Kalyanikutty Amma (known as the Mother of Mohiniyattam), and Jayaprabha Menon.

• Geographical Indication: While it is an art form, its cultural identity is strictly tied to the Malabar coast and the socio-cultural history of Kerala.

Q100. Answer: (d) Ninety-Third Amendment

The correct answer is Ninety-Third Amendment.

Key Points

• The Ninety-Third Constitutional Amendment Act, 2005 is the landmark legislation that provided for 27% reservation for Other Backward Classes (OBCs) in educational institutions. Hence, the statement regarding the Ninety-Third Amendment is correct.

• This amendment resulted in the insertion of Clause (5) into Article 15 of the Constitution of India. This clause enables the State to make special provisions for the advancement of any socially and educationally backward classes of citizens, or for the Scheduled Castes (SC) or the Scheduled Tribes (ST).

• The scope of this reservation extends to admission to educational institutions, including private institutions, whether aided or unaided by the State, other than the minority educational institutions mentioned in Article 30(1).

• Following this amendment, the Parliament enacted the Central Educational Institutions (Reservation in Admission) Act, 2006, which mandated the 27% quota for OBCs in higher educational institutions such as IITs, IIMs, and Central Universities.

• This move was aimed at promoting social equity and ensuring that individuals from historically disadvantaged backgrounds have better access to higher education and professional opportunities.

Additional Information

• Eighty-Sixth Amendment Act (2002): This amendment dealt with the Right to Education. It inserted Article 21A, making free and compulsory education a Fundamental Right for children in the age group of 6 to 14 years. It did not deal with OBC reservations. Hence, this statement is incorrect in the context of the question.

• Ninety-Fourth Amendment Act (2006): This amendment modified Article 164(1) to exclude Bihar from the requirement of having a Minister in charge of tribal welfare and extended this provision to the states of Chhattisgarh and Jharkhand. Hence, this statement is incorrect.

• Ninety-Seventh Amendment Act (2011): This amendment provided constitutional status and protection to co-operative societies. It made the right to form co-operatives a Fundamental Right under Article 19 and added Part IXB to the Constitution. Hence, this statement is incorrect.

• Article 15(4): Introduced by the First Constitutional Amendment in 1951, it allowed the state to make special provisions for socially and educationally backward classes or SCs/STs, but the 93rd Amendment specifically expanded this to include private educational institutions via Article 15(5).

Important Points

• Mandal Commission: Formally known as the Socially and Educationally Backward Classes Commission (SEBC), it was established in 1979 under the chairmanship of B.P. Mandal. It recommended 27% reservation for OBCs in central government jobs and public sector undertakings.

• Indra Sawhney Case (1992): The Supreme Court of India upheld the 27% reservation for OBCs but introduced the "Creamy Layer" criteria to ensure that the benefits reach the truly needy and capped the total reservation at 50%.

• Ashoka Kumar Thakur v. Union of India (2008): In this case, a five-judge bench of the Supreme Court unanimously upheld the 93rd Amendment and the 2006 Act, confirming the validity of OBC reservations in higher education.

• Latest Developments: Recently, the 103rd Amendment (2019) introduced an additional 10% reservation for the Economically Weaker Sections (EWS) among the general category in educational institutions and government jobs, further expanding the reservation policy landscape in India.

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