RRB NTPC (UG) CBT-I Official Paper (Held On 08 May, 2026 Shift 2) (Previous Year Paper)

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

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MATHEMATICS

Q1. Evaluate $20^3 + (-9)^3 + (-11)^3$

(a) 5930
(b) 5950
(c) 5940
(d) 5992

Q2. If $x = \sqrt{225} + \sqrt{484}$, what is the value of $x^2 - [(\sqrt{225})^2 + (32)^2]$?

(a) 484
(b) 0
(c) 100
(d) 120

Q3. Pooja gets a discount of 17% on a dryer whose marked price is Rs. 2,000. Since she pays by credit card, she gets an additional 10% discount. How much does she pay (in Rs.)?

(a) 1,491
(b) 1,493
(c) 1,495
(d) 1,494

Q4. At present, a father is 30 years older than his son. In 12 years, the father will be three times as old as his son. What is the present age of the son?

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

Q5. If 9 workers can build a wall in 12 days, how many days will 6 workers take to build the same wall, assuming they work at the same rate?

(a) 18
(b) 15
(c) 17
(d) 16

Q6. Find the value of m which satisfies

(19/10)^7 × (10/19)^6 × (19/10)^(10) = (10/19)^(6m + 18)

(a) -27/6
(b) -20/6
(c) -38/6
(d) -29/6

Q7. If x is the mean proportional between (a+b) and (a-b), then find the value of x.

(a) √(a - b)
(b) √(a + b)
(c) √(a^2-b^2)
(d) √(a^2+b^2)

Q8. The difference between a discount of 35% and two successive discounts of 20% and 15% on a certain marked price is Rs. 70. Find the marked price (rounded off to the nearest integer).

(a) Rs. 2,333
(b) Rs. 2,433
(c) Rs. 2,367
(d) Rs. 2,467

Q9. The enrolment of students in an institution increased by 10% in April compared to the number of students in March and then decreased by 5%, resulting in 1045 students in June. Find the number of students in March.

(a) 1050
(b) 900
(c) 1000
(d) 1085

Q10. What is the arithmetic mean of the dataset {12, 25, 37, 48, 56, 61, 73, 85, 92, 104}?

(a) 57.3
(b) 58.3
(c) 56.3
(d) 59.3

Q11. The expenditures of R are 65% of his salary. If his salary increased by 10% and his savings are Rs. 3,150 more than previous savings, his expenditures are now 60% of his salary. His present salary is Rs. _____.

(a) 38,500
(b) 37,500
(c) 39,000
(d) 35,000

Q12. The value of $((2.3)^3 + (1.5)^3 + (1.2)^3 - 3 \times 2.3 \times 1.5 \times 1.2)/((2.3)^2 + (1.5)^2 + (1.2)^2 - 2.3 \times 1.5 - 1.5 \times 1.2 - 1.2 \times 2.3)$ is equal to:

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

Q13. The average of 5 consecutive integers is 10. What is the smallest integer?

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

Q14. Three numbers are in the ratio 17 : 13 : 8, and their LCM is 7072. Their HCF is:

(a) 23
(b) 3
(c) 4
(d) 12

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Q15. If the third proportional to 4 and 6 is used as the base of a rectangle, and the first number (4) is its height, what is the area of the rectangle?

(a) 30 unit2
(b) 36 unit2
(c) 48 unit2
(d) 24 unit2

Q16. A sum of Rs. 25,000 is invested at 2% per annum compounded annually. Find the compound interest after 2 years.

(a) Rs. 1,130
(b) Rs. 1,050
(c) Rs. 1,230
(d) Rs. 1,010

Q17. A shopkeeper offers the following schemes on toys of the same marked price.

(A) Successive discounts of 35% and 4% on any number of toys bought.

(B) Successive discounts of 45%, 46% and 50% on any number of toys bought.

(C) 15% discount on the first 3 toys and 5% discount on each toy thereon.

(D) 2 toys free of cost on buying 9 toys.

A customer wants to buy 9 toys. Which of the above schemes is the least beneficial to her?

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

Q18. A keg is fitted with three taps A, B and C. If opened together, all the three taps will drain the full keg in 11/2 minutes. Taps A and B together take 3 minutes to drain the keg while taps B and C together take 41/2 minutes to drain it. How long (in minutes) taps A and C together take to drain the keg?

(a) 9/7
(b) 4/7
(c) 4/9
(d) 5/7

Q19. A park is designed in the shape of a right-angled triangle, where the two shorter sides measure 13 m and 84 m. A circular track with a uniform width of 2 m is constructed such that its outer boundary coincides with the circumcircle of the triangular park. Determine the perimeter of the inner boundary of this circular track.

(a) 81π m
(b) 89π m
(c) 85π m
(d) 82π m

Q20. The angle of elevation of the top of a tree from a point on the ground is 30°. After moving 10 m towards the tree, the angle of elevation becomes 60°. Find the height of the tree.

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

Q21. The 5-digit number 7a35b is divisible by 45, where a and b are positive integers. What is the value of (a + b)?

(a) 14
(b) 5
(c) 12
(d) 7

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Q22. Yogesh invested a certain sum of money at 10% per annum. After 2 years, he received Rs. 147 as compound interest, compounded annually. Find the corresponding simple interest (in Rs.) for 2 years at the same rate.

(a) 140
(b) 130
(c) 125
(d) 135

Q23. A man is walking at 4 km/hr. A 180 m long train crosses him in 12 seconds while coming from the opposite direction. What is the speed of the train (in km/hr)?

(a) 61
(b) 50
(c) 45
(d) 32

Q24. Ram has Rs. 1000 in the denomination of Rs. 10, Rs. 20 and Rs. 5 notes. If the number of Rs. 10 notes is 16 more than that of Rs. 20 notes and the number of Rs. 5 notes is twice the number of Rs. 20 notes, find the total number of notes that Ram has.

(a) 90
(b) 120
(c) 100
(d) 80

Q25. Two taps can fill a cistern in 4 hours and 8 hours, respectively. A third tap can empty it in 4 hours. How long (in hours) will it take to fill one-fourth of the empty cistern if all the taps are opened together?

(a) 8
(b) 4
(c) 6
(d) 2

Q26. Two trains, A and B, start simultaneously from stations Delhi and Mumbai respectively towards each other on parallel tracks. After meeting, train A takes 16 hours to reach Mumbai, and train B takes 9 hours to reach Delhi. If train A's speed is 60 km/h, what is the length of train B (in meters), given that it crosses a pole in 18 seconds?

(a) 300
(b) 420
(c) 400
(d) 280

Q27. Two solid hemispheres are joined together to make a sphere. The total surface area of solids reduced by approximately ___%.

(a) 50
(b) 33.33
(c) 66.67
(d) 25

Q28. Lekhraj sells an article at a profit of 25%. If the cost price is increased by 20% and the selling price is reduced by 10%, what percentage loss will Lekhraj incur?

(a) 6.5%
(b) 7.25%
(c) 7.5%
(d) 6.25%

Q29. In a science experiment, chemicals X, Y, and Z are mixed in the ratio 5:2:3. If the total weight of the mixture is 100 grams, how much of chemical Y is present?

(a) 50 grams
(b) 10 grams
(c) 20 grams

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(d) 30 grams

Q30. Find the measure of the unknown interior angle in an irregular hexagon with angles 140°, 80°, 145°, 155°, and 100°.

(a) 100°
(b) 120°
(c) 105°
(d) 110°

GENERAL AWARENESS

Directions

Q31. The winner of the Nobel Prize in Literature for 2025, author László Krasznahorkai, belongs to which country?

(a) Romania
(b) Slovakia
(c) Serbia
(d) Hungary

Q32. What is the function of the keyboard shortcut Alt + F10?

(a) Maximizes the current window
(b) Selects the active tab on the Ribbon and shows access keys
(c) Opens the Help menu
(d) Closes the document

Q33. Which memory is fastest and located very close to the CPU?

(a) Cache Memory
(b) Hard Disk
(c) Pen Drive
(d) CD-ROM

Q34. As per RTI Rules 2012, a person below poverty line is liable to pay what amount as application fee to file an RTI?

(a) Rs. 5
(b) Rs. 2
(c) Rs. 10
(d) No payment

Q35. During which of the following revolutions in India did planned investment in horticulture become highly productive, leading to the emergence of the sector as a sustainable livelihood option?

(a) Blue revolution
(b) Golden revolution
(c) Green revolution
(d) White revolution

Q36. Which of the following is NOT a prominent language of the Indo-Aryan family?

(a) Kurukh
(b) Bengali
(c) Hindi
(d) Urdu

Q37. Which international health day was celebrated on November 14, 2025?

(a) World Health Day
(b) World Malaria Day
(c) World Hypertension Day
(d) World Diabetes Day

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Q38. How did Aurobindo Ghosh contribute to the extremist phase of the Indian national movement?

(a) Promoting constitutional agitation through petitions and legislative reforms
(b) Promoting passive resistance and boycott by linking nationalism with spiritual ideals
(c) Organising revolutionary activities based on socialist and labour ideologies
(d) Leading peasant movements focused on agrarian tax reduction campaigns

Q39. Which category of beneficiaries is eligible for Rs. 1 lakh under Telangana's Revanth Anna ka Sahara-Miskeen la Kosam scheme launched in September 2025?

(a) Economically weak Muslim families
(b) Overseas migrant workers from Telangana
(c) Tribal self-help groups
(d) Minority teachers in private institutions

Q40. Which of the following was NOT recommended by the 73^(rd) Indian Constitutional Amendment Act?

(a) Establishment of State Finance Commissions
(b) Establishment of Zila panchayat at district level
(c) Establishment of Finance Commission of India
(d) Establishment of a three-tier structure

Q41. A doctor prescribes a lens with a power of P=−2.5 D to a patient. This lens is _____.

(a) A convex lens, used to correct Myopia.
(b) A concave lens, used to correct Hypermetropia.
(c) A concave lens, used to correct Myopia.
(d) A convex lens, used to correct Hypermetropia.

Q42. What was the impact of the 1990s' reforms on India's economic growth?

(a) They led to more sustainable growth.
(b) They caused economic instability.
(c) They had no significant impact.
(d) They resulted in economic stagnation.

Q43. On 16 September 2025, World Ozone Day was observed under which theme?

(a) Montreal Protocol: Our Shield, Our Future
(b) Ozone for Life
(c) From Science to Global Action
(d) Global Cooperation Protecting Life on Earth

Q44. In December 2025, which of the following companies introduced "Aantriva", an AI-enabled platform to improve agri-food supply-chain visibility?

(a) Alliance Broadband Services Pvt. Ltd.
(b) Syngenta
(c) Ayekart
(d) Tech Mahindra

Q45. The Goa Carnival is primarily associated with which of the following cultural or religious traditions?

(a) Jewish traditions
(b) Persian traditions
(c) Christian tradition
(d) Buddhist tradition

Q46. Which Article of the Indian Constitution empowers the Parliament to make grants to the States which are in need of financial assistance?

(a) Article 265
(b) Article 255
(c) Article 275

(d) Article 285

Q47. Which deity was worshipped as the chief female deity in Harappan culture?

(a) Lakshmi
(b) Saraswati
(c) Mother Goddess
(d) Durga

Q48. According to Joule's law of heating, heat produced in a resistor is expressed by which relation?

(a) H = IR
(b) H = I^2Rt
(c) H = Vt
(d) H = V/I

Q49. Which of the following is the most widely used irrigation method in India?

(a) Surface irrigation
(b) Drip irrigation
(c) Sprinkler irrigation
(d) Subsurface irrigation

Q50. Which of the following is an example of General-Purpose Software?

(a) Accounting Software made for a company
(b) School Management Software
(c) A Customized Website
(d) LibreOffice Calc

Q51. Which community lost its constitutional provision of nominated representation in legislatures through the 104^(th) Amendment Act?

(a) Jains
(b) Scheduled Tribes
(c) Scheduled Castes
(d) Anglo-Indians

Q52. Which of the following dance forms originated in the temples of Odisha and often depicts the divine love of Radha and Krishna?

(a) Karam
(b) Dalkhai
(c) Ghumura dance
(d) Odissi

Q53. Which of the following countries has one of the highest population densities?

(a) Russia
(b) Australia
(c) India
(d) Canada

Q54. Which of the following types of weathering is common in areas with large temperature differences between day and night?

(a) Exfoliation
(b) Carbonation
(c) Oxidation
(d) Solution

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Q55. Which of the following was the first electro-mechanical computer?

(a) UNIVAC
(b) ENIAC
(c) Mark I
(d) EDVAC

Q56. Krishna Basin mainly extends over which of the following groups of states?

(a) Maharashtra, Gujarat and Madhya Pradesh
(b) Maharashtra, Madhya Pradesh and Chhattisgarh
(c) Maharashtra, Odisha and Karnataka
(d) Maharashtra, Karnataka and Andhra Pradesh

Q57. Which of the following regions, ruled by the Maukharies, gradually replaced Pataliputra as a political centre of North India?

(a) Allahabad
(b) Patna
(c) Thanesar
(d) Kannauj

Q58. What is the primary goal of the Energy Conservation Act (EC Act) of 2001, enacted by the Government of India?

(a) To encourage the use of hydrocarbons
(b) To increase CO_2 emissions
(c) To promote renewable energy sources
(d) To reduce energy intensity in the Indian economy

Q59. Which of the following economic models formed the basis of the Second Five-Year Plan?

(a) Neo-classical minimal-state model
(b) Market-led export model
(c) Mahalanobis heavy-industry model
(d) Agrarian cooperative model

Q60. 'The Mango Season' is a book written by _____ and is a story of an Indian woman of modern India.

(a) Sandhya Menon
(b) Sara Desai
(c) Amulya Malladi
(d) Alka Joshi

Q61. The fibrous root system, in which the primary root is short-lived and replaced by numerous adventitious roots, is a characteristic feature of which group of plants?

(a) Dicotyledonous
(b) Gymnosperms
(c) Pteridophytes
(d) Monocotyledonous

Q62. Who among the following was a prominent Moderate leader of the Indian National Congress?

(a) Subhas Chandra Bose
(b) Bhagat Singh
(c) Bal Gangadhar Tilak
(d) Pherozeshah Mehta

Q63. The 3rd Trilateral Consultations between India, Iran and Armenia was held at which place in September 2025?

(a) Mumbai
(b) New Delhi
(c) Yerevan
(d) Tehran

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Q64. What is the theme of the 18^(th) Pravasi Bharatiya Divas 2025?

(a) Global Indians for Atmanirbhar Bharat
(b) Diaspora's contribution to a Viksit Bharat
(c) Diaspora and Digital India
(d) Connecting the Indian Diaspora

Q65. Gopal Krishan Gokhale went to England in 1897 to give evidence before which commission?

(a) Hunter Commission
(b) Welby Commission
(c) Fraser Commission
(d) Raleigh Commission

Q66. 'Effect of Proclamation of Emergency' is explicitly provided in which of the following provisions of the Constitution of India?

(a) Article 353
(b) Article 350
(c) Article 256
(d) Article 252

Q67. Which of the following subjects was addressed by the 42nd Constitutional Amendment, granting Parliament the authority to establish tribunals?

(a) Service conditions of public servants
(b) Judicial review of laws made by high court
(c) Election disputes of states only
(d) Religious disputes

Q68. Which of the following country will host the 2025 United Nations Ocean Conference?

(a) South Africa
(b) Barbados
(c) Portugal
(d) France

Q69. In the process of ecological succession, the entire sequence of communities that successively change in a given area are called _____.

(a) Climax
(b) Ecesis
(c) Invasion
(d) Sere

Q70. Which of the following correctly describes eutrophication?

(a) Mixing of cold and warm water currents in oceans
(b) Accumulation of non-biodegradable chemicals at higher trophic levels
(c) Neutralisation of acidic water by dissolved minerals
(d) Enrichment of water with nutrients leading to excessive algal growth

GENERAL INTELLIGENCE AND REASONING

Q71. Jay ranked 12^(th) from the bottom and 9^(th) from the top in his class. How many students are there in his class?

(a) 20
(b) 18
(c) 19
(d) 17

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Q72. In a certain code language,

A % B means ‘A is the father of B’,

A € B means ‘A is the wife of B’,

A = B means ‘A is the brother of B’, and

A ? B means ‘A is the daughter of B’.

Based on the above, how is B related to X if 'B = C ? O % P € X'?

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

Q73. HLJN is related to JNLP in a certain way based on the English alphabetical order. In the same way, EIGK is related to GKIM. To which of the following is FJHL related, following the same logic?

(a) HKIN
(b) HLIN
(c) HLJN
(d) HMIN

Q74. Based on the English alphabetical order, three of the following four are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) JKL
(b) FGH
(c) BDD
(d) LMN

Q75. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which is the one that DOES NOT belong to that group?

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

(a) LHM
(b) RNS
(c) OKM
(d) UQV

Q76. Each letter in the word LANGUID is arranged in the English alphabetical order. How many letters are there in the English alphabetical order between the letter which is third from the left and the one which is third from the right in the new letter cluster thus formed?

(a) 4
(b) 6
(c) 2
(d) 5

Q77. Seven people F, G, H, L, M, O and Q are sitting around a circular table, facing the centre of the table. Only one person sits between Q and L when counted from the right of Q. Only one person sits between L and M when counted from the left of M. Only one person sits between Q and G when counted from the right of G. Only two people sit between H and M when counted from the left of M. Only one person sits between F and G when counted from the right of F. Who sits to the immediate right and left of O, respectively?

(a) G and F
(b) Q and G
(c) F and L
(d) Q and L

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Q78. In the following triad, each group of letters is related to the subsequent one following a certain logic. Select, from the given options, the one which follows the same logic.

TREK - RTEK - KRTE

MAPS - AMPS - SAMP

(a) OPEN - OEPN - NEPO
(b) WISE - IWSE - EIWS
(c) SIDE - ISDE - IDES
(d) MANY - AMNY - YANM

Q79. Akshay starts from Point A and drives 12 km towards the north. He then takes a right turn, drives 15 km, turns right and drives 17 km. He then takes a right turn and drives 18 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-degree turns only unless specified.)

(a) 2 km to the east
(b) 4 km to the west
(c) 5 km to the west
(d) 3 km to the east

Q80. If 1 is added to each odd digit and 1 is subtracted from each even digit in the number 47321568, which of the following digits will be first from the left in the new number thus formed?

(a) 3
(b) 5
(c) 7
(d) 8

Q81. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements: All clouds are water. Some water is vapor.

Conclusions:

(I) Some clouds are vapor.

(II) Some vapor is water.

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

Q82. In a certain code language, ‘PINS’ is coded as ‘3247’ and ‘HIPS’ is coded as ‘4627’. What is the code for ‘H’ in the given code language?

(a) 2
(b) 6
(c) 4
(d) 7

Q83. In a certain code language,

'A @ B' means ‘A is the mother of B’,

'A & B' means ‘A is the husband of B’,

'A # B' means ‘A is the father of B’,

'A % B' means ‘A is the son of B’ and

'A * B' means ‘A is the daughter of B’.

If G @ K & V * P # W % J, then how is J related to K?

(a) Wife’s sister
(b) Wife's mother
(c) Mother

(d) Daughter

Q84. In a certain code language, ‘unit flash zebra’ is coded as ' mi de cz' and ‘zebra dance king’ is coded as ‘de uv id’. How is ‘zebra’ coded in the given language?

(a) cz
(b) uv
(c) mi
(d) de

Q85. Refer to the following series and answer the question. (Counting to be done from left to right only.) (All numbers are single-digit numbers only.)

(Left) 9 7 6 4 3 5 7 6 4 6 7 6 9 8 7 7 6 6 7 6 5 7 6 8 7 5 6 (Right)

How many such even digits are there, each of which is immediately preceded by a perfect square and immediately followed by an even digit? (NOTE: 1 is also a perfect square)

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

Q86. Seven people, L, V, H, D, E, F and T, are sitting in a row, facing north.

Only four people sit to the right of D. V sits fourth from the left end. E is the immediate neighbour of H and T. F sits third to the left of T.

How many people sit between L and H?

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

Q87. What should come in place of the ‘?’ in the given series?

28 12 10 13 24 ?

(a) 58
(b) 65
(c) 70
(d) 60

Q88. Based on the alphabetical order, three of the following four are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) EGF
(b) BDC
(c) HJI
(d) VYW

Q89. What should come in place of the ‘?’ in the given series?

10 13 22 41 66 101 ?

(a) 164
(b) 142
(c) 146
(d) 124

Q90. Seven boxes F, A, C, T, O, R and S are kept one over the other but not necessarily in the same order. Only two boxes are kept below A. Only three boxes are kept between T and A. Only one box is kept between S and R. R is kept immediately above A. Only four boxes are kept between S and F. O is kept at someplace above C. How many boxes are kept below O?

(a) Two

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

Q91. What should come in place of ? in the given series based on the English alphabetical order?

WAX BFC GKH LPM ?

(a) QUR
(b) QTQ
(c) QVQ
(d) QRT

Q92. Seven boxes I, J, K, M, N, P and Q are kept one over the other but not necessarily in the same order. Only three boxes are kept between box K and box P. Only one box is kept between box I and box P, where box I is kept at the topmost position. Box N is kept immediately above box Q. Only two boxes are kept between box N and box M. Which box is kept fourth from the top?

(a) Q
(b) N
(c) P
(d) J

Q93. 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 their constituent digits. E.g. 13 – Operations on 13 such as adding / subtracting /multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

54, 110

56, 114

(a) 45, 90
(b) 48, 96
(c) 62, 126
(d) 58, 120

Q94. Select the option that represents the correct order of the given words as they would appear in an English dictionary.

1. Mistake
2. Mild
3. Mist
4. Migrate
5. Milk

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

Q95. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

HDK 10, LIO 15, PNS 20, TSW 25, ?

(a) XYB 30
(b) YYB 30
(c) YXA 28
(d) XXA 30

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Q96. Select the triad which follows the same pattern as that followed by the two triads given below. Both triads follow the same pattern.

RN-TP-VY

PL-RN-TW

(a) MJ-PL-RV
(b) MJ-PK-RV
(c) NJ-PL-RU
(d) NJ-PL-RV

Q97. What will come in place of the question mark (?) in the following equation if '+' and '−' are interchanged and '×' and '÷' are interchanged?

805 ÷ 2 + 26 − 1203 × 3 = ?

(a) 1588
(b) 1985
(c) 1598
(d) 1895

Q98. What should come in place of the question mark (?) in the given series to make it logically complete?

ON35, MP44, KR53, ?

(a) IT62
(b) JT65
(c) JU62
(d) IU63

Q99. If '+' means '−', '−' means '×', '×' means '÷', '÷' means '+', then what will come in place of the question mark (?) in the following equation?

18 − 3 ÷ 9 + 15 × 3 = ?

(a) 50
(b) 57
(c) 58
(d) 49

Q100. Read the given statement(s) 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 statement(s).

Statements:

All chairs are bats.

No bat is a hat.

Conclusions:

(I) No chair is a hat.

(II) Some hats are bats.

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

ANSWER KEY

1	c	2	d	3	d	4	b	5	a	6	d	7	c	8	a	9	c	10	d
11	a	12	c	13	a	14	c	15	b	16	d	17	d	18	a	19	a	20	b
21	c	22	a	23	b	24	c	25	d	26	c	27	b	28	d	29	c	30	a
31	d	32	b	33	a	34	d	35	b	36	a	37	d	38	b	39	a	40	c

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41	c	42	a	43	c	44	c	45	c	46	c	47	c	48	b	49	a	50	d
51	d	52	d	53	c	54	a	55	c	56	d	57	d	58	d	59	c	60	c
61	d	62	d	63	d	64	b	65	b	66	a	67	a	68	d	69	d	70	d
71	a	72	a	73	c	74	c	75	c	76	a	77	b	78	b	79	d	80	a
81	a	82	b	83	b	84	d	85	d	86	c	87	a	88	d	89	b	90	c
91	a	92	d	93	c	94	c	95	d	96	c	97	b	98	a	99	c	100	c

SOLUTIONS

Q1. Answer: (c) 5940

Shortcut Trick

Use the algebraic identity: If a + b + c = 0, then $a^3 + b^3 + c^3 = 3abc$.

Here, a = 20, b = −9, and c = −11.

Sum = 20 + (−9) + (−11) = 20 − 20 = 0.

Therefore $20^3 + (-9)^3 + (-11)^3 = 3 \times 20 \times (-9) \times (-11) = 60 \times 99 = 5940$.

Therefore The correct answer is 5940.

Alternate Method

Given: $20^3 + (-9)^3 + (-11)^3$

Formula Used: Direct calculation of cubes.

=> $20^3 = 20 \times 20 \times 20 = 8000$

=> $(-9)^3 = (-9) \times (-9) \times (-9) = -729$

=> $(-11)^3 = (-11) \times (-11) \times (-11) = -1331$

=> 8000 + (−729) + (−1331)

=> 8000 − (729 + 1331)

=> 8000 − 2060

=> 5940

Therefore The correct answer is 5940.

Additional Information

Special Algebraic Identity

The conditional identity states that if a + b + c = 0, then the sum of their cubes is exactly 3abc.

General Cube Formula

$a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$. This formula explains why the sum equals 3abc when the first factor is zero.

Negative Base Property

The cube of a negative number is always negative: $(-x)^3 = -(x^3)$.

Q2. Answer: (d) 120

Shortcut Trick

Directly substitute the perfect squares: √225 = 15 and √484 = 22.

Find variable x: x = 15 + 22 = 37.

Solve target expression: $37^2 - (15^2 + 32^2)$.

Simplify: 1369 − (225 + 1024) = 1369 − 1249 = 120.

Therefore The correct answer is 120.

Alternate Method

Given:

$x = \sqrt{225} + \sqrt{484}$

Expression to solve: $x^2 - [(\sqrt{225})^2 + (32)^2]$

Step-by-step Calculation:

=> First, determine the value of x by calculating square roots:

=> √225 = 15

=> √484 = 22
=> x = 15 + 22 = 37
=> Now, substitute x into the expression:
=> $(37)^2 - [(15)^2 + (32)^2]$
=> 1369 − [225 + 1024]
=> 1369 − 1249
=> 120
Therefore The correct answer is 120.
Additional Information
Perfect Square Roots
Memorizing squares up to 40 helps in simplification; for example, $15^2 = 225$, $22^2 = 484$, $32^2 = 1024$, and $37^2 = 1369$.
BODMAS Rule
Always prioritize Brackets, then Orders (powers/roots), followed by Division, Multiplication, Addition, and lastly Subtraction.
Algebraic Identity Shortcut
If $x = a + b$, then $x^2 = a^2 + b^2 + 2ab$. In this problem, substituting a = √225 and b = √484 can also simplify the calculation steps.

Q3. Answer: (d) 1,494

Shortcut Trick
Net successive discounts are 17% and 10% on the Marked Price.
Final Selling Price = Marked Price × (100 − d1)% × (100 − d2)%
Final Selling Price = 2000 × 83% × 90%
Final Selling Price = 2000 × 0.83 × 0.9 = 1494
Therefore The correct answer is Rs. 1494.
Alternate Method
Given:
Marked Price (MP) = Rs. 2,000
First Discount = 17%
Additional Discount (Credit Card) = 10%
Calculations:
=> Price after 17% discount = 2000 − (17/100 × 2000)
=> Price after 17% discount = 2000 − 340 = Rs. 1,660
=> Additional 10% discount on Rs. 1,660 = 10/100 × 1660 = Rs. 166
=> Final amount paid by Pooja = 1660 − 166 = Rs. 1,494
Therefore The correct answer is Rs. 1494.
Additional Information
Effective Successive Discount
For two successive discounts of a% and b%, the single equivalent discount is (a + b − ab/100)%.
Discount and Selling Price
Selling Price (SP) = Marked Price (MP) − Discount. Also, Discount % = (Discount ÷ MP) × 100.
Marked Price vs Cost Price
The relation between CP and MP is given by MP ÷ CP = (100 + Profit%) ÷ (100 − Discount%).

Q4. Answer: (b) 3 years

Shortcut Trick
The age difference between two people always remains constant (30 years).
In 12 years, the ratio of Father : Son = 3 : 1.
Difference in ratio parts = 3 − 1 = 2 units => 30 years.
1 unit = 15 years (This is the son's age after 12 years).
Present age of son = 15 − 12 = 3 years.
Therefore The correct answer is 3 years.
Alternate Method
Given: Current age difference = 30 years. Multiplier after 12 years = 3.

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Formula Used: Age after n years = Present age + n.

=> Let the Present age of the son be S.

=> Then, Father's present age = S + 30.

=> After 12 years, Father's age = (S + 30) + 12 = S + 42.

=> After 12 years, Son's age = S + 12.

=> According to the question: S + 42 = 3 × (S + 12)

=> S + 42 = 3S + 36

=> 42 − 36 = 3S − S

=> 6 = 2S

=> S = 3

Therefore The correct answer is 3 years.

Additional Information

Constant Age Difference

The numerical difference between the ages of two individuals never changes, regardless of how many years pass.

Ratio Method in Ages

When ages are given in ratios at different times, adjust the ratio difference to match the actual age difference to find values quickly.

Average Age Calculation

If the average age of n people is A, then after k years, their new average age will be A + k.

Q5. Answer: (a) 18

Shortcut Trick

Total work is constant, so use the formula: M1 × D1 = M2 × D2.

9 workers × 12 days = 6 workers × D2

108 = 6 × D2

D2 = 108 ÷ 6 = 18 days.

Therefore The correct answer is 18 days.

Alternate Method

Given:

Initial number of workers (M1) = 9

Initial time taken (D1) = 12 days

New number of workers (M2) = 6

Formula Used:

Total Work = Number of Workers × Number of Days

Calculations:

=> Total work done by 9 workers in 12 days = 9 × 12 = 108 man-days

=> Since the wall is the same, 6 workers must complete the same 108 man-days of work.

=> Days taken by 6 workers = Total Work ÷ M2

=> Days = 108 ÷ 6

=> Days = 18 days

Therefore The correct answer is 18 days.

Additional Information

Inverse Variation in Work

When the rate of work is constant, the number of workers is inversely proportional to the time taken. If workers decrease, time increases proportionally.

The Chain Rule (M-D-H Formula)

For different work quantities or hours per day: (M1×D1×H1)/W1 = (M2×D2×H2)/W2, where H is hours and W is units of work.

Efficiency Concept

Efficiency × Time = Total Work. Efficiency is the work done per unit of time (e.g., 1 day or 1 hour).

Q6. Answer: (d) -29/6

Shortcut Trick

Convert all terms to the same base (19/10) to compare the exponents directly.

LHS total power = 7 + (−6) + 10 = 11.

RHS power = −(6m + 18) = −6m − 18.

Equating powers: 11 = −6m − 18 => 6m = −29.

Therefore The correct answer is −29/6.

Alternate Method

Given:

((19)/(10))^7 × ((10)/(19))^6 × ((19)/(10))^(10) = ((10)/(19))^(6m + 18)

Formula Used:

Product Law: a^x × a^y = a^(x+y)

Reciprocal Rule: (a/b)^x = (b/a)^(−x)

Calculations:

=> ((19)/(10))^7 × ((19)/(10))^(−6) × ((19)/(10))^(10) = ((10)/(19))^(6m + 18) => ((19)/(10))^((7 − 6 + 10)) = ((19)/(10))^(−(6m + 18)) => ((19)/(10))^{11} = ((19)/(10))^(−6m − 18)

Since the bases are equal, we can equate the exponents:

=> 11 = −6m − 18 => 6m = −18 − 11 => 6m = −29 => m = −29/6

Therefore The correct answer is −29/6.

Additional Information

Product Rule of Exponents

When multiplying terms with the same base, the powers are added: a^m × a^n = a^(m+n).

Negative Exponent Rule

A negative power indicates the reciprocal of the base with a positive power: (a/b)^(−n) = (b/a)^n.

Property of Equality

In an equation where the bases are the same (and not 0, 1, or −1), the powers must be equal: a^x = a^y => x = y.

Q7. Answer: (c) √(a²-b²)

Shortcut Trick

The mean proportional x between two numbers m and n is calculated using x = √(m × n).

Substitute m = (a + b) and n = (a − b).

x = √((a + b) × (a − b))

Using the identity (a + b)(a − b) = a² − b², we get x = √(a² − b²).

Therefore The correct answer is √(a² − b²).

Alternate Method

Given: The terms are (a + b) and (a − b), and their mean proportional is x.

Formula Used: If three quantities A, B, and C are in continued proportion, then A : B = B : C, which means B² = A × C. Here, B is the mean proportional.

=> (a + b) / x = x / (a − b)

=> x² = (a + b) × (a − b)

=> We know that (x + y)(x − y) = x² − y²

=> x² = a² − b²

=> x = √(a² − b²)

Therefore The correct answer is √(a² − b²).

Additional Information

Third Proportional

For two numbers a and b, the third proportional c is calculated as c = b² / a, where a : b = b : c.

Fourth Proportional

For three numbers a, b, and c, the fourth proportional d is calculated as d = (b × c) / a, where a : b = c : d.

Continued Proportion

Quantities a, b, c, d are in continued proportion if a/b = b/c = c/d.

Q8. Answer: (a) Rs. 2,333

Shortcut Trick

Effective successive discount of 20% and 15% = 20 + 15 − (20 × 15)/100 = 32%.

Difference between 35% and 32% = 3%.

Given, 3% of Marked Price = Rs. 70.
Total MP (100%) = (70 ÷ 3) × 100 = 7000 ÷ 3 ≈ Rs. 2,333.
Therefore The correct answer is Rs. 2,333.
Alternate Method
Given:
Single discount percentage = 35%
Two successive discount percentages = 20% and 15%
Difference between the two discount amounts = Rs. 70
Formula Used:
Equivalent single discount for two successive discounts a% and b% = [a + b − (ab/100)]%
Discount Amount = (Discount% / 100) × Marked Price
Calculations:
=> Let the Marked Price be M.
=> Equivalent of successive discounts = 20 + 15 − (20 × 15)/100 = 35 − 3 = 32%
=> First discount amount = 0.35M
=> Second discount amount = 0.32M
=> Difference = 0.35M − 0.32M = 0.03M
=> 0.03M = 70
=> M = 70 / 0.03 = 7000 / 3
=> M = 2333.333...
=> Rounded to nearest integer, M = 2,333.
Therefore The correct answer is Rs. 2,333.
Additional Information
Successive Discount Formula
For three successive discounts a%, b%, and c%, first find equivalent of a and b as x%, then find equivalent of x and c. Effective = x + c − (xc/100).
Relationship between MP and CP
MP/CP = (100 + Profit%) / (100 − Discount%). This is used when both profit and discount percentages are given.
Selling Price Calculation
SP = MP × (1 − d1/100) × (1 − d2/100) for multiple discounts.

Q9. Answer: (c) 1000

Shortcut Trick
Net percentage change = 10 − 5 − (10 × 5 ÷ 100) = 4.5% increase.
Final enrolment in June = 100% + 4.5% = 104.5%.
Given, 104.5% = 1045 students.
March enrolment (100%) = (1045 ÷ 104.5) × 100 = 1000.
Therefore The correct answer is 1000.
Alternate Method
Given:
Enrolment in June = 1045
Increase in April = 10%
Decrease in May/June = 5%
Let the number of students in March be x.
=> Students in April = x + (10 ÷ 100) × x = 1.1x
=> Students in June = 1.1x − (5 ÷ 100) × 1.1x
=> 1045 = 1.1x × 0.95
=> 1045 = 1.045x
=> x = 1045 ÷ 1.045
=> x = 1000
Therefore The correct answer is 1000.
Additional Information

Successive Percentage Change

If a value is changed by a% and then by b%, the net percentage change is given by the formula: [a + b + (ab/100)]%.

Multiplying Factor Method

An increase of r% is equivalent to multiplying by (1 + r/100), and a decrease of r% is equivalent to multiplying by (1 − r/100).

Base Value Property

The original value (March in this case) is always considered the 100% base for initial calculations.

Q10. Answer: (d) 59.3

Shortcut Trick

Assume an Assumed Mean (A) = 60.

Deviations from 60: −48, −35, −23, −12, −4, +1, +13, +25, +32, +44.

Sum of deviations (Σd) = −7.

Average deviation = Σd ÷ n = −7 ÷ 10 = −0.7.

Actual Mean = Assumed Mean + Average Deviation = 60 − 0.7 = 59.3.

Therefore The correct answer is 59.3.

Alternate Method

Given:

Dataset = {12, 25, 37, 48, 56, 61, 73, 85, 92, 104}

Formula Used:

Arithmetic Mean = (Sum of all observations) ÷ (Total number of observations)

Calculations:

=> Sum = 12 + 25 + 37 + 48 + 56 + 61 + 73 + 85 + 92 + 104

=> Sum = 593

=> Total count (n) = 10

=> Arithmetic Mean = 593 ÷ 10

=> Arithmetic Mean = 59.3

Therefore The correct answer is 59.3.

Additional Information

Median

The middle value of a sorted dataset. For even n, it is the average of the two middle terms: (56 + 61) ÷ 2 = 58.5.

Range

The difference between the maximum and minimum values: 104 − 12 = 92.

Relation between Mean, Median, and Mode

Empirical formula: Mode = 3 × Median − 2 × Mean.

Q11. Answer: (a) 38,500

Shortcut Trick

Ratio of Initial Salary to New Salary = 100 : 110

Initial Savings = 35% of 100 = 35 units

New Savings = 40% of 110 = 44 units (Since new Expenditure is 60%)

Difference in Savings = 44 − 35 = 9 units → Rs. 3,150

1 unit = 3150 ÷ 9 = 350

Present Salary = 110 × 350 = Rs. 38,500

Therefore The correct answer is Rs. 38,500.

Alternate Method

Given:

Initial Expenditure = 65% of Salary

Salary increase = 10%

Savings increase = Rs. 3,150

New Expenditure = 60% of New Salary

Formula Used:

Salary = Expenditure + Savings

Calculations:

Let the Initial Salary be 100x.

=> Initial Savings = 100x − 65% of 100x = 35x

=> New Salary = 100x + 10% of 100x = 110x

=> New Expenditure = 60% of 110x = 0.60 × 110x = 66x

=> New Savings = 110x − 66x = 44x

=> Difference in Savings = 44x − 35x = 9x

=> 9x = 3,150

=> x = 3,150 ÷ 9 = 350

=> Present Salary = 110x = 110 × 350

=> Present Salary = Rs. 38,500

Therefore The correct answer is Rs. 38,500.

Additional Information

Basic Salary Relation

Income is always the sum of Expenditure and Savings. Income = Expenditure + Savings.

Percentage Change Formula

Percentage Change = (Final Value − Initial Value) ÷ Initial Value × 100.

Effective Percentage increase

When a base increases by a% and the component share changes from b% to c%, the net change depends on the product of the new base and the new percentage.

Q12. Answer: (c) 5

Shortcut Trick

The given expression is in the standard form of the algebraic identity: $(a^3 + b^3 + c^3 − 3abc) ÷ (a^2 + b^2 + c^2 − ab − bc − ca)$.

This identity simplifies directly to (a + b + c).

Here, a = 2.3, b = 1.5, and c = 1.2.

Required Value = 2.3 + 1.5 + 1.2 = 5.0.

Therefore The correct answer is 5.

Alternate Method

Given:

a = 2.3

b = 1.5

c = 1.2

Formula Used:

The sum of cubes identity states: $a^3 + b^3 + c^3 − 3abc = (a + b + c)(a^2 + b^2 + c^2 − ab − bc − ca)$

Calculations:

=> Expression = $((2.3)^3 + (1.5)^3 + (1.2)^3 − 3 × 2.3 × 1.5 × 1.2) ÷ ((2.3)^2 + (1.5)^2 + (1.2)^2 − 2.3 × 1.5 − 1.5 × 1.2 − 1.2 × 2.3)$

=> Let a = 2.3, b = 1.5, c = 1.2

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

=> Expression = $[(a + b + c)(a^2 + b^2 + c^2 − ab − bc − ca)] ÷ (a^2 + b^2 + c^2 − ab − bc − ca)$

=> Expression = a + b + c

=> Expression = 2.3 + 1.5 + 1.2

=> Expression = 5

Therefore The correct answer is 5.

Additional Information

Special Case of the Identity

If a + b + c = 0, then the identity simplifies to $a^3 + b^3 + c^3 = 3abc$.

Alternative Form of the Quadratic Part

The term $(a^2 + b^2 + c^2 − ab − bc − ca)$ can also be written as $1/2[(a − b)^2 + (b − c)^2 + (c − a)^2]$.

Basic Algebraic Identities

Remember $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$, which is often used to find missing components of the cubic identity.

Q13. Answer: (a) 8

Shortcut Trick

For an odd number of consecutive integers, the average is always the middle term.

Middle term (3^(rd) term) = 10.

The sequence is: 8, 9, 10, 11, 12.

The smallest integer is the first term of this sequence.

Therefore The correct answer is 8.

Alternate Method

Given:

Number of consecutive integers (n) = 5

Average of the integers = 10

Formula Used:

Average = (Sum of all observations) ÷ (Total number of observations)

Calculations:

Let the five consecutive integers be x, (x + 1), (x + 2), (x + 3), and (x + 4).

=> Sum = x + (x + 1) + (x + 2) + (x + 3) + (x + 4) = 5x + 10

=> Average = (5x + 10) ÷ 5 = 10

=> x + 2 = 10

=> x = 10 − 2

=> x = 8

Therefore The correct answer is 8.

Additional Information

Average of Arithmetic Progression

For any sequence in Arithmetic Progression, Average = (First term + Last term) ÷ 2.

Sum of Consecutive Integers

The sum of n consecutive integers starting from x is given by n × x + [n × (n − 1) ÷ 2].

Middle Term Property

If n is odd, the average is exactly the {(n + 1) ÷ 2}^(th) term of the consecutive sequence.

Q14. Answer: (c) 4

Shortcut Trick

Product of the ratio parts = 17 × 13 × 8 = 1768.

Since the ratio parts 17, 13, and 8 are pairwise co-prime, their LCM is their product multiplied by the HCF.

HCF = Given LCM ÷ Product of ratio parts.

HCF = 7072 ÷ 1768 = 4.

Therefore The correct answer is 4.

Alternate Method

Given: Ratio of numbers = 17 : 13 : 8, LCM = 7072.

Formula: If numbers are in ratio a : b : c and their HCF is x, then the numbers are ax, bx, and cx. Their LCM is x × LCM(a, b, c).

=> Let the three numbers be 17x, 13x, and 8x, where x is the HCF.

=> The LCM of 17x, 13x, and 8x is calculated by taking the common factor x and the LCM of (17, 13, 8).

=> LCM = x × 17 × 13 × 8

=> 7072 = 1768 × x

=> x = 7072 ÷ 1768

=> x = 4

Therefore The correct answer is 4.

Additional Information

Product Property of HCF and LCM

For two numbers a and b: Product of numbers = HCF × LCM. This property does not directly apply to three or more numbers.

Co-prime Numbers

Numbers that have only 1 as their common factor are called co-prime. The LCM of a set of pairwise co-prime numbers is always their product.

HCF and LCM of Fractions

HCF = (HCF of Numerators) ÷ (LCM of Denominators) | LCM = (LCM of Numerators) ÷ (HCF of Denominators).

Q15. Answer: (b) 36 unit2

Shortcut Trick

Third proportional to 4 and 6 = (6 × 6) ÷ 4 = 9 units.

Base of the rectangle = 9 units.

Height of the rectangle = 4 units.

Area of Rectangle = Base × Height = 9 × 4 = 36 unit².

Therefore The correct answer is 36 unit².

Alternate Method

Given:

First number (a) = 4

Second number (b) = 6

Formula Used:

1. If a, b, and c are in continuous proportion, then a : b :: b : c, where c is the third proportional (c = b² ÷ a).

2. Area of a rectangle = Base × Height.

Calculations:

=> Let the third proportional be x.

=> 4 : 6 :: 6 : x

=> x = (6 × 6) ÷ 4

=> x = 36 ÷ 4 = 9 units.

=> Base of the rectangle = 9 units.

=> Height of the rectangle = 4 units (given as the first number).

=> Area = 9 × 4 = 36 unit².

Therefore The correct answer is 36 unit².

Additional Information

Mean Proportional

The mean proportional between two numbers a and b is given by √(a × b).

Fourth Proportional

For three numbers a, b, and c, the fourth proportional d is calculated such that a : b = c : d, which means d = (b × c) ÷ a.

Perimeter of Rectangle

The perimeter of a rectangle is the total distance around its boundary, calculated as 2 × (Base + Height).

Q16. Answer: (d) Rs. 1,010

Shortcut Trick

For 2 years, the effective Compound Interest rate = R + R + (R×R)/100.

Effective Rate = 2 + 2 + (2×2)/100 = 4.04%.

Compound Interest = 4.04% of Rs. 25,000.

CI = 25,000 × (4.04/100) = 250 × 4.04 = Rs. 1,010.

Therefore The correct answer is Rs. 1,010.

Alternate Method

Given:

Principal (P) = Rs. 25,000

Rate (R) = 2% per annum

Time (T) = 2 years

Formula Used:

Amount (A) = P(1 + R/100)^T

Compound Interest (CI) = Amount − Principal

Calculations:

=> A = 25,000 × (1 + 2/100)²

=> A = 25,000 × (102/100) × (102/100)

=> A = 25,000 × 1.02 × 1.02

=> A = 25,000 × 1.0404

=> A = 26,010

=> CI = 26,010 − 25,000

=> CI = 1,010

Therefore The correct answer is Rs. 1,010.

Additional Information

Difference between CI and SI for 2 years

The difference (D) between CI and SI for two years is given by $D = P(R/100)^2$.

Compounding Half-Yearly

When interest is compounded half-yearly, the rate is halved (R/2) and the time is doubled (2n).

Effective Rate Formula

For successive percentage changes (like CI), the net change is a + b + (ab/100). For two years, it is $R + R + (R^2/100)$.

Q17. Answer: (d) C

Shortcut Trick

Evaluate Discount % for all schemes:

(A) 35 + 4 − (35 × 4)/100 = 39 − 1.4 = 37.6%

(B) Successive 45%, 46%, 50% will be > 85% (highest discount).

(C) For 9 toys: (3 × 15% + 6 × 5%) ÷ 9 = (45 + 30) ÷ 9 = 8.33%

(D) 2 free on 9 bought (Total 11): (2 ÷ 11) × 100 ≈ 18.18%

Therefore The correct answer is Scheme C.

Alternate Method

Assume the Marked Price (MP) of each toy = Rs. 100. For 9 toys, Total MP = Rs. 900.

Formula Used:

1. Equivalent Discount (2 successive) = x + y − (xy/100)

2. Discount % (Buy X get Y free) = [Y / (X + Y)] × 100

Calculations:

Scheme A: Successive 35% and 4%

=> Total Discount % = 35 + 4 − (35 × 4)/100 = 39 − 1.4 = 37.6%

Scheme B: Successive 45%, 46% and 50%

=> Final Multiplier = 0.55 × 0.54 × 0.50 = 0.1485

=> Total Discount % = (1 − 0.1485) × 100 = 85.15%

Scheme C: 15% on first 3, 5% on next 6

=> Discount on first 3 = 15% of 300 = Rs. 45

=> Discount on next 6 = 5% of 600 = Rs. 30

=> Total Discount % = [(45 + 30) / 900] × 100 = 75 / 9 = 8.33%

Scheme D: 2 free on buying 9

=> Total toys received = 9 + 2 = 11

=> Total Discount % = (2 / 11) × 100 ≈ 18.18%

Comparing all, 8.33% is the minimum discount, making it the least beneficial for the customer.

Therefore The correct answer is Scheme C.

Additional Information

Successive Discount

When two discounts d1 and d2 are given, effective discount = d1 + d2 − (d1 × d2)/100. For more than two, apply the formula to the first two and then use the result with the third.

Buy X Get Y Free

In such offers, the discount is always calculated on the total number of items (Paid + Free). Discount % = [Free Items / (Paid + Free)] × 100.

Marked Price & Discount

Discount is always calculated on the Marked Price (MP). Selling Price (SP) = MP − Discount. To be least beneficial for a customer, the SP should be the highest (minimum discount).

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Q18. Answer: (a) 9/7

Shortcut Trick

Assume Total Work as the LCM of 1.5, 3, and 4.5 = 9 units.

Efficiency of (A+B+C) = 9 ÷ 1.5 = 6 units/min.

Efficiency of (A+B) = 3 units/min and (B+C) = 2 units/min.

Efficiency of Tap A = 6 − 2 = 4; Efficiency of Tap C = 6 − 3 = 3.

Efficiency of (A+C) = 4 + 3 = 7 units/min.

Therefore The correct answer is 9/7 min.

Alternate Method

Given:

Time taken by (A + B + C) = 1.5 min

Time taken by (A + B) = 3 min

Time taken by (B + C) = 4.5 min

Formula Used:

Efficiency = Total Work ÷ Time

Person/Taps	Time (min)	Total Work	Efficiency (units/min)
A + B + C	1.5	9 units	6
A + B	3	3	
B + C	4.5	2	

Calculations:

=> Efficiency of Tap C = Efficiency(A+B+C) − Efficiency(A+B)

=> Efficiency of Tap C = 6 − 3 = 3 units/min

=> Efficiency of Tap A = Efficiency(A+B+C) − Efficiency(B+C)

=> Efficiency of Tap A = 6 − 2 = 4 units/min

=> Combined Efficiency of (A + C) = 4 + 3 = 7 units/min

=> Time taken by (A + C) = Total Work ÷ Combined Efficiency

=> Time taken by (A + C) = 9 ÷ 7 = 9/7 min

Therefore The correct answer is 9/7 min.

Additional Information

Efficiency and Time

Efficiency is inversely proportional to the time taken to complete the work (E = W/T).

Combined Work

When multiple pipes or taps work together, their individual efficiencies are added to find the net draining or filling rate.

LCM Method

Using the Least Common Multiple (LCM) of the given times as the total work simplifies complex fraction calculations into simple integer arithmetic.

Q19. Answer: (a) 81π m

Shortcut Trick

In a right-angled triangle, the hypotenuse acts as the diameter of the circumcircle.

Hypotenuse = $\sqrt{(13^2 + 84^2)} = \sqrt{(169 + 7056)} = 85$ m.

Outer radius (R) = 85 ÷ 2 = 42.5 m.

Inner radius (r) = 42.5 − 2 = 40.5 m (subtracting the 2 m track width).

Perimeter of the inner boundary = 2 × π × 40.5 = 81π m.

Therefore The correct answer is 81π m.

Alternate Method

Given:

Shorter sides of the right-angled triangle = 13 m and 84 m.

Width of the circular track = 2 m.

Calculations:

=> First, find the hypotenuse (c) using Pythagoras theorem:

=> $c = \sqrt{(13^2 + 84^2)}$

=> $c = \sqrt{(169 + 7056)} = \sqrt{7225} = 85$ m.

=> The outer boundary coincides with the circumcircle, so the outer radius (R) is:

=> R = Hypotenuse ÷ 2 = 85 ÷ 2 = 42.5 m.

=> The track has a uniform width of 2 m, so the inner radius (r) is:

=> r = R − width = 42.5 − 2 = 40.5 m.

=> The perimeter (circumference) of the inner boundary is given by:

=> Perimeter = $2 \times \pi \times r$

=> Perimeter = $2 \times \pi \times 40.5 = 81\pi$ m.

Therefore The correct answer is 81π m.

Additional Information

Circumradius of a Right Triangle

For any right-angled triangle, the circumradius (R) is always equal to half of the hypotenuse. The circumcenter is located at the midpoint of the hypotenuse.

Inradius of a Right Triangle

The radius of the inscribed circle (inradius) of a right triangle with legs a and b and hypotenuse c is given by r = (a + b − c) ÷ 2.

Area of a Circular Track

The area of a circular track with outer radius R and inner radius r is given by Area = $\pi(R^2 - r^2)$.

Q20. Answer: (b) $5\sqrt{3}$ m

Shortcut Trick

For two angles of elevation θ1 and θ2 from two points at a distance d apart on the same side of a tree of height h:

$h = d / (\cot \theta_1 - \cot \theta_2)$

Here, d = 10 m, θ1 = 30°, and θ2 = 60°.

=> $h = 10 / (\cot 30° - \cot 60°) = 10 / (\sqrt{3} - 1/\sqrt{3})$

=> $h = 10 / ((3 - 1) / \sqrt{3}) = (10 \times \sqrt{3}) / 2 = 5\sqrt{3}$ m.

Therefore The correct answer is $5\sqrt{3}$ m.

Alternate Method

Given: Angle of elevation at point A = 30°, angle at point B = 60°, and distance AB = 10 m.

Formula Used: tan θ = Perpendicular / Base

=> Let the height of the tree CD be h and distance BC be x.

=> In right ΔBCD: tan 60° = h / x

=> $\sqrt{3} = h / x \Rightarrow x = h / \sqrt{3}$

=> In right ΔACD: tan 30° = h / (AB + BC)

=> $1 / \sqrt{3} = h / (10 + x)$

=> $1 / \sqrt{3} = h / (10 + h / \sqrt{3})$

=> $10 + h / \sqrt{3} = h\sqrt{3}$

=> $10 = h\sqrt{3} - h / \sqrt{3}$

=> $10 = (3h - h) / \sqrt{3}$

=> $10 = 2h / \sqrt{3}$

=> $2h = 10\sqrt{3} \Rightarrow h = 5\sqrt{3}$ m.

Therefore The correct answer is $5\sqrt{3}$ m.

Additional Information

Angle of Elevation

The angle formed by the line of sight with the horizontal when an observer looks at an object above the horizontal level.

Trigonometric Ratios for 30° and 60°

tan 30° = $1/\sqrt{3}$ and tan 60° = $\sqrt{3}$. Note that as the observer moves towards the object, the angle of elevation increases.

General Formula for Distance

The distance d between two points of observation is given by $d = h(\cot \theta_1 - \cot \theta_2)$, where h is the height.

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Q21. Answer: (c) 12

Shortcut Trick

For a number to be divisible by 45, it must be divisible by both 5 and 9.

Divisibility by 5: The last digit b must be 0 or 5. Since b is a positive integer, b = 5.

Divisibility by 9: The sum of digits (7 + a + 3 + 5 + 5) = 20 + a must be a multiple of 9.

The nearest multiple of 9 greater than 20 is 27. Therefore, 20 + a = 27 => a = 7.

The value of (a + b) = 7 + 5 = 12.

Therefore The correct answer is 12.

Alternate Method

Given: The 5-digit number is 7a35b and it is divisible by 45.

Conditions: a and b are positive integers (a, b in {1, 2, 3, 4, 5, 6, 7, 8, 9}).

Step 1: Divisibility by 5

=> For a number to be divisible by 5, its last digit must be 0 or 5.

=> Since b is a positive integer, b cannot be 0. Thus, b = 5.

Step 2: Divisibility by 9

=> Sum of digits = 7 + a + 3 + 5 + b

=> Sum = 15 + a + 5 = 20 + a

=> For 20 + a to be divisible by 9, the possible values for (20 + a) are 27, 36, ...

=> If 20 + a = 27, then a = 7.

=> If 20 + a = 36, then a = 16 (which is not a single-digit integer).

Step 3: Calculate (a + b)

=> a + b = 7 + 5 = 12.

Therefore The correct answer is 12.

Additional Information

Divisibility Rule of 9

A number is divisible by 9 if the sum of its digits is divisible by 9.

Divisibility Rule of 5

A number is divisible by 5 if its last digit is either 0 or 5.

Composite Divisibility

To check divisibility by a composite number like 45, check divisibility by its coprime factors (5 and 9).

Q22. Answer: (a) 140

Shortcut Trick

Effective rate of Compound Interest (CI) for 2 years at 10% = 10 + 10 + (10 × 10 / 100) = 21%.

Effective rate of Simple Interest (SI) for 2 years at 10% = 10 × 2 = 20%.

According to the question: 21% = Rs. 147.

So, 1% = 147 ÷ 21 = Rs. 7.

Therefore, 20% (SI) = 20 × 7 = Rs. 140.

Therefore The correct answer is Rs. 140.

Alternate Method

Given:

Compound Interest (CI) = Rs. 147

Rate (R) = 10% per annum

Time (T) = 2 years

Formula Used:

CI = P[(1 + R/100)^T − 1]

SI = (P × R × T) ÷ 100

Calculations:

=> 147 = P[(1 + 10/100)² − 1]

=> 147 = P[(11/10)² − 1]

=> 147 = P[121/100 − 1]

=> 147 = P[21/100]

=> P = (147 × 100) ÷ 21 = 7 × 100 = Rs. 700

=> Now, SI for 2 years = (700 × 10 × 2) ÷ 100

=> SI = 7 × 10 × 2 = Rs. 140

Therefore The correct answer is Rs. 140.

Additional Information

Direct SI-CI Relation for 2 Years

For a period of 2 years, the relationship is given by: SI = CI × 200 ÷ (200 + R). In this case, 147 × 200 ÷ 210 = Rs. 140.

Difference between CI and SI

The difference (D) for 2 years is calculated as: $D = CI - SI = P(R/100)^2$. Here, D = 147 − 140 = Rs. 7.

Successive Rate Formula

Compound interest for 2 years can be treated as a successive percentage change: Effective Rate = x + y + (xy/100).

Q23. Answer: (b) 50

Shortcut Trick

Relative Speed = 180 / 12 = 15 m/s

Convert to km/hr: 15 × (18 / 5) = 54 km/hr

In opposite direction, Relative Speed = Speed_(Train) + Speed_(Man)

54 = Speed_(Train) + 4 => Speed_(Train) = 50 km/hr

Therefore The correct answer is 50 km/hr.

Alternate Method

Given:

Speed of walking man = 4 km/hr

Length of the train (Distance) = 180 m

Crossing time = 12 seconds

Formula Used:

Relative Speed = Total Distance / Total Time

Speed (km/hr) = Speed (m/s) × (18/5)

Calculations:

=> Relative Speed = 180 / 12 = 15 m/s

=> Relative Speed in km/hr = 15 × (18 / 5)

=> Relative Speed = 3 × 18 = 54 km/hr

=> Since they are moving in the opposite direction:

=> Relative Speed = Speed of Train + Speed of Man

=> 54 = Speed of Train + 4

=> Speed of Train = 54 − 4 = 50 km/hr

Therefore The correct answer is 50 km/hr.

Additional Information

Relative Speed Concept

When two objects move in opposite directions, their relative speed is the sum of their individual speeds (u + v). If they move in the same direction, it is the difference (u − v).

Speed Conversion

To convert m/s to km/hr, multiply by 18/5. To convert km/hr to m/s, multiply by 5/18.

Crossing a Stationary Point/Man

When a train crosses a man, a pole, or a point object, the distance traveled is equal to the length of the train itself.

Q24. Answer: (c) 100

Shortcut Trick

Let the number of Rs. 20 notes be x. Then Rs. 10 notes = x + 16 and Rs. 5 notes = 2x.

Subtract the value of extra 16 notes of Rs. 10: 1000 − (16 × 10) = Rs. 840.

Effective value per unit: Rs. 10 (from x) + Rs. 20 (from x) + Rs. 10 (from 2x of Rs. 5) = Rs. 40.

Number of units (x) = 840 ÷ 40 = 21.

Total notes = 4x + 16 = 4(21) + 16 = 100.

Therefore The correct answer is 100 notes.

Alternate Method

Given:

Total amount with Ram = Rs. 1000

Denominations are Rs. 10, Rs. 20, and Rs. 5.

Let the number of Rs. 20 notes be x.

Number of Rs. 10 notes = x + 16

Number of Rs. 5 notes = twice of Rs. 20 notes = 2x

Calculations:

=> Total Value = (Value of Rs. 10 notes) + (Value of Rs. 20 notes) + (Value of Rs. 5 notes)

=> 1000 = 10 × (x + 16) + 20 × (x) + 5 × (2x)

=> 1000 = 10x + 160 + 20x + 10x

=> 1000 − 160 = 40x

=> 840 = 40x

=> x = 840 ÷ 40 = 21

=> Number of Rs. 20 notes = 21

=> Number of Rs. 10 notes = 21 + 16 = 37

=> Number of Rs. 5 notes = 2 × 21 = 42

=> Total number of notes = 37 + 21 + 42 = 100

Therefore The correct answer is 100 notes.

Additional Information

Currency Denomination Formula

The total value of money is calculated as: Total Value = ∑(Face Value of Note × Number of Notes).

Linear Equation Application

When multiple variables are related to a single base (like Rs. 20 notes here), express all terms in that base variable to solve the equation easily.

Verification Technique

Always verify the final count by multiplying back: (37 × 10) + (21 × 20) + (42 × 5) = 370 + 420 + 210 = 1000.

Q25. Answer: (d) 2

Shortcut Trick

Net filling rate per hour = (1/4 + 1/8 − 1/4) = 1/8 of the cistern.

Time to fill the full cistern = 1 ÷ (1/8) = 8 hours.

Time to fill one-fourth of the cistern = 8 × 1/4 = 2 hours.

Therefore The correct answer is 2 hr.

Alternate Method

Given: Filling time of Tap A = 4 hr, Tap B = 8 hr. Emptying time of Tap C = 4 hr.

Formula Used: Efficiency = Total Work ÷ Time; Time = Work ÷ Total Efficiency.

Tap	Time (hr)	Total Work (LCM)	Efficiency
Tap A (+)	4	8 units	+2
Tap B (+)	8	+1	
Tap C (−)	4	−2	

=> Total Efficiency when all taps are open = 2 + 1 − 2 = 1 unit/hr.

=> One-fourth capacity of the cistern = 8 × 1/4 = 2 units.

=> Required Time = 2 units ÷ 1 unit/hr = 2 hours.

Therefore The correct answer is 2 hr.

Additional Information

Inlet and Outlet Pipes

An Inlet pipe fills the cistern (positive efficiency) while an Outlet pipe empties it (negative efficiency).

Net Efficiency Rule

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If multiple pipes operate, the net rate of filling is the algebraic sum of their individual efficiencies (Rates).

Work & Wages in Pipes

If workers or pipes are paid based on work, the wage ratio is equal to the ratio of their individual efficiencies.

Q26. Answer: (c) 400

Shortcut Trick

Ratio of speeds after meeting: S_A / S_B = √(Time_B / Time_A)

60 / S_B = √(9 / 16) = 3 / 4

S_B = (60 × 4) / 3 = 80 km/h

Speed of Train B in m/s = 80 × (5 / 18) = 400 / 18 m/s

Length of Train B = Speed × Crossing Time = (400 / 18) × 18 = 400 m

Therefore The correct answer is 400 m.

Alternate Method

Given:

Speed of Train A (S_A) = 60 km/h

Time taken by Train A to reach Mumbai after meeting (t_A) = 16 hr

Time taken by Train B to reach Delhi after meeting (t_B) = 9 hr

Time taken by Train B to cross a pole = 18 sec

Formula Used:

1. S_A / S_B = √(t_B / t_A)

2. Distance = Speed × Time

3. km/h to m/s conversion: Speed × (5 / 18)

Calculations:

=> 60 / S_B = √(9 / 16)

=> 60 / S_B = 3 / 4

=> 3 × S_B = 60 × 4

=> S_B = 240 / 3 = 80 km/h

=> Speed of Train B in m/s = 80 × (5 / 18) = 400 / 18 m/s

=> Length of Train B = Speed × Time to cross pole

=> Length of Train B = (400 / 18) × 18

=> Length of Train B = 400 m

Therefore The correct answer is 400 m.

Additional Information

Meeting Time Formula

If two objects start at the same time and meet at a point, the time they take to meet is T = √(t1 × t2), where t1 and t2 are times taken to reach destinations after meeting.

Train Crossing a Pole

When a train crosses a stationary object of negligible length (pole, man, tree), the distance traveled is equal to the length of the train itself.

Unit Conversion

To convert speed from km/h to m/s, multiply by 5/18. To convert m/s to km/h, multiply by 18/5.

Q27. Answer: (b) 33.33

Shortcut Trick

Total surface area (TSA) of one solid hemisphere = 3 units (πr² factor).

TSA of two separate hemispheres = 3 + 3 = 6 units.

Surface area of the resulting sphere = 4 units.

Reduction = 6 − 4 = 2 units.

Percentage Reduction = (2 ÷ 6) × 100 = 33.33%.

Therefore The correct answer is 33.33%.

Alternate Method

Given: Two identical solid hemispheres are joined at their flat bases to form a sphere of the same radius r.

Formula Used:

=> Total Surface Area of a Solid Hemisphere = $3\pi r^2$

=> Surface Area of a Sphere = $4\pi r^2$

Calculations:

=> Combined TSA of two separate hemispheres = $2 \times 3\pi r^2 = 6\pi r^2$

=> Surface Area of the single sphere formed = $4\pi r^2$

=> Reduction in Surface Area = $6\pi r^2 - 4\pi r^2 = 2\pi r^2$

=> Percentage Reduction = (Reduction ÷ Original Area) × 100

=> Percentage Reduction = $(2\pi r^2 \div 6\pi r^2) \times 100$

=> Percentage Reduction = $(1 \div 3) \times 100 \approx 33.33\%$

Therefore The correct answer is 33.33%.

Additional Information

Curved Surface Area (CSA) of Hemisphere

The area of only the curved part of a hemisphere is $2\pi r^2$. The flat base has an area of πr^2.

Volume Conservation

When solids are joined or melted, the total volume remains constant. Volume of sphere = $(4/3)\pi r^3$.

Total Surface Area of Solid Hemisphere

TSA = CSA + Base Area = $2\pi r^2 + \pi r^2 = 3\pi r^2$.

Q28. Answer: (d) 6.25%

Shortcut Trick

Let initial Cost Price (CP) = 100, then initial Selling Price (SP) = 125.

New CP = 100 × 1.20 = 120.

New SP = 125 × 0.90 = 112.5.

Net Loss = 120 − 112.5 = 7.5.

Loss Percentage = (7.5 ÷ 120) × 100 = 6.25%.

Therefore The correct answer is 6.25%.

Alternate Method

Given: Initial profit = 25%, CP increase = 20%, SP reduction = 10%.

Formula: Profit/Loss % = (SP − CP) ÷ CP × 100.

=> Let the initial Cost Price be Rs. 100.

=> Initial Selling Price = 100 + 25% of 100 = Rs. 125.

=> New Cost Price = 100 + 20% of 100 = Rs. 120.

=> New Selling Price = 125 − 10% of 125 = 125 − 12.5 = Rs. 112.5.

=> Loss = New CP − New SP = 120 − 112.5 = Rs. 7.5.

=> Loss % = (7.5 ÷ 120) × 100 = (1 ÷ 16) × 100 = 6.25%.

Therefore The correct answer is 6.25%.

Additional Information

Profit and Loss Percentage

Profit % = (Profit ÷ CP) × 100 and Loss % = (Loss ÷ CP) × 100. The denominator is always the Cost Price unless specified otherwise.

Successive Changes

When multiple changes occur, always update the base. For example, a 10% reduction on 125 is 125 × 0.90, not 125 − 10.

Base Change Rule

If CP changes, the new profit or loss must be calculated on the revised CP to find the effective percentage.

Q29. Answer: (c) 20 grams

Shortcut Trick

Sum of ratio parts = 5 + 2 + 3 = 10 units.

10 units = 100 g (Total weight).

1 unit = 10 g.

Chemical Y share = 2 units = 2 × 10 = 20 g.

Therefore The correct answer is 20 g.

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Alternate Method

Given:

Ratio of Chemical X : Chemical Y : Chemical Z = 5 : 2 : 3

Total weight of the mixture = 100 g

Calculations:

Let the weight of Chemical X be 5k, Chemical Y be 2k, and Chemical Z be 3k.

=> Total weight = 5k + 2k + 3k = 10k

=> 10k = 100

=> k = 100 ÷ 10

=> k = 10 g

=> Weight of Chemical Y = 2k = 2 × 10

=> Weight of Chemical Y = 20 g

Therefore The correct answer is 20 g.

Additional Information

Ratio and Proportions

A ratio indicates how many times one number contains another. To divide a quantity in a given ratio, the total quantity is divided by the sum of the ratio terms to find the value of one unit.

Percentage in Mixtures

The percentage of any component can be found by (Component Ratio / Total Ratio) × 100. In this case, Chemical Y is (2/10) × 100 = 20% of the total mixture.

Q30. Answer: (a) 100°

Shortcut Trick

Total sum of interior angles of a hexagon (n = 6) = (6 − 2) × 180° = 720°.

Sum of 5 given angles = 140° + 80° + 145° + 155° + 100° = 620°.

Unknown angle = 720° − 620° = 100°.

Therefore The correct answer is 100°.

Alternate Method

Given: Angles of an irregular hexagon are 140°, 80°, 145°, 155°, and 100°.

Formula Used: Sum of interior angles of a polygon = (n − 2) × 180°, where n is the number of sides.

For a hexagon, n = 6:

=> Sum = (6 − 2) × 180°

=> Sum = 4 × 180°

=> Sum = 720°

Let the unknown 6^(th) angle be x.

=> 140° + 80° + 145° + 155° + 100° + x = 720°

=> 620° + x = 720°

=> x = 720° − 620°

=> x = 100°

Therefore The correct answer is 100°.

Additional Information

Polygon Interior Angles Theorem

The sum of the interior angles of any convex polygon is given by (n − 2) × 180°, where n represents the number of sides.

Exterior Angle Sum

For any convex polygon, the sum of the exterior angles (one at each vertex) is always equal to 360° regardless of the number of sides.

Regular Hexagon

In a regular hexagon, all interior angles are equal, and each angle measures 720° ÷ 6 = 120°.

Q31. Answer: (d) Hungary

The correct answer is Hungary.

Key Points

• László Krasznahorkai is a renowned novelist and screenwriter who was awarded the 2025 Nobel Prize in Literature.

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• He was born on January 5, 1954, in the town of Gyula, located in southeastern Hungary.

• The Swedish Academy cited his "compelling and visionary oeuvre that, in the midst of apocalyptic terror, reaffirms the power of art" as the primary motivation for the prestigious award.

• With this achievement, Krasznahorkai became the second Hungarian author to receive the Nobel Prize in Literature, following Imre Kertész, who was honored in 2002.

• His writing is globally recognized for its postmodern depth, often utilizing extremely long sentences and exploring dystopian and melancholic themes.

Additional Information

• Major Literary Contributions and Style:

• His debut novel, Sátántangó (1985), is a landmark of Hungarian literature and was later adapted into a legendary seven-hour film by the director Béla Tarr.

• Other notable works include The Melancholy of Resistance (1989), War & War (1999), and Baron Wenckheim's Homecoming (2016), the latter of which won the National Book Award for Translated Literature in 2019.

• The author's unique prose style, described as 'reality examined to the point of madness', features flowing language that often spans several pages without a single full stop.

• In 2015, he was awarded the Man Booker International Prize, solidifying his status as one of the most important living writers in the world.

• Context of the Nobel Prize:

• The Nobel Prize in Literature has been awarded since 1901 to individuals who have produced the most outstanding work in an ideal direction.

• The prize includes a gold medal, a diploma, and a monetary award, which in 2025 was valued at approximately 11 million Swedish kronor.

Q32. Answer: (b) Selects the active tab on the Ribbon and shows access keys

The correct answer is Selects the active tab on the Ribbon and shows access keys.

Key Points

• In Microsoft Office applications, specifically within Word for the Web and certain web-based productivity suites, the Alt + F10 keyboard shortcut is used to move the keyboard focus to the Ribbon.

• Once this shortcut is triggered, the interface displays Access Keys (also known as Key Tips), which are alphanumeric overlays that allow users to navigate through tabs and commands using only the keyboard.

• This function is vital for accessibility, adhering to Web Content Accessibility Guidelines (WCAG), as it provides a reliable method for users with motor impairments to access complex menu structures without a mouse.

• While the standalone F10 or Alt keys perform a similar function in desktop versions, Alt + F10 is the designated combination in web environments to prevent conflicts with native browser-level shortcuts.

• In modern collaborative platforms, this shortcut ensures that the focus is placed directly on the primary navigation element, enabling rapid execution of formatting and editing tools.

Additional Information

• Maximizes the current window:

• In legacy Windows applications and older Microsoft Word versions, Alt + F10 was the standard shortcut to toggle the maximize state of the program window.

• In contemporary Excel and PowerPoint desktop apps, this combination is also used to toggle the Selection Pane, which manages the visibility and layering of graphic objects.

• Opens the Help menu:

• The universal function key for accessing Help documentation, support search, or Office Assistant features is F1.

• Closes the document:

• Common shortcuts for closing the active document or file without exiting the application include Ctrl + W or Ctrl + F4.

• In contrast, Alt + F4 is used to terminate and close the entire application window.

Q33. Answer: (a) Cache Memory

The correct answer is Cache Memory.

Key Points

• Cache memory is an extremely high-speed, volatile computer memory that provides high-speed data access to the Central Processing Unit (CPU).

• It is physically located directly on the CPU chip or connected via a dedicated high-speed bus, making it the fastest memory in the hierarchy after CPU registers.

• The primary function of Cache is to store frequently used program instructions and data that the CPU is likely to need next,

acting as a buffer between the CPU and the slower Main Memory (RAM).

• It operates on SRAM (Static Random Access Memory) technology, which is faster and more expensive than the DRAM (Dynamic RAM) used for standard system memory.

• Modern processors typically feature multiple levels of cache, known as L1, L2, and L3 Cache, where L1 is the smallest and fastest, located closest to the processor cores.

Additional Information

• Hard Disk:

• It is a Secondary Storage device that uses magnetic storage to store and retrieve digital information.

• While it offers large storage capacities, it is significantly slower than Cache due to its mechanical nature involving spinning platters and moving heads.

• Pen Drive:

• A portable Solid-State storage device that uses Flash memory and interfaces with the computer through a USB port.

• It is Non-volatile and much slower than internal system memory components like Cache or RAM.

• CD-ROM:

• Stands for Compact Disc Read-Only Memory, which is a type of Optical Storage medium.

• Data is recorded and read using laser beams, and it has the slowest data transfer rate among the given options.

Q34. Answer: (d) No payment

The correct answer is No payment.

Key Points

• The Right to Information (RTI) Rules, 2012, notified by the Central Government, govern the fees and procedures for filing applications under the RTI Act, 2005.

• According to Rule 5 of the RTI Rules 2012, no fee under Rule 3 (application fee) and Rule 4 (fees for providing information) shall be charged from any person who is Below Poverty Line (BPL).

• The proviso to Section 7(5) of the Right to Information Act, 2005 also explicitly mandates that persons belonging to the BPL category, as determined by the appropriate government, are exempted from paying any fees.

• To claim this exemption, the applicant must provide a copy of their BPL certificate or a valid proof of identity issued by a competent authority along with the RTI application.

Additional Information

• Fee Structure for General Applicants:

• Application Fee: For individuals not in the BPL category, the standard application fee is Rs. 10.

• Cost of Information: Fees include Rs. 2 for each page (A-4 or A-3 size) and actual cost/price for samples or models.

• Electronic Media: Information provided in diskettes or floppies costs Rs. 50 per unit.

• Operational Framework:

• Payment Modes: Fees can be paid via Cash, Demand Draft, Bankers Cheque, or Indian Postal Order (IPO).

• Response Timeline: The Public Information Officer (PIO) must provide the information within 30 days, or 48 hours if it concerns the life or liberty of a person.

• Appellate Authority: If the information is denied or delayed, the applicant can file a First Appeal within 30 days.

Q35. Answer: (b) Golden revolution

The correct answer is Golden revolution.

Key Points

• The Golden Revolution in India took place between 1991 and 2003, a period marked by a massive surge in the production of horticulture, honey, and fruits.

• During this phase, planned investments in the horticultural sector were prioritized to enhance productivity, helping India emerge as a global leader in the production of bananas, mangoes, and various spices.

• The revolution played a crucial role in diversifying Indian agriculture, shifting the focus from traditional food grains to high-value crops, thereby making horticulture a sustainable livelihood option for many farmers by increasing rural income and export potential.

• Nirpakh Tutej is considered the Father of the Golden Revolution in India due to his significant contributions to the growth of this sector.

Additional Information

• Blue Revolution

• This revolution focused on the exponential growth of the fisheries and aquaculture sector.

• It was launched during the Seventh Five-Year Plan (1985−1990) to improve the economic condition of fish farmers through the

Fish Farmers Development Agency (FFDA).

• Green Revolution

• Initiated in the mid-1960s, it aimed to achieve self-sufficiency in food grains, specifically wheat and rice.

• It involved the use of High-Yielding Variety (HYV) seeds, chemical fertilizers, and modern irrigation techniques, led by M.S. Swaminathan in India.

• White Revolution

• Also known as Operation Flood, it was launched in 1970 to transform India from a milk-deficient nation to the world's largest milk producer.

• Dr. Verghese Kurien, the founder of Amul, is known as the Father of the White Revolution.

Q36. Answer: (a) Kurukh

The correct answer is Kurukh.

Key Points

• The Indo-Aryan language family is a major sub-branch of the Indo-European family, spoken by approximately 78 percent of the Indian population. It includes prominent languages like Hindi, Bengali, Urdu, Punjabi, Marathi, and Gujarati.

• Hindi is a premier Indo-Aryan language written in the Devanagari script. It serves as one of the official languages of the Union of India and is primarily spoken in the Hindi Belt of Northern and Central India.

• Bengali is the second most spoken language in India, belonging to the Eastern Indo-Aryan group. It evolved from Magadhi Prakrit and is the official language of West Bengal and Tripura.

• Urdu is an Indo-Aryan language that developed in North India. While it shares a nearly identical grammar and base vocabulary with Hindi (forming Hindustani), it is distinguished by its Perso-Arabic script and heavy lexical influence from Persian and Arabic.

• Kurukh (also known as Oraon) is NOT an Indo-Aryan language. It belongs to the Dravidian language family, specifically the North Dravidian subgroup. It is spoken by the Oraon and Kisan tribes in Jharkhand, Chhattisgarh, Odisha, and West Bengal.

Additional Information

• Kurukh Language:

• Subgroup: It is closely related to the Malto language of the Rajmahal Hills and Brahui spoken in Pakistan, forming the northernmost branch of the Dravidian family.

• Official Status: In 2017, the state of West Bengal granted Kurukh the status of an official language.

• Script: It is traditionally written in the Devanagari script, but an indigenous script called Tolong Siki was developed by Dr. Narayan Oraon in 1999 for the language.

• UNESCO Status: The language is listed in UNESCO’s Atlas of the World’s Languages in Danger as a vulnerable language.

• Language Families in India:

• Dravidian: Primarily concentrated in the South, including Tamil, Telugu, Kannada, and Malayalam, as well as tribal pockets like Gondi and Kurukh.

• Austroasiatic: Includes tribal languages such as Santhali, Munda, and Khasi.

• Sino-Tibetan: Includes languages of the Himalayan region and North-East India like Manipuri and Bodo.

Q37. Answer: (d) World Diabetes Day

The correct answer is World Diabetes Day.

Key Points

• World Diabetes Day (WDD) is observed globally on November 14 each year to raise awareness about the increasing health threats posed by diabetes.

• The date was chosen to commemorate the birthday of Sir Frederick Banting, who, along with Charles Best, co-discovered insulin in 1922.

• It was established in 1991 by the International Diabetes Federation (IDF) and the World Health Organization (WHO) in response to growing concerns about the health and economic impact of the disease.

• The day became an official United Nations Day in 2006 with the adoption of UN Resolution 61/225.

• The theme for the period 2024−2026 is Diabetes and Well-being, which advocates for better access to diabetes care and support for the mental and physical health of patients.

• The universal symbol for diabetes awareness is the Blue Circle, representing the unity of the global diabetes community.

Additional Information

• World Health Day:

• Observed on April 7 every year to mark the anniversary of the founding of the World Health Organization (WHO) in 1948.

• World Malaria Day:

• Celebrated on April 25 to emphasize the need for continued investment and political commitment for malaria prevention and

control.

• World Hypertension Day:

• Recognized on May 17 to promote public awareness of high blood pressure and encourage citizens of all countries to prevent and control this silent killer.

Q38. Answer: (b) Promoting passive resistance and boycott by linking nationalism with spiritual ideals

The correct answer is Promoting passive resistance and boycott by linking nationalism with spiritual ideals.

Key Points

• Aurobindo Ghosh was a pivotal figure in the Extremist phase of the Indian national movement, especially during the Swadeshi Movement following the Partition of Bengal in 1905.

• He formulated the comprehensive doctrine of Passive Resistance, which he articulated through a series of articles in the journal Bande Mataram in 1907, advocating for a total Boycott of British goods, schools, and courts.

• Ghosh transformed the political struggle into a Spiritual Creed, famously asserting that Nationalism is a religion that has come from God and that the service to the motherland was a form of worship to Bhavani Bharati.

• Unlike the Moderates, he insisted on Swaraj (Complete Independence) as the only goal, arguing that political freedom is the Life-breath of a nation without which no internal reform is possible.

Additional Information

• Constitutional Agitation:

• This approach was characteristic of the Moderate Phase (1885−1905) led by figures like Gopal Krishna Gokhale and Dadabhai Naoroji, who relied on Petitions and Protests within the legal framework.

• Revolutionary and Socialist Ideologies:

• While Aurobindo was initially linked to the Anushilan Samiti, the specific focus on Socialist and Labour ideologies emerged later with the Hindustan Socialist Republican Association (HSRA) led by Bhagat Singh.

• Peasant Movements:

• Agrarian tax reduction campaigns were primarily the domain of leaders like Mahatma Gandhi (e.g., Kheda Satyagraha) and the All India Kisan Sabha, rather than the urban-centric Extremist leadership of the early 1900s.

• Pondicherry Transition:

• After the Alipore Bomb Case (1908), Aurobindo retired from active politics and moved to Pondicherry in 1910 to pursue Integral Yoga and spiritual philosophy.

Q39. Answer: (a) Economically weak Muslim families

The correct answer is Economically weak Muslim families.

Key Points

• The Revanth Anna ka Sahara-Miskeen la Kosam scheme is a flagship social welfare initiative launched by the Government of Telangana in September 2025 under the leadership of Chief Minister Anumula Revanth Reddy.

• The term Miskeen is derived from Arabic and Urdu, signifying the destitute or the needy, while la Kosam is a Telugu phrase meaning for the sake of, highlighting the inclusive nature of the state's administration.

• The scheme provides a one-time financial assistance of Rs. 1,00,000 (1 Lakh) to economically weak Muslim families to help them overcome financial distress and improve their standard of living.

• It specifically targets individuals and households listed under the Below Poverty Line (BPL) category within the minority community, ensuring that the benefits reach the most marginalized sections of society.

• The Minority Welfare Department of Telangana serves as the nodal agency for the implementation, verification, and disbursement of funds through Direct Benefit Transfer (DBT).

• This initiative is part of a broader strategy to increase the Minority Welfare Budget, which has historically seen significant allocations in Telangana to support its 12.7 percent Muslim population as per the 2011 Census.

Additional Information

• Overseas migrant workers from Telangana:

• The state government manages the Gulf Workers Welfare programs and the Pravasi Bhartiya insurance schemes to support the large number of workers migrating to the Middle East for employment.

• Tribal self-help groups:

• Welfare for Scheduled Tribes is primarily handled through TRICOR (Telangana Scheduled Tribes Co-operative Finance Corporation) and the Girijan Vikas initiatives, which focus on entrepreneurship and skill development.

• Minority teachers in private institutions:

• While the government provides Grants-in-Aid to minority institutions, the Miskeen la Kosam scheme is a poverty-alleviation fund rather than a professional or salary-linked subsidy.

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• Shaadi Mubarak: A similar scheme providing financial aid for the marriage of girls from minority families.

• Kalyana Lakshmi: Parallel financial assistance for brides belonging to SC, ST, and BC communities.

Q40. Answer: (c) Establishment of Finance Commission of India

The correct answer is Establishment of Finance Commission of India.

Key Points

• The 73rd Constitutional Amendment Act, 1992, which came into effect on April 24, 1993, inserted Part IX (The Panchayats) and the Eleventh Schedule into the Constitution of India.

• The Act mandated the establishment of a three-tier structure of Panchayati Raj in every state with a population over 20 lakhs, comprising the Gram Panchayat (village level), Panchayat Samiti (intermediate level), and Zila Panchayat (district level).

• Under Article 243-I, the Act recommended the Establishment of State Finance Commissions by the Governor of every state to review the financial position of local bodies and recommend the distribution of tax revenues.

• The Establishment of Zila Panchayat at the district level was a core recommendation to ensure decentralized governance and local self-government at the highest administrative level of a district.

• The Finance Commission of India was established under Article 280 of the Constitution in 1951; its origin is independent of and predates the 73rd Amendment Act.

Additional Information

• Article 280 (Finance Commission of India):

• It is a quasi-judicial body constituted by the President of India every five years.

• Its primary role is to define the financial relations between the Union Government and the State Governments.

• The 73rd Amendment only added a clause to Article 280 requiring the central commission to recommend measures to augment the Consolidated Fund of a State to supplement the resources of Panchayats.

• Mandatory Provisions of the 73rd Amendment:

• Organization of Gram Sabha in a village or group of villages.

• Direct elections to all seats in Panchayats at all levels.

• Reservation of seats for Scheduled Castes (SCs) and Scheduled Tribes (STs) in proportion to their population.

• Mandatory one-third reservation for women in seats and chairperson posts.

• Fixing a uniform five-year term for all levels of Panchayati Raj Institutions.

Q41. Answer: (c) A concave lens, used to correct Myopia.

The correct answer is A concave lens, used to correct Myopia.

Key Points

• The power of a lens is mathematically defined as the reciprocal of its focal length (f) expressed in meters (P = 1/f). The standard S.I. unit for lens power is the Dioptre (D).

• According to the Cartesian sign convention, a lens with negative power (such as -2.5 D) possess a negative focal length, which specifically identifies it as a concave lens or diverging lens.

• Myopia, commonly referred to as nearsightedness, is a refractive error where parallel light rays from a distant object converge at a point in front of the retina rather than directly upon it.

• A concave lens is utilized to correct Myopia because it diverges the incoming light rays before they reach the eye lens, effectively shifting the focal point further back so that the image is perfectly formed on the retina.

Additional Information

• Hypermetropia (Farsightedness):

• This vision defect occurs when a person can see distant objects clearly, but nearby objects appear blurred because the image is formed behind the retina.

• It is corrected using a convex lens, also known as a converging lens, which has a positive power and positive focal length.

• Convex Lens:

• Characterized by being thicker in the middle than at the edges.

• It converges light rays and is used in applications like magnifying glasses, microscopes, and to correct presbyopia.

• Calculation:

• For the given power P = -2.5 D, the focal length is f = 1/P = 1/(-2.5) = -0.4 meters or -40 cm.

Q42. Answer: (a) They led to more sustainable growth.

The correct answer is They led to more sustainable growth.

Key Points

• The economic reforms initiated in 1991, often referred to as the LPG (Liberalization, Privatization, and Globalization) model,

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were triggered by a severe Balance of Payments (BoP) crisis.

• Prior to these reforms, the Indian economy was characterized by the Licence Raj and a slow growth rate often termed the Hindu Rate of Growth, which averaged around 3.5% annually between the 1950s and 1980s.

• Post-1991, India witnessed a significant transition toward a market-oriented economy, which led to an increase in Gross Domestic Product (GDP) growth rates, often exceeding 6–7% in the subsequent decades.

• The reforms promoted sustainable growth by diversifying the economic base, increasing the role of the services sector, and enhancing the Foreign Exchange Reserves from a mere 1.2 billion USD in 1991 to robust levels that protected the economy from external shocks.

• The structural adjustments reduced government intervention and encouraged Foreign Direct Investment (FDI), making the growth trajectory more resilient and less dependent on debt-led financing.

Additional Information

• The 1991 reforms were spearheaded by Prime Minister P.V. Narasimha Rao and then-Finance Minister Dr. Manmohan Singh.

• Liberalization: Involved the abolition of industrial licensing for most sectors and the deregulation of the private sector.

• Privatization: Focused on disinvestment in public sector undertakings (PSUs) to improve efficiency and reduce the fiscal burden on the state.

• Globalization: Aimed at integrating the Indian economy with the world through the reduction of import tariffs and the removal of quantitative restrictions on trade.

• Financial Sector Reforms: Included the establishment of SEBI (Securities and Exchange Board of India) as a statutory body in 1992 to regulate the capital markets.

• Fiscal Policy: Efforts were made to curb the fiscal deficit and reform the tax structure to widen the tax base.

Q43. Answer: (c) From Science to Global Action

The correct answer is From Science to Global Action.

Key Points

• The International Day for the Preservation of the Ozone Layer, popularly known as World Ozone Day, is observed every year on September 16 to commemorate the signing of the Montreal Protocol in 1987.

• For the year 2025, the official theme designated by the Ozone Secretariat of the United Nations Environment Programme (UNEP) is From Science to Global Action.

• This specific theme marks the 40th anniversary of the Vienna Convention for the Protection of the Ozone Layer, which was adopted in 1985 as the first major international effort to address ozone depletion.

• The theme From Science to Global Action reflects the historical journey of how scientific research first identified the threat of Ozone-Depleting Substances (ODS), leading to a unified, legal, and technological global response that has successfully set the ozone layer on the path to recovery.

• Scientific assessments indicate that if current policies remain in place, the ozone layer is expected to recover to 1980 values (before the appearance of the ozone hole) by approximately 2066 over the Antarctic and by 2040 for the rest of the world.

Additional Information

• Explanation of historical themes and related concepts:

• Ozone for Life: This was the official theme for World Ozone Day 2020, celebrating 35 years of global ozone layer protection since the Vienna Convention.

• Global Cooperation Protecting Life on Earth: This theme was adopted for the year 2022, highlighting the 35th anniversary of the Montreal Protocol and its broader benefits for climate mitigation and biodiversity.

• Montreal Protocol (1987): An international treaty designed to protect the ozone layer by phasing out the production of numerous substances responsible for ozone depletion, such as Chlorofluorocarbons (CFCs) and halons.

• Kigali Amendment (2016): A significant update to the Montreal Protocol that mandates the phase-down of Hydrofluorocarbons (HFCs). While HFCs do not deplete the ozone layer, they are powerful greenhouse gases; their reduction could prevent up to 0.5 degrees Celsius of global warming by the end of the century.

• Scientific Role: The ozone layer is located in the stratosphere (roughly 15 to 35 km above Earth) and absorbs approximately 97 to 99 percent of the Sun's medium-frequency ultraviolet light (UV-B), which otherwise would cause widespread skin cancer and ecological damage.

Q44. Answer: (c) Ayekart

The correct answer is Ayekart.

Key Points

• In December 2025, the Indian agritech and fintech startup Ayekart officially introduced Aantriva, a sophisticated AI-enabled operating system designed for the food and agriculture sector.

• The primary objective of Aantriva is to provide end-to-end visibility and traceability across the agri-food supply chain, connecting

various stakeholders from farmers to retailers.

• The platform utilizes Artificial Intelligence and Machine Learning to offer predictive analytics, which helps in managing inventory, optimizing logistics, and reducing perishable food wastage.

• By digitizing operational workflows, Aantriva specifically targets the empowerment of Micro, Small, and Medium Enterprises (MSMEs) and Farmer Producer Organizations (FPOs) within the Indian ecosystem.

• The launch represents a significant step in Ayekart's mission to create a technology-driven, credit-enabled marketplace that strengthens the middle-of-the-pyramid food supply chain.

Additional Information

• Ayekart:

• A digital technology platform that provides financial services and market linkages to the food and agri-ecosystem.

• It focuses on improving the economic viability of small-scale food businesses through its comprehensive supply chain solutions.

• Syngenta:

• A leading global agribusiness company based in Switzerland, primarily focused on crop protection (chemicals) and seeds.

• Tech Mahindra:

• A major Indian multinational Information Technology (IT) services provider that develops digital solutions for various industries, including smart agriculture.

• Supply Chain Visibility:

• The capability to track products from their point of origin to the final consumer, which is critical for quality assurance and regulatory compliance in the food industry.

Q45. Answer: (c) Christian tradition

The correct answer is Christian tradition.

Key Points

• The Goa Carnival is a world-renowned festival that was introduced to the Indian subcontinent by the Portuguese during their colonial rule in the 18th century.

• The festival is intrinsically linked to the Catholic Christian liturgical calendar, serving as a pre-Lenten celebration held for four days prior to Ash Wednesday.

• The term Carnival is derived from the Latin words Carne Vale, which translates to 'farewell to meat', marking the final period of indulgence before the 40-day period of fasting and penance known as Lent.

• The celebration is traditionally presided over by King Momo, a character based on the Greek god of mockery, who decrees that his subjects should eat, drink, and be merry (Kha, Piye ani Majja Kar).

• While it originated as a religious observance, it has evolved into a major cultural event in Goa, featuring elaborate floats, Goan folk songs, and public street dances that showcase the state's Luso-Indian heritage.

Additional Information

• Jewish traditions:

• These involve religious observances such as Passover, Yom Kippur, and Hanukkah, which are governed by the Hebrew calendar and do not feature the parade-style festivities of the Goa Carnival.

• Persian traditions:

• This primarily refers to festivals like Nowruz, the Persian New Year, which celebrates the spring equinox and is rooted in Zoroastrianism rather than Western Christian customs.

• Buddhist tradition:

• Centers on festivals such as Vesak (Buddha Purnima) or Losar, focusing on the birth, enlightenment, and Parinirvana of Lord Buddha through monastic rituals and meditation.

Q46. Answer: (c) Article 275

The correct answer is Article 275.

Key Points

• Article 275 of the Indian Constitution empowers the Parliament to provide grants-in-aid from the Consolidated Fund of India to states that are determined to be in need of financial assistance.

• These grants are known as statutory grants and are distinct from discretionary grants. They are specifically charged on the Consolidated Fund of India every year, meaning they do not require an annual vote in the Lok Sabha.

• The primary objective of these grants is to bridge the horizontal and vertical imbalances between the resources of the Union and the States, as well as among different States.

• The Finance Commission, constituted under Article 280, makes recommendations to the President regarding the principles that should govern these grants-in-aid to the revenues of the States.

• Provisos to Article 275 also mandate specific grants for schemes of development aimed at promoting the welfare of Scheduled Tribes or improving the level of administration in Scheduled Areas, particularly in states like Assam.

Additional Information

• Article 265:

• States that no tax shall be levied or collected except by the authority of law, ensuring that the executive cannot impose taxation without legislative consent.

• Article 255:

• Deals with the requirements as to recommendations and previous sanctions of the President or Governor being regarded as matters of procedure only.

• It prevents a law from being declared invalid solely because a required recommendation was not obtained, provided the act received final Assent.

• Article 285:

• Provides for the exemption of property of the Union from all taxes imposed by a State or any authority within a State, such as local municipalities.

• It safeguards the assets of the Central Government from being depleted by regional or local taxation.

Q47. Answer: (c) Mother Goddess

The correct answer is Mother Goddess.

Key Points

• In the Harappan culture, the Mother Goddess (Matridevi) was revered as the chief female deity, representing fertility, creation, and the sustenance of life.

• The primary evidence for this worship comes from the discovery of numerous terracotta figurines of semi-nude females found across major Indus Valley Civilization sites such as Harappa and Mohenjo-daro.

• These figurines typically feature distinctive fan-shaped headdresses and elaborate jewelry; some figurines even show smoke stains, suggesting they were used as incense burners during religious rituals.

• A famous seal from Harappa depicts a plant emerging from a woman's womb, which scholars identify as the Goddess of Earth (Prithvi), further cementing the link between the female deity and agricultural productivity.

• The prevalence of female iconography suggests that Harappan society likely placed a significant emphasis on the feminine principle and may have followed matriarchal social or religious structures.

Additional Information

• Lakshmi, Saraswati, and Durga:

• These are prominent deities in the Puranic and Vedic traditions of Hinduism, which developed several centuries after the decline of the Harappan Civilization.

• While Lakshmi is the goddess of wealth, Saraswati is the goddess of knowledge, and Durga is the goddess of power, no archaeological evidence confirms these specific names or forms existed during the Indus Valley era.

• Religious Symbols in Harappa:

• Pashupati Mahadeva: A three-faced male deity sitting in a yogic posture, surrounded by animals (elephant, tiger, rhino, and buffalo), identified as a Proto-Shiva.

• Natural Worship: The Harappans worshipped the Peepal tree, animals (such as the Unicorn and Humped Bull), and practiced phallic worship (Lingam and Yoni).

• Great Bath: Located at Mohenjo-daro, this structure indicates that ritual purification and communal bathing were essential aspects of their religious life.

Q48. Answer: (b) $H = I^2Rt$

The correct answer is $H = I^2Rt$.

Key Points

• Joule's law of heating describes the mathematical relationship between the heat energy produced in a conductor and the electric current passing through it.

• The law states that when an electric current (I) flows through a resistor (R) for a specific time (t), the electrical energy is converted into heat energy (H).

• The total heat produced is directly proportional to the square of the current (I^2), the electrical resistance (R) of the wire, and the duration (t) of the current flow.

• This relation is derived from the formula for electrical work (W). Work done is given by $W = V \times Q$, where V is potential difference and Q is charge. Since $V = IR$ and $Q = It$, substituting these values yields $W = (IR) \times (It) = I^2Rt$.

• Since all the electrical work is converted into heat in a purely resistive circuit, the expression is represented as $H = I^2Rt$.

Additional Information

• SI Units and Constants:
• The SI unit of heat is the Joule (J).
• The current (I) is measured in Amperes (A), resistance (R) in Ohms (Ω), and time (t) in seconds (s).
• Factors Affecting Heat Production:
• If the current is doubled, the heat produced increases by four times because it depends on the square of the current.
• Increasing the resistance of the material directly increases the thermal energy generated.
• Analysis of Other Options:
• IR: This expression represents the Potential Difference (V) across the ends of a conductor, as defined by Ohm's Law.
• V/I: This ratio defines the Resistance (R) of a conductor according to the linear relationship in electric circuits.
• Vt: While VIt represents energy, Vt alone does not represent a standard physical quantity in the context of heating laws.

Q49. Answer: (a) Surface irrigation

The correct answer is Surface irrigation.

Key Points

• Surface irrigation is the most common and traditional method used in India, where water is distributed over the soil surface by gravity.
• It accounts for more than 90% of the total irrigated area in the country due to its low initial cost and simplicity of operation.
• The primary techniques under this category include Flood irrigation, Basin irrigation, Furrow irrigation, and Border irrigation.
• This method is widely practiced in the Indo-Gangetic Plains, particularly for water-intensive crops like Rice, Wheat, and Sugarcane.
• The water for surface irrigation is primarily sourced from extensive Canal networks, Tanks, and Tube wells.
• Despite its prevalence, it is often associated with low Water-use efficiency (around 30% to 40%) due to significant losses from Evaporation and Seepage.

Additional Information

• Drip irrigation:
• Also known as Trickle irrigation, it involves dripping water onto the soil at very low rates directly to the Root zone.
• It provides the highest efficiency (up to 90%) and is promoted under the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY).
• Sprinkler irrigation:
• Water is sprayed into the air through nozzles, mimicking Natural rainfall.
• It is highly effective for Sandy soils and uneven terrains where surface leveling is difficult.
• Subsurface irrigation:
• Water is applied below the soil surface through a network of Perforated pipes or buried drip lines.
• This method minimizes Surface evaporation and is often used for high-value commercial crops.

Q50. Answer: (d) LibreOffice Calc

The correct answer is LibreOffice Calc.

Key Points

• General-Purpose Software is a type of application software designed to perform a wide range of tasks and satisfy the diverse needs of many different types of users. These programs are flexible and are not limited to one specific function or organization.
• LibreOffice Calc is a sophisticated spreadsheet program that provides tools for data analysis, complex mathematical calculations, and information management. Because it is used globally by individuals and businesses for varied purposes, it is classified as general-purpose software.
• Accounting Software made for a specific company and School Management Software are designed to address the specific operational requirements of a particular niche or organization. These are categorized as Specific-Purpose Software or Bespoke Software.
• A Customized Website is built to fulfill a unique set of requirements for a specific brand or user, unlike general-purpose tools that are ready-made for mass use.

Additional Information

• Bespoke or Customized Software:
• These are tailor-made applications developed to meet the exact specifications of a client.
• Examples include Payroll Systems, Inventory Management for a specific retail chain, and Hotel Reservation Systems.
• LibreOffice Suite:
• It is a free and open-source office productivity suite that serves as an alternative to Microsoft Office.
• Other general-purpose components include Writer (word processor), Impress (presentation tool), and Base (database

management system).

• Application Software Categories:

• General-purpose: Standardized packages like Web Browsers (Chrome), Graphics Software (Photoshop), and Word Processors (MS Word).

• Specific-purpose: Specialized tools like Billing Systems or Scientific Research Software.

Q51. Answer: (d) Anglo-Indians

The correct answer is Anglo-Indians.

Key Points

• The 104^(th) Constitutional Amendment Act, 2019 was enacted to amend Article 334 of the Constitution of India, which regulates the period of reservation for certain communities in the legislatures.

• The amendment extended the reservation of seats for Scheduled Castes (SCs) and Scheduled Tribes (STs) in the Lok Sabha and State Legislative Assemblies for another 10 years, until January 25, 2030.

• Significantly, the Act did not extend the provision for the nomination of members from the Anglo-Indian community to the Lok Sabha and State Legislative Assemblies.

• Under Article 331, the President of India previously had the power to nominate two members of the Anglo-Indian community to the Lok Sabha if they were not adequately represented.

• Similarly, under Article 333, the Governor of a State could nominate one member of the Anglo-Indian community to the State Legislative Assembly.

• As this provision was not renewed by the 104^(th) Amendment, the special representation for Anglo-Indians effectively ceased on January 25, 2020.

Additional Information

• Anglo-Indian Definition:

• According to Article 366(2), an Anglo-Indian is a person whose father or any of whose other male progenitors in the male line is or was of European descent but who is domiciled within the territory of India.

• The Union Government justified the removal of their nomination by stating that the community has integrated well and their population does not necessitate reserved seats.

• Legislative Context:

• The amendment was introduced as the 126^(th) Constitutional Amendment Bill in December 2019 and received the President's assent in January 2020.

• The Scheduled Castes and Scheduled Tribes continue to enjoy seat reservations based on their population proportion to ensure political inclusivity in the world's largest democracy.

Q52. Answer: (d) Odissi

The correct answer is Odissi.

Key Points

• Odissi is one of the eight pre-eminent Classical Dance forms of India, originating in the coastal state of Odisha.

• It traces its roots to the Maharis, who were female temple dancers dedicated to the service of Lord Jagannath in the Puri Temple.

• The dance is deeply spiritual and often draws its lyrical content from the Geeta Govinda, written by the poet Jayadeva, which depicts the Madhura Bhakti or the divine love between Radha and Lord Krishna.

• The technique of Odissi is built upon two fundamental postures: Tribhanga (the three-bend position of the body) and Chauka (a square-like stance that symbolizes Lord Jagannath).

• Archaeological evidence of this dance form dates back to the 2nd century BCE, as seen in the bas-reliefs of the Udayagiri and Khandagiri Caves near Bhubaneswar.

Additional Information

• Karam

• It is a Tribal Folk Dance performed during the Karam Festival in states like Odisha, Jharkhand, and Chhattisgarh.

• The dance is a tribute to Karam Devta, the God of Power, Youth, and Youthfulness, seeking blessings for a good harvest.

• Dalkhai

• This is the most popular Folk Dance of the Western Odisha region, particularly Sambalpur.

• It is traditionally performed by young women during festivals like Dussehra and Bhaijiuntia, accompanied by instruments like the Dhol, Mahuri, and Tamki.

• Ghumura Dance

• A traditional folk dance from the Kalahandi district of Odisha, it was historically classified as a War Dance.

• It is named after the Ghumura, a unique skin-covered clay pitcher used as a percussion instrument.

Q53. Answer: (c) India

The correct answer is India.

Key Points

• Population density is defined as the number of individuals living per unit of geographical area, usually calculated as persons per square kilometer.

• Among the given options, India exhibits one of the highest population densities in the world, with recent estimates placing it at approximately 464 to 480 persons per square kilometer.

• The high density in India is primarily driven by its massive population of over 1.4 billion people residing on a land area of about 3.28 million square kilometers.

• Countries like Russia, Canada, and Australia, despite having massive landmasses, have relatively small populations, resulting in extremely low population density figures compared to South Asian nations.

Additional Information

• Russia:

• It is the largest country in the world by area, but its population density is only about 8.4 people per sq km.

• Large regions like Siberia remain sparsely populated due to extreme climatic conditions.

• Canada:

• The second-largest country globally has a density of approximately 4 people per sq km.

• Most of the population is concentrated in a narrow band near the United States border.

• Australia:

• With a density of roughly 3.3 people per sq km, it is one of the least densely populated sovereign states.

• The arid interior (Outback) is largely uninhabitable, forcing urbanization along the fertile coastal fringes.

• India’s Regional Variation:

• Within India, states like Bihar and West Bengal have densities exceeding 1,000 persons per sq km, while the Indo-Gangetic Plain remains one of the most crowded regions on Earth due to fertile soil and water availability.

Q54. Answer: (a) Exfoliation

The correct answer is Exfoliation.

Key Points

• Exfoliation is a form of mechanical weathering that is particularly dominant in arid and semi-arid regions where the diurnal range of temperature (the difference between maximum day and minimum night temperatures) is extremely high.

• During the day, intense solar radiation causes the outer layers of the rock to heat up and expand. Because rocks are poor conductors of heat, this thermal expansion does not penetrate deep into the interior, creating internal differential stress.

• At night, as temperatures plummet, these surface layers contract rapidly. The repeated cycle of thermal expansion and contraction over thousands of years weakens the structural integrity of the rock's surface.

• Eventually, the outer shells or 'skins' of the rock break away in thin, concentric sheets. This process is frequently referred to as onion-skin weathering due to the way the rock peels in layers.

• This phenomenon is common in granitic rocks and often results in the formation of large, rounded landforms known as exfoliation domes, such as those found in the Sierra Nevada mountains or the Enchanted Rock in Texas.

Additional Information

• Carbonation

• It is a chemical weathering process where carbon dioxide from the atmosphere reacts with rainwater to form carbonic acid (H_2CO_3).

• This weak acid reacts with calcium carbonate in rocks like limestone and marble, converting them into soluble calcium bicarbonate, which is then washed away.

• Oxidation

• This occurs when oxygen in the atmosphere or water reacts with certain minerals, particularly those containing iron.

• The process transforms ferrous iron into ferric iron (rusting), which weakens the rock structure and gives it a characteristic reddish-brown or yellowish hue.

• Solution

• This is the simplest form of chemical weathering where certain minerals are directly dissolved in water.

• It is highly effective on rock salt (halite) and gypsum, where the mineral ions are separated and carried away in a liquid state, leaving voids in the rock.

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Q55. Answer: (c) Mark I

The correct answer is Mark I.

Key Points

• The Harvard Mark I, also known as the Automatic Sequence Controlled Calculator (ASCC), was the first large-scale electro-mechanical computer. It was conceived by Howard Aiken and designed and built by IBM in 1944 at Harvard University.

• Unlike modern electronic computers that use transistors or early electronic ones that used vacuum tubes, the Mark I relied on mechanical components like switches, relays, rotating shafts, and clutches to perform calculations.

• It was a massive machine, measuring approximately 51 feet in length and 8 feet in height, weighing nearly 5 tons. It utilized punched paper tape for inputting instructions and punched cards for data.

• The machine was capable of performing the four basic arithmetic operations (addition, subtraction, multiplication, and division) and could handle complex trigonometric and logarithmic functions.

• While it was significant for its automation and scale, its speed was limited by its mechanical parts; for instance, it took about 0.3 seconds for addition and 6 seconds for multiplication.

Additional Information

• ENIAC (Electronic Numerical Integrator and Computer):

• Completed in 1945 by John Mauchly and J. Presper Eckert, it was the first general-purpose electronic digital computer.

• It was significantly faster than the Mark I because it used over 18,000 vacuum tubes instead of mechanical relays.

• UNIVAC (Universal Automatic Computer I):

• Released in 1951, it was the first commercial electronic computer produced in the United States.

• It was famous for predicting the outcome of the 1952 Presidential Election.

• EDVAC (Electronic Discrete Variable Automatic Computer):

• An early electronic computer that implemented the stored-program concept proposed by John von Neumann.

• It used binary system arithmetic rather than the decimal system used by ENIAC.

Q56. Answer: (d) Maharashtra, Karnataka and Andhra Pradesh

The correct answer is Maharashtra, Karnataka and Andhra Pradesh.

Key Points

• The Krishna River is the second-largest east-flowing peninsular river in India, originating in the Western Ghats near Mahabaleshwar in the Satara district of Maharashtra.

• The river flows for a total length of approximately 1400 kilometers and eventually empties into the Bay of Bengal on the east coast at Hamsaladeevi.

• The Krishna Basin extends over an area of nearly 258,948 square kilometers, representing about 8% of India's total geographical area.

• The drainage basin is shared among the states of Maharashtra, Karnataka, Telangana, and Andhra Pradesh. Historically and in most geographical contexts, Andhra Pradesh includes the region of the present-day Telangana state.

• Statistically, the basin area is distributed with approximately 26.8% in Maharashtra, 43.8% in Karnataka, and the remaining 29.4% in the combined territory of Andhra Pradesh and Telangana.

Additional Information

• Major Tributaries:

• The Tungabhadra is the largest tributary of the Krishna, formed by the junction of the Tunga and Bhadra rivers.

• Other significant tributaries include the Koyna, Ghataprabha, Malaprabha, Bhima, Musi, and Munneru.

• Other River Basins:

• Narmada and Tapi: These rivers primarily flow through Madhya Pradesh and Gujarat, but they are west-flowing rivers that drain into the Arabian Sea.

• Mahanadi: This river basin mainly covers the states of Chhattisgarh and Odisha, distinct from the Krishna system.

• Godavari: Often called the Vriddha Ganga, its basin is the largest in peninsular India and borders the Krishna basin to the north.

Q57. Answer: (d) Kannauj

The correct answer is Kannauj.

Key Points

• The Maukhari Dynasty rose to power in the mid-6th century AD following the decline of the Gupta Empire. While the Guptas ruled from Pataliputra, the Maukharis established their political base at Kannauj (ancient Kanyakubja), marking a significant shift in the geopolitical center of North India.

• The decline of Pataliputra was accelerated by the Huna invasions and the shifting course of the Ganges, which impacted its trade and strategic dominance. Kannauj emerged as the new focal point because of its elevated, defensible position in the

Ganga-Yamuna Doab.

• Under rulers like Ishanavarman and Grahavarman, the Maukhari dynasty transformed Kannauj into a city of immense wealth and political prestige, often referred to as Mahodaya.

• By the time of Harshavardhana (7th century AD), Kannauj had completely eclipsed Pataliputra, becoming the imperial capital of North India. This transition set the stage for the Tripartite Struggle in the subsequent centuries.

Additional Information

• Thanesar

• Located in modern-day Haryana, it was the original capital of the Pushyabhuti Dynasty.

• Harshavardhana was the ruler of Thanesar before he united his kingdom with the Maukhari kingdom and moved his capital to Kannauj.

• Allahabad (Prayag)

• Historically known as Prayagraj, it was a vital religious and administrative site during the Gupta period, famous for the Prayag Prashasti (Allahabad Pillar Inscription) of Samudragupta.

• Patna (Pataliputra)

• Served as the capital for the Mauryas and the Guptas for centuries but lost its status as the 'imperial city' to Kannauj after the 6th century.

• Tripartite Struggle

• This was a long-term conflict between the Gurjara-Pratiharas, Palas, and Rashtrakutas specifically to gain control over Kannauj, illustrating its supreme status in early medieval India.

Q58. Answer: (d) To reduce energy intensity in the Indian economy

The correct answer is To reduce energy intensity in the Indian economy.

Key Points

• The Energy Conservation Act (EC Act) was enacted by the Government of India in 2001 and came into force on March 1, 2002, to provide a legal framework for efficient energy use.

• The central objective of the Act is to reduce the energy intensity of the Indian economy, which measures the amount of energy consumed per unit of Gross Domestic Product (GDP).

• It established the Bureau of Energy Efficiency (BEE) as a statutory body under the Ministry of Power to implement and manage energy conservation policies and programs.

• The Act empowers the government to identify Designated Consumers (heavy industries) and mandate energy audits and the appointment of certified Energy Managers.

Additional Information

• Bureau of Energy Efficiency (BEE):

• Responsible for the Standards and Labeling (S&L) scheme, which provides Star Ratings for appliances like ACs and refrigerators to guide consumers on energy efficiency.

• Introduced the Energy Conservation Building Code (ECBC) to set minimum energy standards for new commercial buildings.

• Launched the Perform, Achieve, and Trade (PAT) scheme, a market-based mechanism to enhance energy efficiency in energy-intensive industries through tradable Energy Saving Certificates (ESCerts).

• Key Amendments:

• The Energy Conservation (Amendment) Act, 2022 expanded the scope to include Renewable Energy mandates for industries and introduced a Carbon Credit Trading Scheme to help India meet its Nationally Determined Contributions (NDCs) under the Paris Agreement.

• Impact on Emissions:

• While the primary goal is intensity reduction, the Act inherently helps in lowering CO_2 emissions and mitigating climate change by reducing the overall demand for power generated from fossil fuels.

Q59. Answer: (c) Mahalanobis heavy-industry model

The correct answer is Mahalanobis heavy-industry model.

Key Points

• The Second Five-Year Plan, which spanned from 1956 to 1961, was based on the economic framework developed by the renowned Indian statistician Prasanta Chandra Mahalanobis.

• The Mahalanobis model shifted the focus of Indian planning from agriculture to rapid industrialization, specifically prioritizing the development of heavy and basic industries.

• The core philosophy of this model was that investment in capital goods (such as steel, chemicals, and machine-building) would provide the necessary infrastructure for long-term economic growth and self-reliance.

• Under this plan, the Public Sector was assigned a leading role in the economy to drive industrial expansion and achieve a

Socialistic Pattern of Society, as envisioned during the Avadi Session of the Indian National Congress in 1955.

• Five major Steel Plants were established during this period with foreign assistance, including those at Bhilai, Durgapur, and Rourkela.

Additional Information

• Harrod-Domar Model:

• This model served as the foundation for the First Five-Year Plan (1951−1956).

• It emphasized increasing the rate of savings and focused primarily on the agricultural sector and irrigation projects to address food shortages.

• Neo-classical minimal-state model:

• This economic perspective advocates for free markets and limited government intervention, which was contrary to the state-led industrialization strategy of the Second Plan.

• Economic Targets:

• The Second Plan aimed for a 25 percent increase in the national income to raise the standard of living.

• It also saw the establishment of the Atomic Energy Commission in 1958, led by Homi J. Bhabha.

Q60. Answer: (c) Amulya Malladi

The correct answer is Amulya Malladi.

Key Points

• The Mango Season is a critically acclaimed novel written by Amulya Malladi, first published in 2003.

• The story revolves around the protagonist, Priya Rao, an Indian woman who has been living in the United States for seven years and returns to her home in Hyderabad, India, for a visit.

• The narrative explores the complexities of modern India, focusing on the tension between traditional family values and the personal independence gained by living abroad.

• The central conflict involves Priya Rao trying to find the right moment to reveal to her conservative family that she is engaged to an American man named Nick.

• The book is set during the sweltering Indian summer, using the mango season as a metaphorical backdrop for the ripening of secrets and the stifling nature of societal expectations.

• Amulya Malladi is a prominent Indian-American author known for her poignant portrayal of the immigrant experience and contemporary Indian life.

Additional Information

• Other authors mentioned in the options include:

• Sandhya Menon: A New York Times bestselling author famous for young adult contemporary novels such as When Dimple Met Rishi.

• Sara Desai: An author known for writing contemporary romance and romantic comedy novels, including The Marriage Game and The Dating Plan.

• Alka Joshi: The celebrated author of the Jaipur Trilogy, which began with the international bestseller The Henna Artist, set in 1950s India.

• Amulya Malladi's other notable literary works include A Breath of Fresh Air, The Song of the Cuckoo Bird, and A House for Happy Mothers.

Q61. Answer: (d) Monocotyledonous

The correct answer is Monocotyledonous.

Key Points

• In Monocotyledonous plants, the primary root is short-lived and is soon replaced by a large number of roots that originate from the base of the stem.

• These roots constitute the fibrous root system, which forms a dense network of thin, moderately branching roots that spread out near the soil surface.

• This system is essential for providing firm anchorage to the plant and ensuring efficient absorption of water and minerals from the upper layers of the soil.

• Common examples of plants exhibiting this characteristic include Wheat, Maize, Rice, Barley, and various types of Grasses.

• Unlike the taproot system, the fibrous system does not have a single dominant central axis; instead, all roots are approximately equal in thickness and length.

Additional Information

• Dicotyledonous

• These plants typically possess a taproot system.

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• The primary root is a direct elongation of the radicle and persists throughout the plant life, giving rise to lateral roots like secondary and tertiary roots.

• Examples include Mustard, Gram, and Pea plants.

• Gymnosperms

• Most Gymnosperms generally have a taproot system.

• In some genera, roots have symbiotic associations, such as Mycorrhiza in Pinus or coralloid roots in Cycas associated with nitrogen-fixing cyanobacteria.

• Pteridophytes

• In Pteridophytes, the primary root is ephemeral (short-lived).

• It is replaced by adventitious roots that arise from the rhizome or stem, providing necessary nutrients to the sporophyte.

Q62. Answer: (d) Pherozeshah Mehta

The correct answer is Pherozeshah Mehta.

Key Points

• Pherozeshah Mehta (1845−1915) was a prominent political leader and lawyer from Bombay who served as a founding member of the Indian National Congress in 1885.

• He belonged to the Moderate faction of the Congress, which dominated the organization during its early years from 1885 to 1905.

• Mehta presided over the sixth session of the Indian National Congress held in Calcutta in 1890.

• Known as the Lion of Bombay, he was a key figure in the Bombay Municipal Corporation and advocated for reforms through constitutional means, such as petitions and dialogues with the British government.

• The Moderates, including leaders like Mehta, believed in the British sense of justice and focused on achieving administrative and legislative reforms rather than immediate self-rule.

Additional Information

• Subhas Chandra Bose:

• A radical nationalist who served as the President of the Indian National Congress in 1938 and 1939.

• He later formed the All India Forward Bloc and organized the Indian National Army (INA) to secure independence through armed struggle.

• Bal Gangadhar Tilak:

• A primary leader of the Extremist faction within the Congress who famously declared, Swaraj is my birthright and I shall have it.

• He advocated for Swadeshi, Boycott, and mass mobilization, moving away from the Moderate approach of constitutional agitation.

• Bhagat Singh:

• A revolutionary leader and a key member of the Hindustan Socialist Republican Association (HSRA).

• He believed in revolutionary socialism and was involved in the 1929 bombing of the Central Legislative Assembly to protest against repressive British laws.

Q63. Answer: (d) Tehran

The correct answer is Tehran.

Key Points

• The 3rd Trilateral Consultations between India, Iran, and Armenia were held on September 8, 2025, in Tehran, the capital of Iran.

• The meeting was co-chaired by Anand Prakash (Joint Secretary, Ministry of External Affairs, India), Mohammad Reza Bahrami (Director General for South Asia, Iran), and Anahit Karapetyan (Head of Asia-Pacific Department, Armenia).

• The consultations followed the first meeting held in Yerevan (April 2023) and the second meeting held in New Delhi (December 2024), establishing a regular annual diplomatic rhythm.

• Discussions primarily focused on regional connectivity, specifically the progress of the International North-South Transport Corridor (INSTC) and the utilization of the Chabahar Port.

• The parties expressed satisfaction with the progress of decisions made in previous rounds and agreed to hold the fourth round of consultations in Armenia in 2026.

Additional Information

• International North-South Transport Corridor (INSTC):

• A 7,200-km-long multi-mode transport network connecting India to Russia and Europe via Iran and the Caucasus.

• It serves as a strategic alternative to the traditional route through the Suez Canal, significantly reducing transit time and costs.

• Chabahar Port:

• Located in Iran\'s Sistan-Balochistan province, it is a key hub for India to access Central Asia and Eurasia, bypassing Pakistan.

• India and Iran signed a 10-year contract in May 2024 for the operation of the Shahid Beheshti Terminal at the port.

• Crossroads of Peace Initiative:

• An Armenian project aimed at modernizing regional infrastructure and connecting the Caspian Sea, the Mediterranean, and the Persian Gulf.

Q64. Answer: (b) Diaspora's contribution to a Viksit Bharat

The correct answer is Diaspora's contribution to a Viksit Bharat.

Key Points

• The 18th Pravasi Bharatiya Divas (PBD) convention is scheduled to be organized from January 8 to 10, 2025.

• The official theme for the 2025 event is 'Diaspora’s contribution to a Viksit Bharat', emphasizing the strategic role of the overseas Indian community in realizing the vision of a developed India by 2047.

• For the first time, the convention will be held in Bhubaneswar, the capital of Odisha, showcasing the state's cultural heritage and investment potential to the global Indian community.

• The event serves as a primary platform for the Ministry of External Affairs to engage with Non-Resident Indians (NRIs) and Persons of Indian Origin (PIOs) to strengthen their bonds with their roots.

• The Youth Pravasi Bharatiya Divas will also be held in partnership with the Ministry of Youth Affairs and Sports on the inaugural day of the convention.

Additional Information

• Background of Pravasi Bharatiya Divas (PBD):

• The day is celebrated on January 9 to commemorate the return of Mahatma Gandhi from South Africa to Mumbai in 1915.

• Since 2015, the format was revised to celebrate the convention once every two years (biennial) rather than annually.

• Previous Themes and Editions:

• The 17th PBD was held in Indore, Madhya Pradesh in 2023, with the theme 'Diaspora: Reliable partners for India’s progress in Amrit Kaal'.

• The 16th PBD was conducted virtually in 2021 due to the pandemic, with the theme 'Contributing to Atmanirbhar Bharat'.

• Pravasi Bharatiya Samman Award (PBSA):

• It is the highest honor conferred by the President of India as part of the PBD Convention to recognize the exceptional contributions of the diaspora in various fields.

Q65. Answer: (b) Welby Commission

The correct answer is Welby Commission.

Key Points

• Gopal Krishna Gokhale, a prominent moderate leader of the Indian National Congress and founder of the Servants of India Society, traveled to England in 1897 to present evidence before the Welby Commission.

• The Welby Commission, formally known as the Royal Commission on Indian Expenditure, was established in 1895 by the British government to investigate the administration and management of military and civil expenditure in India.

• Representing the Deccan Sabha, Gokhale provided a sophisticated critique of the British financial policy, highlighting the systemic economic drain of Indian wealth and the unfair tax burden placed upon the Indian population.

• He argued that India was being forced to pay for British imperial interests, particularly through Home Charges and high military spending, which hindered domestic developmental progress.

• His testimony was instrumental in exposing the fiscal injustices of the British Raj and emphasized the urgent need for Indian representation in the decision-making processes regarding the country's finances.

Additional Information

• Hunter Commission:

• The first Hunter Commission (1882) was appointed by Lord Ripon to look into the state of primary and secondary education in India.

• The second Hunter Commission (1919), officially the Disorders Inquiry Committee, was formed to investigate the Jallianwala Bagh massacre in Amritsar.

• Fraser Commission:

• Appointed in 1902 under the leadership of Andrew Fraser during Lord Curzon's tenure, this commission focused on comprehensive Police reforms.

• It recommended improvements in the training, salary, and structural organization of the Indian Police to curb corruption and inefficiency.

• Raleigh Commission:

• Formed in 1902 and headed by Thomas Raleigh, it was tasked with examining the condition and prospects of universities in India.

• Its findings led to the enactment of the Indian Universities Act of 1904, which increased government control over higher education institutions.

Q66. Answer: (a) Article 353

The correct answer is Article 353.

Key Points

• Article 353 of the Constitution of India explicitly outlines the Effect of Proclamation of Emergency. It details how the administrative and legislative machinery of the country shifts from a federal to a more unitary structure during a National Emergency.

• Under Article 353(a), the executive power of the Union extends to giving directions to any State regarding the manner in which the State's executive power is to be exercised. This essentially brings the State administration under the total control of the Central Government.

• Under Article 353(b), the legislative power of Parliament is expanded. It gains the authority to make laws on subjects mentioned in the State List (List II), which are normally under the exclusive jurisdiction of the States.

• The 42nd Amendment Act of 1976 further expanded the scope of Article 353, allowing the executive directions and legislative power of the Union to extend to States other than the one where the Emergency is specifically in operation, provided the security of India is threatened.

Additional Information

• Article 350:

• Pertains to the Language to be used in representations for redress of grievances.

• It ensures every person has the right to submit a representation in any language used in the Union or the State.

• Article 256:

• Deals with the Obligation of States and the Union.

• It stipulates that the executive power of every State shall be exercised to ensure compliance with the laws made by Parliament.

• Article 252:

• Describes the power of Parliament to legislate for two or more States by consent.

• If the legislatures of two or more States pass resolutions requesting Parliament to regulate a matter in the State List, Parliament can enact such a law for those specific States.

Q67. Answer: (a) Service conditions of public servants

The correct answer is Service conditions of public servants.

Key Points

• The 42nd Constitutional Amendment Act, 1976, inserted a new Part XIV-A into the Constitution of India, titled as Tribunals.

• This Part consists of two main articles: Article 323A and Article 323B, which provide for the establishment of specialized quasi-judicial bodies to reduce the burden on traditional courts.

• Article 323A specifically empowers the Parliament to provide for the adjudication or trial by Administrative Tribunals of disputes and complaints regarding the recruitment and conditions of service of persons appointed to public services and posts.

• The authority extends to public servants at the Union level, State level, local authorities, and any corporation owned or controlled by the Government of India.

• In pursuance of Article 323A, the Parliament enacted the Administrative Tribunals Act, 1985, which led to the setting up of the Central Administrative Tribunal (CAT) and State Administrative Tribunals (SAT).

Additional Information

• Article 323B:

• This article deals with Tribunals for other matters. It allows both the Parliament and State Legislatures to establish tribunals for specific subjects such as taxation, foreign exchange, land reforms, industrial and labour disputes, and ceiling on urban property.

• It also covers elections to Parliament and State Legislatures; however, the option specifying states only is incorrect as it encompasses both levels of government.

• Mini-Constitution:

• The 42nd Amendment is widely known as the Mini-Constitution because it brought the most widespread changes to the Indian Constitution during the Emergency under the Indira Gandhi government.

• It was based on the recommendations of the Swaran Singh Committee.

• Judicial Review:

• The 42nd Amendment attempted to limit the power of Judicial Review and the writ jurisdiction of the High Courts and the Supreme Court, but many of these restrictions were subsequently removed by the 43rd and 44th Amendment Acts.

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Q68. Answer: (d) France

The correct answer is France.

Key Points

• The 2025 United Nations Ocean Conference (UNOC) is scheduled to take place in Nice, France, from June 9 to 13, 2025.

• This high-level conference is being co-hosted by the governments of France and Costa Rica to drive global ocean action.

• The primary mandate of the conference is to support the implementation of Sustainable Development Goal 14 (SDG 14), which focuses on Life Below Water and the sustainable management of marine resources.

• France and Costa Rica launched the preparatory process through the One Ocean Science Congress and high-level diplomatic engagements to ensure the adoption of a transformative Ocean Declaration in 2025.

• The summit aims to address critical threats such as ocean acidification, plastic pollution, and the loss of marine biodiversity through international cooperation.

Additional Information

• Portugal:

• Hosted the 2022 UN Ocean Conference in its capital city, Lisbon, in collaboration with Kenya.

• The 2022 conference resulted in the Lisbon Declaration, titled 'Our Ocean, Our Future, Our Responsibility', emphasizing science-based innovation.

• Costa Rica:

• As the co-host for the 2025 summit, it organized a precursor high-level event titled Immersed in Change in San José in June 2024.

• The country is a global leader in marine conservation and the Blue Economy, pushing for the protection of 30 percent of the world's oceans by 2030 (30x30 target).

• Sustainable Development Goal 14 (SDG 14):

• Adopted by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development.

• It targets the reduction of marine debris, the protection of coastal ecosystems, and the elimination of Illegal, Unreported, and Unregulated (IUU) fishing.

Q69. Answer: (d) Sere

The correct answer is Sere.

Key Points

• The term Sere refers to the entire sequence of biotic communities that replace one another in a given area over a period of time during the process of ecological succession.

• Ecological succession is defined as the orderly and predictable change in the species composition of a given area, eventually leading to a stable community.

• The individual transitional communities within a sere are referred to as seral stages or seral communities.

• In successive seral stages, there is typically an increase in the number of species, a change in the diversity of organisms, and an overall increase in the total biomass of the ecosystem.

• A Sere represents the complete chronological progression of life, starting from the first organisms to inhabit a bare area (the pioneer community) to the final, stable state (the climax community).

• These changes are driven by both biological factors (interaction between species) and physical factors (alterations in soil, light, and moisture conditions caused by the organisms themselves).

Additional Information

• Climax Community:

• This is the final, relatively stable stage of ecological succession that is in near equilibrium with the regional climate.

• Unlike seral stages, the climax community remains essentially unchanged as long as environmental conditions are constant.

• Ecesis:

• This is a vital stage in the process of succession that involves the successful establishment of a species in a new area.

• It includes the germination, growth, and reproduction of the migrating species after they reach a new territory.

• Invasion:

• This represents the entire process of a species entering and establishing itself in a bare area (Nudation).

• It is comprised of three distinct steps: Migration (dispersal of seeds or spores), Ecesis (establishment), and Aggregation (increase in population density).

Q70. Answer: (d) Enrichment of water with nutrients leading to excessive algal growth

The correct answer is Enrichment of water with nutrients leading to excessive algal growth.

Key Points

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• Eutrophication is a process characterized by the excessive enrichment of water bodies with minerals and nutrients, primarily Nitrates and Phosphates.

• These nutrients act as fertilizers, stimulating the rapid and dense growth of phytoplankton and algae on the water surface, a phenomenon known as an Algal Bloom.

• The dense algal layer prevents sunlight from reaching submerged aquatic plants, inhibiting their photosynthesis and leading to their death.

• When these algae eventually die, aerobic bacteria (decomposers) consume large quantities of Dissolved Oxygen (DO) to break down the organic matter.

• This massive consumption of oxygen leads to hypoxia (oxygen depletion), which creates dead zones where fish and other aquatic organisms cannot survive, ultimately causing a collapse of the aquatic ecosystem.

Additional Information

• Biological Magnification (Biomagnification):

• This refers to the increasing concentration of persistent, non-biodegradable toxic substances, such as DDT or Mercury, at higher trophic levels in a food chain.

• Unlike eutrophication, which involves nutrient enrichment, biomagnification involves the accumulation of pollutants in the tissues of organisms.

• Sources of Nutrients:

• Agricultural Runoff: Excess chemical fertilizers washed into lakes and rivers.

• Sewage and Wastewater: Domestic and industrial waste containing phosphates from detergents.

• Types of Eutrophication:

• Natural Eutrophication: A slow, centuries-long process of a lake aging.

• Cultural (Anthropogenic) Eutrophication: Accelerated nutrient enrichment caused specifically by human activities.

Q71. Answer: (a) 20

The logic followed here is:

Position of Jay from the top = 9^(th)

Position of Jay from the bottom = 12^(th)

Total number of students in the class = (Position from top + Position from bottom) − 1

= (9 + 12) − 1

= 21 − 1

= 20

Hence, the correct answer is 'Option 1'.

Q72. Answer: (a) Wife's brother

Family Chart

Let us first decode the given symbols and then draw a family tree.

Symbol	%	€	=	?
Meaning	Father	Wife	Brother	Daughter

Given: B = C ? O % P € X

The Family tree diagram is,

Therefore, B is the brother of P, who is the wife of X → B is the Wife's brother of X.

Hence, the correct answer is 'Option 1'.

Q73. Answer: (c) HLJN

The logic followed in this pattern is based on the English alphabetical order, where each letter in the group is shifted forward by 2 positions.

For 'HLJN' related to 'JNLP':

H(8)	L(12)	J(10)	N(14)
+2 ↓	+2 ↓	+2 ↓	+2 ↓
J(10)	N(14)	L(12)	P(16)

For 'EIGK' related to 'GKIM':

E(5)	I(9)	G(7)	K(11)
+2 ↓	+2 ↓	+2 ↓	+2 ↓
G(7)	K(11)	I(9)	M(13)

Applying the same logic to 'FJHL':

F(6)	J(10)	H(8)	L(12)
+2 ↓	+2 ↓	+2 ↓	+2 ↓
H(8)	L(12)	J(10)	N(14)

Thus, FJHL is related to HLJN.

Hence, the correct answer is 'Option 3'.

Q74. Answer: (c) BDD

The logic followed here is:

For, JKL

For, FGH

For, BDD

For, LMN

The letter clusters JKL, FGH, and LMN follow a common pattern, whereas BDD is the odd one out.

Hence, the correct answer is "Option 3"

Q75. Answer: (c) OKM

The pattern followed here is,

Logic: First letter − 4 = Second letter and Second letter + 5 = Third letter.

LHM,

RNS,

OKM,

UQV,

Therefore, the letter-cluster that is different from the others is OKM.

Hence, the correct answer is 'Option 3'.

Q76. Answer: (a) 4

Given word: 'LANGUID.'

After arranged in alphabetical order:

Alphabets	L	A	N	G	U	I	D
Alphabetical order	A	D	G	I	L	N	U

After arranged in alphabetical order,

The third alphabet from the left end is: G,

The third alphabet from the right end is: L,

Now, there are 4 letters between G and L.

H	I	J	K

Hence, the correct answer is "Option 1."

Q77. Answer: (b) Q and G

Given: Seven people, F, G, H, L, M, O, and Q, are sitting around a circular table, facing the center of the table.

1. Only one person sits between Q and L when counted from the right of Q.
2. Only one person sits between L and M when counted from the left of M.
1. Only one person sits between Q and G when counted from the right of G.
2. Only two people sit between H and M when counted from the left of M.
3. Only one person sits between F and G when counted from the right of F.

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The Final Arrangement is,
Therefore, Q and G sit to the immediate right and left of O, respectively.
Hence, the correct answer is 'Option 2'.

Q78. Answer: (b) WISE - IWSE - EIWS

The logic follows here,
For 'TREK - RTEK - KRTE':
For 'MAPS - AMPS - SAMP':
Applying the same logic to 'WISE' in the options:
Thus, the triad WISE - IWSE - EIWS follows the logic correctly, while other options do not match the expected pattern.
Hence, the correct answer is 'Option 2'.

Q79. Answer: (d) 3 km to the east

Given:
• Akshay starts from Point A and drives 12 km towards the north.
• He then takes a right turn, drives 15 km, turns right and drives 17 km.
• He then takes a right turn and drives 18 km.
• He takes a final right turn, drives 5 km and stops at Point P
The Final Diagram,
3 km to the east in order to reach Point A again
Hence, the correct answer is option 4

Q80. Answer: (a) 3

According to the given information,
When 1 is added to each odd digit and 1 is subtracted from each even digit in the number 47321568,
Now the new number is: 38412657
Left 3 8 4 1 2 6 5 7 Right
Hence the correct answer is "option 1"

Q81. Answer: (a) Only conclusion (II) follows

The least possible Venn diagram for the given statements is:
Conclusions:
(I) Some clouds are vapor - Does not follow
(There is no direct relation between clouds and vapor maybe it is possible but not definite.)
(II) Some vapor is water. - Follows (Some water is vapor, and some vapour is water is true)
Only conclusion (II) follows
Hence the correct answer is "Option 1"

Q82. Answer: (b) 6

Logic followed here is the comparison of words to identify common letters and their corresponding numerical codes.
Given:
PINS is coded as 3247
HIPS is coded as 4627
Step 1: Identify common letters in both words.
The letters common to PINS and HIPS are P, I, and S.
Step 2: Identify common digits in both numerical codes.
The digits common to 3247 and 4627 are 2, 4, and 7.
This implies that the set of letters {P, I, S} corresponds to the set of digits {2, 4, 7}.
Step 3: Determine the code for H.
In the word HIPS, the letter that remains after removing P, I, and S is H.
In the code 4627, the digit that remains after removing 2, 4, and 7 is 6.
Therefore, the code for H is 6.
The correct answer is option 2

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Q83. Answer: (b) Wife's mother

Family Chart

Let us first decode the given symbols and then draw a family tree.

Symbol	@	&	#	%	•
Meaning	Mother	Husband	Father	Son	Daughter

Given: G @ K & V * P # W % J

The family tree diagram is,

Based on the tree, V is the daughter of J, and K is the husband of V. Therefore, J is the Wife's mother of K.

Hence, the correct answer is 'Option 2'.

Q84. Answer: (d) de

The logic follows here,

• unit flash zebra → mi de cz

• zebra dance king → de uv id

• The code for zebra is de.

Hence, the correct answer is "Option 4"

Q85. Answer: (d) None

Given series: 9 7 6 4 3 5 7 6 4 6 7 6 9 8 7 7 6 6 7 6 5 7 6 8 7 5 6

Required Condition: Perfect Square - Even Digit - Even Digit

(Left) 9 7 6 4 3 5 7 6 4 6 7 6 9 8 7 7 6 6 7 6 5 7 6 8 7 5 6 (Right)

Since no even digit in the series is simultaneously preceded by a perfect square and followed by an even digit, the total count is None.

Hence, the correct answer is 'Option 4'.

Q86. Answer: (c) Five

Given: Seven people, L, V, H, D, E, F and T, are sitting in a row, facing north.

• Only four people sit to the right of D.

• V sits fourth from the left end.

• E is the immediate neighbor of H and T.

• F sits third to the left of T.

The Final Arrangement is,

The people sitting between L and H are F, D, V, T, and E.

Hence, the correct answer is "Option 3"

Q87. Answer: (a) 58

The logic followed in the given number series is as follows:

Logic: (Previous number × Multiplier) − 2 = Next number

• 28 × 0.5 − 2 = 14 − 2 = 12

• 12 × 1.0 − 2 = 12 − 2 = 10

• 10 × 1.5 − 2 = 15 − 2 = 13

• 13 × 2.0 − 2 = 26 − 2 = 24

• 24 × 2.5 − 2 = 60 − 2 = 58

The next term in the series is 58.

Hence, the correct answer is "Option1"

Q88. Answer: (d) VYW

The logic followed here is

Logic: First letter + 2 = Second letter; Second letter − 1 = Third letter

EGF,

BDC,

HJI,

VYW,

This cluster does not follow the same logic as the others.

Therefore, the letter cluster that is different from the others is VYW.

Hence, the correct answer is 'Option 4'.

Q89. Answer: (b) 142

The logic follows here.

Logic: Double difference of 6 and 10.

• 10 + 3 = 13

• 13 + 9 = 22

• 22 + 19 = 41

• 41 + 25 = 66

• 66 + 35 = 101

• 101 + 41 = 142

Missing number = 101 + 41 = 142

Hence, the correct answer is "Option 2"

Q90. Answer: (c) Four

Given: Seven boxes F, A, C, T, O, R, and S are kept one over the other but not necessarily in the same order

1. Only two boxes are kept below A.
2. R is kept immediately above A.
3. Only three boxes are kept between T and A.

Position	Box
7	T
6	
5	
4	R
3	A
2	
1	

1. Only one box is kept between S and R.
2. Only four boxes are kept between S and F.
3. O is kept at someplace above C.

Final Arrangement:

7	T
6	S
5	O
4	R
3	A
2	C
1	F

Thus, there are 4 boxes (R, A, C, and F) kept below O.

Hence, the correct answer is 'Option 3'.

Q91. Answer: (a) QUR

The logic followed here is,

Logic: Each letter in the term is shifted forward by 5 positions in the English alphabetical order

By combining the results, the next term in the series is QUR.

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Hence, the correct answer is "option 1"

Q92. Answer: (d) J

Given: Seven boxes I, J, K, M, N, P and Q are kept one over the other but not necessarily in the same order.

1. Box I is kept at the topmost position.
2. Only one box is kept between box I and box P.
3. Only three boxes are kept between box K and box P.

Position	Box
7	I
6	
5	P
4	
3	
2	
1	K

1. Box N is kept immediately above box Q.
2. Only two boxes are kept between box N and box M.

Final Arrangement:

Position	Box
7	I
6	M
5	P
4	J
3	N
2	Q
1	K

The box kept fourth from the top (at position 4) is J.

Hence, the correct answer is 'Option 4'.

Q93. Answer: (c) 62, 126

The logic followed here is:

Logic: Second Number = (First Number × 2) + 2

For the first set 54, 110

=> (54 × 2) + 2

=> 108 + 2 = 110.

For the second set 56, 114

=> (56 × 2) + 2

=> 112 + 2 = 114.

Applying the same logic

62, 126

=> (62 × 2) + 2

=> 124 + 2 = 126.

Hence, the correct answer is "Option 3".

Q94. Answer: (c) 4, 2, 5, 3, 1

Explanation: The option that represents the correct order of the given words as they would appear in the English dictionary is shown below:

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The final alphabetical order is:

4. Migrate

2. Mild

5. Milk

3. Mist

1. Mistake

The correct sequence is 4, 2, 5, 3, 1.

Hence, the correct answer is "Option 3"

Q95. Answer: (d) XXA 30

The logic follows here,

Combining all the elements, the next cluster in the series is XXA 30.

Hence, the correct answer is "option 4"

Q96. Answer: (c) NJ-PL-RU

The logic followed in these triads is based on the positional values of the English alphabets. The pattern for each triad is as follows:

For the triad 'RN-TP-VY':

R(18)	**N(14)**
+2 ↓	+2 ↓
T(20)	P(16)
+2 ↓	+9 ↓
V(22)	Y(25)

For the triad 'PL-RN-TW':

P(16)	**L(12)**
+2 ↓	+2 ↓
R(18)	N(14)
+2 ↓	+9 ↓
T(20)	W(23)

Applying the same logic to the options:

N(14)	**J(10)**
+2 ↓	+2 ↓
P(16)	L(12)
+2 ↓	+9 ↓
R(18)	U(21)

Thus, the triad NJ-PL-RU follows the same pattern.

Hence, the correct answer is 'Option 3'.

Q97. Answer: (b) 1985

Given : 805 ÷ 2 + 26 − 1203 × 3 = ?

After '+' and '-' are interchanged and '×' and '÷' are interchanged then,

=>805 × 2 - 26 + 1203 ÷ 3 = ?

=>805 × 2 - 26 + 401 = ?

=>1610 + 401 - 26 = ?

=> 2011 - 26 = ?

=> 1985 = ?

Hence, "Option 2" is the correct answer.

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Q98. Answer: (a) IT62

The logic follows here,

Logic: (First Letter − 2), (Second Letter + 2), and (Number + 9).

The missing term in the series is IT62.

Hence, the correct answer is "option 1"

Q99. Answer: (c) 58

BODMAS Rule:

According to the question, the signs are interchanged as follows:

Original Symbol	•	−	×	÷
New Symbol	−	×	÷	•

Now, given the equation: 18 − 3 ÷ 9 + 15 × 3 = ?

After interchanging the specified signs, the new equation is:

18 × 3 + 9 - 15 ÷ 3 = ?

Perform operations according to BODMAS:

=>18 × 3 + 9 - 15 ÷ 3

=>18 × 3 + 9 - 5

=>54 + 9 - 5

=>63 - 5

=>58

Hence, the correct answer is "Option 3".

Q100. Answer: (c) Only conclusion (I) follows

The least possible Venn diagram for the given statements is:

Conclusions:

(I) No chair is a hat - Follows (No bat is a Hat. All chair is bat. So, no chair is a hat is true)

(II) Some hats are bats - Does not follow (As there is no relation between hats and bats). Hence, it is false.

Only conclusion (I) follows

Hence, the correct answer is "Option 3"

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