RRB NTPC (UG) CBT-I Official Paper (Held On 15 Jun, 2026 Shift 3) (Previous Year Paper)

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

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MATHEMATICS

Q1. What is the greatest length of a measuring rod that can exactly measure three fabric pieces of lengths 7 m 35 cm, 9 m 45 cm, and 10 m 50 cm?

(a) 1 m 15 cm
(b) 1 m 20 cm
(c) 1 m 5 cm
(d) 1 m 25 cm

Q2. A student scores an average of 72 marks in 5 subjects and 84 marks in 3 additional subjects. The overall average marks is

(a) 75.25
(b) 75.5
(c) 76.25
(d) 76.5

Q3. The sum of two positive numbers is 67 and their product is 1012. The positive difference between them is:

(a) 24
(b) 13
(c) 21
(d) 30

Q4. The fourth proportional to the first number, the second number, and 20 is 36. If the sum of the first two numbers is 14, find the geometric mean of the first two numbers.

(a) $5\sqrt{3}$
(b) $3\sqrt{5}$
(c) $5\sqrt{2}$
(d) $2\sqrt{5}$

Q5. Let both a and b be prime numbers such that $(a^2 + b)$ is also a prime number less than 20. What is the number of possible values of b?

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

Q6. A, B, and C can complete a work in 10, 12, and 15 days, respectively. A and B work together for 3 days, after which A withdraws. B and C then work together. Find the number of days required by B and C to complete the remaining work.

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

Q7. Simplify: {20/33 ÷ 20/7} ÷ (3/5 × 10/9 + 2/11) + 7/4 ÷ 28/23 of 23/4

(a) 19/29
(b) 6/19
(c) 1/2
(d) 23/31

Q8. Which of the following numbers is divisible by 11?

(a) 3522
(b) 4735
(c) 2145
(d) 5281

Q9. If the income tax is increased by 18%, the net income is reduced by 2%. Find the original rate of income tax.

(a) 8%
(b) 5%
(c) 10%
(d) 12%

Q10. A scooter travels 40 km at 20 km/hr and returns 60 km at the same speed. What is the average speed?

(a) 24 km/hr
(b) 22 km/hr
(c) 25 km/hr
(d) 20 km/hr

Q11. What sum (in Rs.) will earn a simple interest of Rs. 1,440 in 3 years at 8% per year rate of interest?

(a) 6,000
(b) 3,000
(c) 12,000
(d) 345.6

Q12. An article is sold at a profit of 58%. If the cost price is increased by Rs. 20 and the selling price is reduced by Rs. 74, then the profit would be 52.5%. What is the original cost price (in Rs.) of the article?

(a) 2,000
(b) 2,100
(c) 2,200
(d) 1,900

Q13. ABCD is a quadrilateral in which AB || DC, and E and F are the mid points of the diagonals AC and BD, respectively. If AB = 60 cm, BC = 65 cm, DC = 18 cm, and AD = 10 cm, then what is the length (in cm) of EF?

(a) 21
(b) 22
(c) 23
(d) 25

Q14. What is the mode of the following data?

40, 47, 54, 45, 50, 43, 53, 52, 53, 49, 40, 50, 42, 52, 44, 52, 47, 55

(a) 47
(b) 54
(c) 52
(d) 40

Q15. The following ratios are given:

a : b = 2 : 3
b : c = 4 : 5
c : d = 3 : 2

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d : e = 5 : 4

What is the value of the ratio a : e?

(a) 1 : 1
(b) 3 : 4
(c) 4 : 7
(d) 3 : 5

Q16. A train passes two persons walking in the same direction in which the train is going. These persons are walking at the rates of 2 km/hr and 4 km/hr, respectively, and are completely crossed by the train in 9 seconds and 10 seconds, respectively. What is the length of the train?

(a) 55 meters
(b) 45 meters
(c) 75 meters
(d) 50 meters

Q17. In a class, there are 10 boys more than girls. Each girl has 3 pencils and each boy has 2 pencils with them. The total number of pencils in the class is 170. The ratio of girls to boys in the class is _____.

(a) 2:3
(b) 4:5
(c) 3:4
(d) 5:6

Q18. The angles of depression of two ships from the top of a light house are 45^0 and 30^0 towards east. If the ships are 50 m apart, the height of the light house is

(a) 25 (√3 + 1) m
(b) 25/(√3+1) m
(c) 50(√3+1) m
(d) 50/(√3+1) m

Q19. A and B can do a piece of work in 12 days and 15 days, respectively. Both work for 4 days and then A leaves. How long (in days) will B take to complete the remaining work?

(a) 5
(b) 8
(c) 7
(d) 6

Q20. If p is the third proportional to 6 and 18, and q is the third proportional to p and 54, find the value of q.

(a) 36
(b) 72
(c) 18
(d) 54

Q21. Simplify: $9^2 + \sqrt{4}^2 - 7\sqrt{16} - 7$

(a) 50
(b) 57
(c) 45
(d) 58

Q22. If a trader purchases 50 notebooks for Rs. 1000 and sells all at a gain of 20%, what is the selling price of each notebook?

(a) Rs. 24
(b) Rs. 20
(c) Rs. 18
(d) Rs. 22

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Q23. The marked price of a refrigerator is Rs. 4,884. The shopkeeper allows a discount of 10% and gains 8%. If no discount is allowed, his gain percentage would be:

(a) 30%
(b) 10%
(c) 40%
(d) 20%

Q24. The sum of the present ages of a father and his son is 50 years. Five years ago, the father's age was three times the son's age. By how many years is the father older than his son?

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

Q25. The difference in simple interest on a sum of money invested at 4% per annum for five years and for three years is Rs. 784. Find the simple interest (in Rs.) on the same sum invested at the same rate of interest for eight years.

(a) 3920
(b) 2352
(c) 3136
(d) 4144

Q26. A solid metallic sphere is melted and recast into a cone whose radius is equal to the radius of the sphere. If the height of the cone is 84 cm, what was the volume of the original sphere?

(Use $\pi = 22/7$)

(a) 27808 cm^3
(b) 38808 cm^3
(c) 49808 cm^3
(d) 16808 cm^3

Q27. A hollow spherical shell is made of a metal of density 39 g/cm^3. Its internal and external radii are 12 cm and 13 cm, respectively. What is the weight (in kg) of the shell?

(Use $\pi = 22/7$ and Density = Mass/Volume)

(a) 77.9
(b) 77.7
(c) 76.648
(d) 73.648

Q28. The LCM of the numbers 5, 3.2 and 0.03 is:

(a) 215
(b) 185
(c) 120
(d) 240

Q29. A tech firm's revenue decreased from Rs. 2,50,000 to Rs. 2,12,500. What is the percentage decrease in the revenue?

(a) 20%
(b) 10%
(c) 15%
(d) 12%

Q30. A marker costs Rs. 43. A store offers "Buy 5, Get 2 Free". What is the effective price per marker? [Give your answer in Rs. , correct to two places after decimal.]

(a) Rs. 32.71
(b) Rs. 30.71
(c) Rs. 31.71

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(d) Rs. 33.71

GENERAL AWARENESS

Q31. A window that covers the entire screen without showing the desktop behind it is said to be in:

(a) Full-screen mode
(b) Restored mode
(c) Minimized mode
(d) Hidden mode

Q32. Which Part of the Indian Constitution deals with Panchayats?

(a) Part V
(b) Part IX
(c) Part VII
(d) Part XI

Q33. Which Constitutional Amendment introduced 10% reservation for Economically Weaker Sections in education and jobs?

(a) 103^(rd) Amendment
(b) 98^(th) Amendment
(c) 102^(nd) Amendment
(d) 104^(th) Amendment

Q34. Who led the Ahom Revolt (1828–33) against British interference in Assam?

(a) Maniram Dutta
(b) Piyali Phukan
(c) Harakanta
(d) Gomdhar Konwar

Q35. As reiterated by the Supreme Court of India in September 2025, under which legislation does a Tribunal have the authority to order the eviction of a child from the property of a senior citizen in cases of failure to maintain them?

(a) Maintenance and Welfare of Parents and Senior Citizens Act, 2007
(b) Maintenance and Welfare of Parents and Senior Citizens Act, 2008
(c) Maintenance and Welfare of Parents and Senior Citizens Act, 2009
(d) Maintenance and Welfare of Parents and Senior Citizens Act, 2006

Q36. Which three indicators are considered while calculating the Human Development Index (HDI)?

(a) Life expectancy, education, and per capita income
(b) Foreign exchange reserves, literacy rate, and poverty rate
(c) Industrial production, exports, and imports
(d) GDP, inflation rate, and unemployment rate

Q37. In Google Docs, when you press Ctrl + S, what technical action occurs in the background?

(a) The document is saved to local storage
(b) An immediate sync to Drive is triggered
(c) The keyboard shortcut is not recognized
(d) The Save As dialog box appears on screen

Q38. Which of the following correctly describes the role of the Windows operating system?

(a) Designing multimedia presentations
(b) Editing audio files
(c) Managing files and folders
(d) Playing games

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Q39. How much funding did ADB pledge for India's urban infrastructure over the next five years from 2025 to 2030?

(a) USD 10 billion
(b) USD 8 billion
(c) USD 5 billion
(d) USD 12 billion

Q40. According to the Census 2011, which state remained the most populous in India?

(a) West Bengal
(b) Uttar Pradesh
(c) Maharashtra
(d) Bihar

Q41. Solar energy is globally measured in the unit of KWh. The physical quantity corresponding to the unit KWh is _____.

(a) Electric charge
(b) Current
(c) Electric energy
(d) Force

Q42. Which of the following is NOT an objective of the Pradhan Mantri Fasal Bima Yojana (PMFBY)?

(a) Providing financial support to farmers facing crop loss due to unforeseen events
(b) Promoting adoption of modern and innovative agricultural practices by farmers
(c) Providing minimum support price for agricultural produce to farmers
(d) Stabilising farmers' income and ensuring continuation in farming activities

Q43. Which landmark case is credited with relaxing the rule of locus standi and establishing the foundation for Public Interest Litigation (PIL) in India?

(a) Minerva Mills vs. Union of India
(b) Golaknath vs. State of Punjab
(c) Maneka Gandhi vs. Union of India
(d) S.P. Gupta vs. Union of India

Q44. When was Oil India Limited (OIL) incorporated as a company?

(a) 1962
(b) 1956
(c) 1965
(d) 1959

Q45. Which institute is partnering with the Ministry of Minority Affairs to provide future-tech training in Kerala on 8th October 2025 ?

(a) IIT Madras
(b) IIT Palakkad
(c) NIT Calicut
(d) IIT Bombay

Q46. Which of the following pairs of local names of Western Ghats and their respective states are correctly matched?

Local Name of Western Ghats Known in State

(1) Sahyadri Maharashtra

(2) Nilgiri Hills Karnataka and Tamil Nadu

(3) Anaimalai Hills Kerala

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

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Q47. The leader of the Rampa Revolt (1922–24) in Andhra Pradesh was:

(a) Durgawati Devi
(b) Ram Chandra Reddy
(c) Chittu Pandey
(d) Alluri Seetharama Raju

Q48. Who amongst the following won CNN-News18's Indian of the Year 2025 in sports?

(a) Jay Shah
(b) Rahul Dravid
(c) Mahendra Singh Dhoni
(d) Gautam Gambhir

Q49. Which of the following substances is considered neutral according to the pH scale?

(a) Pure water
(b) Stomach acid
(c) Sea water
(d) Lime juice

Q50. How many Departmentally Related Standing Committees (DRSCs) are there in the Indian Parliament?

(a) 24
(b) 15
(c) 31
(d) 21

Q51. In November 2025, the first-ever auction of seven limestone mineral blocks was launched in which Union Territory?

(a) Chandigarh
(b) Andaman and Nicobar Islands
(c) Jammu & Kashmir
(d) Puducherry

Q52. National Unity Day, observed in India on 31 October 2025, commemorates the birth anniversary of which national leader?

(a) Mahatma Gandhi
(b) Lal Bahadur Shastri
(c) Jawaharlal Nehru
(d) Sardar Vallabhbhai Patel

Q53. When lemon juice is added to milk, it forms paneer. This process is known as _____.

(a) Coagulation
(b) Sedimentation
(c) Hydrolysis
(d) Crystallization

Q54. Which of the following Chola rulers is credited with building a powerful navy and conquering Sri Lanka, Maldives, and Lakshadweep?

(a) Kulottunga I
(b) Rajendra I
(c) Rajaraja I
(d) Vijayalaya

Q55. Which of the following is NOT included in the four official meteorological seasons of India?

(a) Summer season
(b) Spring season
(c) Rainy season
(d) Winter season

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Q56. The 'Kensington Treaty' was signed between which of the following two countries in 2025?

(a) United Kingdom (UK) and Germany
(b) Germany and France
(c) United Kingdom (UK) and Italy
(d) United Kingdom (UK) and France

Q57. The Banarasi, Patiala and Lucknow Gharanas are associated with which of the following musical styles?

(a) Tappa
(b) Kajari
(c) Thumri
(d) Chaiti

Q58. The Atal Tunnel is built in which Himalayan range?

(a) Karakoram Range
(b) Zaskar Range
(c) Pir Panjal Range
(d) Dhauladhar Range

Q59. Which of the following features of the Constitution of India is NOT borrowed from the United Kingdom?

(a) Appointment of state governors by the Centre
(b) Single citizenship
(c) Speaker of Lok Sabha
(d) Bicameral Parliament

Q60. Which type of natural vegetation is typically found in regions with high temperature, high humidity, and rainfall exceeding 200 cm annually?

(a) Temperate grasslands
(b) Tropical evergreen forests
(c) Thorn and scrub vegetation
(d) Tropical deciduous forests

Q61. In basketball, what does the term “triple-double” signify?

(a) Achieving double the points, rebounds, and assists in a single game
(b) Making three consecutive dunks in a game
(c) Recording double digits in three statistical categories
(d) Committing three technical fouls in a match

Q62. Who won the Holberg Prize in 2025?

(a) Gayatri Chakravorty Spivak
(b) Urmila Satyanarayana
(c) Maithili Mrinalini
(d) Vidya Balan

Q63. A physicist is designing an experiment where the result depends on the product of force and velocity. Which of the following physical quantities is directly measured by this product, considering units and dimensions?

(a) Pressure
(b) Energy
(c) Power
(d) Impulse

Q64. A national emergency must be approved by Parliament within _____.

(a) 45 Days
(b) 90 Days
(c) 60 Days
(d) 30 Days

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Q65. Consider the following statements regarding RAM and ROM and select the correct option.

(i) ROM is faster than RAM because it stores permanent system instructions accessed less frequently by the CPU.

(ii) RAM can be read from and written to by the CPU, but its contents are erased when the power is turned off.

(a) (i) False, (ii) True
(b) (i) True, (ii) False
(c) (i) True, (ii) True
(d) (i) False, (ii) False

Q66. Which tool is most commonly used by the Reserve Bank of India to regulate liquidity in the economy?

(a) Fiscal stimulus
(b) Tariff imposition
(c) Repo rate adjustment
(d) Government subsidies

Q67. When was the Telugu language declared as a classical language of India?

(a) 2006
(b) 2008
(c) 2007
(d) 2005

Q68. The earliest evidence of stone tools in India has been found at:

(a) Lothal
(b) Attirampakkam
(c) Hunsgi Valley
(d) Mehrgarh

Q69. What was the central aim of Raja Rammohan Roy's Atmiya Sabha in early nineteenth-century Bengal?

(a) Supporting caste exclusiveness and encouraging ritualistic social customs
(b) Defending polytheistic worship and resisting all intellectual reform efforts
(c) Opposing idolatry and promoting rational interpretation of Vedantic doctrine
(d) Propagating occult traditions and discouraging scientific modes of thinking

Q70. Who wrote the iconic nationalist novel Anandamath?

(a) Sarat Chandra Chattopadhyay
(b) Dinabandhu Mitra
(c) Rabindranath Tagore
(d) Bankim Chandra Chattopadhyay

GENERAL INTELLIGENCE AND REASONING

Q71. FR 6 is related to KN -6 in a certain way. In the same way, LU 9 is related to QQ -3. To which of the following is LS 14 related, following the same logic?

(a) PR 0
(b) YT 8
(c) QO 2
(d) GT 6

Q72. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) MJ – IF
(b) XA – TU
(c) RF – NB
(d) PL – LH

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Q73. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

GAO 81, EYM 75, CWK 69, AUI 63, ?

(a) YSG 57
(b) YRJ 50
(c) XSF 52
(d) XRF 55

Q74. What should come in place of the '?' in the given series?

8 6 9 23 87 ?

(a) 437
(b) 433
(c) 421
(d) 429

Q75. Mr. Vasu starts from Point A and drives 23 km towards the south. He then takes a left turn, drives 19 km, turns left and drives 36 km. He then takes a left turn and drives 19 km, turns left drives 9 km. He then takes a right turn and drives 5 km. He takes a final left turn, drives 4 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) 5 km to the east
(b) 8 km to the north
(c) 4 km to the west
(d) 7 km to the south

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

7 11 20 24 46 50 ?

(a) 100
(b) 98
(c) 102
(d) 96

Q77. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which is the one that does not belong to that group? (Note: The odd one out is not based on the number of consonants/vowels or their position in the letter cluster.)

(a) OR-KM
(b) SV-OQ
(c) QT-MO
(d) UX-QR

Q78. In a certain code language, 'DOLT' is coded as '4963' and 'LOTS' is coded as '6435'. What is the code for 'S' in the given code language?

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

Q79. Seven people H, I, J, K, W, Y and Z are sitting around a circular table facing the center of the table. Only one person sits between H and W when counted from the left of W. Z sits third to the right of I. J sits third to the left of K. Z sits to the immediate right of J. Y is not an immediate neighbor of J. How many people sit between Y and W when counted from the right of Y?

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

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Q80. 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) 3 5 8 9 7 4 1 5 9 6 2 3 6 5 8 7 4 1 5 9 8 6 3 2 1 5 4 7 8 4 1 2 5 9 8 7 4 1 5 6 2 3 9 8 7 8 9 7 5 1(Right)

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

(a) 5
(b) 8
(c) 4
(d) 6

Q81. Which two numbers should be interchanged to make the given equation correct?

(28 ÷ 4) × 6 + 14 × 3 − 7 × 9 + (66 ÷ 2) + 38 = 67

(a) 2 and 6
(b) 2 and 3
(c) 6 and 3
(d) 4 and 7

Q82. Seven boxes, B, C, D, E, Q, R and S, are kept one over the other, but not necessarily in the same order. Only one box is kept above E. Only two boxes are kept between C and E. B is kept immediately above E. Only Q is kept immediately below S. D is kept at some place below B and at some place above R. How many boxes are kept between B and S?

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

Q83. MJ 8 is related to OM -6 in a certain way. In the same way, RW 12 is related to TZ -2. To which of the following is UR 1 related, following the same logic?

(a) YT -10
(b) UH -5
(c) KKO -12
(d) WU -13

Q84. In a certain code language, ‘VIBE’ is coded as ‘4395’ and ‘BITE’ is coded as ‘5914’. What is the code for ‘T’ in the given code language?

(a) 9
(b) 5
(c) 1
(d) 4

Q85. If ‘A’ stands for ‘÷’, ‘B’ stands for ‘x’, ‘C’ stands for ‘+’ and ‘D’ stands for ‘-‘, what will come in place of the question mark ‘?’ in the following equation?

81 A 3 D 7 B 2 C 16 = ?

(a) 24
(b) 21
(c) 32
(d) 29

Q86. What should come in place of '?' in the given series based on the English alphabetical order?

URW GDI SPU EBG ?

(a) NJP
(b) PLR
(c) QNS
(d) LIN

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Q87. Select the pair which follows the same pattern as that followed by the two sets of pairs given below. Both pairs follow the same pattern.

QVI : KZJ

USH : OWI

(a) LQG : FUH
(b) BRH : VVF
(c) CNK : WRJ
(d) AHL : UMK

Q88. In a certain code language,

A % B means ‘A is the sister of B’

A € B means ‘A is the son of B’

A = B means ‘A is the father of B’

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
(b) Mother
(c) Brother's daughter
(d) Mother's mother

Q89. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

FHD GIE HJF IKG ?

(a) JKM
(b) JKG
(c) JLH
(d) JMG

Q90. In a certain code language,

A $ B means ‘A is the father of B’,

A @ B means ‘A is the sister of B’,

A # B means ‘A is the wife of B’ and

A & B means ‘A is the brother of B’.

How is L related to T if ‘L # I $ G @ H & T’?

(a) Sister
(b) Brother
(c) Daughter
(d) Mother

Q91. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group.

Which is the one that does not belong to that group?

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

(a) MO – EU
(b) UW-MC
(c) SU-KA
(d) ZB – PH

Q92. 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: Some poets are writers. All writers are dreamers.

Conclusions:

(I) Some dreamers are poets.

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(II) All poets are dreamers.

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

Q93. 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.)

(14, 7, 21)

(56, 28, 42)

(a) (62, 31, 45)
(b) (242, 121, 134)
(c) (346, 173, 188)
(d) (114, 57, 72)

Q94. Refer to the given number series and answer the question that follows. All numbers are single-digit numbers only. Counting to be done from left to right only.

(Left) 9 6 3 1 8 7 2 9 5 6 1 4 7 5 3 4 5 6 2 6 8 7 2 3 7 6 5 8 (Right)

How many such even digits are there which are immediately preceded by a perfect square and immediately followed by an odd digit?

(NOTE: 1 is also a perfect square.)

(a) One
(b) Three
(c) More than three
(d) Two

Q95. In a row of 15 students facing the north, Yusuf is 10^(th) from the right end. If Suman is 4^(th) to the left of Yusuf, what is Suman's position from the left end of the line?

(a) 3^(rd)
(b) 4^(th)
(c) 1^(st)
(d) 2^(nd)

Q96. Av, Bg, Ck, Dq, Et, Fx and Gp are sitting around a circular table, facing the centre.

Bg sits second to the right of Av. Gp sits second to the left of Av. Dq sits third to the right of Gp. Ck sits to the immediate right of Fx.

How many people sit between Et and Ck when counted from the left of Et?

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

Q97. If ‘A’ stands for ‘+’, ‘B’ stands for ‘–’, ‘C’ stands for ‘×’, and ‘D’ stands for ‘÷’, then what will come in place of the question mark (?) in the following equation?

25 A 51 D 3 B 6 C 5 = ?

(a) 14
(b) 12
(c) 15
(d) 10

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Q98. 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) 7 5 9 2 7 9 4 1 5 1 7 8 3 2 8 4 1 2 3 8 2 7 9 (Right)

How many such odd digits are there, each of which is immediately preceded by an odd digit and also immediately followed by an even digit?

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

Q99. In a row of 122 students facing north, Ccd is 54th from the right end. If Vks is 17th to the left of Ccd, what is Vks's position from the left end of the line?

(a) 56th
(b) 54th
(c) 53rd
(d) 52nd

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 tigers are chairs.

All chairs are monks.

Conclusions:

(I) Some monks are chairs.

(II) All tigers are monks.

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

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (c) 1 m 5 cm

Shortcut Trick

Convert all units to cm: 735 cm, 945 cm, and 1050 cm.

To find the greatest length, find the HCF using the difference method.

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Difference 1 = 945 − 735 = 210; Difference 2 = 1050 − 945 = 105.

Since 105 divides 735 (105 × 7), 945 (105 × 9), and 1050 (105 × 10), the HCF is 105 cm.

105 cm = 100 cm + 5 cm = 1 m 5 cm.

Therefore The correct answer is 1 m 5 cm.

Alternate Method

Given: Fabric lengths are 7 m 35 cm, 9 m 45 cm, and 10 m 50 cm.

Formula Used: The greatest length that can exactly measure several lengths is their Highest Common Factor (HCF).

=> Conversion to cm: (1 m = 100 cm)

=> L1 = 7 × 100 + 35 = 735 cm

=> L2 = 9 × 100 + 45 = 945 cm

=> L3 = 10 × 100 + 50 = 1050 cm

=> Prime Factorization:

=> 735 = 3 × 5 × 7 × 7

=> 945 = 3 × 3 × 3 × 5 × 7

=> 1050 = 2 × 3 × 5 × 5 × 7

=> Common factors = 3, 5, 7

=> HCF = 3 × 5 × 7 = 105 cm

=> Converting back to meters: 105 cm = 100 cm + 5 cm = 1 m 5 cm

Therefore The correct answer is 1 m 5 cm.

Additional Information

Highest Common Factor (HCF)

The HCF of two or more numbers is the largest number that divides each of them without leaving a remainder. In measurement problems, the greatest possible size is always the HCF.

Least Common Multiple (LCM)

The LCM is the smallest number that is a multiple of all the given numbers. It is used for finding simultaneous occurrences or the smallest common container.

Unit Conversion

Always ensure all measurements are in the same standard unit before performing calculations. 1 meter = 100 centimeters; 1 kilometer = 1000 meters.

Q2. Answer: (d) 76.5

Shortcut Trick

Assume the base average marks is 72.

Deviation for 3 additional subjects = 3 × (84 − 72) = +36.

Distribute this extra value across all 8 subjects = 36 ÷ 8 = 4.5.

New overall average = 72 + 4.5 = 76.5.

Therefore The correct answer is 76.5.

Alternate Method

Given:

Number of subjects in first group (n1) = 5

Average marks of first group (A1) = 72

Number of additional subjects (n2) = 3

Average marks of additional group (A2) = 84

Formula Used:

Overall Average = (Total Marks in all subjects) ÷ (Total number of subjects)

Calculations:

=> Total marks in 5 subjects = 5 × 72 = 360

=> Total marks in 3 additional subjects = 3 × 84 = 252

=> Grand total marks = 360 + 252 = 612

=> Total number of subjects = 5 + 3 = 8

=> Overall Average = 612 ÷ 8

=> Overall Average = 76.5

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Comparing this value with the given options, we find it matches Option (4).
Therefore The correct answer is 76.5.
Additional Information
Weighted Average Formula
When two groups are combined, the new average is given by: Average = (n1A1 + n2A2) ÷ (n1 + n2).
Deviation Method
Overall Average = Assumed Average + (Total Deviation ÷ Total Count). This minimizes calculation steps for large datasets.
Concept of Net Change
In averages, the sum of deviations of all observations from their arithmetic mean is always zero.

Q3. Answer: (c) 21

Shortcut Trick
Direct identity: $(\text{Difference})^2 = (\text{Sum})^2 - 4 \times (\text{Product})$
$\text{Difference}^2 = 67^2 - 4 \times 1012$
$\text{Difference}^2 = 4489 - 4048 = 441$
$\text{Difference} = \sqrt{441} = 21$
Therefore The correct answer is 21.
Alternate Method
Given:
Sum of two numbers $(x + y) = 67$
Product of two numbers $(xy) = 1012$
Formula Used:
The relationship between sum, product, and difference of two numbers is given by the algebraic identity: $(x - y)^2 = (x + y)^2 - 4xy$
Calculations:
=> Let the two positive numbers be x and y.
=> $(x - y)^2 = (67)^2 - 4 \times 1012$
=> $(x - y)^2 = 4489 - 4048$
=> $(x - y)^2 = 441$
=> $(x - y) = \sqrt{441}$
=> $x - y = 21$
Therefore The correct answer is 21.
Additional Information
Algebraic Identity for Squares
The square of a sum and square of a difference are related as: $(a + b)^2 - (a - b)^2 = 4ab$.
Quadratic Equation Roots
If the sum (S) and product (P) of two numbers are known, the numbers are the roots of the equation: $t^2 - St + P = 0$.
Difference of Squares
The product of the sum and the difference of two numbers equals the difference of their squares: $(a + b)(a - b) = a^2 - b^2$.

Q4. Answer: (b) 3 √5

Shortcut Trick
The ratio of the first two numbers is derived from the fourth proportional: a : b = 20 : 36 = 5 : 9.
Sum of the ratio parts = 5 + 9 = 14.
Since the given sum is exactly 14, the actual numbers are 5 and 9.
The Geometric Mean = $\sqrt{(5 \times 9)} = \sqrt{45} = 3\sqrt{5}$.
Therefore The correct answer is $3\sqrt{5}$.
Alternate Method
Given:
The fourth proportional to a, b, and 20 is 36.
The sum of the first two numbers (a + b) is 14.
Formula Used:
If a, b, c, d are in proportion, then a/b = c/d.

Geometric Mean of two numbers a and b = √(a × b).
=> a/b = 20/36
=> a/b = 5/9
=> Let a = 5k and b = 9k
=> a + b = 14 => 5k + 9k = 14
=> 14k = 14 => k = 1
=> Therefore, a = 5 and b = 9
=> Geometric Mean = √(5 × 9) = √45
=> Geometric Mean = 3√5
Therefore The correct answer is 3√5.
Additional Information
Fourth Proportional
In a proportion sequence a, b, c, d where a:b = c:d, the value d is the fourth proportional, calculated as d = (b × c) ÷ a.
Geometric Mean (GM)
For any two positive numbers x and y, the geometric mean is the square root of their product: GM = √(x × y).
Mean Proportional
The mean proportional between two numbers a and c is a number b such that a:b = b:c, which simplifies to $b^2 = ac$ or b = √(ac).

Q5. Answer: (c) 4

Shortcut Trick
Identify prime numbers a such that a^2 is less than 20: only a = 2 and a = 3 are possible.
If a = 2, $a^2 = 4$. Possible primes b such that 4 + b is a prime < 20 are 3, 7, and 13.
If a = 3, $a^2 = 9$. The only prime b such that 9 + b is a prime < 20 is 2 (Sum = 11).
The set of all possible b values is {2, 3, 7, 13}.
Total count of b values = 4.
Therefore The correct answer is 4.
Alternate Method
Given: a and b are prime numbers, and $a^2 + b$ is a prime number < 20.
Step-by-step evaluation:
=> Prime numbers are {2, 3, 5, 7, 11, 13, 17, 19, ...}.
=> Since $a^2 + b < 20$, and b ≥ 2, we must have $a^2 < 18$. Thus a can only be 2 or 3.
=> For a = 2: 4 + b must be in {5, 7, 11, 13, 17, 19}.
=> 4 + b = 7 => b = 3; 4 + b = 11 => b = 7; 4 + b = 17 => b = 13.
=> For a = 3: 9 + b must be in {11, 13, 17, 19}.
=> 9 + b = 11 => b = 2; 9 + b = 13 => b = 4 (Not prime); 9 + b = 17 => b = 8 (Not prime); 9 + b = 19 => b = 10 (Not prime).
=> Distinct values of b = {2, 3, 7, 13}.
Therefore The correct answer is 4.
Additional Information
Prime Numbers
A prime number is a natural number greater than 1 that has no positive divisors other than 1 and itself. The sequence begins 2, 3, 5, 7, 11, ...
Even Prime Property
The number 2 is the only even prime number. All other prime numbers are odd, which means their squares are also odd.
Parity in Sums
For the sum of two numbers to be an odd prime (like 7, 11, 17), one number must be even and the other must be odd.

Q6. Answer: (d) 3 days

Shortcut Trick
Total Work = LCM(10, 12, 15) = 60 units.
Efficiencies: A = 6, B = 5, C = 4.
Work done by A and B in 3 days = (6 + 5) × 3 = 33 units.
Remaining Work = 60 − 33 = 27 units.

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Days required by B and C = 27 ÷ (5 + 4) = 3 days.

Therefore The correct answer is 3 days.

Alternate Method

Given:

Time taken by A = 10 days

Time taken by B = 12 days

Time taken by C = 15 days

Person	Days	Total Work	Efficiency
A	10	60 (LCM)	6
B	12	5	
C	15	4	

Calculations:

=> Work done by A and B together in 1 day = 6 + 5 = 11 units.

=> Work completed by A and B in 3 days = 11 × 3 = 33 units.

=> Remaining Work = Total Work − Completed Work = 60 − 33 = 27 units.

=> Combined Efficiency of B and C = 5 + 4 = 9 units/day.

=> Time required for B and C to complete the Remaining Work = 27 ÷ 9

=> Time = 3 days.

Therefore The correct answer is 3 days.

Additional Information

Pipes and Cisterns

Similar to time and work, where filling pipes perform positive work and outlet/leakage pipes perform negative work.

Work and Wages

Wages are generally distributed in the ratio of Efficiency × Time (total work done by each individual).

Alternate Day Work

When people work on alternate days, work is calculated in cycles (e.g., 2-day or 3-day blocks) based on the rotation.

Man-Days Formula

The relationship between men, days, and hours is given by (M1 × D1 × H1)/W1 = (M2 × D2 × H2)/W2.

Q7. Answer: (c) 1/2

Given:

Expression = { (20/33) ÷ (20/7) } ÷ ((3/5) × (10/9) + (2/11)) + (7/4) ÷ (28/23) of (23/4)

Formula used:

The VBODMAS rule is applied to solve this expression, following the order: Brackets, Of, Division, Multiplication, Addition, and Subtraction.

Calculations:

First, solve the operations inside the brackets:

=> { (20/33) ÷ (20/7) } = (20/33) × (7/20) = 7/33

=> ((3/5) × (10/9) + (2/11)) = ((1/1) × (2/3) + (2/11)) = (2/3 + 2/11)

=> (22 + 6) / 33 = 28/33

Now, substitute these values back into the expression:

=> (7/33) ÷ (28/33) + (7/4) ÷ (28/23) of (23/4)

Next, evaluate the of operator:

=> (28/23) of (23/4) = (28/23) × (23/4) = 7

The expression now becomes:

=> (7/33) ÷ (28/33) + (7/4) ÷ 7

Perform the division operations from left to right:

=> (7/33 × 33/28) + (7/4 × 1/7)

=> 1/4 + 1/4

Finally, perform the addition:

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=> 2/4 = 1/2

Therefore The correct answer is option (3).

Q8. Answer: (c) 2145

Shortcut Trick

Apply the divisibility rule of 11: The difference between the sum of digits at odd positions and the sum of digits at even positions must be 0 or a multiple of 11.

For the number 2145:

Sum of digits at odd places (1^(st) and 3^(rd)) = 2 + 4 = 6.

Sum of digits at even places (2^(nd) and 4^(th)) = 1 + 5 = 6.

Difference = 6 − 6 = 0.

Therefore The correct answer is 2145.

Alternate Method

Given: Numbers to check are 3522, 4735, 2145, and 5281.

Method: Verify each number using the alternating sum property.

=> Sum of odd-placed digits (from left) = 2 + 4 = 6

=> Sum of even-placed digits (from left) = 1 + 5 = 6

=> Difference = |6 − 6| = 0

=> Since the result is 0, the number 2145 is divisible by 11.

Checking other options:

=> 3522: (3 + 2) − (5 + 2) = 5 − 7 = −2 (No)

=> 4735: (4 + 3) − (7 + 5) = 7 − 12 = −5 (No)

=> 5281: (5 + 8) − (2 + 1) = 13 − 3 = 10 (No)

Therefore The correct answer is 2145.

Additional Information

Divisibility by 3 and 9

A number is divisible by 3 or 9 if the sum of its digits is divisible by 3 or 9 respectively.

Divisibility by 7

Subtract twice the last digit from the remaining number; if the result is divisible by 7, the original number is too.

Divisibility by 11 (General Case)

For any integer, the difference between the sum of alternating digits must be a multiple of 11 (e.g., ..., −22, −11, 0, 11, 22, ...).

Q9. Answer: (c) 10%

Shortcut Trick

In such cases, the absolute increase in tax equals the absolute decrease in net income.

Tax Rate = [Reduction in Net Income / (Increase in Tax + Reduction in Net Income)] × 100

Rate = [2 / (18 + 2)] × 100

Rate = (2 / 20) × 100 = 10%

Therefore The correct answer is 10%.

Alternate Method

Given:

Increase in Income Tax = 18%

Reduction in Net Income = 2%

Calculations:

=> Let Income Tax be T and Net Income be NI.

=> 18% of T = 2% of NI

=> 18/100 × T = 2/100 × NI

=> 18 × T = 2 × NI

=> T / NI = 2 / 18 = 1 / 9

=> Gross Income = Tax + Net Income = 1 + 9 = 10

=> Original Rate of Tax = (Income Tax / Gross Income) × 100

=> Rate = (1 / 10) × 100 = 10%

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Therefore The correct answer is 10%.

Additional Information

Net Income Formula

Net Income is the remaining income after deducting Income Tax from Gross Income. Formula: Net Income = Gross Income − Income Tax.

Tax and Net Income Relation

For a fixed Gross Income, any change in the amount of Income Tax results in an equal and opposite change in the amount of Net Income.

Tax Rate Calculation

The Tax Rate is always calculated as a percentage of the Gross Income. Formula: (Income Tax ÷ Gross Income) × 100.

Q10. Answer: (d) 20 km/hr

Shortcut Trick

If an object travels different distances at the same uniform speed, the average speed for the entire journey is equal to that uniform speed itself.

Since the scooter travels both segments at 20 km/hr, the average speed is 20 km/hr.

Therefore The correct answer is 20 km/hr.

Alternate Method

Given:

Distance 1 (d1) = 40 km, Speed 1 (s1) = 20 km/hr

Distance 2 (d2) = 60 km, Speed 2 (s2) = 20 km/hr

Formula Used:

Average Speed = Total Distance ÷ Total Time

Time = Distance ÷ Speed

Calculations:

=> Total Distance = 40 + 60 = 100 km

=> Time for first part (t1) = 40 ÷ 20 = 2 hours

=> Time for second part (t2) = 60 ÷ 20 = 3 hours

=> Total Time = 2 + 3 = 5 hours

=> Average Speed = 100 ÷ 5 = 20 km/hr

Therefore The correct answer is 20 km/hr.

Additional Information

Average Speed for Equal Distances

If a journey is divided into two equal distances traveled at speeds x and y, the average speed = 2xy ÷ (x + y).

Relative Speed

When two objects move in the opposite direction, relative speed = s1 + s2. In the same direction, relative speed = |s1 − s2|.

Unit Conversion

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

Q11. Answer: (a) 6,000

Shortcut Trick

Calculate the effective interest rate for the given period: 8% × 3 years = 24%.

The total simple interest earned is 24% of the principal sum.

Given 24% = Rs. 1,440, then 1% = 1,440 ÷ 24 = Rs. 60.

The principal (100%) = 60 × 100 = Rs. 6,000.

Therefore The correct answer is Rs. 6,000.

Alternate Method

Given:

Simple Interest (SI) = Rs. 1,440

Rate of Interest (R) = 8% per annum

Time (T) = 3 years

Formula Used:

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

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Calculations:
=> 1,440 = (P × 8 × 3) ÷ 100
=> 1,440 = 24P ÷ 100
=> 24P = 1,440 × 100
=> 24P = 144,000
=> P = 144,000 ÷ 24
=> P = 6,000
Therefore The correct answer is Rs. 6,000.
Additional Information
Amount in Simple Interest
The total sum payable at the end of the period is called Amount (A). Formula: A = Principal (P) + Interest (SI) = P × (1 + RT/100).
Difference between SI and CI
For a period of 2 years, the difference between Compound Interest (CI) and Simple Interest (SI) is given by: D = P × $(R/100)^2$.
Calculation of Rate or Time
Using the basic formula, we can derive: R = (SI × 100) ÷ (P × T) and T = (SI × 100) ÷ (P × R).

Q12. Answer: (d) 1,900

Shortcut Trick
Let initial Cost Price (CP) = 100% and Selling Price (SP) = 158%.
New CP = 100% + Rs. 20 and New SP = 158% − Rs. 74.
According to 52.5% profit: (158% − 74) = 1.525 × (100% + 20)
158% − 74 = 152.5% + 30.5 => 5.5% = 104.5
Original CP (100%) = (104.5 ÷ 5.5) × 100 = 1900
Therefore The correct answer is Rs. 1,900.
Alternate Method
Given:
Initial Profit = 58%, CP increase = Rs. 20, SP decrease = Rs. 74, New Profit = 52.5%.
Formula Used:
Selling Price (SP) = Cost Price (CP) × (1 + Profit%/100)
Calculations:
Let the original cost price of the article be Rs. x.
=> Original Selling Price = x + 58% of x = 1.58x
=> New Cost Price = x + 20
=> New Selling Price = 1.58x − 74
As per the question, new profit is 52.5%:
=> New SP = New CP × (100 + 52.5)/100
=> 1.58x − 74 = (x + 20) × 1.525
=> 1.58x − 74 = 1.525x + (20 × 1.525)
=> 1.58x − 74 = 1.525x + 30.5
=> 1.58x − 1.525x = 30.5 + 74
=> 0.055x = 104.5
=> x = 104.5 ÷ 0.055
=> x = 104500 ÷ 55
=> x = 1900
Therefore The correct answer is Rs. 1,900.
Additional Information
Profit Percentage on Cost Price
Profit % = [(SP − CP) ÷ CP] × 100. By default, profit is always calculated on the Cost Price unless stated otherwise.
Selling Price Multiplier
If an article is sold at a profit of P%, then SP = CP × (100 + P)/100. For example, a 58% profit means SP = 1.58 × CP.
Successive Changes in CP and SP
When both CP and SP change by absolute values, the new profit percentage is applied to the updated CP to find the new SP.

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Q13. Answer: (a) 21

Shortcut Trick

In a trapezoid where two sides are parallel (AB || DC), the length of the segment joining the midpoints of the diagonals (EF) is given by the formula:

EF = (Length of longer parallel side − Length of shorter parallel side) ÷ 2

=> EF = (AB − DC) ÷ 2

=> EF = (60 − 18) ÷ 2

=> EF = 42 ÷ 2 = 21 cm

Therefore The correct answer is 21 cm.

Alternate Method

Given:

Parallel sides: AB = 60 cm and DC = 18 cm.

Non-parallel sides: BC = 65 cm and AD = 10 cm.

Points E and F are midpoints of diagonals AC and BD respectively.

Theorem:

In any quadrilateral ABCD where AB || DC, let E be the midpoint of diagonal AC and F be the midpoint of diagonal BD. The segment EF is parallel to AB and DC, and its length is half the absolute difference of the lengths of the parallel sides.

Calculation:

=> Length of EF = 1/2 × |AB − DC|

=> EF = 1/2 × (60 − 18)

=> EF = 1/2 × 42

=> EF = 21 cm

Therefore The correct answer is 21 cm.

Additional Information

Median of a Trapezoid

The segment joining the midpoints of the non-parallel sides is called the median. Its length is the arithmetic mean of the parallel sides: Median = (AB + DC) ÷ 2.

Area of a Trapezoid

The area is calculated as: Area = 1/2 × (Sum of parallel sides) × Height. The segment joining the midpoints of diagonals is always collinear with the median.

Property of Diagonals

In a trapezoid, the diagonals intersect each other in the same ratio as the lengths of the parallel sides. Specifically, AO/OC = BO/OD = AB/DC, where O is the intersection point.

Q14. Answer: (c) 52

Shortcut Trick

The mode of a dataset is the value that appears most frequently.

Counting the occurrences: 52 appears 3 times, while all other numbers appear 2 times or once.

Since 52 has the highest count, it is the mode.

Therefore The correct answer is 52.

Alternate Method

Given: Data observations = {40, 47, 54, 45, 50, 43, 53, 52, 53, 49, 40, 50, 42, 52, 44, 52, 47, 55}

Formula: Mode = Observation with the maximum frequency.

=> Organize data into a frequency table: => Value 40: 2 times | Value 42: 1 time | Value 43: 1 time | Value 44: 1 time => Value 45: 1 time | Value 47: 2 times | Value 49: 1 time | Value 50: 2 times => Value 52: 3 times | Value 53: 2 times | Value 54: 1 time | Value 55: 1 time => Maximum frequency observed = 3. => The corresponding value for maximum frequency is 52.

Therefore The correct answer is 52.

Additional Information

Measures of Central Tendency

Central tendency includes the Mean (sum ÷ total count), Median (middle value of sorted data), and Mode (most frequent value).

Empirical Relationship

For a moderately skewed distribution, the relationship is: Mode = 3 × Median − 2 × Mean.

Types of Mode

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A dataset can be Unimodal (one mode), Bimodal (two modes), or Multimodal (more than two modes).

Q15. Answer: (a) 1 : 1

Shortcut Trick

To find the compounded ratio of the first and last terms (a : e), simply multiply all the given intermediate ratios.

Required ratio (a/e) = (a/b) × (b/c) × (c/d) × (d/e)

a/e = (2/3) × (4/5) × (3/2) × (5/4)

By observing the fractions, we see that 2/3 cancels with 3/2 and 4/5 cancels with 5/4, resulting in 1/1.

Therefore The correct answer is 1 : 1.

Alternate Method

Given:

a : b = 2 : 3 | b : c = 4 : 5 | c : d = 3 : 2 | d : e = 5 : 4

Formula Used:

Compound Ratio = Product of individual ratios = (a1/b1) × (a2/b2) × ... × (a_n/b_n)

Calculations:

=> a/b = 2/3

=> b/c = 4/5

=> c/d = 3/2

=> d/e = 5/4

=> a/e = (a/b) × (b/c) × (c/d) × (d/e)

=> a/e = (2/3) × (4/5) × (3/2) × (5/4)

=> a/e = (2 × 4 × 3 × 5) / (3 × 5 × 2 × 4)

=> a/e = 120 / 120

=> a/e = 1 / 1

Therefore The correct answer is 1 : 1.

Additional Information

Compound Ratio

For two or more ratios, the ratio of the product of the antecedents to the product of the consequents is called the compounded ratio.

Duplicate and Triplicate Ratios

The duplicate ratio of a : b is $a^2 : b^2$, and the triplicate ratio is $a^3 : b^3$.

Reciprocal Ratio

The reciprocal or inverse ratio of a : b is 1/a : 1/b, which simplifies to b : a.

Continued Proportion

Three quantities a, b, and c are in continued proportion if a : b = b : c, which implies $b^2 = ac$.

Q16. Answer: (d) 50 meters

Shortcut Trick

Ratio of time taken to cross the two persons = 9 : 10.

Since Length is constant, Relative Speed ratio = 10 : 9.

Difference in Relative Speeds = 4 km/hr − 2 km/hr = 2 km/hr.

Difference in ratio parts = 10 − 9 = 1 unit => 1 unit = 2 km/hr.

Relative Speed with 1^(st) person = 10 units = 20 km/hr.

Length of train = 20 × (5/18) × 9 = 50 m.

Therefore The correct answer is 50 m.

Alternate Method

Given:

Speed of 1^(st) person = 2 km/hr | Time taken (t1) = 9 sec

Speed of 2^(nd) person = 4 km/hr | Time taken (t2) = 10 sec

Formula Used:

Distance (Length) = Relative Speed × Time

Relative Speed (Same Direction) = Speed of Train − Speed of Person

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Calculations:

=> Let Speed of Train be V km/hr and Length be L meters.

=> L = (V − 2) × (5/18) × 9 = (V − 2) × 5/2

=> L = (V − 4) × (5/18) × 10 = (V − 4) × 25/9

=> (V − 2) × 5/2 = (V − 4) × 25/9

=> (V − 2) ÷ 2 = (V − 4) × 5 ÷ 9

=> 9 × (V − 2) = 10 × (V − 4)

=> 9V − 18 = 10V − 40

=> V = 22 km/hr

=> Length (L) = (22 − 2) × (5/18) × 9 = 20 × 5/2 = 50 m.

Therefore The correct answer is 50 m.

Additional Information

Relative Speed Concept

When two objects move in the same direction, relative speed is (u − v). When they move in opposite directions, relative speed is (u + v).

Unit Conversion

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

Train Crossing a Person

The distance covered by a train while crossing a person (standing or moving) is equal to the length of the train itself.

Q17. Answer: (c) 3:4

Shortcut Trick

Remove pencils of 10 extra boys: 170 − (10 × 2) = 150.

Combined pencil units for one pair (1 Girl + 1 Boy) = 3 + 2 = 5.

Number of Girls = 150 ÷ 5 = 30.

Number of Boys = 30 + 10 = 40.

Required Ratio (Girls : Boys) = 30 : 40 = 3 : 4.

Therefore The correct answer is 3:4.

Alternate Method

Given:

Extra Boys = 10 | Pencils per Girl = 3 | Pencils per Boy = 2 | Total Pencils = 170

Let the number of Girls be G.

Then the number of Boys = G + 10.

=> Total Pencils = (3 × G) + [2 × (G + 10)]

=> 170 = 3G + 2G + 20

=> 170 − 20 = 5G

=> 150 = 5G

=> G = 30

=> Boys = 30 + 10 = 40

=> Ratio of Girls to Boys = 30 : 40 = 3 : 4

Therefore The correct answer is 3:4.

Additional Information

Ratio and Proportion

A ratio is a comparison of two quantities of the same kind. If two ratios a:b and c:d are equal, they are said to be in proportion (a:b :: c:d).

Linear Equation Formulation

To solve word problems, translate phrases like more than or times into mathematical operators (+, −, ×) to form an equation.

Weighted Average/Sum

The total value is the sum of (Quantity × Value per Unit) for all individual categories involved.

Q18. Answer: (a) 25 (√3 + 1) m

Shortcut Trick

For two objects on the same side of a tower with angles θ1 and θ2, the distance d between them is d = h (cot θ2 − cot θ1).

Here d = 50 m, θ1 = 45°, and θ2 = 30°.
=> 50 = h (cot 30° − cot 45°)
=> 50 = h (√3 − 1) => h = 50 / (√3 − 1)
=> h = 25 (√3 + 1) m (after rationalizing the denominator).
Therefore The correct answer is 25 (√3 + 1) m.
Alternate Method
Let the height of the lighthouse be h meters and the distance of the first ship from the lighthouse be x.
In triangle ABC (nearer ship):
=> tan 45° = h / x
=> 1 = h / x => x = h
In triangle ABD (farther ship):
=> tan 30° = h / (x + 50)
=> 1 / √3 = h / (h + 50)
=> h + 50 = h × √3
=> h√3 − h = 50
=> h (√3 − 1) = 50
=> h = 50 / (√3 − 1)
To rationalize, multiply numerator and denominator by (√3 + 1):
=> h = [50 × (√3 + 1)] / [(√3 − 1) × (√3 + 1)]
=> h = 50(√3 + 1) / (3 − 1)
=> h = 50(√3 + 1) / 2
=> h = 25 (√3 + 1) m
Therefore The correct answer is 25 (√3 + 1) m.
Additional Information
Distance Formula (Opposite Sides)
If two ships are on the opposite sides of the lighthouse, the distance d between them is d = h(cot θ1 + cot θ2).
Trigonometric Ratios
For standard angles: tan 30° = 1/√3, tan 45° = 1, tan 60° = √3. Cotangent is the reciprocal of tangent.
Angle of Depression
The angle of depression from the top is numerically equal to the angle of elevation from the ground point due to alternate interior angles.

Q19. Answer: (d) 6

Shortcut Trick
Assume Total Work = 60 units (LCM of 12 and 15).
Efficiency: A = 5, B = 4; Combined efficiency = 9 units/day.
Work done in 4 days = 9 × 4 = 36 units.
Remaining work = 60 − 36 = 24 units.
Time taken by B = 24 ÷ 4 = 6 days.
Therefore The correct answer is 6 days.
Alternate Method
Given:
Time taken by A = 12 days
Time taken by B = 15 days
Work duration for both = 4 days
Formula Used:
Efficiency = Total Work ÷ Time Taken

Person	Days	Total Work	Efficiency
A	12	60 (LCM)	5
B	15	4	

Calculations:

=> Total work to be done = 60 units
=> Efficiency of A and B together = 5 + 4 = 9 units/day
=> Work done by A and B in 4 days = 9 × 4 = 36 units
=> Remaining work = 60 − 36 = 24 units
=> Time taken by B to finish the remaining work = Remaining work ÷ Efficiency of B
=> Time = 24 ÷ 4 = 6 days
Therefore The correct answer is 6 days.
Additional Information
Work and Efficiency Relationship
The Efficiency of a person is inversely proportional to the Time taken to complete the work (Efficiency prop. to 1 ÷ Time).
Combined Rate Rule
When multiple people work together, their net efficiency is the sum of their individual efficiencies (E_(total) = E1 + E2 + ... + E_n).
Remaining Work Calculation
Remaining Work = Total Work − (Rate × Time Spent). This is crucial when one person leaves mid-way through the task.

Q20. Answer: (d) 54

Shortcut Trick
Third proportional of two numbers a and b is calculated as $b^2 \div a$.
First, find p using a = 6 and b = 18: p = (18 × 18) ÷ 6 = 3 × 18 = 54.
Now, find q using p = 54 and second value 54: q = (54 × 54) ÷ 54 = 54.
Therefore The correct answer is 54.
Alternate Method
Given: First pair for third proportional p is (6, 18). Second pair for third proportional q is (p, 54).
Formula Used: If a, b, and c are in continued proportion, then a : b = b : c, which means $c = b^2 \div a$.
Calculations:
=> 6 : 18 = 18 : p
=> 6 ÷ 18 = 18 ÷ p
=> 1 ÷ 3 = 18 ÷ p
=> p = 18 × 3 = 54
=> Now, for q: p : 54 = 54 : q
=> 54 : 54 = 54 : q
=> 1 = 54 ÷ q
=> q = 54
Therefore The correct answer is 54.
Additional Information
Mean Proportional
The mean proportional between two numbers a and b is x such that $x^2 = ab$ or $x = \sqrt{(ab)}$.
Fourth Proportional
If four quantities a, b, c, d are in proportion (a:b = c:d), then d is the fourth proportional: d = (b × c) ÷ a.
Compound Ratio
For two ratios a:b and c:d, the compound ratio is (a × c) : (b × d).

Q21. Answer: (a) 50

Given:
$9^2 + (\sqrt{4})^2 - 7\sqrt{16} - 7$
Formula used:
Square: $a^2 = a \times a$
Square Root identity: $(\sqrt{a})^2 = a$
Calculations:
To simplify the expression, solve each term separately:
$9^2 + (\sqrt{4})^2 - 7\sqrt{16} - 7$
=> 81 + 4 − (7 × 4) − 7

=> 81 + 4 − 28 − 7

=> 85 − 35

=> 50

Therefore The correct answer is option (1).

Q22. Answer: (a) Rs. 24

Shortcut Trick

Cost Price (CP) of 1 notebook = 1000 ÷ 50 = Rs. 20.

Profit percentage = 20%.

Selling Price (SP) = CP × (100 + Profit)% = 20 × 120% = 20 × 1.2 = Rs. 24.

Therefore The correct answer is Rs. 24.

Alternate Method

Given: Total quantity = 50 notebooks, Total CP = Rs. 1000, Profit = 20%.

Formula Used: CP per unit = Total CP ÷ Quantity; SP = CP + (Profit% of CP).

=> Cost Price of 1 notebook = 1000 ÷ 50

=> CP = Rs. 20

=> Profit amount = 20% of 20 = (20 ÷ 100) × 20

=> Profit = 0.2 × 20 = Rs. 4

=> Selling Price = CP + Profit = 20 + 4

=> SP = Rs. 24

Therefore The correct answer is Rs. 24.

Additional Information

Profit and Loss Formulas

Profit % = (Profit ÷ CP) × 100. Loss % = (Loss ÷ CP) × 100. Always calculate percentage on the Cost Price unless stated otherwise.

Selling Price Calculation

SP = CP × (100 + Gain%) ÷ 100 when there is a profit, and SP = CP × (100 − Loss%) ÷ 100 when there is a loss.

Marked Price and Discount

Discount is always calculated on the Marked Price (MP). SP = MP − Discount. Discount % = (Discount ÷ MP) × 100.

Q23. Answer: (d) 20%

Shortcut Trick

Ratio of Cost Price (CP) to Marked Price (MP) = (100 − Discount%) : (100 + Gain%)

=> CP : MP = (100 − 10) : (100 + 8) = 90 : 108 = 5 : 6

If no discount is allowed, Selling Price (SP) = Marked Price (MP) = 6 units.

=> Profit = SP − CP = 6 − 5 = 1 unit.

=> Gain percentage = (Profit / CP) × 100 = (1 / 5) × 100 = 20%.

Therefore The correct answer is 20%.

Alternate Method

Given: Marked Price of refrigerator = Rs. 4,884, Discount = 10%, Gain = 8%.

Formula Used: CP = [MP × (100 − D%)] / (100 + G%)

=> Cost Price (CP) = [4884 × (100 − 10)] / (100 + 8)

=> CP = (4884 × 90) / 108

=> CP = 4884 × (5 / 6) = Rs. 4,070

=> If no discount is allowed, new Selling Price (SP) = Marked Price = Rs. 4,884

=> Profit = SP − CP = 4884 − 4070 = Rs. 814

=> Gain percentage = (Profit / CP) × 100

=> Gain percentage = (814 / 4070) × 100 = 20%

Therefore The correct answer is 20%.

Additional Information

Relationship between CP and MP

The direct formula connecting Cost Price and Marked Price is CP/MP = (100 − D%)/(100 + G%). This eliminates the need to calculate SP.

Marked Price (MP)

Also known as the list price or tag price. Discounts are always calculated on the Marked Price.

Successive Discounts

If two discounts d1 and d2 are given, the effective discount is d1 + d2 − (d1 × d2)/100.

Q24. Answer: (d) 20

Shortcut Trick

Sum 5 years ago = 50 − (2 × 5) = 40 years.

Ratio 5 years ago (Father : Son) = 3 : 1.

Total units = 3 + 1 = 4 units => 4 units = 40 years => 1 unit = 10 years.

Age Difference = 3 − 1 = 2 units = 2 × 10 = 20 years.

Age difference always remains constant over time.

Therefore The correct answer is 20 years.

Alternate Method

Given:

Present sum of Father and Son = 50 years.

Age ratio 5 years ago = 3 : 1.

Let the Son's age 5 years ago be x years.

=> Father's age 5 years ago = 3x years.

=> Present Age of Father = 3x + 5

=> Present Age of Son = x + 5

=> (3x + 5) + (x + 5) = 50

=> 4x + 10 = 50

=> 4x = 40 => x = 10

=> Father's present age = 3(10) + 5 = 35 years.

=> Son's present age = 10 + 5 = 15 years.

=> Age difference = 35 − 15 = 20 years.

Therefore The correct answer is 20 years.

Additional Information

Constant Age Difference

The numerical difference between the ages of two individuals never changes with time, regardless of how many years pass or go back.

Sum of Ages Rule

If the sum of ages of 'n' people is S at present, then 't' years ago, the sum was S − (n × t).

Ratio of Ages

If the ratio of ages is a : b and the difference is D, then the ages are [a/(a−b)] × D and [b/(a−b)] × D respectively.

Q25. Answer: (c) 3136

Shortcut Trick

Difference in Time Period = 5 years − 3 years = 2 years.

Effective Interest Percentage difference = 2 years × 4% = 8%.

Given that 8% of the Principal corresponds to Rs. 784.

Required Simple Interest for 8 years = 8 years × 4% = 32%.

By unitary method: 32% = (784 ÷ 8) × 32 = 98 × 32 = 3136.

Therefore The correct answer is Rs. 3136.

Alternate Method

Given:

Rate of Interest (R) = 4% per annum

Difference in Simple Interest = Rs. 784

Time Durations: T1 = 5 years, T2 = 3 years, T3 = 8 years

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

=> Let the Principal amount be P.

=> SI for 5 years − SI for 3 years = 784
=> (P × 4 × 5 ÷ 100) − (P × 4 × 3 ÷ 100) = 784
=> 20P ÷ 100 − 12P ÷ 100 = 784
=> 8P ÷ 100 = 784
=> P = (784 × 100) ÷ 8
=> P = Rs. 9800
=> SI for 8 years = (9800 × 4 × 8) ÷ 100
=> SI = 98 × 32
=> SI = Rs. 3136
Therefore The correct answer is Rs. 3136.
Additional Information
Simple Interest Properties
For a fixed Principal and Rate, Simple Interest is directly proportional to Time. SI1 ÷ T1 = SI2 ÷ T2.
Amount Formula
The total Amount (A) is the sum of Principal (P) and Simple Interest (SI): A = P + (P × R × T ÷ 100) = P(1 + RT ÷ 100).
Rate Change Impact
If the Rate increases by r%, the additional interest earned for T years is (P × r × T) ÷ 100.

Q26. Answer: (b) 38808 cm³

Shortcut Trick
When a sphere is melted and recast into a cone with the same radius (R = r):
Volume relationship: 4 × R = h
=> 4 × R = 84 cm => R = 21 cm
=> Volume of sphere = (4/3) × (22/7) × 21 × 21 × 21 = 88 × 441 = 38808 cm³.
Therefore The correct answer is 38808 cm³.
Alternate Method
Given:
Radius of Sphere (R) = Radius of Cone (r)
Height of Cone (h) = 84 cm
Formula Used:
Volume of Sphere = (4/3) π R³
Volume of Cone = (1/3) π r² h
Calculations:
Since the sphere is melted and recast into a cone:
=> Volume of Sphere = Volume of Cone
=> (4/3) × π × R³ = (1/3) × π × r² × h
=> (4/3) × R³ = (1/3) × R² × 84 (Since R = r)
=> 4 × R = 84
=> R = 84 ÷ 4 = 21 cm
Now, calculate the volume of the original sphere:
=> Volume = (4/3) × (22/7) × 21 × 21 × 21
=> Volume = (4 × 22 × 21 × 21 × 21) ÷ 21
=> Volume = 88 × 441
=> Volume = 38808 cm³
Therefore The correct answer is 38808 cm³.
Additional Information
Conservation of Volume
When a solid is melted and reshaped into another form, the total amount of material or volume remains constant (V1 = V2).
Total Surface Area of Sphere
The total surface area (TSA) of a sphere is given by the formula 4πR².
Slant Height of a Cone
The slant height (l) of a cone can be calculated using the Pythagorean theorem: l = √(r² + h²).

Q27. Answer: (c) 76.648

Shortcut Trick

Mass = Density × Volume

Weight (kg) = [4/3 × 22/7 × ($13^3 - 12^3$) × 39] ÷ 1000

=> Weight = [4/3 × 22/7 × 469 × 39] ÷ 1000

=> Weight = (4 × 22 × 67 × 13) ÷ 1000

=> Weight = 76648 ÷ 1000 = 76.648 kg

Therefore The correct answer is 76.648 kg.

Alternate Method

Given:

Internal radius (r) = 12 cm

External radius (R) = 13 cm

Density of metal = 39 g/cm^3

Formula Used:

Volume of hollow sphere = 4/3 × π × ($R^3 - r^3$)

Mass = Density × Volume

Calculations:

=> Volume = 4/3 × 22/7 × ($13^3 - 12^3$)

=> Volume = 4/3 × 22/7 × (2197 − 1728)

=> Volume = 4/3 × 22/7 × 469

=> Volume = 4/3 × 22 × 67 = 5896/3 cm^3

=> Mass = 39 × (5896/3)

=> Mass = 13 × 5896 = 76648 g

=> Weight in kg = 76648 ÷ 1000

Therefore The correct answer is 76.648 kg.

Additional Information

Volume of a Solid Sphere

The total space occupied by a solid sphere is given by the formula V = 4/3 πr^3.

Surface Area of a Sphere

The total outer surface area of a sphere is calculated as A = $4\pi r^2$.

Density-Mass-Volume Triangle

Mass = Density × Volume | Density = Mass ÷ Volume | Volume = Mass ÷ Density.

Unit Conversion

To convert grams to kilograms, divide the value by 1000 (1 kg = 1000 g).

Q28. Answer: (d) 240

Shortcut Trick

Equalize decimal places for all numbers: 5.00, 3.20, and 0.03.

Remove the decimal to treat them as integers: 500, 320, and 3.

Calculate LCM(500, 320, 3) = 24000.

Adjust the decimal back by dividing by 100: 24000 ÷ 100 = 240.

Therefore The correct answer is 240.

Alternate Method

Given: Numbers are 5, 3.2, and 0.03.

Formula: LCM of Fractions = LCM of Numerators ÷ HCF of Denominators.

=> Convert decimals to simplest fractions:

=> 5 = 5/1

=> 3.2 = 32/10 = 16/5

=> 0.03 = 3/100

=> LCM of Numerators (5, 16, 3):

=> Prime factors: $5 = 5^1$, 16 = 2^4, $3 = 3^1$

=> LCM = $2^4 \times 5^1 \times 3^1$ = 16 × 5 × 3 = 240

=> HCF of Denominators (1, 5, 100) = 1

=> Required LCM = 240 ÷ 1 = 240

Therefore The correct answer is 240.

Additional Information

LCM of Fractions

LCM = LCM of numerators ÷ HCF of denominators. Ensure fractions are in their simplest form before applying the formula.

HCF of Fractions

HCF = HCF of numerators ÷ LCM of denominators. This is the inverse logic used for finding the LCM of fractions.

Product Rule for Two Numbers

For any two numbers 'a' and 'b', the product of the numbers is equal to the product of their HCF and LCM: a × b = HCF(a, b) × LCM(a, b).

Q29. Answer: (c) 15%

Shortcut Trick

Ratio of Initial Revenue to Final Revenue = 2,50,000 : 2,12,500

Divide both by 12,500 => 20 : 17

Decrease in units = 20 − 17 = 3 units

Percentage decrease = (3 ÷ 20) × 100 = 15%

Therefore The correct answer is 15%.

Alternate Method

Given:

Initial Revenue = Rs. 2,50,000

Final Revenue = Rs. 2,12,500

Formula Used:

Percentage Decrease = [(Initial Value − Final Value) ÷ Initial Value] × 100

Calculations:

=> Amount of decrease = 2,50,000 − 2,12,500

=> Amount of decrease = Rs. 37,500

=> Percentage decrease = (37,500 ÷ 2,50,000) × 100

=> Percentage decrease = 3,75,00,00 ÷ 2,50,000

=> Percentage decrease = 375 ÷ 25

=> Percentage decrease = 15%

Therefore The correct answer is 15%.

Additional Information

Percentage Increase

It is calculated as [(New Value − Old Value) ÷ Old Value] × 100 when the value grows over time.

Base Change Rule

In percentage calculations, the denominator is always the original (initial) value unless specified otherwise.

Fraction to Percentage Conversion

Multiplying a fraction by 100 converts it into a percentage. For example, 3/20 × 100 = 15%.

Q30. Answer: (b) Rs. 30.71

Shortcut Trick

Under the Buy 5, Get 2 Free offer, a customer pays for 5 markers but receives a total of 7 markers.

Total amount paid = 5 × Rs. 43 = Rs. 215

Effective price per marker = Rs. 215 ÷ 7 ≈ Rs. 30.71

Therefore The correct answer is Rs. 30.71.

Alternate Method

Given:

Cost of one marker = Rs. 43

Offer = Buy 5, Get 2 Free

Formula Used:

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Effective price per marker = Total cost paid ÷ Total markers received

Calculations:

=> Total markers received = 5 + 2 = 7 markers

=> Total price paid = 5 × Rs. 43 = Rs. 215

=> Effective price per marker = Rs. 215 ÷ 7

=> Effective price per marker = Rs. 30.7142...

=> Effective price per marker ≈ Rs. 30.71

Therefore The correct answer is Rs. 30.71.

Additional Information

Discount % in 'Buy X Get Y Free' Offer

The discount percentage is calculated as: Discount % = [Y ÷ (X + Y)] × 100. For 'Buy 5, Get 2 Free', the equivalent discount is [2 ÷ 7] × 100 ≈ 28.57%.

Effective Price Formula

Effective Price = Original Price × (1 − Discount Rate) = Original Price × [X ÷ (X + Y)].

Successive Discounts Rule

If two successive discounts of a% and b% are offered on an item, the equivalent single discount is given by: (a + b − ab/100)%.

Q31. Answer: (a) Full-screen mode

The correct answer is Full-screen mode.

Key Points

• Full-screen mode is a display configuration where a software application occupies the entire surface area of the monitor. Unlike a standard window, it removes all Operating System interface elements such as the Taskbar, Start Button, and System Tray from view.

• The primary purpose of this mode is to provide an immersive experience by hiding the Desktop background and other running applications, ensuring that no external visual stimuli distract the user from the primary task.

• In most web browsers like Google Chrome, Microsoft Edge, and Mozilla Firefox, users can trigger this mode by pressing the F11 function key. This action hides the Address Bar, Tabs, and Bookmarks Toolbar.

• It is technically distinct from the Maximized state. While a maximized window fills the available workspace, it typically remains bounded by the Taskbar. In contrast, Full-screen mode overlays the taskbar entirely, utilizing every available pixel of the Display Resolution.

• This mode is the standard for Video Players, Digital Presentations, and Video Games, where maximizing the Aspect Ratio and visibility of the content is critical for functionality and user engagement.

Additional Information

• Other Window States:

• Restored mode: Also known as Windowed mode, this refers to a state where the window is set to a specific, adjustable size. In this state, the Desktop and other windows are clearly visible behind the active application, allowing for Multitasking.

• Minimized mode: This action collapses the window into a small icon or button on the Taskbar. While the application remains active in the Random Access Memory (RAM), it is not rendered on the display, making the Desktop fully visible.

• Hidden mode: This generally refers to Background Processes or windows that are deliberately excluded from the user interface. These processes run without a visible window or taskbar entry, often used for System Services or Malware detection scripts.

Q32. Answer: (b) Part IX

The correct answer is Part IX.

Key Points

• Part IX of the Indian Constitution specifically addresses the Panchayati Raj Institutions (PRIs). It was constitutionally mandated to establish local self-government in rural areas.

• This part was officially inserted into the Constitution of India by the 73rd Constitutional Amendment Act, 1992, which came into force on April 24, 1993.

• It consists of Articles 243 to 243-O, detailing the structure, composition, powers, and functions of Panchayats.

• The 73rd Amendment also introduced the 11th Schedule, which identifies 29 functional items related to rural development, including agriculture, land improvement, and primary education, to be handled by the Panchayats.

• The provision mandates a three-tier system of Panchayati Raj at the Village, Intermediate (Mandal), and District levels for states with a population exceeding 20 lakhs.

Additional Information

• Other Parts of the Constitution:

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• Part V: This part deals with The Union, encompassing the executive, legislature, and judiciary at the central level from Articles 52 to 151.

• Part VII: This part previously dealt with States in Part B of the First Schedule but was repealed by the 7th Constitutional Amendment Act, 1956.

• Part XI: This part defines the Relations between the Union and the States, covering legislative and administrative aspects under Articles 245 to 263.

• Evolution of Panchayati Raj:

• Balwant Rai Mehta Committee (1957): Recommended the establishment of a three-tier Panchayati Raj system for the first time.

• Rajasthan: Was the first state to adopt the Panchayati Raj system in Nagaur district on October 2, 1959.

• Article 40: Located in the Directive Principles of State Policy, it initially directed the State to organize Village Panchayats.

Q33. Answer: (a) 103^(rd) Amendment

The correct answer is 103^(rd) Amendment.

Key Points

• The 103^(rd) Constitutional Amendment Act, 2019, introduced a 10% reservation for the Economically Weaker Sections (EWS) of citizens who are not covered under the existing reservation schemes for SCs, STs, and OBCs.

• This amendment modified the Indian Constitution by inserting Article 15(6) and Article 16(6) to permit the State to make special provisions for the advancement of economically weaker citizens.

• Article 15(6) enables the State to reserve up to 10% of seats in educational institutions, including private institutions, whether aided or unaided by the State, except for minority educational institutions.

• Article 16(6) empowers the State to provide a maximum of 10% reservation in appointments or posts in favor of any economically weaker section of citizens in addition to the existing reservations.

• The criteria for EWS eligibility are notified by the State from time to time based on family income and other indicators of economic disadvantage.

Additional Information

• 98^(th) Amendment

• Enacted in 2012, it inserted Article 371J to provide special provisions for the Hyderabad-Karnataka region, aiming to promote inclusive growth in backward districts of Karnataka.

• 102^(nd) Amendment

• Passed in 2018, it granted constitutional status to the National Commission for Backward Classes (NCBC) and inserted Article 338B and Article 342A regarding the identification of socially and educationally backward classes.

• 104^(th) Amendment

• Enacted in 2020, it extended the reservation of seats for Scheduled Castes (SCs) and Scheduled Tribes (STs) in the Lok Sabha and state assemblies for another 10 years, while discontinuing the reserved seats for the Anglo-Indian community.

Q34. Answer: (d) Gomdhar Konwar

The correct answer is Gomdhar Konwar.

Key Points

• The Ahom Revolt of 1828 was the first significant organized uprising in Assam against the British East India Company following the conclusion of the first Anglo-Burmese War.

• After the signing of the Treaty of Yandabo in 1826, the British failed to fulfill their promise of withdrawing from Assam, instead attempting to annex the territory into their administrative fold.

• Gomdhar Konwar, a prince of the Ahom royal family, emerged as the primary leader of the resistance, aiming to restore the Ahom Monarchy and end foreign interference.

• In October 1828, the rebels formally declared Gomdhar Konwar as the Swargadeo (Ahom King) at Binnakuchi and planned a military strike against the British station at Jorhat.

• The rebellion was bolstered by prominent Ahom officials and nobles, including Dhanjay Borgohain and Jairam Khargharia Phukan, who mobilized local levies to fight the colonial forces.

• The British military response, led by Lieutenant Rutherford, quickly suppressed the uprising; Gomdhar Konwar fled to the Naga Hills but was eventually captured and sentenced to imprisonment for treason.

Additional Information

• Maniram Dutta (Maniram Dewan):

• He was a sophisticated Assamese nobleman who originally served the British but later became a mastermind of the Revolt of 1857 in Assam.

• He sought to restore Kandarpeswar Singha to the throne and was eventually executed by hanging in 1858 for his anti-British conspiracies.

• Piyali Phukan:

• He was a patriot who led a subsequent rebellion in 1830, targeting the British military headquarters at Rangpur.

• Following the failure of this second major attempt at restoration, he was executed by the British, becoming a celebrated martyr of the Assamese freedom struggle.

• Treaty of Yandabo:

• Signed on February 24, 1826, this treaty ended the First Anglo-Burmese War and resulted in Burma ceding Assam, Manipur, and Arakan to the British.

Q35. Answer: (a) Maintenance and Welfare of Parents and Senior Citizens Act, 2007

The correct answer is Maintenance and Welfare of Parents and Senior Citizens Act, 2007.

Key Points

• The Maintenance and Welfare of Parents and Senior Citizens Act, 2007 was enacted to ensure the financial security, health, and welfare of elderly individuals in India. It mandates a legal obligation for children and heirs to provide maintenance to their parents.

• The Supreme Court of India and various High Courts have consistently interpreted the provisions of this Act to include the power of the Maintenance Tribunal to issue eviction orders. This is particularly applicable when children or legal heirs fail to maintain the senior citizen or occupy their property against their will, causing physical or mental distress.

• Under Section 23 of the Act, any transfer of property by a senior citizen (via gift or otherwise) can be declared void by the Tribunal if the transferee fails to provide basic amenities and physical needs as promised.

• In recent judicial reiterations, the courts have clarified that while the Act does not explicitly use the word 'eviction' in its text, the Right to Live with Dignity and the definition of Welfare (under Section 2k) grant the Tribunal the authority to remove abusive or non-compliant children from the senior citizen's residence to ensure their protection.

• The Act provides a summary procedure for maintenance, meaning the Tribunal can pass orders relatively quickly compared to standard civil court proceedings, which is essential for the immediate relief of the elderly.

Additional Information

• Maintenance and Welfare of Parents and Senior Citizens Act, 2007:

• Senior Citizen: Defined as any person being a citizen of India who has attained the age of 60 years or above.

• Maintenance: Includes provisions for food, clothing, residence, medical attendance, and treatment.

• Tribunal Composition: Each state government constitutes one or more Maintenance Tribunals for each sub-division, presided over by an officer not below the rank of Sub-Divisional Officer (SDO).

• Maximum Maintenance: The Act originally capped the monthly maintenance amount at Rs. 10,000, though several amendments and judicial reviews have sought to remove this ceiling based on the standard of living.

• Appellate Tribunal: Any senior citizen or parent aggrieved by the order of the Tribunal can prefer an appeal to the Appellate Tribunal within 60 days.

• Legal Representation: One unique feature of this Act is that no party to a proceeding before a Tribunal or Appellate Tribunal shall be represented by a legal practitioner, ensuring a simplified and direct process.

Q36. Answer: (a) Life expectancy, education, and per capita income

The correct answer is Life expectancy, education, and per capita income.

Key Points

• The Human Development Index (HDI) is a summary composite measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable, and having a decent standard of living.

• The health dimension is assessed by Life Expectancy at Birth, which estimates the number of years a newborn is expected to live based on current mortality rates.

• The education dimension is measured by combining the Mean Years of Schooling for adults aged 25 years and older and the Expected Years of Schooling for children of school-entering age.

• The standard of living dimension is measured by Gross National Income (GNI) per capita, adjusted for Purchasing Power Parity (PPP) in international dollars to account for differences in the cost of living across countries.

• The United Nations Development Programme (UNDP) publishes the Human Development Report annually, ranking countries based on their HDI score, which ranges from 0 to 1.

Additional Information

• Origin of HDI:

• It was created by Pakistani economist Mahbub ul Haq and Indian economist Amartya Sen in 1990 to shift the focus of development economics from national income accounting to people-centered policies.

• Other Indices in the Human Development Report:

• Inequality-adjusted HDI (IHDI): Adjusts the HDI for inequality in the distribution of each dimension across the population.

• Gender Inequality Index (GII): Measures gender disparities in reproductive health, empowerment, and labor market participation.

• Multidimensional Poverty Index (MPI): Identifies multiple deprivations at the household and individual level in health, education, and standard of living.

• Categorization:

• Countries are categorized into four groups based on their scores: Very High (0.800 and above), High (0.700 to 0.799), Medium (0.550 to 0.699), and Low Human Development (below 0.550).

Q37. Answer: (b) An immediate sync to Drive is triggered

The correct answer is An immediate sync to Drive is triggered.

Key Points

• Google Docs is a cloud-based word processor that utilizes asynchronous data transmission to save changes in real-time as a user types.

• While the application features an Auto-save mechanism that periodically pushes data to the server, pressing Ctrl + S acts as a manual trigger to force the synchronization process immediately.

• Technically, this action sends a request to the Google Drive servers to ensure that the latest buffer of edits is committed to the cloud storage and reflected in the Version History.

• Upon pressing the shortcut, the status message near the document title usually transitions from Saving... to All changes saved to Drive, confirming that the handshake between the browser and the remote server is complete.

Additional Information

• Cloud Architecture and Storage:

• Unlike legacy software that writes data to a local Hard Disk Drive (HDD), Google Docs stores data within the Google Cloud Platform infrastructure.

• The Ctrl + S shortcut in web apps is often a legacy habit for users transitioning from desktop environments like Microsoft Word, where manual saving is critical to prevent data loss from system crashes.

• Collaborative Environment:

• Immediate syncing ensures that other collaborators viewing the same document see the most recent updates with minimal latency.

• The Real-time Presence feature relies on these constant sync triggers to maintain consistency across multiple user sessions.

• Offline Functionality:

• If Offline Mode is enabled via the Google Docs Offline extension, pressing Ctrl + S saves the changes to the browser's IndexedDB or Local Storage until a network connection allows for a server sync.

Q38. Answer: (c) Managing files and folders

The correct answer is Managing files and folders.

Key Points

• Microsoft Windows is a widely used Operating System (OS) that serves as the essential layer of software managing communication between the user and the computer hardware.

• One of the fundamental responsibilities of any operating system, including Windows, is File Management, which involves the organized storage, retrieval, and naming of data on storage devices.

• Windows utilizes a hierarchical file system structure where data is stored in files, and these files are grouped into folders (also known as directories) to maintain an orderly environment.

• The File Explorer is the native utility in Windows that provides a Graphical User Interface (GUI) for users to perform critical tasks such as creating, moving, renaming, copying, and deleting files and folders.

• Behind the scenes, the operating system manages file allocation tables or NTFS (New Technology File System) metadata to keep track of exactly where bits of data are physically located on Hard Disk Drives (HDD) or Solid State Drives (SSD).

• Beyond organization, the OS ensures data security by managing file permissions and attributes, deciding which users or programs have the right to read, write, or execute specific files.

Additional Information

• Understanding Application vs. System Software:

• Designing multimedia presentations: This is an application-level task performed using specialized software like Microsoft PowerPoint or Google Slides, which runs on top of the operating system.

• Editing audio files: This requires dedicated Digital Audio Workstations (DAW) or editors such as Audacity or Adobe Audition; the OS provides the resources (CPU/RAM) for these tools but does not perform the editing itself.

• Playing games: While Windows is a premier platform for gaming due to its DirectX API and driver support, the actual execution of game logic is the function of the game application, not the primary role of the OS.

• Other Core Functions of Windows:

• Memory Management: Efficiently allocating Random Access Memory (RAM) to different running processes.

• Processor Management: Handling the scheduling of tasks to ensure the Central Processing Unit (CPU) is utilized optimally.

• Device Management: Using Device Drivers to facilitate communication with peripherals like printers, keyboards, and monitors.

Q39. Answer: (a) USD 10 billion

The correct answer is USD 10 billion.

Key Points

• The Asian Development Bank (ADB) has officially pledged a substantial funding of USD 10 billion specifically dedicated to India's urban infrastructure sector for the five-year period spanning 2025 to 2030.

• This commitment is designed to support the Government of India in its mission to create climate-resilient, inclusive, and sustainable cities, aligning with the Viksit Bharat 2047 vision.

• The funding will prioritize critical areas such as urban transport (including metro rail projects), solid waste management, wastewater treatment, and the provision of 24/7 piped water supply in various urban clusters.

• This investment strategy focuses on improving the Ease of Living in Indian cities by leveraging digital technologies and smart governance to manage rapid urbanization effectively.

• The pledge underscores ADB's role as a primary development partner, helping India mobilize private sector participation and innovative financing for large-scale municipal projects.

Additional Information

• Asian Development Bank (ADB):

• Headquarters: Located in Mandaluyong, Metro Manila, Philippines.

• Establishment: Founded on December 19, 1966, to foster economic growth and cooperation in the Asia-Pacific region.

• Membership: Currently comprises 68 members, with 49 from within the region and 19 from outside.

• India's Status: India is a founding member of ADB and is currently its largest borrower of sovereign loans, focusing on industrial corridors and energy efficiency.

• Strategic Alignment:

• The USD 10 billion pledge complements India's flagship schemes like AMRUT 2.0 (Atal Mission for Rejuvenation and Urban Transformation) and the Smart Cities Mission.

• It emphasizes decarbonization of urban centers to help India meet its Net Zero targets by 2070.

Q40. Answer: (b) Uttar Pradesh

The correct answer is Uttar Pradesh.

Key Points

• Uttar Pradesh emerged as the most populous state in India as per the Census 2011, recording a total population of approximately 19,98,12,341 (nearly 199.8 million).

• The state accounts for roughly 16.5% of the total Indian population, which was enumerated at 1.21 billion during that period.

• The population of Uttar Pradesh is notably higher than that of many sovereign nations, being roughly equal to the population of Brazil at the time of the census.

• The decadal growth rate of the state between 2001 and 2011 was 20.23%, indicating a significant demographic expansion over ten years.

Additional Information

• Other highly populous states in India according to Census 2011 include:

• Maharashtra: Secured the second position with a population of 11.23 crore.

• Bihar: Ranked as the third most populous state with 10.40 crore and remains the most densely populated state in India.

• West Bengal: Occupied the fourth position with 9.12 crore residents.

• Sikkim: Recorded as the least populous state in India with a population of only 6.10 lakh.

• Lakshadweep: Identified as the least populous Union Territory in the country.

• Census 2011 Details: This was the 15th national census of India and the 7th since independence, conducted under Registrar General and Census Commissioner C. Chandramouli.

Q41. Answer: (c) Electric energy

The correct answer is Electric energy.

Key Points

• The unit Kilowatt-hour (kWh) is the standard commercial unit used to measure the total amount of Electric energy consumed or generated over a specific period of time.

• Physical quantity Power is defined as the rate of energy consumption or transfer, expressed as Power = Energy ÷ Time.

• By rearranging the formula, Energy is calculated as the product of power and time (Energy = Power × Time); since Kilowatt is a

unit of power and Hour is a unit of time, their product represents energy.

• In the context of Solar energy systems, the output of Photovoltaic (PV) panels is measured in kWh to quantify the total electrical work performed or electricity produced by the system globally.

Additional Information

• Electric charge:

• The physical property of matter that causes it to experience a force in an electromagnetic field, measured in Coulombs (C).

• It is the product of current and time (Q = I × t).

• Current:

• The rate of flow of electric charge through a conductor, with the Ampere (A) as its SI unit.

• 1 Ampere is equivalent to the flow of 1 Coulomb of charge per second.

• Force:

• A vector quantity that causes an object to change its velocity, measured in Newtons (N).

• It is defined by Newton's Second Law as mass multiplied by acceleration (F = m × a).

• Energy Conversion Fact:

• 1 kWh is equivalent to 3.6 × 10^6 Joules.

• This is derived from 1,000 Watts (Joules/second) × 3,600 Seconds.

Therefore, the correct option is 3.

Q42. Answer: (c) Providing minimum support price for agricultural produce to farmers

The correct answer is Providing minimum support price for agricultural produce to farmers.

Key Points

• The Pradhan Mantri Fasal Bima Yojana (PMFBY) was launched on 18th February 2016 to provide a comprehensive insurance solution for farmers against non-preventable natural risks.

• One primary objective is to provide financial support to farmers who suffer crop loss or damage arising out of unforeseen events such as floods, dry spells, or pest attacks. Hence, statement 1 is an objective of PMFBY.

• The scheme aims to encourage farmers to adopt modern and innovative agricultural practices by providing a safety net, which reduces the financial risk of experimenting with new technologies. Hence, statement 2 is an objective of PMFBY.

• Stabilising the income of farmers is a core goal, ensuring they remain financially stable and continue their farming activities despite seasonal fluctuations or disasters. Hence, statement 4 is an objective of PMFBY.

• Minimum Support Price (MSP) is a separate market intervention by the Government of India to protect producers against sharp falls in agricultural prices; it is managed under different policies and is not a component of this insurance scheme. Hence, statement 3 is not an objective of PMFBY.

Additional Information

• Premium Structure:

• Farmers pay a uniform premium of only 2% for all Kharif crops.

• A premium of 1.5% is applicable for all Rabi crops.

• For annual commercial and horticultural crops, the premium to be paid by farmers is 5%.

• Minimum Support Price (MSP):

• MSP is fixed on the recommendations of the Commission for Agricultural Costs and Prices (CACP).

• The Cabinet Committee on Economic Affairs (CCEA) of the Union Government takes the final decision on the level of MSP.

• Currently, it covers 22 mandated crops and a fair and remunerative price (FRP) for sugarcane.

• Administrative Authority:

• PMFBY is implemented by the Ministry of Agriculture and Farmers Welfare.

• It replaced the National Agricultural Insurance Scheme (NAIS) and the Modified National Agricultural Insurance Scheme (MNAIS).

Q43. Answer: (d) S.P. Gupta vs. Union of India

The correct answer is S.P. Gupta vs. Union of India.

Key Points

• The landmark case of S.P. Gupta vs. Union of India (1981), popularly known as the First Judges Case, is fundamentally credited with the relaxation of the traditional rule of Locus Standi.

• The Supreme Court, through a bench led by Justice P.N. Bhagwati, ruled that any member of the public or a social action group acting bona fide can approach the court to seek judicial redress for a person or class of persons who, due to poverty, disability, or a socially disadvantaged position, cannot approach the court themselves.

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• By allowing third parties to represent the interests of the marginalized, the judgment established the procedural foundation for Public Interest Litigation (PIL) in the Indian judicial system.

• The court emphasized that the Rule of Law requires that legal injury to a person or group should not go unredressed simply because they lack the means to navigate the legal process.

• This shift transformed the Indian judiciary from a passive arbiter of private disputes into an active protector of Fundamental Rights and social justice, making justice more accessible to the common man.

Additional Information

• Minerva Mills vs. Union of India (1980)

• This case is pivotal for the Basic Structure Doctrine, where the court struck down clauses of the 42nd Amendment Act that sought to give Directive Principles of State Policy (DPSP) absolute precedence over Fundamental Rights.

• It established that the power of the Parliament to amend the Constitution is limited and Judicial Review is an essential feature of the Constitution.

• Golaknath vs. State of Punjab (1967)

• The Supreme Court held that the Parliament does not have the power to curtail or take away any of the Fundamental Rights through constitutional amendments.

• It introduced the doctrine of Prospective Overruling, ensuring that the judgment did not invalidate previous amendments but restricted future ones.

• Maneka Gandhi vs. Union of India (1978)

• This case expanded the horizon of Article 21 (Right to Life and Personal Liberty) by ruling that any 'procedure established by law' must be just, fair, and reasonable, and not arbitrary.

• It linked Article 14, 19, and 21, creating the Golden Triangle of the Indian Constitution.

Q44. Answer: (d) 1959

The correct answer is 1959.

Key Points

• Oil India Limited (OIL) was officially incorporated as a private limited company on February 18, 1959.

• The company was established as a joint venture between the Government of India and the Burmah Oil Company Limited (a British entity) to explore and develop oil resources in Northeast India.

• The incorporation followed the significant discovery of oil fields in Nahorkatiya (1953) and Moran (1956) in the state of Assam, which necessitated a specialized corporate body for management.

• Initially, the headquarters was located in Shillong, but the operational base was later moved to Duliajan, Assam, to be closer to the production sites.

Additional Information

• Corporate Evolution and Nationalization:

• In 1961, the equity structure was revised to a 50:50 partnership between the Government of India and Burmah Oil Company.

• On October 14, 1981, the company became a fully-owned Government of India Enterprise under the Ministry of Petroleum and Natural Gas.

• OIL was granted the Navratna status in 2010 and was further elevated to the Maharatna category in August 2023.

• Infrastructural Contributions:

• OIL constructed the 1,157 km long cross-country crude oil pipeline to transport crude from the Assam fields to refineries in Guwahati, Bongaigaon, and Barauni.

• The company is the second-largest national hydrocarbon explorer in India, maintaining a diverse portfolio in exploration, production, and transportation across over nine states and several international locations like Russia, Nigeria, and Gabon.

Q45. Answer: (b) IIT Palakkad

The correct answer is IIT Palakkad.

Key Points

• On 8th October 2025, a significant Memorandum of Understanding (MoU) was signed between the Ministry of Minority Affairs (MoMA) and the Indian Institute of Technology (IIT) Palakkad at the institute's Nila Campus in Kerala.

• The partnership is established under the Pradhan Mantri Virasat Ka Samvardhan (PM VIKAS) scheme, a 100% centrally funded initiative aimed at the socio-economic empowerment of minority communities.

• The collaboration focuses on providing future-tech training to 400 aspirants from minority communities, equipping them with advanced skills in high-demand technological sectors.

• Specifically, the program includes three specialized courses: Junior Chip Designer (150 seats), Embedded Software Engineer (150 seats), and Junior Drone Engineer - R&D (100 seats).

• The ceremony was attended by the Union Minister of State for Minority Affairs, Shri George Kurian, who emphasized the role of

such initiatives in building Brand India and fostering entrepreneurship.

Additional Information

• IIT Palakkad and the PM VIKAS Scheme:

• IIT Palakkad is the third institute in Kerala to join this national skilling initiative, following IIIT Kottayam and CMFRI Trivandrum.

• The total number of beneficiaries under the PM VIKAS scheme in Kerala across these three institutes reached 1,540 by late 2025.

• Beyond technical training, the program provides participants with a monthly stipend and dedicated placement support for both employment and self-employment.

• The PM VIKAS scheme integrates five earlier schemes (Seekho aur Kamao, USTTAD, Hamari Dharohar, Nai Roshni, and Nai Manzil) to provide a unified platform for skill development, education, and leadership.

• The training is implemented through the IIT Palakkad Technology I-Hub Foundation (IPTIF), which specializes in Intelligent Collaborative Systems.

Q46. Answer: (a) 1, 2 and 3

The correct answer is 1, 2 and 3.

Key Points

• The Western Ghats, also known as the Sahyadri mountains, are a mountain range that covers an area of 160,000 square kilometers in a stretch of 1,600 kilometers parallel to the western coast of the Indian peninsula. In the state of Maharashtra, this range is locally and primarily referred to as Sahyadri. Hence, statement 1 is correct.

• The Nilgiri Hills form a part of the Western Ghats and are located at the junction where the Western Ghats and Eastern Ghats meet. These hills are spread across the borders of Karnataka, Tamil Nadu, and Kerala, and are locally identified by this name in these regions. Hence, statement 2 is correct.

• The Anaimalai Hills, which translate to Elephant Hills, are located in the southern part of the Western Ghats. They are situated on the border of Kerala and Tamil Nadu, south of the Palghat Gap. They are a prominent local mountain range in Kerala. Hence, statement 3 is correct.

Additional Information

• Geographical Significance:

• The Western Ghats are older than the Himalayan mountains and represent geomorphic features of immense importance with highly unique biophysical and ecological processes.

• The range is recognized as a UNESCO World Heritage Site and is one of the eight hotspots of biological diversity in the world.

• The highest peak of the Western Ghats is Anamudi, standing at an elevation of 2,695 meters (8,842 feet), located within the Anaimalai Hills in the state of Kerala.

• The mountains act as a major watershed, giving rise to important perennial rivers like the Godavari, Krishna, and Kaveri.

• Further south of the Anaimalai Hills lie the Cardamom Hills, which are also part of the Western Ghats system in Kerala.

Q47. Answer: (d) Alluri Seetharama Raju

The correct answer is Alluri Seetharama Raju.

Key Points

• The Rampa Rebellion, also known as the Manyam Rebellion, took place between 1922−1924 in the Godavari Agency region of the Madras Presidency (modern-day Andhra Pradesh).

• Alluri Seetharama Raju led the tribal people against the oppressive British colonial rule, specifically targeting the Madras Forest Act of 1882 which restricted tribal rights over forest land.

• The revolt was a response to the British policy of preventing tribal communities from practicing their traditional Podu (shifting) cultivation and collecting forest produce.

• Raju was highly influenced by the Non-Cooperation Movement led by Mahatma Gandhi; he persuaded people to wear Khadi and give up drinking alcohol.

• Despite his admiration for Gandhiji, he believed that Swaraj could only be achieved through the use of force and guerrilla warfare rather than pure non-violence.

• The rebels carried out daring raids on police stations in Chintapalle, Rampa Chowdavaram, Dammanapalli, and Anantagiri to capture weapons.

• The rebellion came to an end after Alluri Seetharama Raju was captured and executed by the British in May 1924.

Additional Information

• Durgawati Devi

• Commonly known as Durga Bhabhi, she was a prominent member of the Hindustan Socialist Republican Association (HSRA).

• She played a crucial role in assisting Bhagat Singh in his escape from Lahore following the Saunders assassination in 1928.

• Chittu Pandey

• He was a revolutionary leader during the Quit India Movement of 1942 in Ballia, Uttar Pradesh.

• He is celebrated as the Sher-e-Ballia (Tiger of Ballia) for establishing a short-lived independent local government.

• Manyam Veerudu

• This title, meaning Hero of the Jungles, was given to Alluri Seetharama Raju by the local tribal population in recognition of his bravery and leadership.

• His struggle remains a significant part of the Indian Independence Movement history in South India.

Q48. Answer: (a) Jay Shah

The correct answer is Jay Shah.

Key Points

• Jay Shah, the current Chairman of the International Cricket Council (ICC) and former Honorary Secretary of the Board of Control for Cricket in India (BCCI), was honored with the CNN-News18 Indian of the Year 2025 award in the Outstanding Achievement category.

• He was recognized for his transformative role in the sports industry, particularly for his successful efforts in securing the inclusion of cricket in the 2028 Los Angeles Olympics, marking a historic milestone for the game's global expansion.

• His leadership was instrumental in implementing equal match fees for Indian women and men cricketers, a landmark decision that established gender pay parity within the BCCI.

• Under his administration, the Women's Premier League (WPL) was conceptualized and launched, which has become the most successful professional women's cricket league globally, providing a major platform for emerging talent.

• The 15th edition of the prestigious awards ceremony took place on November 28, 2025, in New Delhi, under the theme India's Invincible Icons.

• The award reflects his significant influence on sports governance and his vision for modernizing the commercial and administrative framework of the game while maintaining record levels of fan engagement.

Additional Information

• Rahul Dravid:

• Known as The Wall, he served as the head coach of the Indian men's cricket team and guided them to victory in the ICC Men's T20 World Cup 2024.

• Mahendra Singh Dhoni:

• The only captain in history to win all three major ICC trophies (T20 World Cup, 50-over World Cup, and Champions Trophy).

• He continues to lead the Chennai Super Kings in the IPL and remains one of India's most iconic sports figures.

• Gautam Gambhir:

• A former Indian opener and a two-time World Cup winner (2007 and 2011).

• He was appointed as the Head Coach of the Indian national team in July 2024, succeeding Dravid.

Q49. Answer: (a) Pure water

The correct answer is Pure water.

Key Points

• The pH scale is a logarithmic measurement used to specify the acidity or basicity of an aqueous solution, originally developed by Danish biochemist S.P.L. Sørensen in 1909.

• A substance is defined as neutral when it possesses a pH value of exactly 7.0 at a standard temperature of 25°C (298 K).

• Pure water is the primary reference for neutrality because it undergoes auto-ionization, where the concentration of hydrogen ions (H^+) is exactly equal to the concentration of hydroxide ions (OH^−).

• At equilibrium in pure water, the concentration of these ions is 1.0 × 10^(−7) moles per liter, resulting in a state where neither acidic nor basic characteristics are dominant.

• The scale ranges from 0 to 14, where values below 7 indicate an acidic nature (high H^+ concentration) and values above 7 indicate a basic or alkaline nature (high OH^− concentration).

Additional Information

• Stomach acid

• Mainly consists of Hydrochloric acid (HCl) produced by the stomach lining.

• It typically has a very low pH range of 1.5 to 3.5, which is crucial for activating digestive enzymes and killing ingested bacteria.

• Sea water

• Functions as a complex chemical solution with a slightly alkaline pH generally ranging from 7.5 to 8.4.

• Its pH is stabilized by the bicarbonate buffer system, though it is susceptible to ocean acidification due to rising atmospheric CO2 levels.

• Lime juice

• Contains high concentrations of citric acid, typically between 5% to 6% by weight.

• This high acid content results in a low pH value of approximately 2.0 to 2.8, making it significantly more acidic than neutral solutions.

Q50. Answer: (a) 24

The correct answer is 24.

Key Points

• The system of Departmentally Related Standing Committees (DRSCs) was first inaugurated in the Indian Parliament in April 1993 based on the recommendation of the Rules Committee.

• Initially, there were 17 committees established to cover various ministries and departments of the Union Government.

• On July 20, 2004, the Parliament expanded the committee system, increasing the total number of DRSCs from 17 to 24.

• Among the 24 committees, 16 committees function under the administrative control of the Speaker of the Lok Sabha, and 8 committees function under the Chairman of the Rajya Sabha.

• The main objective of these committees is to ensure the accountability of the Executive to the Legislature, especially in terms of financial expenditure and policy implementation.

Additional Information

• Composition and Membership:

• Each Departmentally Related Standing Committee consists of 31 members in total.

• Out of these 31 members, 21 are nominated from the Lok Sabha and 10 are nominated from the Rajya Sabha.

• The Speaker of the Lok Sabha and the Chairman of the Rajya Sabha nominate the members from their respective houses based on the proportional representation of political parties.

• Tenure and Eligibility:

• The term of office for the members of these committees is one year.

• A Minister cannot be a member of any Standing Committee; if a member is appointed as a minister, they must vacate their seat in the committee.

• Functions:

• The committees examine the Demands for Grants made by various ministries before they are voted upon in the Lok Sabha.

• They scrutinize Bills referred to them by the presiding officers and consider Annual Reports of the ministries.

• They also evaluate long-term National Policy Documents presented to the Parliament.

Q51. Answer: (c) Jammu & Kashmir

The correct answer is Jammu & Kashmir.

Key Points

• In November 2025, the Union Territory of Jammu & Kashmir launched its first-ever e-auction of seven limestone mineral blocks.

• The landmark e-auction was jointly inaugurated on November 24, 2025, by Union Minister of Coal & Mines Shri G. Kishan Reddy, J&K Chief Minister Omar Abdullah, and Deputy Chief Minister Surinder Kumar Choudhary.

• These seven blocks cover approximately 314 hectares across the districts of Anantnag, Rajouri, and Poonch, holding valuable deposits critical for cement manufacturing and infrastructure.

• This initiative represents the first-ever mineral block auction in the Union Territory since the implementation of major mining reforms under the Mines and Minerals (Development and Regulation) Act, 2015.

Additional Information

• UNFC Exploration Stages:

• The auctioned limestone deposits fall under G3 (Prospecting Stage) and G4 (Reconnaissance Stage) of the United Nations Framework Classification.

• G3 involves early-stage mapping and prospecting to identify mineral continuity, while G4 relies on broad regional surveys.

• Limestone Properties:

• It is a sedimentary rock predominantly rich in calcium carbonate ($CaCO_3$), acting as the core raw material for clinker and cement production.

• Other UTs Context:

• Chandigarh, Andaman and Nicobar Islands, and Puducherry are other Indian Union Territories but have not launched any such commercial limestone block auctions.

Q52. Answer: (d) Sardar Vallabhbhai Patel

The correct answer is Sardar Vallabhbhai Patel.

Key Points

• National Unity Day, also known as Rashtriya Ekta Diwas, is celebrated in India every year on October 31 to mark the birth anniversary of Sardar Vallabhbhai Patel.

• The day was officially introduced by the Government of India in 2014 with the objective of paying tribute to Patel for his extraordinary efforts in unifying the country.

• Sardar Patel played a crucial role during the Indian independence movement and served as the first Home Minister and Deputy Prime Minister of independent India.

• He is famously known as the Iron Man of India for his uncompromising commitment to national integration and his success in persuading over 560 princely states to join the Indian Union.

• The celebration serves as a reminder of the inherent strength and resilience of the nation to withstand threats to its unity, integrity, and security.

Additional Information

• Sardar Vallabhbhai Patel:

• He was the visionary behind the modern All India Services system and is often hailed as the Patron Saint of India s civil servants.

• The Statue of Unity, the world s tallest statue at 182 meters, is located in Kevadia, Gujarat, as a memorial to his legacy.

• He was posthumously awarded the Bharat Ratna, India s highest civilian honor, in 1991.

• Other Distinguished Leaders:

• Mahatma Gandhi: His birth anniversary on October 2 is celebrated as Gandhi Jayanti and the International Day of Non-Violence.

• Lal Bahadur Shastri: The second Prime Minister of India, who also shares his birthday on October 2.

• Jawaharlal Nehru: The first Prime Minister of India, whose birth anniversary on November 14 is celebrated as Children s Day (Bal Diwas).

Q53. Answer: (a) Coagulation

The correct answer is Coagulation.

Key Points

• Milk is a colloidal solution where protein particles, specifically Casein, are suspended and prevented from clumping by negative electrical charges.

• When an acidic substance like lemon juice (which contains citric acid) is added, the hydrogen ions (H^+) neutralize the negative charges on the protein molecules.

• As the pH of the milk drops towards its isoelectric point (approximately 4.6 for casein), the proteins lose their repulsive forces and begin to aggregate.

• The process of these particles clumping together to transform a liquid into a thickened mass or solid is scientifically defined as Coagulation or Curdling.

• In the preparation of paneer, this coagulation results in the separation of solid curds from the liquid whey, which is then filtered and pressed.

Additional Information

• Sedimentation:

• It is a physical process where insoluble solids settle at the bottom of a liquid due to the influence of gravity.

• It is commonly used in water treatment to remove sand, silt, and clay particles from raw water.

• Hydrolysis:

• It is a chemical reaction involving the breaking of a bond in a molecule using a water molecule.

• In biological systems, enzymes facilitate the hydrolysis of polymers (like starch or proteins) into smaller monomers during the process of digestion.

• Crystallization:

• It is the process by which a solid forms, where the atoms or molecules are highly organized into a structure known as a crystal lattice.

• This technique is widely used in laboratories and industries to purify substances, such as obtaining pure sugar from cane juice or salt from seawater.

Q54. Answer: (c) Rajaraja I

The correct answer is Rajaraja I.

Key Points

• Rajaraja I, who reigned from 985 CE to 1014 CE, is considered the primary architect of the Imperial Chola maritime empire, transforming the kingdom into a dominant sea power.

• He established a powerful navy that allowed the Cholas to assert control over the Bay of Bengal and the Arabian Sea, facilitating

trade with the Song Dynasty of China and Southeast Asian kingdoms.

• During his military campaigns, he conquered the Northern part of Sri Lanka (then known as Ilam), destroyed the capital Anuradhapura, and established a new Chola province with Polonnaruwa as its headquarters.

• His naval expeditions reached the Maldives, which are referred to in Chola inscriptions as Munnir Palantivu Pannirayiram (the twelve thousand ancient islands of the sea), and the Lakshadweep islands.

• The naval strength developed under his reign laid the crucial foundation for his son, Rajendra I, to launch even more ambitious trans-oceanic expeditions to Southeast Asia.

Additional Information

• Rajendra I:

• He was the son of Rajaraja I and expanded the empire to its greatest extent, conquering the entire island of Sri Lanka and reaching the Ganges River.

• He is famous for his naval raid on the Srivijaya Empire (modern-day Indonesia and Malaysia) in 1025 CE to protect Chola trade interests.

• Vijayalaya:

• He was the founder of the Imperial Chola Dynasty who captured Thanjavur from the Muttaraiyar in approximately 850 CE.

• He initially ruled as a feudatory of the Pallavas before establishing an independent power base.

• Kulottunga I:

• A later Chola ruler who was known for his administrative acumen and for sending a large trade embassy consisting of 72 merchants to China in 1077 CE.

• He earned the title Sungam Thavirtha Chola (the Chola who abolished tolls) for removing internal customs duties and taxes to promote commerce.

Q55. Answer: (b) Spring season

The correct answer is Spring season.

Key Points

• The India Meteorological Department (IMD), which is the principal government agency responsible for meteorological observations and weather forecasting, officially recognizes four distinct meteorological seasons in India.

• The four official seasons are: the Winter season (December to February), the Summer season or Pre-monsoon (March to May), the Rainy season or Southwest Monsoon (June to September), and the Post-monsoon season (October to November).

• Spring season (traditionally known as Vasant) is part of the traditional Indian Shada-Ritu (six seasons) calendar, but it is not classified as an independent meteorological season by the IMD for climate reporting and administrative data.

• Meteorologically, the period associated with spring is transitionary and is typically absorbed within the latter half of the Winter season and the onset of the Pre-monsoon/Summer period.

Additional Information

• Summer season:

• Known as the Hot Weather Season, it occurs from March to May as the sun moves northward toward the Tropic of Cancer.

• Characteristic features include the Loo (hot, dry winds) in Northern India and pre-monsoon showers such as Mango Showers in Karnataka and Kerala.

• Rainy season:

• Identified as the Southwest Monsoon Season (June to September), it provides nearly 75% of India's annual rainfall.

• The monsoon usually sets in over the Kerala coast by early June and covers the entire country by mid-July.

• Winter season:

• Designated as the Cold Weather Season from December to February.

• It is marked by clear skies and the influence of Western Disturbances, which bring rainfall to the North-West plains and snow to the Himalayas.

Q56. Answer: (a) United Kingdom (UK) and Germany

The correct answer is United Kingdom (UK) and Germany.

Key Points

• The Kensington Treaty (formally known as the UK-Germany Defence Treaty) is a landmark security agreement signed in January 2025 to enhance military and industrial cooperation.

• It represents the most significant bilateral defense pact between the United Kingdom and Germany since World War II, aiming to solidify the European pillar within NATO.

• The treaty facilitates joint procurement of advanced weaponry, including the development of new long-range strike missiles and high-precision artillery systems.

• A major economic outcome of the treaty is the establishment of a specialized artillery gun barrel factory in the UK, marking the first time in ten years that such barrels will be manufactured domestically.

• The agreement includes provisions for maritime security, allowing German P-8 Poseidon aircraft to operate from RAF Lossiemouth in Scotland to monitor hostile activity in the North Atlantic.

• It focuses heavily on the protection of critical underwater infrastructure, such as data cables and energy pipelines, against sabotage or hybrid threats.

Additional Information

• Trinity House Agreement:

• This was the foundational defense pact signed in October 2024 that paved the way for the full 2025 treaty.

• It established the framework for industrial collaboration and synchronized military exercises between the British Army and the Bundeswehr.

• Strategic Implications:

• The treaty aligns the two largest defense spenders in Europe, creating a deterrent against regional aggression.

• It complements existing agreements like the Lancaster House Treaties (UK-France) and the Aachen Treaty (Germany-France), forming a strategic defense triangle.

• Joint Air Defense:

• The pact emphasizes interoperability between the Royal Air Force (RAF) and the Luftwaffe, particularly in integrated air and missile defense systems.

Q57. Answer: (c) Thumri

The correct answer is Thumri.

Key Points

• Thumri is a prominent semi-classical vocal form of Hindustani Classical Music, characterized by its lyrical focus on romantic and devotional themes, particularly the divine love of Radha and Krishna.

• The Lucknow Gharana played a pivotal role in the evolution of Thumri, reaching its peak under the patronage of Nawab Wajid Ali Shah in the 19th century. This style is often linked with Kathak dance, emphasizing expressive gestures (Abhinaya) and grace.

• The Banaras Gharana (Varanasi) is famous for the Bol Banav style of Thumri. This tradition focuses on the melodic elaboration of words to evoke deep emotional meaning. Renowned vocalists like Girija Devi and Siddheshwari Devi are the pillars of this gharana.

• The Patiala Gharana is distinguished by the Patiala-Ang of Thumri, which was revolutionized by Ustad Bade Ghulam Ali Khan. It is known for its intricate vocal ornamentations like Murkis, Khatkas, and its fusion of Tappa-like agility with soulful melody.

Additional Information

• Tappa:

• A vocal style derived from the folksongs of camel riders in the Punjab region.

• It is known for its extremely rapid and complex Taans and was refined by Shori Mian of the Lucknow court.

• Kajari:

• A popular seasonal folk song of Uttar Pradesh and Bihar, traditionally sung during the monsoon season.

• While frequently performed by Banaras vocalists, it is classified as a folk-based genre rather than the defining classical style of the three gharanas.

• Chaiti:

• A semi-classical song performed during the Hindu month of Chait (March-April), often associated with the Rama Navami festival.

• It belongs to the same Purvanchal musical tradition as Kajari and Thumri but remains a seasonal specific sub-genre.

Q58. Answer: (c) Pir Panjal Range

The correct answer is Pir Panjal Range.

Key Points

• The Atal Tunnel, formerly known as the Rohtang Tunnel, is a world-class highway tunnel constructed in the eastern Pir Panjal Range of the Himalayas on the Leh-Manali Highway.

• It is situated in the state of Himachal Pradesh at an altitude of approximately 3,000 meters (10,000 feet) above mean sea level, making it the longest highway tunnel in the world at this elevation.

• The tunnel spans a total length of 9.02 kilometers and provides all-weather connectivity to the Lahaul and Spiti valley, which previously remained cut off for six months due to heavy snowfall at Rohtang Pass.

• The project was executed by the Border Roads Organization (BRO) and was officially inaugurated by Prime Minister Narendra Modi on October 3, 2020.

• Engineered with a horseshoe-shaped cross-section, the tunnel reduces the road distance between Manali and Keylong by 46

kilometers and saves about 4 to 5 hours of travel time.

Additional Information

• Karakoram Range

• A major Trans-Himalayan mountain range spanning the borders of India, Pakistan, and China.

• It houses the world's second-highest peak, K2 (Mount Godwin-Austen), and the Siachen Glacier.

• Zaskar Range

• A mountain range in Ladakh that separates the Zanskar Valley from the Indus Valley.

• It lies to the north of the Great Himalayan Range and contains peaks like Kamet and Nanda Devi in its eastern extensions.

• Dhauladhar Range

• Commonly referred to as the Lesser Himalayas or the White Range.

• It rises from the Indian plains to the north of Kangra and Mandi and lies south of the Pir Panjal Range.

Q59. Answer: (a) Appointment of state governors by the Centre

The correct answer is Appointment of state governors by the Centre.

Key Points

• The feature of Appointment of state governors by the Centre is borrowed from the Canadian Constitution, not the United Kingdom.

• In India, the Governor is neither directly elected by the people nor indirectly elected by a specially constituted electoral college as in the United States; instead, they are appointed by the President by warrant under his hand and seal.

• This model follows the Canadian system where the Governor-General of Canada appoints the Lieutenant-Governor of the provinces, ensuring a strong centralizing tendency in the federal structure.

• Provisions related to the Governor are enshrined in Articles 153 to 167 of the Indian Constitution, with Article 155 specifically addressing the appointment process.

• Conversely, the United Kingdom (British Constitution) provided the foundation for the Parliamentary government, the Rule of Law, Legislative procedure, and Single citizenship.

Additional Information

• Features borrowed from the United Kingdom:

• Single Citizenship: Despite being a federal state, India provides only one citizenship to promote national integration.

• Bicameral Parliament: The existence of two houses, the Lok Sabha (Lower House) and Rajya Sabha (Upper House), mirrors the British House of Commons and House of Lords.

• Speaker of Lok Sabha: The office and the crucial role of the Speaker in maintaining parliamentary decorum and neutrality are derived from British conventions.

• Writs: The power of courts to issue Prerogative Writs like Habeas Corpus and Mandamus.

• Features borrowed from Canada:

• Federation with a strong Centre: The distribution of powers where the Union remains dominant.

• Residuary Powers: Vesting remaining legislative powers in the Centre (Article 248).

• Advisory Jurisdiction: The power of the Supreme Court to provide advice to the President under Article 143.

Q60. Answer: (b) Tropical evergreen forests

The correct answer is Tropical evergreen forests.

Key Points

• Tropical evergreen forests thrive in regions where the annual rainfall exceeds 200 cm, accompanied by a very short dry season or no dry season at all.

• The climatic conditions required include a mean annual temperature generally above 22°C to 25°C and consistently high humidity exceeding 70 percent.

• Due to the warm and wet climate throughout the year, these forests support a luxuriant vegetation of all kinds, including trees, shrubs, and creepers, giving it a multi-layered structure.

• In India, these forests are predominantly distributed along the windward side of the Western Ghats, the Andaman and Nicobar Islands, Lakshadweep, and the hilly regions of Northeastern India (Assam, Meghalaya, etc.).

• Trees in these forests do not have a fixed time to shed their leaves; consequently, the forest appears green throughout the year, leading to the name evergreen.

• Commercial tree species found here include Rosewood, Ebony, Mahogany, Rubber, and Cinchona, which often reach heights up to 60 meters or more.

Additional Information

• Tropical deciduous forests:

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• These are the most widespread forests in India and are also called Monsoon forests.

• They are found in regions receiving rainfall between 70 cm and 200 cm and shed their leaves for about six to eight weeks in dry summer.

• Thorn and scrub vegetation:

• Occurs in areas with less than 70 cm of rainfall, particularly in semi-arid regions like North-western India.

• Common species include Acacias, Euphorbias, and Cacti, characterized by long roots and succulent stems to conserve water.

• Temperate grasslands:

• These ecosystems are found in mid-latitudinal zones where rainfall is moderate and varies seasonally.

• They are known by various names globally, such as the Steppes in Eurasia and Prairies in North America.

Q61. Answer: (c) Recording double digits in three statistical categories

The correct answer is Recording double digits in three statistical categories.

Key Points

• A triple-double is a performance in which a basketball player accumulates a double-digit total (10 or more) in three of five statistical categories.

• The five statistical categories officially tracked for this achievement are points, total rebounds, assists, steals, and blocked shots.

• The most common combination achieved by players involves points, rebounds, and assists, reflecting a high level of versatility on the court.

• The term was popularized in the 1980s, specifically to describe the all-around impact of players like Magic Johnson, who could facilitate, score, and rebound effectively.

Additional Information

• Related Statistical Terms:

• Double-Double: This occurs when a player reaches double digits in two of the five categories. It is a common occurrence for elite NBA players.

• Quadruple-Double: Reaching double digits in four categories. This is extremely rare and has only been officially recorded four times in NBA history by Nate Thurmond, Alvin Robertson, Hakeem Olajuwon, and David Robinson.

• Quintuple-Double: Achieving double digits in all five categories. This feat has never been recorded in NBA history.

• Notable Record Holders:

• Russell Westbrook holds the record for the most career triple-doubles in NBA history, surpassing the long-standing record of Oscar Robertson.

• Nikola Jokic is another modern player known for high frequency in recording triple-doubles from the Center position.

• Rules Context:

• In the NBA, committing two technical fouls results in an automatic ejection, making the notion of three technical fouls irrelevant to a positive performance metric.

Q62. Answer: (a) Gayatri Chakravorty Spivak

The correct answer is Gayatri Chakravorty Spivak.

Key Points

• The Holberg Prize Board announced on March 14, 2025, that the 2025 laureate is the Indian-American scholar Gayatri Chakravorty Spivak.

• Spivak is a University Professor at Columbia University and is widely considered one of the most influential thinkers in the fields of postcolonial theory, deconstruction, and feminist criticism.

• The prize recognizes her career-long dedication to challenging dominant narratives and her role in establishing postcolonial studies as a rigorous academic discipline.

• Her seminal 1988 essay, 'Can the Subaltern Speak?', is cited by the committee as a foundational text that fundamentally changed how scholars analyze the voices of the marginalized and the power dynamics of global discourse.

• She is also celebrated for her groundbreaking translation of and preface to Jacques Derrida's 'Of Grammatology' (1976), which introduced Deconstruction to the English-speaking world.

• The Holberg Prize is one of the largest international prizes awarded annually for outstanding contributions to research in the humanities, social sciences, law, and theology.

Additional Information

• Holberg Prize Overview:

• Established by the Norwegian Parliament in 2003 and named after the Dano-Norwegian writer Ludvig Holberg.

• Administered by the University of Bergen, it carries a monetary value of 6 million NOK (approximately 550,000 USD).

• Previous laureates include notable figures like Julia Kristeva, Jürgen Habermas, and Martha Nussbaum.

• Gayatri Chakravorty Spivak's Background:

• Born in Kolkata, India, in 1942, she later moved to the United States for higher education at Cornell University.

• She was awarded the Padma Bhushan by the Government of India in 2013 for her contributions to education and literature.

• She is a co-founder of the Institute for Comparative Literature and Society at Columbia University and is known for her activism in rural education in West Bengal.

Q63. Answer: (c) Power

The correct answer is Power.

Key Points

• Power is defined as the rate at which Work is performed or the rate at which Energy is transferred. The standard formula for power is Power = Work / Time.

• Work (W) is calculated as the product of Force (F) and Displacement (s). Therefore, the formula can be expressed as Power = (Force × Displacement) / Time.

• Since Velocity (v) is defined as Displacement / Time, the relationship simplifies to Power = Force × Velocity. This is specifically the instantaneous power when force is constant.

• From the perspective of Dimensional Analysis, the dimensions of Force are [MLT^(−2)] and those of Velocity are [LT^(−1)]. Multiplying these gives [ML²T^(−3)].

• The SI unit of Power is the Watt (W), which is equivalent to one Joule per second (J/s) or one Newton-meter per second (N·m/s). Hence, Power is the correct answer.

Additional Information

• Pressure:

• Defined as Force applied per unit Area (P = F / A).

• Its SI unit is the Pascal (Pa) and its dimensional formula is [ML^(−1)T^(−2)].

• Energy:

• The capacity of a physical system to perform Work.

• Commonly measured in Joules (J), energy has the dimensional formula [ML²T^(−2)], which is force times distance.

• Impulse:

• Calculated as the product of Force and the Time interval (I = F × Δt) over which it acts.

• It represents the change in Linear Momentum and has the dimensional formula [MLT^(−1)].

Q64. Answer: (d) 30 Days

The correct answer is 30 Days.

Key Points

• Article 352 of the Indian Constitution empowers the President to proclaim a National Emergency when the security of India or any part of its territory is threatened by war, external aggression, or armed rebellion.

• A proclamation of National Emergency must be approved by both the Lok Sabha and the Rajya Sabha within one month (which is equivalent to 30 days) from the date of its issue.

• Prior to the 44th Amendment Act of 1978, the period allowed for parliamentary approval was two months; however, this timeframe was reduced to ensure stricter legislative control over executive powers.

• If the proclamation is issued at a time when the Lok Sabha has been dissolved or the dissolution takes place during the 30-day period without approval, the proclamation survives until 30 days from the first sitting of the reconstituted Lok Sabha, provided the Rajya Sabha has approved it in the meantime.

• Once approved, the Emergency continues for six months and can be extended for an indefinite period with periodic parliamentary approval every six months via a special majority.

Additional Information

• Grounds and Procedure:

• The President can only declare a National Emergency after receiving a written recommendation from the Cabinet (the Prime Minister and other ministers of cabinet rank), a safeguard added by the 44th Amendment.

• The special majority required for approval consists of a majority of the total membership of each House and a majority of not less than two-thirds of the members present and voting.

• Other Emergency Provisions:

• Article 356 (President's Rule): Relates to the failure of constitutional machinery in states. It must be approved by Parliament within two months (60 days) and lasts for six months at a time.

• Article 360 (Financial Emergency): Declared when the financial stability or credit of India is threatened. It also requires parliamentary approval within two months (60 days) and remains in force indefinitely until revoked.

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Q65. Answer: (a) (i) False, (ii) True

The correct answer is (i) False, (ii) True.

Key Points

• Statement (i) claims that ROM is faster than RAM; however, in standard computer architecture, RAM is significantly faster than ROM. RAM is designed for high-speed data exchange with the CPU to handle active processes, whereas ROM is used for permanent storage of firmware and has much slower data transfer rates. Hence, statement (i) is incorrect.

• Statement (ii) identifies RAM as memory that supports both read and write operations, which is essential for the CPU to process and update data in real-time. It also correctly states that RAM is volatile, meaning all data is lost when the power supply is cut off. Hence, statement (ii) is correct.

Additional Information

• Random Access Memory (RAM):

• Acts as the primary memory or main memory of a computer.

• Includes DRAM (Dynamic RAM), which is used for system memory, and SRAM (Static RAM), which is faster and used for the CPU Cache.

• Its capacity directly impacts the multi-tasking capabilities and overall speed of the system.

• Read-Only Memory (ROM):

• It is non-volatile, meaning it retains instructions like the BIOS (Basic Input/Output System) or UEFI even without power.

• The Bootstrap Loader, which starts the operating system during the booting process, is stored here.

• Modern versions include EEPROM, which can be erased and rewritten using electrical charges, and Mask ROM, which is programmed during manufacturing.

Q66. Answer: (c) Repo rate adjustment

The correct answer is Repo rate adjustment.

Key Points

• The Repo Rate, or Repurchase Rate, is the key benchmark interest rate at which the Reserve Bank of India (RBI) lends short-term money to commercial banks against the collateral of government securities.

• It serves as the primary instrument of the Monetary Policy to regulate liquidity, control inflation, and ensure price stability in the Indian economy.

• When the RBI aims to reduce excess liquidity and curb inflation, it increases the Repo Rate, making borrowing expensive for banks, which subsequently raises lending rates for the public and reduces the money supply.

• To stimulate economic growth during a slowdown, the RBI decreases the Repo Rate, providing cheaper credit to banks and encouraging investment and consumption.

• Decisions regarding the Repo Rate are made by the Monetary Policy Committee (MPC), which typically meets bi-monthly to review the macroeconomic situation and adjust the Liquidity Adjustment Facility (LAF) corridor.

Additional Information

• Fiscal Policy Tools (Managed by the Government of India):

• Fiscal Stimulus: This refers to budgetary measures like increased government spending or tax reductions designed to revive the economy; it is not a direct tool of the RBI.

• Government Subsidies: These are financial grants provided by the state to reduce the cost of essential goods (like fertilizers or food), functioning as a fiscal transfer rather than a monetary liquidity tool.

• Trade and Revenue Tools:

• Tariff Imposition: These are customs duties or taxes placed on imported goods to protect domestic industries or generate revenue, managed by the Ministry of Finance and Ministry of Commerce.

• Other RBI Monetary Instruments:

• Reverse Repo Rate: The rate at which the RBI absorbs liquidity from banks by borrowing from them.

• Cash Reserve Ratio (CRR): A specific portion of a bank's Net Demand and Time Liabilities (NDTL) that must be maintained with the RBI in cash.

Q67. Answer: (b) 2008

The correct answer is 2008.

Key Points

• The Telugu language was officially declared as a Classical Language by the Government of India in the year 2008.

• The formal announcement was issued by the Union Ministry of Culture on October 31, 2008, acknowledging the language's profound historical and literary significance.

• Alongside Telugu, the Kannada language was also granted the same status in 2008 after fulfilling the specific criteria set by the

linguistic expert committee.

• The recognition followed a long-standing demand by scholars and the state government of Andhra Pradesh, providing evidence of the language's antiquity and its original literary tradition.

• Eligibility for this status requires a language to have a recorded history of early texts spanning at least 1500 to 2000 years, a condition that Telugu successfully satisfied through its ancient inscriptions and poetic works.

Additional Information

• Classical Language Criteria:

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

• A body of ancient literature or texts considered a valuable heritage by generations of speakers.

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

• A distinction must exist between the classical language and its modern or later forms.

• List of Classical Languages:

• Tamil: The first language to be accorded the status in 2004.

• Sanskrit: Declared in 2005.

• Malayalam: Accorded status in 2013.

• Odia: Declared in 2014.

• Recent Additions (2024): The Cabinet recently approved Marathi, Assamese, Bengali, Pali, and Prakrit as classical languages.

• Benefits of Status: Two major international awards for scholars of eminence in the language and the establishment of a Centre of Excellence for Studies in Classical Languages.

Q68. Answer: (b) Attirampakkam

The correct answer is Attirampakkam.

Key Points

• Attirampakkam, located in the Kortallayar River Basin near Chennai, Tamil Nadu, is recognized as one of the most significant Paleolithic archaeological sites in India.

• Extensive excavations led by Shanti Pappu and her team from the Sharma Centre for Heritage Education have revealed a continuous sequence of prehistoric cultures at this location.

• The site is famous for providing the earliest scientifically dated evidence of Acheulian stone tools in the Indian subcontinent, using cosmogenic nuclide burial dating.

• The findings indicate that hominins were present in South Asia and producing handaxes and cleavers as far back as approximately 1.51 million years ago (mya).

• This discovery at Attirampakkam challenged previous theories about the Out of Africa migration, suggesting that early humans reached India much earlier than the previously estimated 0.5 mya.

• The stone tools recovered from the site were primarily fashioned from quartzite, exhibiting sophisticated bifacial flaking techniques typical of the Lower Paleolithic era.

Additional Information

• Lothal:

• Situated in the Saragwala village of Gujarat, it was a major city of the Indus Valley Civilization.

• It flourished during the Bronze Age (c. 2400−1900 BCE) and is renowned for the world's earliest known artificial dockyard.

• Hunsgi Valley:

• Located in the Yadgir district of Karnataka, it is another vital Lower Paleolithic site in India.

• Early humans in this region notably used limestone to manufacture their stone tools, providing insight into the adaptation to local geological resources.

• Mehrgarh:

• Located on the Kacchi Plain of Balochistan, Pakistan, it is one of the earliest Neolithic sites in the world.

• It dates back to roughly 7000 BCE and provides foundational evidence of the transition from hunting-gathering to agriculture and animal domestication in South Asia.

Q69. Answer: (c) Opposing idolatry and promoting rational interpretation of Vedantic doctrine

The correct answer is Opposing idolatry and promoting rational interpretation of Vedantic doctrine.

Key Points

• Raja Rammohan Roy established the Atmiya Sabha (Society of Friends) in 1815 in Calcutta to initiate a platform for theological and philosophical debates.

• The central objective of the Atmiya Sabha was to promote Monotheism and challenge the prevailing Polytheistic practices and Idol worship within Hinduism.

• Roy utilized the Atmiya Sabha to provide a Rational interpretation of the Upanishads and the Vedanta, arguing that ancient Hindu scriptures emphasized the worship of one supreme, formless God.

• Members of the Sabha engaged in discussions regarding Social reforms, specifically criticizing the rigid Caste system and meaningless religious Rituals that had burdened the society.

• By advocating for Reason over Blind faith, the society laid the intellectual foundation for the later socio-religious movements in Bengal, seeking to modernize Indian thought while remaining rooted in scriptural authority.

Additional Information

• Raja Rammohan Roy (1772−1833):

• Often hailed as the Father of the Indian Renaissance and the Prophet of Indian Nationalism.

• He founded the Brahmo Sabha in 1828, which later transformed into the Brahmo Samaj, aiming to institutionalize monotheistic worship.

• He was instrumental in the abolition of Sati in 1829, working closely with the British Governor-General Lord William Bentinck.

• In 1817, he assisted David Hare in establishing the Hindu College in Calcutta to promote Western education and a Scientific temper.

• His literary contributions include Tuhfat-ul-Muwahhidin (A Gift to Monotheists), written in Persian, and translations of several Upanishads into Bengali and English.

• He rejected Occult traditions and Ritualistic social customs, which directly contradicts the alternative options suggesting he supported caste exclusiveness or resisted intellectual reform.

Q70. Answer: (d) Bankim Chandra Chattopadhyay

The correct answer is Bankim Chandra Chattopadhyay.

Key Points

• Anandamath is a seminal Bengali novel written by Bankim Chandra Chattopadhyay and was first published in 1882.

• The novel is set in the background of the Sannyasi Rebellion of the late 18th century and the Great Bengal Famine of 1770, depicting the struggle of ascetic warriors against British colonial rule.

• It is most famous for containing the hymn Vande Mataram, which later became the National Song of India and served as a powerful rallying cry for the Indian independence movement.

• The work is credited with popularizing the concept of Bharat Mata (Mother India), personifying the nation as a mother figure requiring liberation from foreign oppression.

• The narrative focuses on a secret society called Santan Dal (Children's Army) that fights against the tyranny of the British East India Company and its administrative failures during the famine.

• Bankim Chandra Chattopadhyay is often referred to as Sahitya Samrat (Emperor of Literature) in Bengali for his profound impact on Indian literature and nationalism.

Additional Information

• Sarat Chandra Chattopadhyay:

• A renowned novelist known for portraying the struggles of rural society and female protagonists in works like Devdas, Parineeta, and Srikanta.

• His novel Pather Dabi was banned by the British government for its revolutionary nationalist content.

• Dinabandhu Mitra:

• A Bengali dramatist best known for his play Nil Darpan (1860), which exposed the brutal exploitation of indigo farmers by British planters.

• Rabindranath Tagore:

• The first non-European to win the Nobel Prize in Literature (1913) for Gitanjali.

• He composed the national anthems of both India (Jana Gana Mana) and Bangladesh (Amar Shonar Bangla).

Q71. Answer: (c) QO 2

The logic follows here,

For FR 6 is related to KN -6

For LU 9 is related to QQ -3,

LS 14 related,

The term QO 2 is obtained by applying the same (+5, −4, −12) pattern to LS 14.

Hence, the correct answer is 'Option 3'.

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Q72. Answer: (b) XA – TU

The logic followed here is,

Logic: 1st letter of first cluster − 4 = 1st letter of second cluster; 2nd letter of first cluster − 4 = 2nd letter of second cluster.

For MJ - IF,

For RF - NB,

For PL - LH,

For XA - TU,

Therefore, the letter-cluster pair that is different from the others is XA - TU.

Hence, the correct answer is "Option 2".

Q73. Answer: (a) YSG 57

The logic followed here is:

The next term is "YSG 57".

Hence, the correct answer is "option 1"

Q74. Answer: (d) 429

The logic followed here is:

• 8 × 1 − 2 = 6

• • 6 × 2 − 3 = 9

• 9 × 3 − 4 = 23

• 23 × 4 − 5 = 87

• 87 × 5 − 6 = 429

Thus, the missing term in the series is 429.

Hence, the correct answer is 'Option 4';

Q75. Answer: (a) 5 km to the east

Given :

• Mr. Vasu starts from Point A and drives 23 km towards the south.

• He then takes a left turn, drives 19 km, turns left and drives 36 km.

• He then takes a left turn and drives 19 km, turns left drives 9 km.

• He then takes a right turn and drives 5 km.

• He takes a final left turn, drives 4 km and stops at Point P.

The Final Diagram,

Hence, the correct answer is "option 1"

Q76. Answer: (b) 98

The logic followed here is:

• 7 + 4 = 11

• 11 × 2 − 2 = 20

• 20 + 4 = 24

• 24 × 2 − 2 = 46

• 46 + 4 = 50

• 50 × 2 − 2 = 98

Thus, the missing term in the series is 98.

Hence, the correct answer is 'Option 2';

Q77. Answer: (d) UX-QR

The logic follows here,

OR-KM,

SV-OQ,

QT-MO,

UX-QR,

Therefore, the letter-cluster pair that is different from the others is UX-QR.

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Hence, the correct answer is 'Option 4'.

Q78. Answer: (c) 5

The logic followed here is,

Therefore, the code for the letter S is 5.

Hence, the correct answer is "option 3".

Q79. Answer: (b) Three

Given: Seven people H, I, J, K, W, Y and Z are sitting around a circular table facing the center of the table

1. Z sits third to the right of I.
2. J sits third to the left of K.
3. Z sits to the immediate right of J.
4. Y is not an immediate neighbor of J.
5. Only one person sits between H and W when counted from the left of W.

The Final Arrangement is,

There are three people (K, H, and I) sitting between them.

Hence, the correct answer is "Option 2 "

Q80. Answer: (a) 5

Given: (Left) 3 5 8 9 7 4 1 5 9 6 2 3 6 5 8 7 4 1 5 9 8 6 3 2 1 5 4 7 8 4 1 2 5 9 8 7 4 1 5 6 2 3 9 8 7 8 9 7 5 1(Right)

Required Condition: Perfect Cube - Odd digit - Even Digit

(Left) 3 5 8 9 7 4 1 5 9 6 2 3 6 5 8 7 4 1 5 9 8 6 3 2 1 5 4 7 8 4 1 2 5 9 8 7 4 1 5 6 2 3 9 8 7 8 9 7 5 1(Right)

8 7 4, 1 5 4, 8 7 4, 1 5 6, 8 7 8

Hence, the correct answer is 'Option 1'.

Q81. Answer: (b) 2 and 3

BODMAS Table:

On interchanging each option one by one,

1) 2 and 6L.H.S = (28 ÷ 4) × 2 + 14 × 3 − 7 × 9 + (66 ÷ 6) + 38

= 7 × 2 + 42 − 63 + 11 + 38

= 14 + 42 − 63 + 11 + 38

= 56 − 63 + 11 + 38

= −7 + 11 + 38

= 42 ≠ 67 (R.H.S)

Option 2) 2 and 3

(28÷4) × 6 + 14 × 2 − 7 × 9 + (66 ÷ 3) + 38 = 67

L.H.S = 7 × 6 + 14 × 2 − 63 + 22 + 38

= 42 + 28 − 63 + 22 + 38

= 70 − 63 + 22 + 38

= 7 + 22 + 38

= 67 = 67 (R.H.S)

3) (28 ÷ 4) × 3 + 14 × 6 − 7 × 9 + (66÷2) + 38 = 67

L.H.S = 7 × 3 + 14 × 6 − 63 + 33 + 38

= 21 + 84 − 63 + 33 + 38

= 105 − 63 + 33 + 38

= 42 + 33 + 38

= 113 ≠ 67 (R.H.S)

4) 4 and 7

L.H.S = (28÷7) × 6 + 14 × 3 − 4 × 9 + (66 ÷ 2) + 38 = 67

= 4 × 6 + 42 − 36 + 33 + 38

= 24 + 42 − 36 + 33 + 38

= 66 − 36 + 33 + 38

= 30 + 33 + 38

= 101 ≠ 67 (R.H.S)

Since LHS = RHS, the equation is correct after interchanging 2 and 3.

Hence, the correct answer is "option 2"

Q82. Answer: (c) Four

Given:Seven boxes, B, C, D, E, Q, R and S, are kept one over the other, but not necessarily in the same order.

1. Only one box is kept above E.
2. B is kept immediately above E.
3. Only two boxes are kept between C and E.

Position	Box
7	B
6	E
5	
4	
3	C
2	
1	

1. Only Q is kept immediately below S.
2. D is kept at some place below B and at some place above R.

Final Arrangement:

7	B
6	E
5	D
4	R
3	C
2	S
1	Q

There are four boxes (E, D, R, and C) kept between B and S.

Hence, the correct answer is 'Option 3'.

Q83. Answer: (d) WU -13

The logic follows here,

MJ 8 is related to OM -6,

RW 12 is related to TZ -2,

Applying to the same logic, UR 1 related to WU −13,

Thus, UR 1 is related to WU −13.

Hence, the correct answer is 'Option 4'.

Q84. Answer: (c) 1

The logic followed here is.

Therefore, the code for T is 1.

Hence, the correct answer is "option 3"

Q85. Answer: (d) 29

BODMAS Table:

According to the question, the symbols represent:

A	B	C	D

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÷	×	•	–

Given Equation: 81 A 3 D 7 B 2 C 16 = ?

After replacement and following BODMAS rule,

= 81 ÷ 3 − 7 × 2 + 16

= 27 − 7 × 2 + 16

= 27 + 16 − 14

= 43 − 14

= 29

Hence, the correct answer is "option 4"

Q86. Answer: (c) QNS

The logic followed here is,

The resulting term is QNS.

Hence, the correct answer is "option 3"

Q87. Answer: (a) LQG : FUH

The logic followed in this pattern is a series of alphabetical shifts based on the positional values of the letters.

For 'QVI' related to 'KZJ':

Q(17)	**V(22)**	**I(9)**
−6 ↓	+4 ↓	+1 ↓
K(11)	Z(26)	J(10)

For 'USH' related to 'OWI':

U(21)	**S(19)**	**H(8)**
−6 ↓	+4 ↓	+1 ↓
O(15)	W(23)	I(9)

Applying the same logic to 'LQG':

L(12)	**Q(17)**	**G(7)**
−6 ↓	+4 ↓	+1 ↓
F (6)	U (21)	H (8)

Thus, LQG is related to FUH.

Hence, the correct answer is 'Option 1'.

Q88. Answer: (c) Brother's daughter

Preparing the family tree diagram by using the following symbols:

Let us first decode the given symbols and then draw a family tree.

Symbol	**%**	**€**	**=**	**?**
Meaning	Sister	Son	Father	Daughter

Given: B % C ? O € P = X

Therefore, B is the daughter of O, and O is the brother of X (since both are children of P and O is male). Thus, B is the Brother's daughter of X.

Hence, the correct answer is 'Option 3'.

Q89. Answer: (c) JLH

The logic followed here is,

Similarly, the next term in the series is JLH.

Hence, the correct answer is "option 3"

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Q90. Answer: (d) Mother

BODMAS Table:

Let us first decode the given symbols and then draw a family tree.

Symbol	(Space)	@	#	&
Meaning	Father	Sister	Wife	Brother

Given: L # I G @ H & T

From the family tree, it is evident that I is the father of G, H, and T. Since L is the wife of I, she is the mother of all his children.

Therefore, L is the Mother of T.

Hence, the correct answer is 'Option 4'.

Q91. Answer: (d) ZB – PH

The logic followed here is,

MO - EU,

UW - MC,

SU - KA,

ZB - PH,

Therefore, the letter-cluster pair that is different from the others is ZB - PH.

Hence, the correct answer is 'Option 4'.

Q92. Answer: (c) Only conclusion (I) follows

The least possible Venn diagram for the given statements is:

(I) Some dreamers are poets. - Follows

(all writers are dreamers and some poets are writers, the poets who are writers must also be dreamers)

(II) All poets are dreamers. - Doesn't follows

(Some poets are dreamers, all writers are dreamers. All poets are dreamers is may be possible but not definite. Hence, it is false)

Only conclusion (I) follows

Hence, the correct answer is " Option 3"

Q93. Answer: (a) (62, 31, 45)

The logic followed here is:

Logic: Second Number = First Number ÷ 2; Third Number = Second Number + 14

For the first set (14, 7, 21)

=> 14 ÷ 2 = 7

=> 7 + 14 = 21.

For the second set (56, 28, 42)

=> 56 ÷ 2 = 28

=> 28 + 14 = 42.

Applying the same logic to the options

Checking Option 1: (62, 31, 45)

=> 62 ÷ 2 = 31

=> 31 + 14 = 45.

Hence, the correct answer is 'Option 1'.

Q94. Answer: (b) Three

Given series: (Left) 9 6 3 1 8 7 2 9 5 6 1 4 7 5 3 4 5 6 2 6 8 7 2 3 7 6 5 8 (Right)

Required Conditions: Perfect square, Even digits, Odd digit

(Left) 9 6 3 1 8 7 2 9 5 6 1 4 7 5 3 4 5 6 2 6 8 7 2 3 7 6 5 8 (Right)

(963) (187) (147)

So, the total count of such even digits satisfying the given conditions is: 3.

Hence, the correct answer is 'Option 2'.

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Q95. Answer: (d) 2^(nd)

The logic followed here is:
Total number of students in the row = 15
Position of Yusuf from the right end = 10^(th)
Position of Yusuf from the left end = (Total number of students − Position from the right end) + 1
= 15 − 10 + 1
= 6^(th)
Since the students are facing North, Suman is 4^(th) to the left of Yusuf, which means Suman is closer to the left end of the row.
Position of Suman from the left end = Position of Yusuf from the left end − 4
= 6 − 4
= 2^(nd)
Hence, the correct answer is 'Option 4'.

Q96. Answer: (d) One

Given: Av, Bg, Ck, Dq, Et, Fx and Gp are sitting around a circular table, facing the centre.
1. Bg sits second to the right of Av.
2. Gp sits second to the left of Av.
3. Dq sits third to the right of Gp.
4. Ck sits to the immediate right of Fx.
The Final Arrangement is,
Only one person, sits between them.
Hence, the correct answer is 'Option 4'.

Q97. Answer: (b) 12

BODMAS Table:

Alphabet	A	B	C	D
Sign	•	−	×	÷

Given expression: 25 A 51 D 3 B 6 C 5
Replacing the letters and according to the BODMAS rule
= 25 + (51 ÷ 3) − 6 × 5
= 25 + 17 − 6 × 5
= 25 + 17 − 30
= 42 − 30
= 12
Hence, the correct answer is "Option 2"

Q98. Answer: (a) Three

Given series: (Left) 7 5 9 2 7 9 4 1 5 1 7 8 3 2 8 4 1 2 3 8 2 7 9 (Right)
Required Condition : Odd Digit − Odd Digit − Even Digit.
(Left) 7 5 9 2 7 9 4 1 5 1 7 8 3 2 8 4 1 2 3 8 2 7 9 (Right)
5 9 2 7 9 4 1 7 8
So, there are a total of three such odd digits.
Hence, the correct answer is 'Option 1'.

Q99. Answer: (d) 52nd

The logic followed here is:
Total number of students in the row = 122
Position of Ccd from the right end = 54^(th)
Vks is 17^(th) to the left of Ccd.
Position of Vks from the right end = Position of Ccd from the right end + 17
= 54 + 17 = 71^(th)
Position of Vks from the left end = (Total number of students − Position of Vks from the right end) + 1

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= (122 − 71) + 1
= 51 + 1
= 52^(nd)
Hence, the correct answer is 'Option 4'.

Q100. Answer: (c) Both conclusions (I) and (II) follow

The least possible Venn diagram for the given statements is:
(I) Some monks are chairs. - Follows (All chair are monks and some chairs are monk. Some monks are chair)
(II) All tigers are monks - Follows (All tigers are chairs.All chairs are monks.Hence, All tigers are monks is true)
Both conclusions (I) and (II) follow.
Hence, the correct answer is " Option 3"

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