RRB NTPC (UG) CBT-I Official Paper (Held On 13 Jun, 2026 Shift 2) (Previous Year Paper)

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MATHEMATICS

Q1. The third proportional to 75 and 45 is the same as the fourth proportional to 10, 5x and 6x. Find the value of x.

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

Q2. 2 men and 8 women can complete a piece of work in 13 days, and 3 men and 19 women can complete the same work in 8 days. The work of how many women is equivalent to that of one man?

(a) 23
(b) 29
(c) 25
(d) 24

Q3. The price of an article increases by 25%, then decreases by 20%, and finally increases by 15%. What is the overall percentage change in the price?

(a) 10%
(b) 15%
(c) 20%
(d) 25%

Q4. A cube is melted and recast into a cuboid whose dimensions are in the ratio 4:5:8. If the height of the cuboid is 12 cm, then the edge of the original cube is (correct to 2 decimal places)

(a) 15.34 space cm
(b) 9.44 space cm
(c) 12.12 space cm
(d) 8.14 space cm

Q5. A dealer buys an article marked at 1800 after successive discounts of 25% and 62/3 %. Find the cost price of the article to the dealer.

(a) Rs. 1260
(b) Rs. 1275
(c) Rs. 1250
(d) Rs. 1290

Q6. Two alloys A and B contain copper and zinc in the ratio 3:4 and 5:9, respectively. If equal weights of both alloys are melted together to form a new alloy, what is the ratio of copper to zinc in the new alloy?

(a) 8:13
(b) 12:19
(c) 9:16
(d) 11:17

Q7. In a division sum, the divisor is 2 times the quotient and 3 times the remainder. If the remainder is 10, what is the dividend?

(a) 456
(b) 464
(c) 465
(d) 460

Q8. From a regular octagon of side 4 units, a largest rectangle is cut out. From the remaining pieces, two largest rectangles are cut out. The remaining area of the octagon is _____ square units.

(a) 32
(b) 24
(c) 8
(d) 16

Q9. A sum of money earns Rs. 2,400 as simple interest in 2 years at 12% per annum. Find the sum.

(a) Rs. 10,000
(b) Rs. 18,000
(c) Rs. 12,000
(d) Rs. 24,000

Q10. A milkman adds two litres of water to every eight litres of milk and sells it at 50% more than his cost price of milk. Find the profit percentage of the milkman.

(a) 87.5%
(b) 68.5%
(c) 50%
(d) 75%

Q11. Three numbers are in the ratio 17 : 5 : 11, and their LCM is 3740. Their HCF is:

(a) 14
(b) 4
(c) 2
(d) 47

Q12. If a recipe requires ingredients in the ratio 1:2 and you have 3 cups of the first ingredient, how many cups of the second ingredient should you use?

(a) 6
(b) 4
(c) 8
(d) 3

Q13. A shopkeeper marks the price of a washing machine 40% above its cost price. He offers a 25% discount on the marked price to attract customers. If the final selling price of the washing machine is Rs. 21,000, what was its cost price?

(a) Rs. 20,000
(b) Rs. 16,000
(c) Rs. 14,000
(d) Rs. 15,000

Q14. Find the value of m which satisfies

(28/8)^(17) ×(8/28)^(20) ×(28/8)³=(8/28)^(9 m+14)

(a) -13/9
(b) -7/9
(c) -14/9
(d) -11/9

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Q15. Simplify:

(sin A cos (90° - A))/(cot (90° + A) cos (180° + A))

(a) – sinA
(b) sinA
(c) cosA
(d) – cosA

Q16. If the price of a shirt increases from Rs. 400 to Rs. 500, what is the percentage increase in the price?

(a) 15%
(b) 10%
(c) 25%
(d) 30%

Q17. Simplify the following expression: (3/4) + 0.25 × 2

(a) 1.00
(b) 1.50
(c) 1.25
(d) 1.75

Q18. Lata walks from home to the market, 20 km away, at 10 km/h. She stays there for 1 hour for shopping and returns home by an e-rickshaw at 20 km/h. Find the average speed for the whole trip.

(a) 9 km/h
(b) 6 km/h
(c) 8 km/h
(d) 10 km/h

Q19. Evaluate $22^3 + (-13)^3 + (-9)^3$

(a) 7730
(b) 7722
(c) 7472
(d) 7604

Q20. A shop sold 5 types of items over a week: 120, 150, 110, 130, and 140 units respectively. After receiving a return of 10 units from the first item, what is the new arithmetic mean (in units) of items sold?

(a) 124
(b) 122
(c) 126
(d) 128

Q21. Simplify: $9^2 + \sqrt{4}^2 - 10 \times \sqrt{81} - 15$

(a) -10
(b) -21
(c) -20
(d) -12

Q22. A and B can do a piece of work in 12 days and 36 days, respectively. Both work for 2 days and then A leaves. How long (in days) will B take to complete the remaining work?

(a) 28
(b) 29
(c) 27
(d) 30

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Q23. In a division sum, the divisor is 9 times the quotient and 3 times the remainder. If the remainder is 42, what is the dividend?

(a) 1809
(b) 1808
(c) 1803
(d) 1806

Q24. During a sale, 50% of the goods are sold at 37% profit, 30% of the remaining goods are sold at 26% profit and the still remaining goods are sold at a loss of 24%. If there is an overall profit of x%, then what is the value of x?

(a) 14
(b) 13.5
(c) 14.5
(d) 15

Q25. A sum of money at compound interest, compounded annually grows to Rs. 24000 in 2 years and Rs. 28800 in 3 years. Find the annual rate of interest.

(a) 10%
(b) 25%
(c) 15%
(d) 20%

Q26. A dealer of stationery items buys two types of pens, named Rajat Pen and Naveen Pen. The cost of 4 Rajat Pens and 6 Naveen Pens together is Rs. 540. The cost of one Naveen Pen is Rs. 15 more than the cost of one Rajat Pen. What is the cost of one Rajat Pen?

(a) Rs. 50
(b) Rs. 45
(c) Rs. 42
(d) Rs. 48

Q27. If a car covers a distance of 150 km at a speed of 50 km/h, how much time does it take to complete the journey?

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

Q28. The monthly incomes (in Rs. thousands) of ten employees are 35, 40, 38, 50, 46, 42, 39, 37, 41, and 44. What is the median income of the employees (in Rs. thousands)?

(a) 40.5
(b) 42
(c) 40
(d) 41

Q29. A metallic sphere of radius 6 units is melted and recast into 27 smaller identical spheres. Find the ratio of the surface area of the larger sphere to the sum of the surface areas of all the smaller spheres.

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

Q30. A school teacher observes that 4 years ago, her age was three times the age of her daughter at that time. 8 years from now, the teacher's age will be twice her daughter's age. What is the present age of the teacher?

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

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GENERAL AWARENESS

Q31. Which type of unemployment is caused by a decline in aggregate demand during economic downturns?

(a) Structural
(b) Voluntary
(c) Cyclical
(d) Seasonal

Q32. Article 22 provides safeguards to arrested or detained individuals under which two detention categories?

(a) Civil and military
(b) Punitive and preventive
(c) Judicial and executive
(d) Temporary and permanent

Q33. Which socio-economic condition contributed to the prolonged Mappila uprisings?

(a) Harsh land laws and landlord oppression in the Malabar region.
(b) Disruption of caravan trade routes linking Mysore and Malabar.
(c) Enforcement of new fishing bans affecting coastal settlements.
(d) Taxation of pepper exports restricting maritime activities.

Q34. Dharmapala, the Pala ruler, is credited with founding which of the following famous universities near Bhagalpur in Bihar?

(a) Odantapuri University
(b) Vallabhi University
(c) Nalanda University
(d) Vikramashila University

Q35. Dr. BR Ambedkar described Directive Principles of State Policy as _____.

(a) a novel feature
(b) a fundamental feature
(c) an inalienable feature
(d) an essential feature

Q36. Who among the following is credited with the discovery of the law of conservation of mass?

(a) Joseph Priestley
(b) Antoine Lavoisier
(c) John Dalton
(d) Dmitri Mendeleev

Q37. When fats react with sodium hydroxide to produce soap and glycerol, the reaction is classified as:

(a) Precipitation reaction
(b) Combustion reaction
(c) Fermentation reaction
(d) Saponification reaction

Q38. Which of the following is NOT one of the merged schemes under Vigyan Dhara?

(a) Research and Development
(b) Science and Technology Institutional and Human Capacity Building
(c) Innovation, Technology Development and Deployment
(d) National Education Policy Implementation

Q39. Provision for “just and humane conditions of work and maternity relief” under the Directive Principle of State Policy (DPSP) is contained in:

(a) Article 47
(b) Article 41

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(c) Article 43
(d) Article 42

Q40. Which of the following is listed as an effect of global warming?
(a) Decrease in sea levels worldwide
(b) Permanent cooling of ocean surface waters
(c) Melting of glaciers and flooding of coastal areas
(d) Reduction in atmospheric temperature

Q41. Most of the route of the Orient Express (Trans-Continental Railway Route) majorly lies in which continent?
(a) Asia
(b) North America
(c) Europe
(d) South America

Q42. Which of the following executive powers is exercised by the President of India?
(a) Conducting elections to Parliament
(b) Deciding the tenure of the Governors
(c) Appointing the Prime Minister and, on his advice, other Union Ministers
(d) Appointing judges of High Courts and framing the rules of procedure of the Supreme Court

Q43. Vasco Da Gama reached Kappad near Calicut on which date to establish trade relations with Indian rulers?
(a) 20 May 1498
(b) 10 June 1495
(c) 14 April 1492
(d) 20 November 1500

Q44. The new classification system for economic activities in India termed National Industrial Classification 2025 (NIC-2025) was prepared by which national body?
(a) National Statistical Commission (NSC)
(b) Reserve Bank of India (RBI)
(c) Ministry of Statistics and Programme Implementation (MoSPI)
(d) NITI Aayog

Q45. On 17 November 2025 which of the following institute has been selected to host the Centre of Excellence in Quantum AI and Computing?
(a) Indian Institute of Technology, Dharwad
(b) Indian Institute of Information Technology, Dharwad
(c) Indian Institute of Technology, Roorkee
(d) Indian Institute of Science, Bengaluru

Q46. In 2025, which wildlife sanctuary in Madhya Pradesh was notified as a tiger reserve?
(a) Kanha Sanctuary
(b) Pench Wildlife Sanctuary
(c) Omkareshwar Sanctuary
(d) Panna Sanctuary

Q47. Which of the following is the specialized kind of cell division that reduces the chromosome number by half, resulting in the production of haploid daughter cells?
(a) Translocation
(b) Fertilization
(c) Meiosis
(d) Mitosis

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Q48. Which country topped the World Happiness Index 2025?

(a) Finland
(b) Denmark
(c) Norway
(d) Sweden

Q49. Jnanadeva's renowned work Bhavarthadipika (Jnaneshwari) serves as an elaborate commentary on which of the following scriptures?

(a) Upanishads
(b) Vishnu Purana
(c) Bhagavad Gita
(d) Brahma Sutras

Q50. In the Windows 11 operating system, when working with multiple open applications, pressing the Alt key combined with the Tab key is the fastest way to _____ between the running programs.

(a) close
(b) switch
(c) save
(d) open

Q51. Which statement correctly describes the nature of Kumaragupta I's rule?

(a) His rule witnessed continuous territorial expansion across central India.
(b) His reign was marked by repeated internal rebellions, weakening Gupta authority.
(c) His reign faced the initial emergence of the Pushyabhutis, threats without major disruption.
(d) His reign focused mainly on consolidation and prosperity of the Gupta realm.

Q52. A file with the extension ".docx" is usually created by:

(a) MS Paint
(b) Calculator
(c) MS Word
(d) Notepad

Q53. What is the name of the world's tallest statue dedicated to Sardar Vallabhbhai Patel?

(a) Statue of Unity
(b) Statue of Equity
(c) Statue of Equality
(d) Statue of Liberty

Q54. Under Article 226, High Courts can issue writs to which authorities within their territorial jurisdiction?

(a) Any person or authority or government
(b) Only State Government
(c) Only Union Government
(d) Only private companies

Q55. Which outcome correctly reflects the impact of the Battle of Wandiwash on European rivalry in India?

(a) British control weakened as their forces retreated from key southern ports.
(b) British dominance increased as French military influence collapsed permanently.
(c) The French authority expanded through the successful seizure of British territories.
(d) French supremacy grew due to new alliances with Deccan-based rulers.

Q56. The rise of vernacular languages in modern Indian literature was mainly due to _____.

(a) Increase in oral storytelling traditions in various Indian languages
(b) Decline of regional kingdoms due to Western colonization
(c) British colonial education and printing technology
(d) Printing of Mughal court documents in regional languages

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Q57. According to the Census 2011, which of the following States and Union Territories recorded the lowest sex ratio in India?

(a) Haryana
(b) Chandigarh
(c) Delhi
(d) Daman & Diu

Q58. According to the Ministry of Coal Annual Report 2024–25, which state held the highest proportion of lignite reserves in India as of April 2024?

(a) Tamil Nadu
(b) Jharkhand
(c) Rajasthan
(d) Gujarat

Q59. Which of the following Indian states is NOT crossed by the Tropic of Cancer?

(a) Madhya Pradesh
(b) Gujarat
(c) Odisha
(d) West Bengal

Q60. Which country joined as the 9th member of New Development Bank by BRICS in 2025?

(a) Vietnam
(b) Myanmar
(c) Algeria
(d) Brunei

Q61. Which of the following is not an application software?

(a) Microsoft Publisher
(b) Operating System
(c) Microsoft Excel
(d) Adobe Photoshop

Q62. In pre-independence India, who among the following first discussed the concept of the poverty line in his book Poverty and Un-British Rule in India?

(a) Ravindra Nath Tagore
(b) Mahatma Gandhi
(c) Dadabhai Naoroji
(d) Jawaharlal Nehru

Q63. In the context of Lok Adalats, which statement is correct?

(a) Lawyers are mandatory in every case presented to Lok Adalat
(b) Formal procedures and strict rules of evidence are followed
(c) Proceedings are informal, flexible, and less technical
(d) Only Supreme Court judges can preside over Lok Adalat sessions

Q64. Which of the following is no more a stock exchange in the country?

(a) National Stock Exchange of India Ltd.
(b) National Commodity & Derivatives Exchange Ltd.
(c) Multi Commodity Exchange of India Ltd.
(d) Delhi Stock Exchange Ltd.

Q65. Which high-altitude wildlife area was declared India's first "cold desert biosphere reserve" under UNESCO in 2025?

(a) Ladakh Wildlife Division
(b) Nubra Valley Reserve
(c) Spiti Valley

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(d) Kargil Wildlife Sanctuary

Q66. A computer lab server handles login requests from many students at the same time without confusion.

Which characteristic does this scenario mainly highlight?

(a) Multitasking and reliability
(b) Versatility only
(c) Portability
(d) Lack of memory

Q67. The river Kosi frequently shifts its channel in the plains mainly because:

(a) It traverses a long stretch of tectonic rifted lowland
(b) It carries huge quantities of sediment from the Himalayas
(c) Large upstream dams constantly modify their natural flow
(d) Its flow is sustained only by seasonal monsoon rain

Q68. 'Playing It My Way' is the autobiography of which of the following sportspersons?

(a) Mohammed Shahid
(b) Sachin Tendulkar
(c) Subhadra Pradhan
(d) Debashish Mishra

Q69. Which type of surface absorbs more heat and is therefore preferred during winters?

(a) White surface
(b) Shiny surface
(c) Dark-coloured surface
(d) Light-coloured surface

Q70. Cricket player Suzie Bates, who became the first woman to play 350 international matches during the 2025 Women's ODI World Cup, belongs to which country?

(a) South Africa
(b) England
(c) Australia
(d) New Zealand

GENERAL INTELLIGENCE AND REASONING

Q71. 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) 5 4 5 6 5 8 5 1 7 6 3 9 7 6 4 1 7 6 4 5 7 6 4 7 7 6 (Right)

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

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

Q72. Seven boxes, G, H, I, L, M, N and O, are kept one over the other, but not necessarily in the same order.

Only three boxes are kept below H. O is kept immediately above H. I is kept immediately above N. Only G is kept above L. M is not kept at the lowermost position.

How many boxes are kept between M and G?

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

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Q73. Each vowel in the word CORRECT is changed to the letter immediately following it in the English alphabetical order and each consonant is changed to the letter immediately preceding it in the English alphabetical order.

Which of the following letters will be fourth from the right in the new group of letters thus formed?

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

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

63 68 ? 93 113 138

(a) 85
(b) 88
(c) 83
(d) 78

Q75. In a certain code language, 'kin hair calm' is coded as 'nl ix wp' and 'guest calm iron' is coded as 'ag lj ix'.

How is 'calm' coded in the given language? (All codes are two-letter codes.)

(a) nl
(b) ix
(c) wp
(d) ag

Q76. Six boxes F, G, H, I, J and C are kept one over the other but not necessarily in the same order. Only four boxes are kept between H and I. Only H is kept above J. Only two boxes are kept between J and F. C is kept immediately above G. Which box is kept fourth from the bottom?

(a) F
(b) C
(c) G
(d) J

Q77. Vikash starts from Point A and drives 14 km towards the south. He then takes a right turn, drives 17 km, turns right and drives 19 km. He then takes a right turn and drives 18 km. He takes a final right turn, drives 5 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90-degree turns only unless specified.)

(a) 3 km to the east
(b) 1 km to the west
(c) 4 km to the east
(d) 2 km to the west

Q78. Each letter in the word CENTURY is changed to the letter immediately following it in the English alphabetical order and then all the letters thus formed are arranged in alphabetical order. Which of the following letters will be fifth from the left in the new group of letters thus formed?

(a) V
(b) U
(c) O
(d) Z

Q79. Seven people P1, P2, P3, P4, P5, P6 and P7 are sitting around a circular table facing towards the centre of the table. P2 sits to the immediate right of P6. P5 is sitting immediately between P4 and P3. P2 sits second to left of P4. P1 sits third to left of P7. How many people are sitting between P1 and P7 when checked from right of P7?

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

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Q80. 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?

36 A 3 C 21 D 12 B 2 = ?

(a) 18
(b) 4
(c) 9
(d) 13

Q81. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

CMZ 3 HRE 6 MWJ 9 RBO 12 ?

(a) KDT 15
(b) SPR 16
(c) WGT 15
(d) NDY 18

Q82. In a certain code language,

A ! B means ‘A is the wife of B’,

A > B means ‘A is the sister of B’,

A = B means ‘A is the father of B’ and

A − B means ‘A is the son of B’.

How is N related to E if ‘N > U − R ! S = E’?

(a) Sister's daughter
(b) Daughter's sister
(c) Sister
(d) Daughter

Q83. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

UWS OQM IKG CEA ?

(a) WZT
(b) WXZ
(c) WXT
(d) WYU

Q84. 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.)

(13, 33, 5)

(6, 40, 19)

(a) (20, 37, 12)
(b) (8, 46, 22)
(c) (9, 39, 15)
(d) (17, 33, 10)

Q85. G is the sister of Y. Y is the brother of J. M is the father of W. W is the son of J. How is G related to M?

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

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Q86. Based on the English alphabetical order, three of the following four are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) GFI
(b) BAD
(c) NMP
(d) VUY

Q87. LPBF is related to QUGK in a certain way based on the English alphabetical order. In the same way, FJVZ is related to KOAE. To which of the following options is UYKO related, following the same logic?

(a) ZOPT
(b) ZDTP
(c) ZDPT
(d) ZTPO

Q88. TJ 12 is related to VF 4 in a certain way. In the same way, HE 10 is related to JA 2. To which of the following is DR 5 related, following the same logic?

(a) FN -3
(b) HJ 9
(c) JI -7
(d) VH -6

Q89. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

JUC55, OZH67, TEM79, YJR91, ?

(a) LOW103
(b) DOW103
(c) DEW103
(d) DOX103

Q90. If ‘A’ stands for ‘÷’, ‘B’ stands for ‘×’, ‘C’ stands for ‘+’ and ‘D’ stands for ‘−’, what will come in place of the question mark ‘?’ in the following equation?

10 A 2 C 35 B 2 = ? C 20

(a) 45
(b) 50
(c) 35
(d) 55

Q91. Seven people, Manu, Neha, Ojas, Pritam, Rina, Sita and Tina, are sitting around a circular table, facing the centre. Rina sits second to the right of Tina and second to the left of Sita. Manu sits third to the left of Ojas and Manu is an immediate neighbour of Rina. Pritam sits second to the left of Manu. How many people sit between Sita and Tina, when counted from the left of Tina?

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

Q92. 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:

Some pickles are seeds.

All seeds are flowers.

Conclusions:

(I) Some pickles are flowers.

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(II) All flowers are seeds.

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

Q93. If 2 is added to each odd digit and 1 is subtracted from each even digit in the number 1528634, then what will be the sum of the digits that are second from the left and second from the right in the new number thus formed?

(a) 14
(b) 13
(c) 12
(d) 10

Q94. Select the pair which follows the same pattern as that followed by the two set of pairs given below. Both pairs follow the same pattern.

FI – HE – DG

LO –NK –JM

(a) CB - AD - EF
(b) OR - QN - RV
(c) PS - TW - VR
(d) KN - MJ - IL

Q95. 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 hens are shirts.

All cats are shirts.

Conclusions:

(I) Some hens are cats.

(II) Some shirts are cats.

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

Q96. Based on the alphabetical order, three of the following four are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) CAD
(b) IGK
(c) FDG
(d) KIL

Q97. 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) SU-KE
(b) DF-WP
(c) HJ-ZT
(d) UW-MG

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Q98. In a row of 214 students facing north, Rt is 164th from the left end. If Kl is 37th to the right of Rt, what is Kl's position from the right end of the line?

(a) 12th
(b) 13th
(c) 14th
(d) 11th

Q99. What should come in place of the '?' in the given series?

352 ? 88 44 22 11

(a) 164
(b) 178
(c) 176
(d) 160

Q100. In a certain code language, 'FILM' is coded as '6043' and 'LIME' is coded as '7304'. What is the code for 'E' in the given code language?

(a) 4
(b) 0
(c) 7
(d) 3

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) 3

Shortcut Trick

Third proportional of 75 and 45 = (45 × 45) ÷ 75 = 27

Fourth proportional of 10, 5x, and 6x = (5x × 6x) ÷ 10 = $3x^2$

Equating both: $3x^2 = 27 \Rightarrow x^2 = 9 \Rightarrow x = 3$

Therefore The correct answer is 3.

Alternate Method

Given:

First set of numbers: 75, 45 (to find Third Proportional)

Second set of numbers: 10, 5x, 6x (to find Fourth Proportional)

Formula Used:

1. Third proportional (c) of a and b is given by: $a/b = b/c \Rightarrow c = b^2/a$

2. Fourth proportional (d) of a, b, and c is given by: $a/b = c/d \Rightarrow d = (b \times c)/a$

Calculations:

=> Let the third proportional to 75 and 45 be 'c'.
=> c = (45 × 45) ÷ 75
=> c = 2025 ÷ 75 = 27
=> Let the fourth proportional to 10, 5x, and 6x be 'd'.
=> 10 / 5x = 6x / d
=> d = (5x × 6x) ÷ 10
=> d = $30x^2 \div 10 = 3x^2$
=> As per the question: c = d
=> $27 = 3x^2$
=> $x^2 = 9$
=> $x = \sqrt{9} = 3$
Therefore The correct answer is 3.
Additional Information
Mean Proportional
The mean proportional between two numbers a and b is $\sqrt{(a \times b)}$.
Continued Proportion
Three numbers a, b, c are said to be in continued proportion if a : b = b : c.
Compounded Ratio
For two ratios a : b and c : d, the compounded ratio is (a × c) : (b × d).

Q2. Answer: (d) 24

Shortcut Trick
Equate the total work by multiplying the number of days with the group efficiency.
13 × (2M + 8W) = 8 × (3M + 19W)
=> 26M + 104W = 24M + 152W
=> 26M − 24M = 152W − 104W
=> 2M = 48W
=> 1M = 24W
Therefore The correct answer is 24.
Alternate Method
Given: Group 1 (2 men + 8 women) takes 13 days. Group 2 (3 men + 19 women) takes 8 days.
Formula Used: Total Work = (Efficiency of Men + Efficiency of Women) × Number of Days

Person	Days	Total Work	Efficiency
Group 1 (2M + 8W)	13	104	8
Group 2 (3M + 19W)	8	13	

=> 2M + 8W = 8 => M + 4W = 4 => M = 4 − 4W — (Eq. 1)
=> 3M + 19W = 13 — (Eq. 2)
Substitute M from (Eq. 1) into (Eq. 2):
=> 3 × (4 − 4W) + 19W = 13
=> 12 − 12W + 19W = 13
=> 7W = 13 − 12 => 7W = 1
=> W = 1/7
Substitute W in (Eq. 1):
=> M = 4 − 4 × (1/7) = 4 − 4/7 = 24/7
=> Man : Woman ratio = (24/7) : (1/7) = 24 : 1
=> 1 Man = 24 Women
Therefore The correct answer is 24.
Additional Information
Man-Day Formula
If M1 men do W1 work in D1 days and M2 men do W2 work in D2 days, then (M1 × D1)/W1 = (M2 × D2)/W2.

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Efficiency and Time Relationship

Efficiency is inversely proportional to the time taken to complete a task. Efficiency × Time = Constant (Work).

Work and Wages

Wages are distributed in the ratio of the work done by each individual, which is the product of their efficiency and the time they worked.

Q3. Answer: (b) 15%

Shortcut Trick

Use the Multiplying Factor (MF) method for successive changes.

Net MF = 1.25 (25% increase) × 0.80 (20% decrease) × 1.15 (15% increase)

Net MF = (1.25 × 0.80) × 1.15 = 1.00 × 1.15 = 1.15

Overall change = (1.15 − 1) × 100 = 15%

Therefore The correct answer is 15%.

Alternate Method

Given:

First increase = 25%, Second decrease = 20%, Third increase = 15%

Formula Used:

Final Price = Initial Price × (1 ± r1/100) × (1 ± r2/100) × (1 ± r3/100)

=> Let the Initial Price of the article be 100.

=> After 25% increase, price = 100 + (25% of 100) = 125.

=> After 20% decrease, price = 125 − (20% of 125) = 125 − 25 = 100.

=> After 15% increase, price = 100 + (15% of 100) = 115.

=> Net percentage change = [(Final Price − Initial Price) / Initial Price] × 100

=> Net percentage change = [(115 − 100) / 100] × 100 = 15%.

Therefore The correct answer is 15%.

Additional Information

Net Successive Change Formula

For two successive percentage changes a% and b%, the net percentage change is given by the formula: (a + b + (ab/100))%.

Fractional Equivalence

Converting percentages to fractions (e.g., 25% = 1/4, 20% = 1/5) can often simplify complex successive change calculations.

Base Independence

The final percentage change in successive calculations is independent of the actual initial value of the quantity.

Q4. Answer: (d) 8.14 space cm

Shortcut Trick

Ratio of cuboid dimensions = 4 : 5 : 8.

Given height (8 units) = 12 cm => 1 unit = 1.5 cm.

Volume of cuboid = (4 × 1.5) × (5 × 1.5) × (8 × 1.5) = 6 × 7.5 × 12 = 540 cm^3.

Since Volume of Cube = Volume of Cuboid => $a^3 = 540$.

Edge a = $\sqrt[3]{540} \approx 8.14$ cm.

Therefore The correct answer is 8.14 cm.

Alternate Method

Given: Ratio of dimensions = 4 : 5 : 8, Height = 12 cm.

Formula: Volume of cuboid = Length × Breadth × Height; Volume of cube = $(Edge)^3$.

=> Let the dimensions of the cuboid be 4x, 5x, and 8x.

=> Given Height = 8x = 12 cm.

=> x = 12 ÷ 8 = 1.5 cm.

=> Length = 4 × 1.5 = 6 cm and Breadth = 5 × 1.5 = 7.5 cm.

=> Volume of Cuboid = 6 × 7.5 × 12 = 540 cm^3.

=> When a cube is melted to form a cuboid, their volumes remain equal.

=> Volume of Cube = 540 cm^3.

=> $(Edge)^3 = 540$.

=> Edge = 540^(1/3).
=> Since $8^3 = 512$ and $9^3 = 729$, the value is slightly more than 8.
=> $8.14 \times 8.14 \times 8.14 \approx 539.35 \approx 540$.
=> Edge ≈ 8.14 cm.
Therefore The correct answer is 8.14 cm.
Additional Information
Volume and Surface Area of Cube
Volume = a^3 and Total Surface Area = $6a^2$, where 'a' is the edge of the cube.
Volume of Cuboid
Volume = Length × Breadth × Height. Total Surface Area = 2(lb + bh + hl).
Recasting Rule
When one 3D shape is melted and recast into another, the total volume remains constant, provided there is no wastage.
Diagonal Length
Diagonal of a cube = $a\sqrt{3}$ and diagonal of a cuboid = $\sqrt{(l^2 + b^2 + h^2)}$.

Q5. Answer: (a) Rs. 1260

Shortcut Trick
Convert percentage discounts to fractions: 25% = 1/4 and 6(2/3)% = 1/15.
Multipliers for discounts: (1 − 1/4) = 3/4 and (1 − 1/15) = 14/15.
Effective Multiplier = 3/4 × 14/15 = 7/10.
Cost Price = 1800 × 7/10 = 180 × 7 = 1260.
Therefore The correct answer is Rs. 1260.
Alternate Method
Given:
Marked Price (MP) = Rs. 1800
First Discount = 25%
Second Discount = 6(2/3)% = 20/3%
Formula Used:
Selling Price = MP × (100 − d1)% × (100 − d2)%
=> Price after 1^(st) discount = 1800 − (25% of 1800)
=> Price after 1^(st) discount = 1800 − 450 = Rs. 1350
=> Price after 2^(nd) discount = 1350 − (20/3% of 1350)
=> 2^(nd) discount amount = (20/300) × 1350 = 1/15 × 1350 = Rs. 90
=> Final Cost Price (CP) to the dealer = 1350 − 90 = Rs. 1260
Therefore The correct answer is Rs. 1260.
Additional Information
Successive Discount Formula
For two successive discounts of a% and b%, the equivalent single discount is given by (a + b − (a × b)/100)%.
Marked Price and Selling Price
Selling Price = Marked Price × (100 − Discount%)/100. Discount is always calculated on the Marked Price.
Fractional Conversions
Using fractions like 6(2/3)% = 1/15 or 33(1/3)% = 1/3 can significantly speed up calculations in competitive exams.

Q6. Answer: (d) 11:17

Shortcut Trick
Total units in Alloy A = 3 + 4 = 7; Alloy B = 5 + 9 = 14.
To make weights equal, take LCM(7, 14) = 14 units for each alloy.
In A (14 units): Copper = 3 × 2 = 6, Zinc = 4 × 2 = 8.
In B (14 units): Copper = 5 × 1 = 5, Zinc = 9 × 1 = 9.
Final Ratio (Cu:Zn) = (6 + 5) : (8 + 9) = 11 : 17.
Therefore The correct answer is 11:17.
Alternate Method

Given:
Ratio of Copper to Zinc in Alloy A = 3 : 4
Ratio of Copper to Zinc in Alloy B = 5 : 9
Weights of both alloys are equal.
Let the weight of each alloy be 1 unit.
Quantity of Copper in Alloy A = 3/7
Quantity of Zinc in Alloy A = 4/7
Quantity of Copper in Alloy B = 5/14
Quantity of Zinc in Alloy B = 9/14
=> Total Copper in new alloy = 3/7 + 5/14
=> Total Copper = (6 + 5) / 14 = 11/14
=> Total Zinc in new alloy = 4/7 + 9/14
=> Total Zinc = (8 + 9) / 14 = 17/14
=> Required Ratio = (11/14) : (17/14)
=> Required Ratio = 11 : 17
Therefore The correct answer is 11:17.
Additional Information
Mixture of Multiple Alloys
When mixing 'n' alloys of equal weight, the final ratio is the sum of respective fractions: Σ(component_i / total_i).
Unequal Weight Mixing
If weights are in ratio m:n, multiply the component fractions of Alloy A by 'm' and Alloy B by 'n' before adding.
Rule of Alligation
Used to find the ratio in which two mixtures must be mixed to get a desired final concentration: (Higher value − Mean) / (Mean − Lower value).

Q7. Answer: (d) 460

Shortcut Trick
Remainder = 10
Divisor = 3 × 10 = 30
Quotient = 30 ÷ 2 = 15
Dividend = (30 × 15) + 10 = 460
Therefore The correct answer is 460.
Alternate Method
Given:
Remainder = 10
Divisor = 2 × Quotient
Divisor = 3 × Remainder
Formula Used:
Dividend = (Divisor × Quotient) + Remainder
=> Divisor = 3 × 10 = 30
=> 30 = 2 × Quotient => Quotient = 30 ÷ 2 = 15
=> Dividend = (30 × 15) + 10
=> Dividend = 450 + 10 = 460
Therefore The correct answer is 460.
Additional Information
Division Algorithm
The fundamental relation in arithmetic is Dividend = (Divisor × Quotient) + Remainder.
Remainder Rule
The remainder must always be a non-negative integer and strictly less than the divisor (0 ≤ Remainder < Divisor).
Perfect Divisibility
If a number is perfectly divisible by another, the remainder is always zero, meaning Dividend = Divisor × Quotient.

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Q8. Answer: (d) 16

Shortcut Trick

A regular octagon of side 4 units can be decomposed into a central square of area $4^2 = 16$, 4 rectangles of area $4 \times 2\sqrt{2}$, and 4 corner triangles.

The largest rectangle (central strip) consists of the central square and two rectangles.

From the remaining 2 rectangles and 4 triangles, the two largest rectangles cut out are simply the two rectangles themselves.

The remaining area consists of the 4 corner right-angled triangles.

Area of 4 corner triangles = $2 \times (\text{side})^2 \div 2 = (\text{side})^2 = 4^2 = 16$ square units.

Therefore The correct answer is 16 square units.

Alternate Method

Given:

Side of the regular octagon (a) = 4 units

Formula Used:

Area of regular octagon = $2 \times (1 + \sqrt{2}) \times a^2$

Corner triangle leg (x) = $a / \sqrt{2}$

Calculations:

=> Area of Octagon = $2 \times (1 + \sqrt{2}) \times 4^2 = 32(1 + \sqrt{2}) = 32 + 32\sqrt{2}$

=> Corner triangle leg (x) = $4 / \sqrt{2} = 2\sqrt{2}$

=> Largest Rectangle (R1) = $a \times (a + 2x) = 4 \times (4 + 4\sqrt{2}) = 16 + 16\sqrt{2}$

=> Remaining Area after 1st cut = $(32 + 32\sqrt{2}) - (16 + 16\sqrt{2}) = 16 + 16\sqrt{2}$

=> This remaining area consists of two trapezoidal caps. Each cap area = $8 + 8\sqrt{2}$

=> Largest rectangle from each cap (R2) = $a \times x = 4 \times 2\sqrt{2} = 8\sqrt{2}$

=> Total area of two rectangles cut from pieces = $2 \times 8\sqrt{2} = 16\sqrt{2}$

=> Final remaining area = $(16 + 16\sqrt{2}) - 16\sqrt{2} = 16$

Therefore The correct answer is 16 square units.

Additional Information

Regular Octagon Properties

Each internal angle is 135°, and the total area can be seen as the area of a bounding square $(a + 2x)^2$ minus four corner triangles of area $x^2/2$ each.

Largest Inscribed Rectangle

The largest rectangle inscribed in a regular octagon has an area exactly equal to half the area of the octagon, given by Area = $a^2(1 + \sqrt{2})$.

Pythagoras in Octagons

The corner triangles formed when an octagon is inscribed in a square are isosceles right-angled triangles where the hypotenuse is the side of the octagon (a) and legs are $x = a/\sqrt{2}$.

Q9. Answer: (a) Rs. 10,000

Shortcut Trick

The effective rate for Simple Interest is calculated as Rate × Time.

Effective interest percentage = 12% × 2 = 24%.

Given that 24% of the Sum is equivalent to Rs. 2,400.

Sum (Principal) = (2400 ÷ 24) × 100 = 100 × 100 = Rs. 10,000.

Therefore The correct answer is Rs. 10,000.

Alternate Method

Given:

Simple Interest (SI) = Rs. 2,400

Rate (R) = 12% per annum

Time (T) = 2 years

Formula Used:

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

Calculations:

=> 2400 = (P × 12 × 2) ÷ 100

=> 2400 = (P × 24) ÷ 100

=> 2400 × 100 = 24P

=> 240,000 = 24P

=> P = 240,000 ÷ 24

=> P = 10,000

Therefore The correct answer is Rs. 10,000.

Additional Information

Amount in Simple Interest

The total sum of money after a period is called the Amount (A), which is the sum of the Principal (P) and Simple Interest (SI): A = P + SI.

Principal Formula

To find the Principal when SI, Rate, and Time are known: P = (100 × SI) ÷ (R × T).

SI vs CI for 1st Year

For the first year, if the interest is calculated annually, the Simple Interest and Compound Interest on a specific sum at the same rate are always equal.

Q10. Answer: (a) 87.5%

Shortcut Trick

Ratio of Milk to Water = 8 : 2 = 4 : 1. Total Quantity = 5 units.

Total CP = Quantity of Milk × CP = 4 × 1 = 4 units.

Total SP = Total Quantity × (CP + 50% increase) = 5 × 1.5 = 7.5 units.

Profit = 7.5 − 4 = 3.5 units.

Profit % = (3.5 ÷ 4) × 100 = 87.5%.

Therefore The correct answer is 87.5%.

Alternate Method

Given:

Milk quantity = 8 litres | Water added = 2 litres | SP = 50% more than CP.

Let the Cost Price (CP) of 1 litre of milk = Rs. 100.

=> Total CP of 8 litres of milk = 8 × 100 = Rs. 800.

=> Total quantity of the mixture = 8 + 2 = 10 litres.

=> Selling Price (SP) per litre = 100 + 50% of 100 = Rs. 150.

=> Total Selling Price (SP) = 10 × 150 = Rs. 1500.

=> Profit = Total SP − Total CP = 1500 − 800 = Rs. 700.

=> Profit Percentage = (Profit ÷ Total CP) × 100

=> Profit % = (700 ÷ 800) × 100

=> Profit % = 87.5%

Therefore The correct answer is 87.5%.

Additional Information

Dishonest Dealer Concept

Profit % = [(True Value − Error) ÷ Error] × 100 is used when the weight is manipulated, but for mixture problems, use total CP and total SP.

Successive Change Formula

Total change % = a + b + (ab ÷ 100), where 'a' is the percentage increase due to quantity (water addition) and 'b' is the price markup percentage.

Effective Profit from Adulteration

If a milkman adds water and sells at CP, profit % = (Water ÷ Milk) × 100. If he also marks up the price, the net profit is calculated on the initial cost of milk only.

Q11. Answer: (b) 4

Shortcut Trick

Since the given ratios 17, 5, and 11 are pairwise co-prime numbers, their LCM is simply the product of their ratios multiplied by their HCF.

=> LCM = (Product of ratios) × HCF

=> 3740 = (17 × 5 × 11) × HCF

=> 3740 = 935 × HCF

=> HCF = 3740 ÷ 935 = 4

Therefore The correct answer is 4.

Alternate Method

Given:

Ratio of the three numbers = 17 : 5 : 11

LCM of the three numbers = 3740

Formula Used:

Let the common factor (which is also the HCF) of the numbers be x.

The three numbers are 17x, 5x, and 11x.

Since 1

Q12. Answer: (a) 6

Shortcut Trick

According to the ratio 1 : 2, for every 1 part of the first ingredient, there are 2 parts of the second ingredient.

If 1 unit = 3 cups,

Then 2 units = 2 × 3 = 6 cups.

Therefore The correct answer is 6 cups.

Alternate Method

Given: Ratio of ingredients = 1 : 2; Quantity of first ingredient = 3 cups.

=> Let the quantity of the second ingredient be x cups.

=> Ratio = (Ingredient 1) ÷ (Ingredient 2)

=> 1 ÷ 2 = 3 ÷ x

=> 1 × x = 3 × 2

=> x = 6 cups

Therefore The correct answer is 6 cups.

Additional Information

Direct Proportion

Two quantities are in direct proportion if the ratio of their values remains constant (x/y = k). If one increases, the other increases accordingly.

Fourth Proportional

If four quantities a, b, c, d are such that a:b = c:d, then d is called the fourth proportional to a, b, and c, calculated as d = (b × c) ÷ a.

Scaling Ratios

To maintain the same ratio when one part is multiplied by a factor, all other parts of the ratio must be multiplied by the same scaling factor.

Q13. Answer: (a) Rs. 20,000

Shortcut Trick

Net Profit% = Mark-up% − Discount% − (Mark-up × Discount)/100

Net Profit% = 40 − 25 − (40 × 25)/100 = 15 − 10 = 5%

Selling Price = 105% of Cost Price => 21,000 = 1.05 × CP

CP = 21,000 ÷ 1.05 = 20,000

Therefore The correct answer is Rs. 20,000.

Alternate Method

Given:

Mark-up Percentage = 40%

Discount Percentage = 25%

Selling Price (SP) = Rs. 21,000

=> Let Cost Price (CP) = 100 units

=> Marked Price (MP) = 100 + 40% of 100 = 140 units

=> Selling Price (SP) = 140 − 25% of 140

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=> SP = 140 − (25 ÷ 100) × 140 = 140 − 35 = 105 units
=> Given, 105 units = Rs. 21,000
=> 1 unit = 21,000 ÷ 105 = 200
=> Cost Price (CP) = 100 units = 100 × 200 = Rs. 20,000
Therefore The correct answer is Rs. 20,000.
Additional Information
Mark-up Percentage
The percentage by which the cost price is increased to set the marked price. Formula: Mark-up% = (MP − CP)/CP × 100.
Relationship between CP and MP
CP × (100 + Profit%) = MP × (100 − Discount%). This ratio can be used to directly find the relation between CP and MP.
Successive Percentage Change
If a value is increased by x% and then decreased by y%, the net change is [x − y − (xy/100)]%.

Q14. Answer: (c) -14/9

Given:
(28/8)^(17) × (8/28)^(20) × (28/8)³ = (8/28)^(9m+14)
Formula used:
1. (a/b)ⁿ = (b/a)^(−n)
2. a^x × a^y × a^z = a^(x + y + z)
3. If a^x = a^y, then x = y
Calculations:
According to the given equation:
(28/8)^(17) × (8/28)^(20) × (28/8)³ = (8/28)^(9m+14)
To solve for m, express all terms with the same base (8/28):
=> (8/28)^(−17) × (8/28)^(20) × (8/28)^(−3) = (8/28)^(9m + 14)
Applying the law of exponents on the left-hand side:
=> (8/28)^((−17 + 20 − 3)) = (8/28)^(9m + 14)
=> (8/28)^0 = (8/28)^(9m + 14)
Now, equating the exponents on both sides of the equation:
=> 0 = 9m + 14
=> 9m = −14
=> m = −14/9
Therefore The correct answer is option (3).

Q15. Answer: (b) sinA

Shortcut Trick
Apply quadrant rules: cos(90° − A) = sin A, cot(90° + A) = −tan A, and cos(180° + A) = −cos A.
Numerator = sin A × sin A = sin² A.
Denominator = (−tan A) × (−cos A) = tan A × cos A = (sin A / cos A) × cos A = sin A.
Expression = sin² A / sin A = sin A.
Therefore The correct answer is sin A.
Alternate Method
Given: [sin A × cos(90° − A)] / [cot(90° + A) × cos(180° + A)]
Trigonometric Transformations:
Step-by-step Simplification:
=> Numerator: sin A × cos(90° − A)
=> In 1st quadrant, cos(90° − A) = sin A
=> Numerator = sin A × sin A = sin² A
=> Denominator: cot(90° + A) × cos(180° + A)
=> In 2nd quadrant, cot(90° + A) = −tan A
=> In 3rd quadrant, cos(180° + A) = −cos A
=> Denominator = (−tan A) × (−cos A) = tan A × cos A

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=> Denominator = (sin A / cos A) × cos A = sin A

=> Final Expression: $\sin^2 A / \sin A$

=> Expression = sin A

Therefore The correct answer is sin A.

Additional Information

ASTC Rule

It determines the sign of trigonometric ratios: 1st Quadrant (All positive), 2nd (Sine/Cosec positive), 3rd (Tan/Cot positive), and 4th (Cos/Sec positive).

Complementary Ratio Changes

Ratios change to their co-ratios at (90° ± θ) or (270° ± θ): sin ↔ cos, tan ↔ cot, and sec ↔ cosec.

Tangent Identity

tan A = sin A / cos A and cot A = cos A / sin A. These are fundamental for simplifying product-form trigonometric expressions.

Q16. Answer: (c) 25%

Shortcut Trick

Ratio of Initial Price to New Price = 400 : 500 = 4 : 5.

Increase = 5 − 4 = 1 unit.

Percentage Increase = (Increase ÷ Initial Ratio) × 100 = (1 ÷ 4) × 100 = 25%.

Therefore The correct answer is 25%.

Alternate Method

Given:

Original Price of the shirt = Rs. 400

Increased Price of the shirt = Rs. 500

Formula Used:

Percentage Increase = [(New Price − Old Price) ÷ Old Price] × 100

Calculations:

=> Total price increase = 500 − 400 = Rs. 100

=> Percentage increase = (100 ÷ 400) × 100

=> Percentage increase = (1 ÷ 4) × 100

=> Percentage increase = 25%

Therefore, Option (3) is the correct answer.

Therefore The correct answer is 25%.

Additional Information

Percentage Change Formula

Percentage Increase or Decrease = (Difference ÷ Original Value) × 100. Always use the starting (initial) value as the base.

Successive Percentage Change

If a value increases by a% and then by b%, the net percentage change is given by [a + b + (a × b ÷ 100)]%.

Fraction to Percentage Conversion

Common fractions help in fast calculations: 1/2 = 50%, 1/3 = 33.33%, 1/4 = 25%, 1/5 = 20%, and 1/8 = 12.5%.

Q17. Answer: (c) 1.25

Given:

(3/4) + 0.25 × 2

Formula used:

BODMAS rule: Perform Multiplication before Addition.

Fraction conversion: 3/4 = 0.75

Calculations:

(3/4) + 0.25 × 2

=> 0.75 + 0.25 × 2

=> 0.75 + 0.50

=> 1.25

Therefore The correct answer is option (3).

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Q18. Answer: (d) 10 km/h

Shortcut Trick

Total Distance = 20 km (Going) + 20 km (Returning) = 40 km.

Total Time = (20 ÷ 10) + 1 (Stay) + (20 ÷ 20) = 2 + 1 + 1 = 4 hours.

Average Speed = Total Distance ÷ Total Time = 40 ÷ 4 = 10 km/h.

Therefore The correct answer is 10 km/h.

Alternate Method

Given:

Distance from Home to Market = 20 km

Speed while walking = 10 km/h

Stay time at market = 1 hour

Speed while returning by e-rickshaw = 20 km/h

Formula used:

Time = Distance ÷ Speed

Average Speed = (Total Distance) ÷ (Total Time)

Calculations:

=> Time taken to reach the market = 20 ÷ 10 = 2 hours

=> Time taken for returning = 20 ÷ 20 = 1 hour

=> Total time taken for the entire trip = 2 (walking) + 1 (stay) + 1 (returning) = 4 hours

=> Total distance covered = 20 (going) + 20 (returning) = 40 km

=> Average Speed = 40 ÷ 4 = 10 km/h

Therefore The correct answer is 10 km/h.

Additional Information

Average Speed (Equal Distances)

If a person covers equal distances at speeds x and y, the average speed (excluding stay time) is given by 2xy ÷ (x + y).

Stoppage Time Effect

When stay time or stoppage time is included, the total time of the journey increases, which subsequently reduces the average speed of the trip.

Unit Conversion

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

Q19. Answer: (b) 7722

Shortcut Trick

Identify the numbers as a = 22, b = −13, and c = −9.

Check the sum: a + b + c = 22 + (−13) + (−9) = 0.

Using the Algebraic Identity: If a + b + c = 0, then $a^3 + b^3 + c^3 = 3abc$.

Calculation: 3 × 22 × (−13) × (−9) = 66 × 117 = 7722.

Therefore The correct answer is 7722.

Alternate Method

Given:

The expression to evaluate is $22^3 + (-13)^3 + (-9)^3$.

Formula Used:

The conditional identity states that if a + b + c = 0, then $a^3 + b^3 + c^3 = 3abc$.

=> Let a = 22, b = −13, and c = −9.

=> a + b + c = 22 + (−13) + (−9)

=> a + b + c = 22 − 22 = 0.

=> Since the sum of the terms is zero, apply the identity:

=> Value = 3 × (22) × (−13) × (−9)

=> Value = 66 × 117

=> Value = 7722

Therefore, the calculated value is 7722, which matches option (2).

Therefore The correct answer is 7722.

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Additional Information

General Algebraic Identity

The complete identity is $a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$.

Negative Number Cubes

The cube of a negative number is always negative, for example, $(-13)^3 = -2197$.

Applications of Identity

This identity is primarily used to simplify expressions involving cubes without performing large multiplications manually.

Q20. Answer: (d) 128

Shortcut Trick

Total units initially sold = 120 + 150 + 110 + 130 + 140 = 650 units

Initial Arithmetic Mean = 650 ÷ 5 = 130 units

A return of 10 units reduces the total sum by 10.

Reduction in mean = Total Reduction ÷ Number of items = 10 ÷ 5 = 2 units

New Arithmetic Mean = 130 − 2 = 128 units

Therefore The correct answer is 128 units.

Alternate Method

Given:

Units sold for 5 items = 120, 150, 110, 130, 140

Return from the first item = 10 units

Formula Used:

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

Calculations:

=> New value of the first item = 120 − 10 = 110 units

=> Sum of new observations = 110 + 150 + 110 + 130 + 140

=> Total Sum = 640 units

=> New Arithmetic Mean = 640 ÷ 5

=> New Mean = 128 units

Therefore The correct answer is 128 units.

Additional Information

Arithmetic Mean (Average)

The average of a set of numbers is the sum of the numbers divided by the count. Formula: $x = (\Sigma x_i) \div n$.

Property of Change in Mean

If every observation in a data set is decreased by a constant value k, then the mean of the new observations is decreased by k. If only one observation is decreased by k, the mean decreases by k/n.

Sum of Deviations

The sum of the deviations of all observations from their arithmetic mean is always equal to zero, i.e., $\Sigma(x_i - x) = 0$.

Q21. Answer: (c) -20

Given:

$9^2 + \sqrt{4^2} - 10 \times \sqrt{81} - 15$

Formula used:

BODMAS rule (Brackets, Orders, Division, Multiplication, Addition, Subtraction)

Calculations:

$9^2 + (\sqrt{4})^2 - 10 \times \sqrt{81} - 15$

=> $81 + 4 - 10 \times 9 - 15$

=> $81 + 4 - 90 - 15$

=> $85 - 105$

=> -20

Therefore The correct answer is option (3).

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Q22. Answer: (a) 28

Shortcut Trick

Total work = LCM of (12, 36) = 36 units.

Efficiency: A = 3 units/day, B = 1 unit/day.

Work done by (A + B) in 2 days = (3 + 1) × 2 = 8 units.

Remaining work = 36 − 8 = 28 units.

Time taken by B to complete it = 28 ÷ 1 = 28 days.

Therefore The correct answer is 28 days.

Alternate Method

Given: Time taken by A = 12 days, Time taken by B = 36 days.

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

Person	Days	Total Work	Efficiency
A	12	36	3
B	36	1	

=> Total efficiency of A and B = 3 + 1 = 4 units/day.

=> Work completed by both in 2 days = 4 × 2 = 8 units.

=> Remaining work to be done by B = 36 − 8 = 28 units.

=> Days taken by B = 28 ÷ 1 = 28 days.

Therefore The correct answer is 28 days.

Additional Information

Work and Wages

Wages are always distributed in the ratio of work done by the individuals, which is usually the ratio of their efficiencies if they work for the same duration.

Pipes and Cisterns

The concept is identical to Time and Work, where an inlet pipe does positive work and an outlet pipe (leak) does negative work.

Combined Efficiency

If multiple people work together, their net efficiency is the sum of their individual efficiencies (E_(total) = E1 + E2 + ...).

Q23. Answer: (d) 1806

Shortcut Trick

Remainder = 42

Divisor = 3 × 42 = 126

Quotient = 126 ÷ 9 = 14

Dividend = (126 × 14) + 42 = 1764 + 42 = 1806

Therefore The correct answer is 1806.

Alternate Method

Given: The remainder is 42. The divisor is 9 times the quotient and 3 times the remainder.

Formula Used: Dividend = (Divisor × Quotient) + Remainder

=> Remainder = 42

=> Divisor = 3 × 42 = 126

=> Quotient = 126 ÷ 9 = 14

=> Dividend = (126 × 14) + 42

=> Dividend = 1764 + 42 = 1806

Therefore The correct answer is 1806.

Additional Information

Division Algorithm

For any two integers a and b (b ≠ 0), there exist unique integers q and r such that a = bq + r, where 0 ≤ r < |b|.

Remainder Rule

The remainder must always be non-negative and strictly smaller than the divisor.

Verification of Division

To verify a division result, compute (Divisor × Quotient) + Remainder; the sum must equal the dividend.

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Q24. Answer: (a) 14

Shortcut Trick

Ratio of quantities sold: 50 : (30% of 50) : (50 − 15) => 50 : 15 : 35 => 10 : 3 : 7.

Net Profit x% = [(10 × 37) + (3 × 26) − (7 × 24)] ÷ (10 + 3 + 7)

x% = [370 + 78 − 168] ÷ 20 => 280 ÷ 20 = 14%.

Therefore The correct answer is 14%.

Alternate Method

Given: 50% goods at 37% profit, 30% of remaining at 26% profit, rest at 24% loss.

Assume total quantity = 100 units and Cost Price (CP) of each unit = Rs. 1.

=> Total Cost Price = Rs. 100.

=> Case 1: 50 units sold at 37% profit => Profit1 = 50 × 37/100 = Rs. 18.5.

=> Remaining units = 100 − 50 = 50 units.

=> Case 2: 30% of 50 = 15 units sold at 26% profit => Profit2 = 15 × 26/100 = Rs. 3.9.

=> Case 3: Remaining units = 50 − 15 = 35 units sold at 24% loss => Loss3 = 35 × 24/100 = Rs. 8.4.

=> Total Net Profit = Profit1 + Profit2 − Loss3

=> Total Net Profit = 18.5 + 3.9 − 8.4 = Rs. 14.

=> Overall Profit Percentage (x) = (Total Profit ÷ Total CP) × 100

=> x = (14 ÷ 100) × 100 = 14%.

Therefore The correct answer is 14%.

Additional Information

Weighted Average Formula

Net Profit/Loss% = (n1p1 + n2p2 + ... + n_kp_k) ÷ (n1 + n2 + ... + n_k), where n is quantity and p is profit(+)/loss(−) percentage.

Net Profit Percentage

Overall Profit % = [(Total Selling Price − Total Cost Price) ÷ Total Cost Price] × 100.

Successive Percentage

If a value is changed by a% and then by b%, the net change is [a + b + (a × b)/100] %.

Q25. Answer: (d) 20%

Shortcut Trick

For consecutive years in Compound Interest, the Amount of the previous year acts as the Principal for the subsequent year.

Interest for the 3rd year = Rs. 28,800 − Rs. 24,000 = Rs. 4,800.

Rate of Interest (R) = (Interest ÷ Principal for the year) × 100

R = (4,800 ÷ 24,000) × 100 = 1/5 × 100 = 20%.

Therefore The correct answer is 20%.

Alternate Method

Given:

Amount after 2 years (A2) = Rs. 24,000

Amount after 3 years (A3) = Rs. 28,800

Formula Used:

$A = P(1 + R \div 100)^n$

Calculations:

=> $A2 = P(1 + R/100)^2 = 24000$

=> $A3 = P(1 + R/100)^3 = 28800$

=> $A3 \div A2 = [P(1 + R/100)^3] \div [P(1 + R/100)^2]$

=> 28800 ÷ 24000 = (1 + R/100)

=> 288 ÷ 240 = 1 + R/100

=> 1.2 = 1 + R/100

=> R/100 = 1.2 − 1 = 0.2

=> R = 0.2 × 100 = 20%

Therefore The correct answer is 20%.

Additional Information

Successive Growth in Compound Interest

When time periods are consecutive, the annual rate of interest can be calculated as $[(A_{n+1} - A_n) \div A_n] \times 100$.

Effective Interest Rate

If interest is compounded n times a year, the effective annual rate is given by $R_{eff} = [1 + (R \div n)]^n - 1$.

Difference between SI and CI

For a period of 2 years, the difference between Simple Interest and Compound Interest is $D = P \times (R \div 100)^2$.

Q26. Answer: (b) Rs. 45

Shortcut Trick

Identify the excess cost: 6 Naveen Pens cost Rs. 15 more each than Rajat Pens.

Total excess cost = 6 × Rs. 15 = Rs. 90.

Subtract excess from total: Rs. 540 − Rs. 90 = Rs. 450 (This represents the cost if all 10 pens were Rajat Pens).

Cost of one Rajat Pen = Rs. 450 ÷ 10 = Rs. 45.

Therefore The correct answer is Rs. 45.

Alternate Method

Given:

Total pens = 4 Rajat + 6 Naveen

Total Cost Price = Rs. 540

Price difference = Naveen Pen − Rajat Pen = Rs. 15

Let the cost of one Rajat Pen be Rs. R.

Then, the cost of one Naveen Pen = Rs. (R + 15).

=> 4 × R + 6 × (R + 15) = 540

=> 4R + 6R + 90 = 540

=> 10R + 90 = 540

=> 10R = 540 − 90

=> 10R = 450

=> R = 450 ÷ 10

=> R = 45

Therefore The correct answer is Rs. 45.

Additional Information

Linear Equation in One Variable

An equation of the form ax + b = c, where a, b, and c are constants. It is solved by isolating the variable x on one side.

Substitution Method

Expressing one variable in terms of another (e.g., N = R + 15) and substituting it into the main equation to reduce the number of unknowns.

Cost Price (CP)

The total amount paid by a buyer to acquire an item. Total CP = (Quantity 1 × Rate 1) + (Quantity 2 × Rate 2).

Q27. Answer: (a) 3 hours

Shortcut Trick

Direct application of the Time-Speed-Distance relationship:

Time = Distance ÷ Speed

Time = 150 ÷ 50 = 3 hr

Therefore The correct answer is 3 hr.

Alternate Method

Given:

Total Distance (D) = 150 km

Speed (S) = 50 km/h

Formula Used:

Time (T) = Distance ÷ Speed

Calculations:

=> Time taken = 150 ÷ 50 => Time taken = 3 hr

Therefore The correct answer is 3 hr.

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Additional Information

Fundamental Formulas

Distance = Speed × Time | Speed = Distance ÷ Time.

Unit Conversion

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

Average Speed

For a trip with different speeds over equal distances, Average Speed = (2 × S1 × S2) ÷ (S1 + S2).

Q28. Answer: (a) 40.5

Shortcut Trick

Arrange the monthly incomes in ascending order: 35, 37, 38, 39, 40, 41, 42, 44, 46, 50.

Count of observations (n) = 10 (which is even).

Median = Average of the middle two terms (5^(th) and 6^(th) terms).

Median = (40 + 41) ÷ 2 = 40.5.

Therefore The correct answer is 40.5.

Alternate Method

Given: Monthly incomes of 10 employees (in Rs. thousands) are 35, 40, 38, 50, 46, 42, 39, 37, 41, and 44.

Formula Used:

For an even number of observations (n):

Median = [(n/2)^(th) observation + (n/2 + 1)^(th) observation] ÷ 2

=> Total observations (n) = 10

=> Arrange incomes in ascending order: 35, 37, 38, 39, 40, 41, 42, 44, 46, 50

=> n/2 = 10/2 = 5^(th) term

=> n/2 + 1 = 10/2 + 1 = 6^(th) term

=> 5^(th) term = 40 and 6^(th) term = 41

=> Median = (40 + 41) ÷ 2

=> Median = 81 ÷ 2 = 40.5

Therefore The correct answer is 40.5.

Additional Information

Median for Odd Number of Terms

If n is odd, the Median is simply the middle-most value, calculated as the ((n + 1) ÷ 2)^(th) term after sorting.

Empirical Relationship

For moderately skewed distributions: Mode = 3 × Median − 2 × Mean.

Effect of Outliers

The Median is a measure of central tendency that is robust against outliers, unlike the arithmetic mean which is heavily influenced by extreme values.

Q29. Answer: (a) 1:3

Shortcut Trick

When a large sphere is melted into n identical small spheres, the radius ratio is R/r = n^(1/3).

For n = 27, R/r = 27^(1/3) = 3.

Ratio of Surface Area = R^2 : (n × r^2) = $(R/r)^2$: n.

Required Ratio = 3^2 : 27 = 9 : 27 = 1 : 3.

Therefore The correct answer is 1:3.

Alternate Method

Given: Radius of the larger metallic sphere (R) = 6 units, Total number of smaller spheres (n) = 27.

Formula Used: Volume of sphere = $(4/3)\pi r^3$; Surface area of sphere = $4\pi r^2$.

=> Total Volume remains constant: Volume of Large Sphere = 27 × Volume of Small Sphere

=> $(4/3)\pi \times 6^3 = 27 \times (4/3)\pi \times r^3$

=> $216 = 27 \times r^3$

=> $r^3 = 216 / 27 = 8$

=> $r = \sqrt[3]{8} = 2$ units

=> Surface Area of Large Sphere (SA_L) = $4\pi \times R^2 = 4\pi \times 6^2 = 144\pi$

=> Total Surface Area of 27 Small Spheres (SA_(S_total)) = $27 \times (4\pi \times r^2)$

=> SA_(S_total) = $27 \times 4\pi \times 2^2 = 27 \times 16\pi = 432\pi$

=> Required Ratio = SA_L : SA_(S_total) = $144\pi : 432\pi$

=> Ratio = 144 / 432 = 1 / 3

Therefore The correct answer is 1:3.

Additional Information

Volume Conservation

In melting and recasting problems, the initial volume of the object always equals the final total volume of all new objects formed.

Surface Area to Volume Relationship

If the radius of a sphere is scaled by a factor k, its surface area scales by k^2 and its volume scales by k^3.

Surface Area of Hemisphere

For a sphere cut in half, the curved surface area is $2\pi r^2$ and the total surface area is $3\pi r^2$.

Q30. Answer: (c) 40 years

Shortcut Trick

Ratio 4 years ago (Teacher : Daughter) = 3 : 1 (Difference = 2 units)

Ratio 8 years hence (Teacher : Daughter) = 2 : 1 → 4 : 2 (Difference = 2 units)

Increase in ratio units = 4 − 3 = 1 unit => Total time gap = 4 + 8 = 12 years.

1 unit = 12 years Therefore Teacher's age 4 years ago = 3 × 12 = 36 years.

Present age of teacher = 36 + 4 = 40 years.

Therefore The correct answer is 40 years.

Alternate Method

Given: 4 years ago, the teacher was 3 times her daughter's age. 8 years later, she will be twice her daughter's age.

Let the daughter's age 4 years ago be x.

Then, the teacher's age 4 years ago = 3x.

=> Present age of teacher = 3x + 4

=> Present age of daughter = x + 4

According to the second condition (8 years from now):

=> (3x + 4 + 8) = 2 × (x + 4 + 8)

=> 3x + 12 = 2 × (x + 12)

=> 3x + 12 = 2x + 24

=> 3x − 2x = 24 − 12

=> x = 12

Present age of teacher = 3 × 12 + 4 = 36 + 4 = 40 years.

Therefore The correct answer is 40 years.

Additional Information

Constant Age Difference

The numerical difference between the ages of two individuals always remains constant, regardless of how many years pass.

Ratio Balancing Method

When solving with ratios, multiply the ratios by the difference of the other ratio's parts to make the unit difference uniform across time periods.

Linear Equation Application

For multiple conditions, use the present age as the base variable (x) to avoid confusion when moving backward or forward in time.

Q31. Answer: (c) Cyclical

The correct answer is Cyclical.

Key Points

• Cyclical unemployment refers to the component of overall unemployment that results directly from cycles of economic upturn and downturn.

• It occurs when there is a significant decline in aggregate demand (the total demand for goods and services in an economy) during a recession or depression.

• When consumer spending falls, businesses experience reduced revenues and are forced to scale back production, leading to

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layoffs and a reduction in the workforce to manage costs.

• This type of unemployment is typically involuntary and is highly sensitive to the macroeconomic health of a country; it increases when Gross Domestic Product (GDP) declines and decreases during periods of economic expansion.

• Economists use the Okuns Law to describe the relationship between cyclical unemployment and the gap between actual and potential GDP growth.

Additional Information

• Structural Unemployment:

• Arises due to a fundamental mismatch between the skills workers possess and the skills required for available jobs.

• Often caused by technological shifts (automation), globalization, or changes in consumer preferences that render certain industries obsolete.

• Voluntary Unemployment:

• Occurs when an individual chooses not to work at the prevailing market wage rate.

• Reasons may include searching for a better job (frictional), pursuing education, or personal lifestyle choices.

• Seasonal Unemployment:

• Occurs when the demand for labor changes systematically according to the time of year.

• Commonly observed in sectors like agriculture (harvesting periods), tourism (holiday seasons), and retail (festival rushes).

Q32. Answer: (b) Punitive and preventive

The correct answer is Punitive and preventive.

Key Points

• Article 22 of the Indian Constitution provides fundamental protections to individuals against arbitrary arrest and detention.

• The Constitution classifies detention into two broad categories: Punitive detention and Preventive detention.

• Punitive detention refers to the detention of a person after a formal trial and conviction in a court of law for an offense already committed by them.

• Preventive detention is the detention of a person without any trial or conviction, based solely on the apprehension that the person may commit an act that is prejudicial to the security of the state or public order.

• The objective of preventive detention is not to punish an individual for a past offense but to prevent them from committing an offense in the near future.

Additional Information

• Safeguards for Punitive Detention (Article 22(1) and (2)):

• The right to be informed of the grounds of arrest as soon as possible.

• The right to consult and be defended by a legal practitioner of one's choice.

• The right to be produced before the nearest Magistrate within a period of 24 hours (excluding travel time).

• No person can be detained in custody beyond 24 hours without the authority of a Magistrate.

• Safeguards for Preventive Detention (Article 22(4) to (7)):

• A person cannot be detained for more than three months unless an Advisory Board, comprising persons qualified to be High Court Judges, finds sufficient cause for an extension.

• The detaining authority must communicate the grounds of detention to the detenu, though facts deemed against the public interest can be withheld.

• The individual must be given the earliest opportunity to make a representation against the detention order.

• Both Parliament and State Legislatures have the power to enact laws for preventive detention under the Seventh Schedule.

Q33. Answer: (a) Harsh land laws and landlord oppression in the Malabar region.

The correct answer is Harsh land laws and landlord oppression in the Malabar region.

Key Points

• The Mappila Uprisings (also known as the Moplah Rebellions) were a series of revolts by the Muslim peasantry of the Malabar region in Kerala against the British colonial rule and the local Hindu landlords throughout the 19th and early 20th centuries.

• The primary catalyst was the radical change in land tenure systems introduced by the British East India Company after 1792, which recognized the Jenmis (hereditary landlords) as absolute owners of the land.

• Under the traditional system, tenants had customary rights, but the British legal framework stripped the Kudiyans (tenants) of their security, leading to arbitrary rent hikes and high eviction rates known as Melkanam.

• The socio-economic distress was compounded by heavy taxation and illegal exactions by the landlords, who were backed by British courts and police, leaving the peasantry with no legal recourse for their grievances.

• The prolonged nature of these uprisings was a direct result of the systemic oppression and the economic exploitation of the tillers, which eventually culminated in the massive armed rebellion of 1921.

Additional Information

• The 1921 Rebellion and Khilafat Movement:

• The 1921 rebellion was the most significant phase, merging agrarian discontent with the Khilafat Movement and the Non-Cooperation Movement led by Mahatma Gandhi.

• Prominent leaders of this phase included Ali Musaliyar and Variyankunnath Kunjahammed Haji, who challenged the British authority to establish an independent state.

• The uprising was violently suppressed by the British military and the Malabar Special Police, leading to the Wagon Tragedy, where approximately 60 to 70 prisoners died of suffocation in a railway goods wagon.

• Land Tenure Categories:

• Kanam: A form of mortgage-tenure where the tenant provided a loan to the landlord and paid annual rent, which became increasingly exploitative under British law.

• Verumpattam: A simple lease for a short duration, offering the least protection to the cultivator and making them most vulnerable to landlord oppression.

Q34. Answer: (d) Vikramashila University

The correct answer is Vikramashila University.

Key Points

• Dharmapala, the second ruler of the Pala Dynasty, established Vikramashila University during the late 8th century or early 9th century CE.

• The university was located at Antichak in the Bhagalpur district of Bihar, strategically positioned on the banks of the river Ganges.

• It was founded to serve as a premier center for Vajrayana Buddhism (Tantric Buddhism) and was intended to complement and eventually surpass the fame of Nalanda University.

• The institution was renowned for its academic excellence, housing over 100 teachers and attracting thousands of students from across Asia, particularly Tibet.

• The university was presided over by highly learned monks known as Dwara-Panditas (Gate Scholars) who supervised the entrance examinations for prospective students.

• One of the most famous scholars associated with this university was Atisa Dipankara, who was instrumental in the reformation of Buddhism in Tibet.

• The site features a massive Stupa at the center and was eventually destroyed by the forces of Bakhtiyar Khalji around 1193 CE during the Turko-Afghan invasions.

Additional Information

• Odantapuri University

• Established by the Pala founder Gopala in the 8th century.

• Located in Bihar Sharif, it was a major center for Buddhist learning and served as the architectural inspiration for the Samye Monastery in Tibet.

• Vallabhi University

• Situated in Saurashtra, Gujarat, this university flourished under the patronage of the Maitraka Dynasty between 475 CE and 775 CE.

• It was a vital center for the Hinayana sect of Buddhism and was known for its courses in Law, Economics, and Administration.

• Nalanda University

• Founded in the 5th century CE by Kumaragupta I of the Gupta Dynasty in present-day Rajgir, Bihar.

• It was the oldest residential university in the world, specializing in Mahayana Buddhism and drawing scholars like Xuanzang and Yi Jing from China.

Q35. Answer: (a) a novel feature

The correct answer is a novel feature.

Key Points

• Dr. B.R. Ambedkar, the principal architect of the Indian Constitution, described the Directive Principles of State Policy (DPSP) as a 'novel feature' because they aimed to facilitate social and economic democracy in addition to political democracy.

• The Directive Principles are enshrined in Part IV of the Constitution of India, covering Article 36 to Article 51.

• These principles serve as guidelines for the Central and State governments, directing them to frame policies that ensure social justice and welfare for all citizens.

• According to Article 37, though these principles are non-justiciable (not enforceable by any court), they are fundamental in the governance of the country.

• The DPSP along with the Fundamental Rights contain the philosophy and the soul of the Constitution, often described by

Granville Austin as the 'Conscience of the Constitution'.

Additional Information

• Directive Principles of State Policy (DPSP):

• Source: The concept was borrowed from the Irish Constitution of 1937, which in turn had borrowed it from the Spanish Constitution.

• Categorization: Although the Constitution does not formally classify them, they are typically grouped into Socialistic, Gandhian, and Liberal-Intellectual principles based on their content.

• Comparison: They are akin to the 'Instrument of Instructions' issued to the Governor-General and the Governors of the colonies of India by the British Government under the Government of India Act of 1935.

• Key Articles: Examples include Article 40 (Organization of village panchayats), Article 44 (Uniform Civil Code), and Article 45 (Provision for early childhood care and education).

• Legal Status: In the Minerva Mills case (1980), the Supreme Court emphasized that the Indian Constitution is founded on the bedrock of the balance between Fundamental Rights and Directive Principles.

Q36. Answer: (b) Antoine Lavoisier

The correct answer is Antoine Lavoisier.

Key Points

• Antoine Lavoisier, a French chemist often referred to as the Father of Modern Chemistry, is credited with the discovery and formalization of the Law of Conservation of Mass in 1789.

• The Law of Conservation of Mass states that in a closed system, the total mass remains constant over time; mass can neither be created nor destroyed through chemical reactions or physical transformations.

• Lavoisier established this principle through meticulous quantitative experiments, such as heating mercury in a sealed container to form mercuric oxide, demonstrating that the mass of the products exactly matched the mass of the reactants.

• He published his findings in the landmark textbook Traité Élémentaire de Chimie (Elementary Treatise on Chemistry), which helped transition chemistry from a qualitative discipline into a rigorous quantitative science.

• This discovery was fundamental in refuting the Phlogiston Theory and provided the experimental basis for the development of modern stoichiometry and atomic theory.

Additional Information

• Joseph Priestley:

• An English scientist credited with the discovery of Oxygen in 1774, which he initially termed 'dephlogisticated air'.

• He is also known for inventing carbonated water and isolating various gases like ammonia and carbon monoxide.

• John Dalton:

• An English chemist and physicist who proposed the Atomic Theory in 1803, providing a theoretical framework for why mass is conserved during reactions.

• He formulated the Law of Multiple Proportions and conducted pioneering research into color blindness.

• Dmitri Mendeleev:

• A Russian chemist who formulated the Periodic Law and created the first version of the Periodic Table of Elements in 1869.

• He famously predicted the existence and properties of yet-to-be-discovered elements, such as Gallium and Germanium, by leaving gaps in his table.

Q37. Answer: (d) Saponification reaction

The correct answer is Saponification reaction.

Key Points

• Saponification is the chemical process involving the alkaline hydrolysis of esters, specifically the triglycerides found in fats and oils.

• When sodium hydroxide (NaOH) reacts with these fats, it breaks the ester bonds through a nucleophilic attack by the hydroxide ion.

• The reaction results in the production of glycerol (a trihydric alcohol) and sodium salts of long-chain fatty acids, which are the primary constituents of soap.

• The general chemical equation for this transformation is: Triglyceride + 3NaOH → Glycerol + 3Soap.

• This reaction is exothermic in nature and is the fundamental process used in the industrial manufacturing of soap.

Additional Information

• Precipitation reaction

• Characterized by the formation of an insoluble solid (precipitate) when two aqueous solutions containing soluble salts are mixed.

• Commonly used in qualitative inorganic analysis to identify cations and anions.

• Combustion reaction

• An oxidation process where a substance reacts rapidly with oxygen, releasing energy in the form of heat and light.

• Typical products include carbon dioxide (CO_2) and water (H_2O) when hydrocarbons are burned.

• Fermentation reaction

• An anaerobic metabolic process that converts sugars into ethanol, lactic acid, or gases.

• It is mediated by enzymes or microorganisms like yeast and bacteria.

Q38. Answer: (d) National Education Policy Implementation

The correct answer is National Education Policy Implementation.

Key Points

• The Union Cabinet approved the unified scheme Vigyan Dhara, which merges three existing central sector umbrella schemes under the Department of Science and Technology (DST) to improve efficiency and synergy.

• Research and Development is a core component of the merged scheme, focusing on strengthening the S&T ecosystem through basic and applied research in areas like Physical Sciences and Life Sciences. Hence, statement 1 is correct.

• Science and Technology Institutional and Human Capacity Building is the second component aimed at developing human resources and strengthening the S&T infrastructure across academic and research institutions. Hence, statement 2 is correct.

• Innovation, Technology Development and Deployment is the third component designed to foster innovation, support startups, and facilitate the commercialization of indigenous technologies. Hence, statement 3 is correct.

• National Education Policy Implementation is an overarching framework for transforming the education system in India but is not one of the specific sub-schemes merged into the Vigyan Dhara program. Hence, statement 4 is incorrect.

Additional Information

• Vigyan Dhara Scheme Details:

• The unified scheme has a total financial outlay of 10,579 crore rupees for the 15th Finance Commission cycle (2021-22 to 2025-26).

• It aims to streamline fund utilization and create a centralized administrative structure for various S&T initiatives.

• The scheme is aligned with the goals of Viksit Bharat 2047 and supports the implementation of the Anusandhan National Research Foundation (ANRF).

• Specific focus areas include Quantum Technology, Green Hydrogen, and increasing the number of Full-Time Equivalent (FTE) researchers in India.

• National Education Policy (NEP) 2020:

• The NEP 2020 is a separate national policy launched by the Ministry of Education to reform school and higher education, focusing on multidisciplinary learning and skill development.

Q39. Answer: (d) Article 42

The correct answer is Article 42.

Key Points

• Article 42 of the Indian Constitution explicitly mandates that the State shall make provisions for securing just and humane conditions of work and for maternity relief.

• This article is categorized under the Socialistic Principles of the Directive Principles of State Policy (DPSP), which aim to establish a welfare state and ensure social and economic justice for all citizens.

• The provision for maternity relief in this article serves as the constitutional foundation for various welfare legislations, most notably the Maternity Benefit Act, 1961, and its subsequent amendments, which provide paid leave and medical benefits to pregnant women.

• Under Part IV of the Constitution (covering Articles 36 to 51), these principles are considered fundamental in the governance of the country, although they are non-justiciable, meaning they cannot be directly enforced by any court.

• The phrase just and humane conditions requires the State to ensure that the working environment is safe, healthy, and respects the basic human dignity of the laborers, preventing exploitation and hazardous employment practices.

Additional Information

• Article 41:

• Directs the State to ensure the right to work, to education, and to public assistance in cases of unemployment, old age, sickness, and disablement.

• Article 43:

• Focuses on securing a living wage, a decent standard of life, and full enjoyment of leisure for workers, while also promoting cottage industries on an individual or cooperative basis in rural areas.

• Article 47:

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• States that it is the duty of the State to raise the level of nutrition and the standard of living of its people and to improve public health, including the prohibition of intoxicating drinks and drugs.

• DPSP Context:

• The Directive Principles were borrowed from the Irish Constitution and are often described by Dr. B.R. Ambedkar as the 'Novel Features' of the Indian Constitution.

Q40. Answer: (c) Melting of glaciers and flooding of coastal areas

The correct answer is Melting of glaciers and flooding of coastal areas.

Key Points

• Global warming refers to the long-term increase in Earth's average surface temperature, primarily caused by the accumulation of greenhouse gases like Carbon Dioxide (CO_2) and Methane (CH_4) in the atmosphere.

• One of the most immediate consequences is the accelerated melting of land-based ice, including continental glaciers and the massive ice sheets found in Greenland and Antarctica.

• As these glaciers melt, the runoff flows into the oceans, significantly increasing the volume of sea water and leading to a rise in global sea levels.

• Rising sea levels cause coastal inundation, which threatens low-lying regions, islands, and major coastal cities such as Mumbai, New York, and Venice with permanent flooding and habitat loss.

• Furthermore, the thermal expansion of ocean water—where water expands as it absorbs heat—acts alongside melting ice to further elevate sea levels, disrupting coastal ecosystems and increasing the impact of storm surges.

Additional Information

• Greenhouse Effect:

• This is a natural process where the atmosphere traps the sun's warmth. Excessive fossil fuel combustion and deforestation have intensified this effect, leading to unnatural warming.

• Ocean Acidification:

• Besides warming, the oceans absorb about 30% of anthropogenic CO_2, causing the water to become more acidic, which dissolves the calcium carbonate shells of coral reefs and mollusks.

• IPCC Findings:

• The Intergovernmental Panel on Climate Change (IPCC) reports indicate that global sea levels have risen by about 20 centimeters since 1900, with the rate of rise accelerating in recent decades.

• Albedo Effect:

• As white ice and snow melt, they reveal darker land or water surfaces, which absorb more heat instead of reflecting it, creating a dangerous positive feedback loop that further drives global warming.

Q41. Answer: (c) Europe

The correct answer is Europe.

Key Points

• The Orient Express is a legendary Trans-Continental Railway service that began its journey in 1883, connecting the western and eastern extremities of the European landmass.

• The original route was developed by the Compagnie Internationale des Wagons-Lits (CIWL), a Belgian company founded by Georges Nagelmackers, aimed at providing high-end luxury travel across national borders.

• The primary journey connected Paris, France, to Istanbul, Turkey, traversing approximately 3,000 kilometers almost entirely through European sovereign territories.

• Key stops along the historic route included major European cultural and political hubs such as Strasbourg, Munich, Vienna, Budapest, and Bucharest.

• A secondary popular branch, known as the Simplon Orient Express, operated via Switzerland and Italy, passing through the Simplon Tunnel to reach the Balkan Peninsula.

• While Istanbul is a transcontinental city, the Sirkeci Terminal, which served as the eastern terminus for the train, is located on the European side of the Bosphorus.

Additional Information

• Asia:

• Although Istanbul acts as the gateway to Asia, the Orient Express tracks did not historically extend into the Asian interior. Further travel into Asia required crossing the Bosphorus by ferry to connect with the Hejaz Railway or Baghdad Railway.

• North America:

• This continent is home to the First Transcontinental Railroad of the United States, completed in 1869 at Promontory Summit, and the Canadian Pacific Railway, which links the Atlantic and Pacific oceans.

• South America:

• Notable rail routes include the Trans-Andean Railway, which historically connected Mendoza in Argentina with Los Andes in Chile, crossing the high altitudes of the Andes Mountains.

Q42. Answer: (c) Appointing the Prime Minister and, on his advice, other Union Ministers

The correct answer is Appointing the Prime Minister and, on his advice, other Union Ministers.

Key Points

• According to Article 75 of the Constitution of India, the Prime Minister is appointed by the President, and other Union Ministers are appointed by the President based on the recommendation and advice of the Prime Minister.

• The executive power of the Union is formally vested in the President under Article 53, which states that these powers shall be exercised by him either directly or through officers subordinate to him.

• As the formal head of the Union Executive, the President ensures the formation of the government by inviting the leader of the majority party or coalition in the Lok Sabha to serve as the Prime Minister.

• All executive actions of the Government of India are formally taken in the name of the President, as specified under Article 77 of the Constitution.

• While the President is the nominal executive (de jure head), he acts on the aid and advice of the Council of Ministers headed by the Prime Minister, making the latter the real executive (de facto head).

Additional Information

• Conducting Elections:

• The responsibility for the superintendence, direction, and control of elections to the Parliament and State Legislatures is vested in the Election Commission of India under Article 324, not the President.

• Tenure of Governors:

• Under Article 156, the Governor of a State holds office during the pleasure of the President. While the President can remove them at any time, the normal term is five years, and this power is exercised on the advice of the Union Cabinet.

• Judicial Procedures:

• While the President appoints judges of the Supreme Court and High Courts under Article 124 and Article 217, the power to frame rules of procedure for the Supreme Court lies with the Supreme Court itself under Article 145, subject to the approval of the President.

• Other Executive Appointments:

• The President also appoints the Attorney General of India, the Comptroller and Auditor General (CAG), the Chief Election Commissioner, and the Chairman and members of the Union Public Service Commission (UPSC).

Q43. Answer: (a) 20 May 1498

The correct answer is 20 May 1498.

Key Points

• Vasco da Gama, a Portuguese explorer, was the first European to reach India via the Atlantic Ocean, completing the longest sea voyage of the time.

• He set sail from Lisbon on 8 July 1497 with a fleet of four ships, including the flagship Sao Gabriel.

• After rounding the Cape of Good Hope in South Africa, the fleet sailed across the Indian Ocean with the help of a local navigator.

• The expedition successfully reached Kappad, a beach situated about 16 kilometers from the city of Calicut (modern-day Kozhikode) in Kerala, on 20 May 1498.

• His arrival marked the beginning of a direct sea route between Europe and Asia, effectively bypassing the Silk Road and the Ottoman Empire.

Additional Information

• Zamorin of Calicut:

• Upon arrival, Vasco da Gama was received by the local ruler, the Zamorin (Samoothiri).

• Although the Zamorin welcomed him, initial trade negotiations were difficult because the gifts provided by the Portuguese were considered insufficient by local standards.

• Impact on Trade:

• The discovery of this route led to the Portuguese dominance of the Spice Trade for nearly a century.

• It paved the way for future European colonization in Asia, particularly by the Dutch, French, and British.

• Later Life:

• Vasco da Gama returned to India twice more in 1502 and 1524.

• He was appointed as the Viceroy of India in 1524 but died shortly after in Cochin due to malaria.

Q44. Answer: (c) Ministry of Statistics and Programme Implementation (MoSPI)

The correct answer is Ministry of Statistics and Programme Implementation (MoSPI).

Key Points

• The National Industrial Classification (NIC) is the essential framework for classifying various economic activities in India, ensuring uniformity in data collection across different statistical surveys and censuses.

• The Ministry of Statistics and Programme Implementation (MoSPI), specifically through the National Statistical Office (NSO), is the nodal national body responsible for preparing and revising this classification.

• NIC-2025 was developed to replace the older NIC-2008 version, reflecting the structural changes and modernization of the Indian economy over the last decade.

• A primary objective of NIC-2025 is to synchronize Indian standards with the International Standard Industrial Classification (ISIC) Revision 5, maintained by the United Nations Statistics Division.

• This update is crucial for capturing emerging sectors such as digital platforms, information technology-enabled services, and renewable energy production, which were not fully detailed in previous versions.

Additional Information

• Ministry of Statistics and Programme Implementation (MoSPI):

• It manages the Central Statistics Office (CSO) and the National Sample Survey Office (NSSO), which are vital for measuring GDP and inflation.

• The ministry also oversees the implementation of the Twenty Point Programme and the MP Local Area Development Scheme (MPLADS).

• National Statistical Commission (NSC):

• Formed in 2005 following the Rangarajan Commission report, it serves as an advisory body to improve the quality of official statistics in India.

• NITI Aayog:

• Established on January 1, 2015, to replace the Planning Commission, it functions as a policy think tank focusing on sustainable development goals and cooperative federalism.

• Reserve Bank of India (RBI):

• It is India's central bank, established in 1935, primarily responsible for monetary policy and regulating the banking sector.

Q45. Answer: (b) Indian Institute of Information Technology, Dharwad

The correct answer is Indian Institute of Information Technology, Dharwad.

Key Points

• The Indian Institute of Information Technology (IIIT), Dharwad, was designated as the host for the Centre of Excellence (CoE) in Quantum AI and Computing to drive research in cutting-edge technology.

• This initiative aims to bridge the gap between Quantum Computing and Artificial Intelligence, focusing on developing algorithms that can solve complex problems far beyond the capacity of classical computers.

• The center is part of a broader national strategy to position India as a global leader in deep-tech sectors, particularly in the Karnataka region, which is a major hub for technological innovation.

• Funding and support for this Centre of Excellence often involve collaboration between the Ministry of Education, the Ministry of Electronics and Information Technology (MeitY), and various industry partners.

• The focus areas of the center include Quantum Machine Learning, Cryptography, and Optimization, which are critical for future security and industrial efficiency.

Additional Information

• Indian Institute of Information Technology (IIIT), Dharwad:

• It is an Institute of National Importance established under a Public-Private Partnership (PPP) model.

• The institute specializes in Information Technology, Computer Science, and Data Science, making it a suitable environment for a Quantum AI hub.

• Quantum Computing and AI Integration:

• Quantum AI utilizes qubits to perform calculations at speeds exponentially higher than binary bits used in traditional systems.

• Key applications include drug discovery, financial modeling, and enhancing neural network training efficiency.

• National Quantum Mission (NQM):

• The Government of India launched the National Quantum Mission with a budget of over 6,000 crore rupees to foster a vibrant ecosystem for quantum technology.

• The CoE at IIIT Dharwad aligns with the mission goal of establishing specialized research hubs across the country.

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Q46. Answer: (c) Omkareshwar Sanctuary

The correct answer is Omkareshwar Sanctuary.

Key Points

• In 2025, the Madhya Pradesh state government, in coordination with the National Tiger Conservation Authority (NTCA), officially notified Omkareshwar Sanctuary as a Tiger Reserve.

• This sanctuary is situated in the Khandwa district and encompasses a significant portion of the Narmada River basin, providing a diverse ecosystem for flora and fauna.

• The notification aims to strengthen the wildlife corridor between the Satpura Tiger Reserve in Madhya Pradesh and the Melghat Tiger Reserve in Maharashtra, ensuring safe passage for tigers and other predators.

• The establishment of this reserve is a strategic move to manage the rising tiger population in the central Indian landscape and to promote eco-tourism while protecting the core biodiversity of the region.

• With this notification, Madhya Pradesh continues to lead in conservation efforts, maintaining its status as the Tiger State of India with the highest number of tiger reserves in the country.

Additional Information

• Kanha Sanctuary:

• Located in the Mandla and Balaghat districts, it was declared a National Park in 1955 and a Tiger Reserve in 1973.

• It is globally renowned for saving the Barasingha (Swamp Deer) from extinction and was the first tiger reserve in India to introduce an official mascot, Bhoorsingh the Barasingha.

• Pench Wildlife Sanctuary:

• This reserve is shared between Madhya Pradesh (Seoni and Chhindwara districts) and Maharashtra.

• It served as the inspiration for Rudyard Kipling classic novel, The Jungle Book, and features a landscape of teak forests and open grassy meadows.

• Panna Sanctuary:

• Situated in the Vindhyan hills, it is famous for its tiger reintroduction success story after the population was decimated in 2009.

• The Ken River flows through the reserve, which is also a designated UNESCO Biosphere Reserve known for its gharial and vulture conservation programs.

Q47. Answer: (c) Meiosis

The correct answer is Meiosis.

Key Points

• Meiosis is a specialized type of cell division that reduces the chromosome number by half, specifically occurring in the germ cells of sexually reproducing organisms.

• It results in the transformation of a diploid cell (containing two sets of chromosomes, 2n) into four haploid daughter cells (containing a single set of chromosomes, n), which are known as gametes (sperm and egg).

• The process involves two successive rounds of nuclear and cytoplasmic division, termed Meiosis I and Meiosis II, but includes only one cycle of DNA replication during the S-phase of interphase.

• In Meiosis I, homologous chromosomes pair up and exchange genetic material through a process called crossing over or recombination during Prophase I, which ensures genetic diversity in the offspring.

• Meiosis II is similar to mitosis, where sister chromatids are separated, eventually producing four genetically unique haploid cells that are essential for maintaining a constant chromosome number across generations.

Additional Information

• Mitosis:

• Commonly referred to as equational division, it occurs in somatic cells for growth, tissue repair, and asexual reproduction.

• Unlike meiosis, mitosis results in two genetically identical daughter cells with the same diploid chromosome number as the parent cell.

• Fertilization:

• This is the process of fusion of a haploid male gamete and a haploid female gamete to form a diploid zygote.

• It essentially acts as the biological counterpart to meiosis, restoring the diploid state (2n) necessary for the development of a new organism.

• Translocation:

• This is a type of chromosomal abnormality where a segment of one chromosome breaks off and attaches to a non-homologous chromosome.

• It is a structural mutation rather than a standard mode of cell division and can lead to genetic disorders or certain types of cancer.

Q48. Answer: (a) Finland

The correct answer is Finland.

Key Points

• The World Happiness Report 2025 officially ranked Finland as the happiest country in the world for the eighth consecutive year. This annual publication evaluates global well-being across more than 140 nations.

• The report is published by the UN Sustainable Development Solutions Network (SDSN) in collaboration with the Wellbeing Research Centre at the University of Oxford and Gallup.

• Rankings are primarily determined using the Cantril Ladder, where respondents rate their current life satisfaction on a scale from 0 to 10. The 2025 report specifically focused on the themes of caring and sharing and their impact on societal well-being.

• Six key variables are analyzed to explain the variation in happiness levels across countries: GDP per capita, social support, healthy life expectancy, freedom to make life choices, generosity, and perceptions of corruption.

• Finland achieved a leading score of approximately 7.74, driven by its robust social safety nets, high levels of public trust in institutions, and emphasis on work-life balance.

Additional Information

• Top Ranked Countries in 2025:

• Denmark secured the second position, followed by Iceland in third and Sweden in fourth. The Netherlands rounded out the top five, highlighting the continued dominance of Nordic and Western European nations.

• Norway, while consistently in the top tier, generally followed these countries in the 2025 rankings.

• Global Context:

• India showed slight improvement in its ranking, moving to 118th in 2025 from 126th in the 2024 report.

• Afghanistan remained at the bottom of the index (ranked 147th), reflecting the severe impact of prolonged conflict and humanitarian crises on national well-being.

• The International Day of Happiness, celebrated annually on March 20, serves as the typical launch date for the World Happiness Report to emphasize happiness as a fundamental human goal.

Q49. Answer: (c) Bhagavad Gita

The correct answer is Bhagavad Gita.

Key Points

• Sant Dnyaneshwar, also known as Jnanadeva, was a 13th-century Marathi saint, poet, and philosopher of the Nath tradition and the Bhagavata Dharma.

• The Bhavarthadipika, popularly known as the Jnaneshwari, is his most celebrated work, composed around 1290 CE when the saint was only in his teens.

• This monumental work serves as an extensive and aesthetic commentary on the Bhagavad Gita, which is originally a part of the Bhishma Parva of the Mahabharata.

• The primary objective of the Jnaneshwari was to make the profound spiritual wisdom of the Sanskrit Gita accessible to the common masses in their mother tongue, Marathi (specifically Old Marathi).

• It consists of approximately 9,000 verses (known as ovis) and is considered a foundational text for the Warkari sect in Maharashtra, emphasizing the path of Bhakti (devotion).

Additional Information

• Upanishads

• These are late Vedic Sanskrit texts that form the philosophical foundation of Hinduism.

• They focus on the concepts of Brahman (ultimate reality) and Atman (the individual soul), marking the transition from ritualism to internal spiritual enquiry.

• Vishnu Purana

• One of the eighteen Mahapuranas of Hinduism, it is primarily a Vaishnavite text praising Lord Vishnu.

• It includes detailed descriptions of cosmology, genealogy of kings and sages, and the various avatars of Vishnu.

• Brahma Sutras

• Attributed to the sage Badarayana, this text systematizes and summarizes the philosophical teachings found in the Upanishads.

• It is one of the three pillars of the Prasthanatrayi, the others being the Upanishads and the Bhagavad Gita.

Q50. Answer: (b) switch

The correct answer is switch.

Key Points

• The Alt + Tab keyboard shortcut is a core multitasking feature in the Windows 11 operating system, designed to facilitate rapid navigation between active windows.

• When a user presses and holds the Alt key and then taps the Tab key, a graphical interface known as the Task Switcher appears on the screen, displaying thumbnails of all running programs.

• This functionality allows the user to cycle through open applications and switch the system focus to a different task immediately upon releasing the keys.

• In Windows 11, the Task Switcher has been updated to include not only independent applications but also individual Microsoft Edge tabs, provided the feature is enabled in the System Settings.

• Using this shortcut is significantly faster than manually clicking on icons in the Taskbar, making it the primary method for professional workflows to switch between different software environments.

Additional Information

• Windows + Tab:

• This shortcut opens the Task View interface, which provides a bird's eye view of all open windows and allows for the management of Virtual Desktops.

• Alt + F4:

• A critical command used to close the currently active window or application; if no window is active, it prompts the Shut Down Windows dialog.

• Ctrl + S:

• The universal keyboard shortcut used within most software applications to save the current state of a document, project, or file to the storage drive.

• Windows + E:

• A dedicated system shortcut used to open the File Explorer, allowing users to browse folders and local files quickly.

Q51. Answer: (d) His reign focused mainly on consolidation and prosperity of the Gupta realm.

The correct answer is His reign focused mainly on consolidation and prosperity of the Gupta realm..

Key Points

• Kumaragupta I, who adopted the title Mahendraditya, ruled the Gupta Empire for approximately 40 years between 415 CE and 455 CE.

• Inheriting a vast and stable empire from his father, Chandragupta II, his rule is characterized by internal peace, administrative stability, and the preservation of inherited boundaries rather than aggressive expansion.

• The Bilsad Inscription and the Mandsaur Inscription provide evidence of a flourishing society where religious tolerance and public welfare were prioritized.

• His reign marked the zenith of the Gupta Golden Age, supported by a robust monetary system as evidenced by the discovery of numerous gold and silver coins across the empire.

• The performance of the Ashvamedha (horse sacrifice) during his reign was a symbolic assertion of his imperial sovereignty and the undisturbed prosperity of the realm.

Additional Information

• Cultural Contributions:

• Historical records attribute the founding of the prestigious Nalanda University in Bihar to Kumaragupta I, highlighting his role as a patron of learning and academia.

• He was a devotee of Lord Kartikeya, a fact depicted on his peacock-style coins, which distinguishes his numismatics from the Garuda-style coins of his predecessors.

• Evaluation of Challenges:

• The Pushyabhuti dynasty mentioned in Option 3 did not emerge as a significant force until the 6th century CE under Prabhakaravardhana; therefore, they were not a factor during Kumaragupta I's era.

• The actual military challenges at the end of his reign involved the Pushyamitras and the initial waves of Huna invasions, which were successfully repelled by his son, Skandagupta.

• Administrative Units:

• Under his rule, the empire was divided into provinces called Bhuktis, governed by Uparikas, and districts called Vishayas, managed by Vishayapatis, ensuring systematic revenue collection and judicial administration.

Q52. Answer: (c) MS Word

The correct answer is MS Word.

Key Points

• The .docx extension is the standard file format used by Microsoft Word, specifically introduced with the release of Microsoft Office 2007 to replace the older .doc binary format.

• The x in the extension stands for XML (Extensible Markup Language), as the file is essentially a compressed ZIP archive containing XML files that define the document structure, text, and formatting.

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• MS Word is a robust word processing software that allows users to create professional documents, reports, and letters, supporting advanced features like mail merge, macros, and embedded objects.

• Because it is based on the Open XML standard, .docx files are generally smaller in size and more resistant to data corruption compared to legacy document formats.

Additional Information

• MS Paint:

• It is a raster graphics editor included with Microsoft Windows.

• It typically creates and saves images in formats such as .png, .jpg, .bmp, and .gif.

• Notepad:

• A basic plain text editor that does not support advanced text formatting like bold or italics.

• It exclusively creates files with the .txt extension.

• Other MS Office Extensions:

• .xlsx: Used by Microsoft Excel for spreadsheet workbooks.

• .pptx: Used by Microsoft PowerPoint for presentation slides.

• .accdb: Used by Microsoft Access for database management.

Q53. Answer: (a) Statue of Unity

The correct answer is Statue of Unity.

Key Points

• The Statue of Unity is the world's tallest statue, reaching a monumental height of 182 meters (597 feet). It was specifically designed to be twice the height of the Statue of Liberty.

• The statue is dedicated to Sardar Vallabhbhai Patel, a visionary leader who played a pivotal role in the political integration of 562 princely states into the Union of India.

• It is situated on Sadhu Bet island, facing the Narmada Dam (Sardar Sarovar Dam) in the Narmada district of Gujarat.

• The project was announced in 2010 and the statue was inaugurated by Prime Minister Narendra Modi on October 31, 2018, which coincided with the 143rd birth anniversary of Patel.

• The statue was designed by the acclaimed Indian sculptor Ram V. Sutar and constructed by the Indian infrastructure giant Larsen & Toubro (L&T) at a cost of approximately 2,989 crore rupees.

Additional Information

• Sardar Vallabhbhai Patel:

• He is widely known as the Iron Man of India and the Bismarck of India for his resolute leadership.

• He served as the first Home Minister and the first Deputy Prime Minister of independent India.

• His birth anniversary, October 31, is celebrated annually as Rashtriya Ekta Diwas (National Unity Day).

• Statue of Equality:

• This is a 216-foot tall statue located in Muchintal, Hyderabad, dedicated to the 11th-century Bhakti saint Sri Ramanujacharya.

• Statue of Liberty:

• Located on Liberty Island in New York Harbor, USA, this colossal copper statue was a gift from the people of France to the United States.

• Statue of Equity:

• This refers to the 19-foot tall statue of Dr. B.R. Ambedkar, the architect of the Indian Constitution, which was inaugurated in Maryland, USA, in 2023.

Q54. Answer: (a) Any person or authority or government

The correct answer is Any person or authority or government.

Key Points

• Article 226 of the Constitution of India empowers the High Courts to issue directions, orders, or writs, including writs in the nature of Habeas Corpus, Mandamus, Prohibition, Quo Warranto, and Certiorari.

• The power under this article is exercisable by a High Court throughout the territories in relation to which it exercises jurisdiction to issue such orders to any person or authority, including in appropriate cases, any Government within those territories.

• The scope of Article 226 is significantly broader than Article 32 because it allows High Courts to issue writs not only for the enforcement of Fundamental Rights (Part III) but also for any other purpose, which includes the enforcement of ordinary legal rights.

• The expression any other purpose refers to the enforcement of any legal right that is not a fundamental right, making the High Court's writ jurisdiction more expansive in subject matter than that of the Supreme Court.

• A High Court can also issue writs to a government or authority located outside its territorial jurisdiction if the cause of action

arises, wholly or in part, within its own territories.

Additional Information

• Comparison between Article 32 and Article 226:

• Article 32 is a Fundamental Right in itself, meaning the Supreme Court cannot refuse to exercise its writ jurisdiction. In contrast, Article 226 is a discretionary power of the High Court.

• While the Supreme Court can issue writs only for the enforcement of Fundamental Rights, the High Court can issue them for both Fundamental Rights and common legal rights.

• The territorial jurisdiction of the Supreme Court extends to the entire country, whereas the High Court is limited to its specific state or union territory.

• The Five Types of Writs:

• Habeas Corpus: To produce a person who has been detained or imprisoned and examine the legality of the detention.

• Mandamus: A command issued to a public official or authority to perform a statutory duty they have failed to do.

• Certiorari: Issued to a lower court or tribunal to quash an order already passed due to lack of jurisdiction or error of law.

• Prohibition: Issued to prevent a lower court or tribunal from exceeding its jurisdiction or acting contrary to natural justice.

• Quo Warranto: To enquire into the legality of the claim which a person asserts to a public office.

Q55. Answer: (b) British dominance increased as French military influence collapsed permanently.

The correct answer is British dominance increased as French military influence collapsed permanently..

Key Points

• The Battle of Wandiwash was a decisive battle fought on January 22, 1760, during the Third Carnatic War (1758−1763), which was the Indian theatre of the global Seven Years' War.

• The British East India Company forces, led by Sir Eyre Coote, faced the French East India Company forces under the command of Comte de Lally.

• The battle resulted in a crushing defeat for the French, leading to the capture of their key general, Marquis de Bussy-Castelnau, and the eventual surrender of the French stronghold of Pondicherry in 1761.

• This victory effectively ended the French military challenge to British power in India, as the French lost almost all their possessions in the Carnatic region.

• The outcome established the British East India Company as the undisputed European power in India, allowing them to shift their focus towards territorial expansion in Bengal and Southern India without foreign interference.

Additional Information

• Treaty of Paris (1763):

• This treaty concluded the Seven Years' War and returned trading posts like Pondicherry and Chandernagore to the French.

• Crucially, the treaty stipulated that these posts were for commercial purposes only, and the French were forbidden from fortifying them or maintaining large standing armies in India.

• Causes of French Failure:

• The French government's lack of consistent support and the relative poverty of the French East India Company compared to the wealthy British East India Company.

• The British Navy maintained superior control over the sea routes, preventing reinforcements from reaching the French forces in the Deccan.

• Disagreements between French commanders like Lally and Bussy undermined their military strategies against the cohesive British leadership.

Q56. Answer: (c) British colonial education and printing technology

The correct answer is British colonial education and printing technology.

Key Points

• The introduction of the printing press in the 19th century acted as a catalyst for the growth of vernacular literature by enabling the mass production of books and journals at an affordable cost.

• British colonial education policies, such as the Wood’s Despatch of 1854, recommended the use of regional languages for primary education, which created a literate middle class capable of consuming and producing vernacular content.

• The establishment of Fort William College in 1800 at Calcutta was pivotal for the development of modern vernacular prose, as it required standardized textbooks in languages like Hindi, Bengali, and Urdu for training British officials.

• Exposure to Western literature through colonial schooling introduced Indian writers to new literary genres like the novel, short story, and essay, which were successfully adapted into local languages.

• The shift from Sanskrit and Persian, the traditional elite languages, to regional dialects allowed for a more democratic distribution of knowledge and a broader cultural awakening.

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Additional Information

• Serampore Mission Press:

• Founded in 1800 by William Carey, it was one of the earliest institutions to develop movable type for several Indian scripts, facilitating the translation of religious and educational texts.

• It printed the first major vernacular newspapers, which played a crucial role in forming public opinion during the Indian Renaissance.

• Social Reform Movements:

• Reformers like Raja Ram Mohan Roy used the power of the press to advocate for social change through publications like Sambad Kaumudi in Bengali.

• These movements relied heavily on vernacular languages to reach the common people, thereby institutionalizing regional scripts for intellectual discourse.

Q57. Answer: (d) Daman & Diu

The correct answer is Daman & Diu.

Key Points

• According to the Census 2011, the Union Territory of Daman & Diu recorded the lowest sex ratio in India at 618 females per 1000 males.

• The Sex Ratio is a demographic metric defined as the number of females per 1000 males in a population; the national average in 2011 was 943.

• The stark gender imbalance in Daman & Diu is primarily attributed to a massive influx of male migrant workers who move to the region for industrial and manufacturing employment.

• The Census 2011 was the 15th National Census of India and the 7th since Independence, conducted under the Census Act 1948.

Additional Information

• Haryana:

• Among all Indian states, Haryana recorded the lowest sex ratio at 879 females per 1000 males.

• Chandigarh:

• This Union Territory registered a sex ratio of 818, which is higher than Daman & Diu but lower than the national average.

• Delhi:

• The National Capital Territory of Delhi recorded a sex ratio of 868 as per the 2011 data.

• Kerala and Puducherry:

• Kerala recorded the highest sex ratio in India at 1084, while Puducherry recorded the highest sex ratio among Union Territories at 1037.

Q58. Answer: (a) Tamil Nadu

The correct answer is Tamil Nadu.

Key Points

• According to the Ministry of Coal Annual Report 2024-25, the total geological resources of lignite in India were estimated at 47,295.61 million tonnes as of April 1, 2024.

• Tamil Nadu holds the highest proportion of these reserves, with 37,523.65 million tonnes, which accounts for approximately 79.34% of the country's total.

• The state's massive lignite deposits are largely concentrated in the Neyveli and Mannargudi lignite fields.

• These resources in Tamil Nadu are categorized into Measured (5,476.00 MT), Indicated (21,412.16 MT), and Inferred (10,635.49 MT) categories.

Additional Information

• Jharkhand:

• It holds the largest reserves of coking coal (Gondwana coal) in India, particularly in the Jharia coalfield, but has negligible lignite resources.

• Rajasthan:

• It ranks second in lignite reserves with 6,586.24 million tonnes (approximately 13.93% share), found mainly in Barmer and Bikaner districts.

• Gujarat:

• It ranks third with 2,722.05 million tonnes (around 5.76% share), with major deposits located in the Kutch and Surat regions.

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Q59. Answer: (c) Odisha

The correct answer is Odisha.

Key Points

• The Tropic of Cancer is an imaginary line that is located at an angle of 23.50 degrees North of the Equator. It represents the northernmost circle of latitude on Earth at which the Sun can be directly overhead.

• In India, this latitudinal line passes through a total of 8 states. Moving from West to East, these states are Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura, and Mizoram.

• Odisha is a coastal state located on the eastern side of India. Geographically, it lies between 17.49 degrees North and 22.34 degrees North latitudes. Since the Tropic of Cancer sits at approximately 23.5 degrees North, it remains entirely north of the state of Odisha.

• Among the given options, Gujarat is the entry point of the line from the west, Madhya Pradesh contains the longest stretch of the line, and it also crosses through the heart of West Bengal before entering Bangladesh.

Additional Information

• Geographical Characteristics:

• The Mahi River is the only river in India that cuts the Tropic of Cancer twice, first in Madhya Pradesh and then in Gujarat.

• The city of Udaipur in Tripura is considered the city closest to the Tropic of Cancer in India.

• While the line passes through 8 states, Madhya Pradesh has the maximum length of the line, while Rajasthan has the minimum length.

• The Standard Meridian of India (82.5 degrees East) and the Tropic of Cancer intersect each other at Koriya district in Chhattisgarh.

Q60. Answer: (c) Algeria

The correct answer is Algeria.

Key Points

• Algeria was officially authorized to join the New Development Bank (NDB), also known as the BRICS Bank, following an announcement by the bank's President, Dilma Rousseff, in August 2024.

• The decision was finalized during the 9th Annual Meeting of the NDB Board of Governors held in Cape Town, South Africa.

• With this induction, Algeria becomes the 9th member of the institution, joining the original five founding BRICS nations and the three countries that joined in the first expansion wave (Bangladesh, United Arab Emirates, and Egypt).

• The NDB was established in July 2014 at the 6th BRICS Summit in Fortaleza, Brazil, to mobilize resources for infrastructure and sustainable development in emerging markets.

• Algeria's membership is a strategic move to diversify its economy and gain access to new sources of infrastructure financing, given its status as a major global natural gas exporter and its robust macroeconomic performance.

Additional Information

• Structure and History of NDB:

• Headquarters: The bank is located in Shanghai, China, and operates as a multilateral development bank.

• Founding Members: The original members are Brazil, Russia, India, China, and South Africa.

• Expansion Timeline: In 2021, the NDB admitted Bangladesh, the United Arab Emirates (UAE), and Egypt as new members. Uruguay was also admitted as a prospective member, but its final integration process is often counted separately from active full members like Algeria.

• Leadership: The current President of the NDB is Dilma Rousseff, who previously served as the President of Brazil.

• Authorized Capital: The bank was established with an initial authorized capital of 100 billion USD.

• Geopolitical Context: While the BRICS alliance expanded its core political membership in January 2024 (including countries like Iran and Ethiopia), the NDB operates as a separate financial entity with its own independent membership process.

Q61. Answer: (b) Operating System

The correct answer is Operating System.

Key Points

• An Operating System is classified as System Software, which acts as the fundamental interface between the computer hardware and the user.

• Unlike Application Software, which is designed to perform specific tasks for the end-user, system software manages the internal operations of the computer, such as memory management, process scheduling, and file storage.

• The Operating System provides a platform upon which application programs run; without an OS, software like word processors or web browsers cannot function because they lack direct access to CPU resources and input/output devices.

• Major examples of operating systems include Microsoft Windows, macOS, Linux, and mobile platforms like Android and iOS.

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• Application software is typically installed on top of the Operating System to execute high-level functions, whereas the OS remains responsible for hardware abstraction and system security.

Additional Information

• Microsoft Publisher

• It is an entry-level desktop publishing application that differs from Microsoft Word by focusing more on page layout and design.

• Users utilize it for creating marketing materials, brochures, and calendars.

• Microsoft Excel

• This is a spreadsheet application used for data organization, mathematical calculations, and graphing tools.

• It is a core component of the Microsoft Office productivity suite.

• Adobe Photoshop

• It is a professional raster graphics editor used for image manipulation, photo retouching, and digital art.

• It is considered the industry standard for graphic design and visual media production.

Q62. Answer: (c) Dadabhai Naoroji

The correct answer is Dadabhai Naoroji.

Key Points

• Dadabhai Naoroji, widely known as the Grand Old Man of India, was the first person in pre-independence India to scientifically estimate the poverty line and discuss it in detail.

• In his seminal work titled Poverty and Un-British Rule in India, published in 1901, he highlighted the extreme economic distress and exploitation of the Indian population under the colonial administration.

• He formulated the famous Drain of Wealth theory, asserting that Britain was systematically siphoning off India's resources, capital, and wealth, which led to widespread famine and poverty.

• To quantify poverty, Naoroji used the jail cost of living as a proxy for the minimum subsistence level, arguing that even the diet provided to prisoners should be considered the baseline for survival.

• His calculations for the period 1867-68 suggested a poverty line ranging from Rs 16 to Rs 35 per capita per year, based on the prices of essential commodities like rice, flour, dal, ghee, and salt.

• He arrived at this figure by calculating the food requirements of an adult and adjusting it for the total population, including children, through a weighted average method.

Additional Information

• Methodology of Estimation:

• Naoroji divided the population into two categories: producers (adults) and non-producers (children).

• He assumed children constituted one-third of the population and consumed very little, while the remaining two-thirds were adults who consumed the full jail diet.

• By taking the average of these groups, he derived the subsistence level required for a person to remain above the poverty line.

• Historical Context of Options:

• Mahatma Gandhi: Focused on the concept of Gram Swaraj and rural empowerment but did not formulate a statistical poverty line in a published book format like Naoroji.

• Jawaharlal Nehru: Chaired the National Planning Committee in 1938, which later worked on defining basic minimum standards of living, but this was decades after Naoroji's initial work.

• Rabindranath Tagore: While he contributed significantly to rural reconstruction through Sriniketan, his work was primarily social and philosophical rather than statistical economic analysis.

• Political Legacy:

• Naoroji was a co-founder of the Indian National Congress and served as its President in 1886, 1893, and 1906.

• He was also the first Indian to be elected as a member of the British House of Commons, representing the Liberal Party.

Q63. Answer: (c) Proceedings are informal, flexible, and less technical

The correct answer is Proceedings are informal, flexible, and less technical.

Key Points

• In a Lok Adalat, legal representation is not a strict necessity as the forum encourages parties to interact directly with the presiding officers to reach a compromise. Hence, statement 1 is incorrect.

• The Lok Adalat is not bound by the Code of Civil Procedure, 1908 or the Indian Evidence Act, 1872, which allows it to bypass formal courtroom rigmarole and technical evidence rules. Hence, statement 2 is incorrect.

• The essence of a People’s Court lies in its informal, flexible, and less technical nature, which ensures that disputes are settled through a friendly dialogue and conciliation rather than adversarial litigation. Hence, statement 3 is correct.

• While Supreme Court judges can preside, sessions are usually led by sitting or retired judicial officers of various ranks, including

District Judges and High Court judges, assisted by social workers and advocates. Hence, statement 4 is incorrect.

Additional Information

• Statutory Framework:

• Lok Adalats have been given statutory status under the Legal Services Authorities Act, 1987.

• The award passed by a Lok Adalat is deemed to be a decree of a Civil Court.

• Finality of Decision:

• The decision made by the Lok Adalat is final and binding on all parties involved.

• There is no provision for an appeal against the award in any higher court, as the settlement is based on mutual consent.

• Jurisdiction and Cost:

• They handle both cases pending in courts and those at the pre-litigation stage, such as marital disputes, land acquisition, and compoundable criminal offenses.

• There is no court fee involved; if a case is already in court and then settled in Lok Adalat, the original court fee paid is refunded to the parties.

Q64. Answer: (d) Delhi Stock Exchange Ltd.

The correct answer is Delhi Stock Exchange Ltd..

Key Points

• The Delhi Stock Exchange (DSE) was established in 1947 and was historically one of the premier stock exchanges in Northern India.

• On November 19, 2014, the Securities and Exchange Board of India (SEBI) withdrew its recognition of the Delhi Stock Exchange Ltd., marking its exit from the stock trading business.

• The derecognition occurred because the exchange failed to comply with the Corporatization and Demutualization Scheme and failed to achieve the mandatory net worth and turnover criteria required for continuous operation.

• Under the Securities Contracts (Regulation) Act, 1956, exchanges are required to maintain specific regulatory standards to protect investor interests; DSE was found non-compliant with these statutory requirements.

• Following its derecognition, the exchange was directed to provide an exit option to its shareholders and settle its administrative and financial liabilities.

• Consequently, the Delhi Stock Exchange Ltd., which is the fourth option provided, is no longer a functional stock exchange in the country.

Additional Information

• National Stock Exchange of India Ltd. (NSE):

• Founded in 1992 and headquartered in Mumbai, it is the leading stock exchange in India and the world's largest derivatives exchange by volume.

• National Commodity & Derivatives Exchange Ltd. (NCDEX):

• An online multi-commodity exchange established in 2003, primarily focusing on the trading of agricultural commodities.

• Multi Commodity Exchange of India Ltd. (MCX):

• India's first listed exchange and the largest commodity derivatives exchange, facilitating the trading of energy, bullion, and base metals.

Q65. Answer: (c) Spiti Valley

The correct answer is Spiti Valley.

Key Points

• Spiti Valley, located in the Lahaul and Spiti district of Himachal Pradesh, serves as the primary geographic area for the Cold Desert Biosphere Reserve, which attained international recognition under the UNESCO World Network of Biosphere Reserves (WNBR) in 2025.

• This biosphere reserve spans an extensive area of approximately 7,770 square kilometers and encompasses critical ecological zones including Pin Valley National Park, Kibber Wildlife Sanctuary, Sarchu, and the high-altitude wetland of Chandertal.

• The region is classified under the Trans-Himalayan biogeographic zone, characterized by extreme temperatures ranging from −30°C in winter to 20°C in summer, and receives negligible rainfall, making it a unique high-altitude cold desert ecosystem.

• It acts as a vital sanctuary for the conservation of the Snow Leopard (Panthera uncia), supporting a robust population alongside other rare species such as the Tibetan Wolf, Himalayan Ibex, Bharal (Blue Sheep), and the Snow Partridge.

• The UNESCO designation in 2025 highlights the valley's importance in balancing biodiversity conservation with the sustainable development of local Tibetan Buddhist communities who have coexisted with the wildlife for centuries.

Additional Information

• Ladakh Wildlife Division:

• Manages the Hemis National Park, which is the largest national park in India and a major global site for Snow Leopard research.

• Focuses on the protection of the Tibetan Wild Ass (Kiang) and the Black-necked Crane in the high-altitude plateaus.

• Nubra Valley Reserve:

• Located in the Union Territory of Ladakh, it is famous for its unique cold desert sand dunes and the Shyok River.

• It is the natural habitat for the Bactrian Camels (double-humped camels), which are remnants of the ancient Silk Road trade era.

• Kargil Wildlife Sanctuary:

• Situated near the Line of Control (LoC), this area is critical for the survival of the Himalayan Brown Bear and the Long-tailed Marmot.

• It serves as a migratory corridor for various high-altitude avian species and rare medicinal plants like Aconitum.

Q66. Answer: (a) Multitasking and reliability

The correct answer is Multitasking and reliability.

Key Points

• Multitasking is the capability of a computer system, particularly a Server, to process multiple tasks or user requests concurrently. In a computer lab, the server utilizes Time-Sharing techniques to switch between login processes so rapidly that it appears to handle all students at the same time.

• Reliability refers to the ability of the hardware and Operating System to perform consistently without failure. Handling requests without confusion signifies that the system maintains high accuracy and data integrity, ensuring that student A is not logged into student B's account.

• The scenario highlights the Multi-user nature of server environments where the Central Processing Unit (CPU) manages resource allocation across various network nodes efficiently.

• Servers are specifically designed with Redundancy and high Fault Tolerance to ensure that the influx of simultaneous data packets does not lead to a system crash or logic errors.

Additional Information

• Versatility

• This refers to the computer's capacity to perform a wide variety of different jobs, such as Scientific Calculations, Multimedia playback, and Database Management, but it does not specifically define the simultaneous management of users.

• Portability

• This relates to the ease of moving a computing device from one location to another. While Laptops and Tablets are highly portable, lab servers are typically stationary Rack-mounted systems.

• Lack of memory

• This is a technical limitation or a deficit. To handle many logins effectively, a server requires substantial Random Access Memory (RAM) and Cache memory to store temporary session data for every active user.

Q67. Answer: (b) It carries huge quantities of sediment from the Himalayas

The correct answer is It carries huge quantities of sediment from the Himalayas.

Key Points

• The Kosi River, an antecedent river originating in the high Himalayas (Tibet and Nepal), drains one of the most geologically unstable and erosion-prone mountain ranges in the world.

• Due to the steep mountain gradients and fragile lithology of its catchment area, the river carries an exceptionally high sediment load consisting of silt, sand, and boulders.

• When the river emerges from the foothills and enters the flat Indo-Gangetic plains of North Bihar, its flow velocity decreases drastically due to the sudden reduction in the slope.

• The reduced energy of the water makes it unable to transport the heavy debris, leading to massive sedimentation and the continuous rising of the riverbed, a process known as aggradation.

• As the riverbed becomes choked with silt, the river is forced to breach its natural levees and seek a new path with a lower elevation, resulting in frequent lateral channel shifts or avulsions.

• Historically, the Kosi has shifted its course westward by approximately 120 kilometers over the last 250 years, creating a massive alluvial fan known as the Kosi Mega-fan.

Additional Information

• Sorrow of Bihar:

• The river is notorious for catastrophic flooding and unpredictable behavior, earning it the title Sorrow of Bihar because of the massive displacement of people and destruction of crops.

• Its major tributaries include the Sun Kosi, Arun, and Tamur, which join at the Triveni in Nepal to form the Saptakoshi.

• Tectonic and Climatic Factors:

• Unlike the Narmada and Tapi, which flow through tectonic rift valleys, the Kosi flows over a deep alluvial basin where shifting is primarily a function of siltation rather than structural rifts.

• While the Southwest Monsoon provides nearly 80 percent of the annual water discharge, the sediment dynamics remain the fundamental cause of the channel instability.

• The Kosi Barrage at Birpur was constructed to regulate flow and manage irrigation, but the high siltation rates continue to pose a major challenge to flood management infrastructure.

Q68. Answer: (b) Sachin Tendulkar

The correct answer is Sachin Tendulkar.

Key Points

• Playing It My Way is the official autobiography of the former Indian cricketer Sachin Ramesh Tendulkar, who is widely considered one of the greatest batsmen in the history of the sport.

• The book was released on 5 November 2014 and was co-authored by Boria Majumdar, a well-known Indian sports historian and journalist.

• It provides a detailed account of Tendulkar's twenty-four-year long international career, covering his childhood, his debut at the age of 16, and his journey to becoming the only player to score 100 international centuries.

• The autobiography covers significant milestones, including India's victory in the 2011 ICC Cricket World Cup and his final retirement after his 200th Test match against the West Indies at the Wankhede Stadium in Mumbai.

• The publication set a record in the Limca Book of Records for being the best-selling adult hardback in both fiction and non-fiction categories within the first few days of its release.

Additional Information

• Mohammed Shahid:

• He was a legendary Indian Field Hockey player renowned for his exceptional dribbling skills and agility on the field.

• He was a vital member of the Indian team that secured the Gold Medal at the 1980 Moscow Olympics and was awarded the Arjuna Award and Padma Shri.

• Subhadra Pradhan:

• She is a former Indian Hockey player who played as a midfielder for the national women's team.

• She represented India in several prestigious international events, including the Commonwealth Games and the Asia Cup, earning the Player of the Tournament title at the 2009 Asia Cup.

• Debashish Mishra:

• He is a former First-Class cricketer from Odisha who played as a wicket-keeper batsman in the Ranji Trophy during the 1990s.

Q69. Answer: (c) Dark-coloured surface

The correct answer is Dark-coloured surface.

Key Points

• A dark-coloured surface is highly efficient at absorbing thermal radiation. When sunlight or radiant heat hits a dark object, the surface absorbs a vast majority of the electromagnetic waves, converting them into heat energy rather than reflecting them.

• The process of absorption increases the kinetic energy of the molecules within the material, which results in a measurable rise in temperature. This physical property is why dark objects feel hotter to the touch when exposed to the sun.

• During winters, the ambient environment is cold, and the human body requires external heat to maintain homeostasis. Wearing clothes with a dark-coloured surface helps in trapping maximum solar energy, providing a natural warming effect.

• According to Kirchhoffs Law of thermal radiation, a good absorber of a particular wavelength is also a good emitter of that wavelength. However, the high rate of solar gain during daylight hours makes dark surfaces the optimal choice for staying warm in cold weather.

Additional Information

• White surface:

• A white or light-coloured surface has a very high albedo, meaning it reflects most of the incident visible light and infrared radiation.

• Because these surfaces absorb minimal heat, they are preferred during summers to keep the body or buildings cool by preventing thermal gain.

• Shiny surface:

• Shiny surfaces, such as polished metals, act as excellent reflectors of radiant heat and have low emissivity.

• These are often used in vacuum flasks or emergency blankets to minimize heat transfer through radiation, effectively keeping hot things hot and cold things cold.

• Radiation:

• This is a mode of heat transfer that does not require a material medium for propagation, allowing solar energy to travel through

the vacuum of space to reach the Earth.

• The colour and texture of a surface are the primary factors determining its efficiency in radiant heat exchange.

Q70. Answer: (d) New Zealand

The correct answer is New Zealand.

Key Points

• Suzie Bates is a legendary opening batter and former captain of the New Zealand women's national cricket team, famously known as the White Ferns.

• She created history during the 2025 Women’s ODI World Cup by becoming the first woman cricketer to reach the milestone of 350 international matches, encompassing appearances across Tests, One Day Internationals (ODIs), and T20 Internationals (T20Is).

• Bates made her international debut for New Zealand in 2006 and has since established herself as one of the most durable and prolific players in the history of the sport.

• She holds the record for the highest number of runs scored in Women's T20 Internationals (WT20Is) and was named the ICC Women's ODI and T20I Cricketer of the Year in 2016.

• Beyond cricket, she is a dual-international athlete who represented New Zealand in basketball at the 2008 Beijing Olympics.

Additional Information

• New Zealand (White Ferns):

• The team secured their first-ever ICC Women's T20 World Cup title in October 2024.

• They previously won the ICC Women's Cricket World Cup (ODI) in 2000.

• Australia:

• Home to iconic players like Ellyse Perry, who is also among the most-capped players globally.

• Australia remains the most successful team in women's cricket history with multiple World Cup trophies.

• England:

• England hosted and won the first-ever Women's World Cup in 1973.

• Key veteran players include Heather Knight and Danni Wyatt-Hockley.

• South Africa:

• Known as the Proteas, the team reached the finals of the 2023 T20 World Cup and the 2024 T20 World Cup.

Q71. Answer: (c) None

Given: 5 4 5 6 5 8 5 1 7 6 3 9 7 6 4 1 7 6 4 5 7 6 4 7 7 6

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

Required Conditions: Perfect square - Even digits - Perfect square.

So, there are None such even digits.

Hence, the correct answer is 'Option 3'.

Q72. Answer: (b) Three

Given: Seven boxes G, H, I, L, M, N and O are kept one over the other but not necessarily in the same order.

1. Only three boxes are kept below H.
2. O is kept immediately above H.
3. Only G is kept above L.

Position	Box
7	G
6	L
5	O
4	H
3	
2	
1	

1. I is kept immediately above N.
2. M is not kept at the lowermost position.

Final Arrangement:

7	G
6	L
5	O
4	H
3	M
2	I
1	N

There are three boxes, H, O, and L kept between M and G.

Hence, the correct answer is 'Three'.

Q73. Answer: (d) Q

Given Word: CORRECT

According to information,

C	O	R	R	E	C	T
− 1	• 1	− 1	− 1	• 1	− 1	− 1
B	P	Q	Q	F	B	S

Left B P Q Q F B S Right

4th letter from right = Q

Hence, the correct answer is "option 4"

Q74. Answer: (d) 78

The logic follows here,

Logic: The series follows a pattern where each subsequent number is obtained by adding consecutive multiples of 5 to the previous number.

• 63 + 5 = 68

• 68 + 10 = 78

• 78 + 15 = 93

• 93 + 20 = 113

• 113 + 25 = 138

The missing number in the series is 78.

Hence, the correct answer is "Option 4"

Q75. Answer: (b) ix

The logic follows here,

By comparing the two phrases, we can determine the code for the common word:

Therefore, the code for ‘calm’ is ‘ix’.

Hence, the correct answer is "option 2"

Q76. Answer: (b) C

Given: Six boxes F, G, H, I, J and C are kept one over the other but not necessarily in the same order

1. Only H is kept above J.

2. Only four boxes are kept between H and I.

Position	Box
6	H
5	J
4	
3	

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2	
1	I

1. Only two boxes are kept between J and F.
2. C is kept immediately above G.

Final Arrangement:

6	H
5	J
4	C
3	G
2	F
1	I

Counting from the bottom the box at the fourth position from the bottom is C.

Hence, the correct answer is "Option 2".

Q77. Answer: (b) 1 km to the west

Given:

• Vikash starts from Point A and drives 14 km towards the south. He then takes a right turn, drives 17 km, turns right and drives 19 km.

• He then takes a right turn and drives 18 km.

• He takes a final right turn, drives 5 km and stops at Point P

The Final Diagram,

1 km to the west in order to reach Point A again

Hence, the correct answer is "Option 2"

Q78. Answer: (b) U

Given Word: CENTURY

According to the information,

C	E	N	T	U	R	Y
+1	+1	+1	+1	+1	+1	+1
D	F	O	U	V	S	Z

Alphabetical order: Left D F O S U V Z Right

Counting from the left, the fifth letter is U.

Hence, the correct answer is "Option 2".

Q79. Answer: (d) Three

Given: Seven people P1, P2, P3, P4, P5, P6 and P7 are sitting around a circular table facing towards the centre of the table.

1. P2 sits to the immediate right of P6.
2. P5 is sitting immediately between P4 and P3.
3. P2 sits second to left of P4.
4. P1 sits third to left of P7

The Final Arrangement is,

Three people are sitting between P1 and P7 when checked from right of P7.

Hence, the correct answer is "Option 4"

Q80. Answer: (c) 9

BODMAS Rule:

:

Letter	A	B	C	D

Operator	÷	×	•	−

Given Expression: 36 A 3 C 21 D 12 B 2 = ?

After substituting the letters and following BODMAS rule

= 36 ÷ 3 + 21 − 12 × 2

= 12 + 21 − 12 × 2

= 12 + 21 − 24

= 31− 24

= 9

Hence, the correct answer is "option 3"

Q81. Answer: (c) WGT 15

The logic follows here,

Hence, the correct answer is "Option 3".

Q82. Answer: (c) Sister

Family Chart:

Let us first decode the given symbols and then draw a family tree.

Symbol	**!**		**=**	•
Meaning	Wife	Sister	Father	Son

Given : N > U − R ! S = E

From the family tree, it is clear that R and S are parents of N, U, and E. Since N is female, she is the sister of both U and E.

Hence, the correct answer is 'Option 3'.

Q83. Answer: (d) WYU

The logic follows here,

Hence, the correct answer is "option 4"

Q84. Answer: (c) (9, 39, 15)

The logic followed here is:

Logic: Second Number = First Number + Third Number + 15

For the first set (13, 33, 5)

=> 13 + 5 + 15

=> 18 + 15 = 33.

For the second set (6, 40, 19)

=> 6 + 19 + 15

=> 25 + 15 = 40.

Applying the same logic to the correct set (9, 39, 15)

=> 9 + 15 + 15

=> 24 + 15 = 39.

Hence, the correct answer is 'Option 3'.

Q85. Answer: (d) Wife's sister

Family Chart:

The family tree diagram,

From the family tree, it is evident that G is the sister of J, and J is the wife of M. Therefore, G is the Wife's sister of M.

Hence, the correct answer is 'Option 4'.

Q86. Answer: (d) VUY

The logic follows here,

Logic: Second letter = First letter − 1; Third letter = Second letter + 3.

For GFI,

For BAD,

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For NMP,

For VUY,

This letter cluster does not follow the rule.

Therefore, the letter cluster that is different from the others is VUY.

Hence, the correct answer is 'Option 4'.

Q87. Answer: (c) ZDPT

The logic followed in this pattern is a constant shift in the English alphabetical order.

For 'LPBF' related to 'QUGK':

L(12)	P(16)	B(2)	F(6)
+5 ↓	+5 ↓	+5 ↓	+5 ↓
Q(17)	U(21)	G(7)	K(11)

For 'FJVZ' related to 'KOAE':

F(6)	J(10)	V(22)	Z(26)
+5 ↓	+5 ↓	+5 ↓	+5 ↓
K(11)	O(15)	A(1)	E(5)

Applying the same logic to 'UYKO':

U(21)	Y(25)	K(11)	O(15)
+5 ↓	+5 ↓	+5 ↓	+5 ↓
Z(26)	D(4)	P(16)	T(20)

Thus, UYKO is related to ZDPT.

Hence, the correct answer is 'Option 3'.

Q88. Answer: (a) FN -3

The logic follows here,

For TJ 12 is related to VF 4,

For, HE 10 is related to JA 2

Applying the same logic to DR 5:

The term related to DR 5 is FN −3.

Hence, the correct answer is 'Option 1'.

Q89. Answer: (b) DOW103

The logic follows here,

By combining the results, the missing cluster is DOW103.

Hence, the correct answer is "Option 2".

Q90. Answer: (d) 55

BODMAS rule:

Operator conversion:

A	B	C	D
÷	×	•	−

After replacing and using BODMAS rule:

=> 10 ÷ 2 + 35 × 2 = ? + 20

=> 5 + 35 × 2 = ? + 20

=> 5 + 70 = ? + 20

=> 75 = ? + 20

? = 55

The value of the question mark is 55.

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Hence, the correct answer is "option 4"

Q91. Answer: (a) Two

Given: Seven people, Manu, Neha, Ojas, Pritam, Rina, Sita, and Tina, are sitting around a circular table, facing the center.

1. Rina sits second to the right of Tina and second to the left of Sita.

2. Manu sits third to the left of Ojas, and Manu is an immediate neighbor of Rina.

3. Pritam sits second to the left of Manu

The Final Arrangement is,

Two people sit between Sita and Tina when counted from the left of Tina.

Hence, the correct answer is 'Option 1'.

Q92. Answer: (b) Only conclusion (I) follows

The least possible Venn diagram for the given statements is:

Conclusions:

(I) Some pickles are flowers. - Follow (Some pickles are seeds. All seeds are flowers. Hence, Some pickles are flowers is true)

(II) All flowers are seeds - Does not follow (Some pickles are seeds. All seeds are flowers.All flowers are seeds is may be possible but not definite Hence, it is false)

Only conclusion (I) follows

Hence, the correct answer is “Option 2”.

Q93. Answer: (c) 12

Given number: 1528634

According to information if 2 is added to each odd digit and 1 is subtracted from each even digit in the number,

Left 3 7 1 7 5 5 3 Right

So, the sum of the digit second from the left and the digit second from the right is:7 + 5 = 12.

Hence, the correct answer is 'Option 3'.

Q94. Answer: (d) KN - MJ - IL

The logic follows here,

For FI − HE − DG:

For LO − NK − JM:

Applying the same logic,

The correct answer is KN − MJ − IL.

Hence, the correct answer is "Option 4".

Q95. Answer: (d) Only conclusion (II) follows

The least possible Venn diagram for the given statements is:

Conclusions:

(I) Some hens are cats - Does not follow

(As there is no direct relation between the hens and the cats may be it is possible but not definite. Hence, it is false)

(II) Some shirts are cats. - Follow (All cats are shirts and some cats are shirts and some shirts are cats is true)

Therefore, only conclusion (II) follows.

Hence, the correct answer is “Option 4”.

Q96. Answer: (b) IGK

The logic followed here is,

Logic: First letter − 2 = Second letter; Second letter + 3 = Third letter.

For CAD,

For FDG,

For KIL,

For IGK

Therefore, the letter cluster that is different from the others is IGK.

Hence, the correct answer is 'Option 2'.

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Q97. Answer: (b) DF-WP

The logic follows here,

For SU-KE,

For DF-WP,

For HJ-ZT,

For UW-MG,

Therefore, the letter-cluster pair that is different from the others is DF-WP.

Hence, the correct answer is 'Option 2'.

Q98. Answer: (c) 14th

The logic followed here is:

Total number of students in the line = 214

Position of Rt from the left end = 164^(th)

Position of Kl from the left end = Position of Rt from the left end + 37

= 164 + 37

= 201^(st)

Position of Kl from the right end = (Total number of students + 1) − Position of Kl from the left end

= (214 + 1) − 201

= 215 − 201

= 14^(th)

So, Kl is 14^(th) from the right end of the line.

Hence, the correct answer is "Option 3"

Q99. Answer: (c) 176

The logic follows here,

Logic: Each number in the given series is obtained by dividing the preceding number by 2.

• 352 ÷ 2 = 176

• 176 ÷ 2 = 88

• 88 ÷ 2 = 44

• 44 ÷ 2 = 22

• 22 ÷ 2 = 11

Hence, the correct answer is "option 3"

Q100. Answer: (c) 7

The logic follows here,

The code for each letter is determined by comparing the given words and their corresponding sets of digits to identify common elements.

Therefore, the code for E is 7.

Hence, the correct answer is "Option 3"

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