RRB NTPC (UG) CBT-I Official Paper (Held On 19 Jun, 2026 Shift 3) (Previous Year Paper)

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

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MATHEMATICS

Q1. Four years ago, Ravi was thrice as old as Kaviraj. At present, Ravi is twice as old as Kaviraj. Find Ravi's age at present.

(a) 12 years
(b) 16 years
(c) 10 years
(d) 8 years

Q2. The LCM of the numbers 3, 7.2 and 0.64 is:

(a) 153
(b) 96
(c) 72
(d) 144

Q3. If a sum is invested at a simple interest rate of 8% per annum for 9 months to earn an interest of Rs. 18,000, what was the principal amount invested?

(a) Rs. 3,50,000
(b) Rs. 2,50,000
(c) Rs. 4,00,000
(d) Rs. 3,00,000

Q4. A regular polygon has 45 sides; each of length 2 cm. The area (in cm^2) of the polygon is

(a) 45
(b) 45 cos(4°)
(c) 45 cot(4°)
(d) 45 tan(4°)

Q5. The ratio of land to water for Earth as a whole is 1:3, and it is 2:5 in the Northern hemisphere. If the areas of the Northern and the Southern hemispheres are equal, then the ratio of land to water in the Southern hemisphere is:

(a) 7:5
(b) 11:7
(c) 3:11
(d) 1:5

Q6. An article is sold at a profit of 38%. If the cost price is increased by Rs. 20 and the selling price is reduced by Rs. 45, then the profit would be 37.5%. What is the original cost price (in Rs.) of the article?

(a) 14,500
(b) 14,400
(c) 14,700
(d) 14,300

Q7. A and B can do a piece of work in 12 days and 20 days, respectively. Both work for 3 days and then A leaves. How long (in days) will B take to complete the remaining work?

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

Q8. A customer orders food online worth Rs. 1,000. The food delivery app offers a flat promotional discount of 20% on the bill. After this discount, if the amount falls between Rs. 650 to Rs. 800 (both inclusive), an additional discount of 5% is applied on that bill. If the bill includes a fixed delivery charge of Rs. 80 on all orders, what is the final amount the customer has to pay?

(a) Rs. 900
(b) Rs. 840
(c) Rs. 800
(d) Rs. 760

Q9. A number is divided into two sections such that one part is 10 more than the other. If their ratio is 6:4, what are the two parts of the number?

(a) 30 and 20
(b) 32 and 22
(c) 32 and 20
(d) 34 and 24

Q10. A factory produces three types of widgets: A, B, and C. In one week, 12 units of A (average weight 47 kg each), 8 units of B (average weight 62 kg each), and 15 units of C (average weight 53 kg each) are manufactured. What is the weighted average weight of the widgets produced in that week?

(a) 53 kg
(b) 51 kg
(c) 54 kg
(d) 52.5 kg

Q11. A, B and C are partners in a business. A, whose money has been used for 4 months, claims 1/8 of the profit. B, whose money has been used for 6 months, claims 1/3 of the profit. C had invested Rs. 1560 for 8 months. How much money did A contribute?

(a) Rs. 810
(b) Rs. 794
(c) Rs. 720
(d) Rs. 690

Q12. ABCD is a quadrilateral in which AB||DC, and E and F are the mid points of the diagonals AC and BD, respectively. If AB = 23 cm, BC = 91 cm, DC = 35 cm, and AD = 62 cm, then what is the length (in cm) of EF?

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

Q13. To prepare a fruit punch, 2 litres of orange juice are mixed with 5 litres of water. How much water is required if 5 litres of orange juice are used?

(a) 12.5 litres
(b) 15.5 litres
(c) 18 litres
(d) 10 litres

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Q14. Simplify {(13/33)÷ (13/7)}÷ (2/8× 16/6+5/11)+7/3÷ 37/20 of 20/3

(a) 17/29
(b) 19/44
(c) 14/37
(d) 17/42

Q15. The average of 7 consecutive even numbers is 32. Find the sum of the smallest and largest numbers.

(a) 62
(b) 64
(c) 66
(d) 68

Q16. If 31 × 13 + 18 × 86 – 86 = y, then what is the value of y?

(a) 1765
(b) 1665
(c) 1865
(d) 1965

Q17. The total surface area of a cube having side 64 cm is:

(a) 24,528 cm²
(b) 24,589 cm²
(c) 24,548 cm²
(d) 24,576 cm²

Q18. The price of a machine is increased by 20%. Due to a fall in demand, the increased price is then decreased by 25%. Finally, the price is again increased by 10%. The overall percentage change in the price of the machine is:

(a) 1% increase
(b) 1.1% decrease
(c) 1% decrease
(d) 1.1% increase

Q19. A student adds 3/5 unit of a solution, then adds 0.4 unit of the same solution, and finally removes 1/10 unit. What is the net change in the quantity of the solution?

(a) increase of 0.9 unit
(b) increase of 1.0 unit
(c) decrease of 0.8 unit
(d) decrease of 1.5 unit

Q20. If the wages for 9 workers for 8 days are Rs. 2,880, what will be the wages for 15 workers for 9 days at the same rate?

(a) Rs. 3,520
(b) Rs. 3,600
(c) Rs. 5,400
(d) Rs. 3,880

Q21. Pipes C and D can fill a tank of 3,000 litres in 6 hours and 4 hours, respectively. Working together, how many hours will they take to fill a 6,000-litre tank?

(a) 3.5 hours
(b) 4.8 hours
(c) 6 hours
(d) 4.44 hours

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Q22. The shadow of a tower increases by 20 m when the sun's altitude changes from 60° to 45°. Find the length (rounded off to one decimal place, in m) of the tower. (Use √3 = 1.7)

(a) 27.5
(b) 48.6
(c) 17.4
(d) 24.7

Q23. A man covers a certain distance by train. Had the train moved 14 km/hr faster, it would have taken 35 minutes less. If it moved 10 km/hr slower, it would have taken 30 minutes more. Find the distance covered by the train during the journey.

(a) 560 km
(b) 720 km
(c) 780 km
(d) 480 km

Q24. An article is sold at a profit of 20%. If the selling price is reduced by 10%, what will be the profit percentage?

(a) 8%
(b) 20%
(c) 12%
(d) 6%

Q25. Find the compound interest on Rs. 25,600 at the rate of 121/2% interest per annum for 2 years 3 months, compounded annually.

(a) Rs. 7,812.50
(b) Rs. 10,580.50
(c) Rs. 8,650.50
(d) Rs. 9,750.50

Q26. A car covers 360 km at a uniform speed in 8 hours. Find its speed in metres per second.

(a) 13 m/s
(b) 13.5 m/s
(c) 12 m/s
(d) 12.5 m/s

Q27. Find the smallest positive integer that leaves a remainder of 2 when divided by 3, a remainder of 3 when divided by 4, and a remainder of 4 when divided by 5.

(a) 50
(b) 69
(c) 59
(d) 53

Q28. A trader offers "Buy two, get one free" on a certain pair of trousers. If the marked price of the pair of trousers is Rs. 2700, and the trader still earns a profit of 20%, find the cost price of one pair of trousers for the trader.

(a) Rs. 1,600
(b) Rs. 1,550
(c) Rs. 1,450
(d) Rs. 1,500

Q29. A family increases its monthly income by 10% but their monthly expenditure rises by 20%. If their original monthly income was Rs. 45,000 and monthly expenditure was Rs. 36,000, what is the new monthly savings after the increase?

(a) Rs. 6,400
(b) Rs. 6,300
(c) Rs. 6,200
(d) Rs. 6,500

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Q30. The sum of two positive numbers is 13 and their product is 30. The positive difference between them is:

(a) 8
(b) 7
(c) 9
(d) 12

GENERAL AWARENESS

Q31. Mount Etna, Europe's largest and most active volcano, known for its frequent and persistent eruptions, is located in _____, which reported a new eruption at a vent located in the west part of the Southeast Crater in February 2025.

(a) Estonia
(b) Italy
(c) Serbia
(d) Luxembourg

Q32. Which of the following tasks is exclusive to the role of System Software and cannot be performed by an Application Software program?

(a) Allocating a specific block of the CPU's processing time to a newly launched program.
(b) Accepting user input from a keyboard and displaying output on a monitor.
(c) Managing data storage and retrieval on a hard disk drive.
(d) Executing a pre-written script to automate a series of repetitive tasks.

Q33. What is the name of the mascot for the Khelo India Youth Games, 2025?

(a) Simhal
(b) Gajasimha
(c) Yoddha
(d) HathiSher

Q34. According to the Union Budget 2025-26, the government announced the establishment of a Maritime Development Fund with a corpus of:

(a) Rs. 35,000 crore
(b) Rs. 25,000 crore
(c) Rs. 30,000 crore
(d) Rs. 20,000 crore

Q35. Who among the following was the most celebrated Indo-Greek ruler in ancient India?

(a) Alexander
(b) Pushyamitra
(c) Menander
(d) Rudradaman

Q36. The Damodar Valley of the Indian sub-continent is mostly rich in which mineral deposit?

(a) Iron
(b) Limestone
(c) Coal
(d) Magnesium

Q37. Which of the following battles took place in 1761 between the Northern Expeditionary Force of the Maratha Empire and the alliance of the King of Afghanistan?

(a) Third Battle of Panipat
(b) Second Battle of Tarain
(c) First Anglo-Afghan War
(d) Battle of Peshawar

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Q38. Which resolution from 1931 significantly inspired India's Directive Principles promoting social and economic justice aims?

(a) Lucknow Resolution
(b) Karachi Resolution
(c) Lahore Resolution
(d) Delhi Resolution

Q39. Who among the following was NOT a founding member of the Indian National Congress?

(a) Bal Gangadhar Tilak
(b) John Jardine
(c) Dinshaw Wacha
(d) William Wedderburn

Q40. Baryi and Nyioga are folk music forms from which of the following states?

(a) Mizoram
(b) Arunachal Pradesh
(c) Tripura
(d) Manipur

Q41. What does Article 13 of the Indian Constitution primarily deal with?

(a) Reservation Policy
(b) Right to Equality
(c) Freedom of Speech
(d) Judicial Review

Q42. Which judicial doctrine allows laws promoting DPSPs to be protected from being struck down for violating certain Fundamental Rights, as long as they are interpreted harmoniously?

(a) Doctrine of Harmonious Construction
(b) Doctrine of Basic Structure
(c) Doctrine of Severability
(d) Doctrine of Protective Discrimination

Q43. Since hydrogen ions cannot exist alone and exist only after combining with water molecules, they must always be shown as which among the following, represented as H_3O^+?

(a) Hydroxide ion
(b) Hydronium ion
(c) Hydrogen gas
(d) Oxide ion

Q44. According to the Supreme Court of India directives issued in November 2025, which animals must be removed and permanently relocated from institutional public spaces such as schools, hospitals, and railway stations?

(a) Stray donkeys
(b) Stray dogs
(c) Stray cats
(d) Stray cows

Q45. According to the Forest Survey of India (FSI) 2021, which state/UT had the highest percentage of forest cover relative to its geographical area?

(a) Chhattisgarh
(b) Andhra Pradesh
(c) Mizoram
(d) Assam

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Q46. In a classroom discussion about the measurement of work and energy, students are asked to identify the correct SI unit and dimensional formula for these quantities. Which option best represents units for both work or energy?

(a) pascal and M L^(-1) T^(-2)
(b) joule and M L² T^(-2)
(c) newton and M L T^(-2)
(d) watt and M L² T^(-3)

Q47. What is the primary criterion for the selection of beneficiaries under the Pradhan Mantri Awaas Yojana-Gramin (PMAY-G)?

(a) Socio-Economic Caste Census, 2011
(b) Income generated from agriculture
(c) Land ownership documents
(d) Educational qualifications

Q48. Who among the following has been sworn in as the 24^(th) Prime Minister of Canada in March 2025?

(a) Mark Carney
(b) Claudia Sheinbaum
(c) Donald Tusk
(d) James David Vance

Q49. Which device converts printed text into machine-encoded text using pattern recognition?

(a) OCR scanner
(b) OMR scanner
(c) Barcode reader
(d) MICR reader

Q50. Which of the following key combinations is used to open the File menu in many applications?

(a) Alt + Insert
(b) Alt + Tab
(c) Alt + Del
(d) Alt + F

Q51. Which of the following energy resource is considered exhaustible and polluting in India?

(a) Wind
(b) Coal
(c) Solar
(d) Biogas

Q52. Which climatic phenomenon is responsible for sudden winter rainfall in North-West India?

(a) Western Disturbances
(b) Local winds
(c) Jet streams
(d) Easterly waves

Q53. In the Santhal Rebellion (1855–57), Santhals mainly directed their anger against:

(a) Missionaries who distributed free food during the famine
(b) Traditional village headmen and clan chiefs of their own tribe
(c) British officers, zamindars, traders and local moneylenders
(d) Solders of the Bengal army posted in distant cantonments

Q54. Akbar’s revenue minister Todar Mal introduced an efficient revenue system based on crop yields, land surveys, and prices called:

(a) Mansabdari system
(b) Ryotwari system
(c) Zabti system

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(d) Jagirdari system

Q55. Who among the following is NOT associated with Carnatic music?

(a) Vijayalakshmy Subramaniam
(b) Nithyasree Mahadevan
(c) DK Pattammal
(d) Ravi Shankar

Q56. Which function is primarily regulated by the medulla?

(a) Memory
(b) Involuntary actions
(c) Vision
(d) Thinking

Q57. Arundhati Roy's first full-length memoir, published in 2025, is titled:

(a) Notes from a Small Town
(b) The Ministry of Lost Stories
(c) Mother Mary Comes To Me
(d) Walking with the Ants

Q58. Which Article prevents the state from making laws inconsistent with Fundamental Rights, forming the base of judicial review?

(a) Article 17
(b) Article 13
(c) Article 5
(d) Article 9

Q59. Which of the following is characterised as an interconnected chain of submerged mountains, with a central rift zone of intense volcanic activity?

(a) Deep-ocean trenches
(b) Continental slope
(c) Abyssal plains
(d) Mid-oceanic ridges

Q60. Who is the final appellate authority under the Right to Information Act?

(a) Central Information Commission
(b) High Court
(c) Supreme Court
(d) Lokpal

Q61. Which of the following applications are supercomputers primarily used for?

(a) Complex mathematical calculations
(b) Word processing
(c) Office automation
(d) Internet browsing

Q62. Which of the following represents the correct electronic configurations of the element phosphorus?

(a) K=2, L=8, M=5
(b) K=2, L=5, M=8
(c) K=2, L=7, M=6
(d) K=2, L=6, M=7

Q63. Which of the following was one of the primary objectives of India's 1991 economic reforms?

(a) Promoting public sector dominance
(b) Opening up the economy to global markets
(c) Achieving self-sufficiency in agriculture

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(d) Strengthening import barriers

Q64. Which of the following temples is described as a monumental representation of Surya's chariot with 24 wheels?

(a) Mahabodhi Temple
(b) Sun Temple, Konark
(c) Airavatesvara Temple
(d) Virupaksha Temple

Q65. To which Hindu deity is the Sun Temple at Konark dedicated?

(a) Brahma
(b) Vishnu
(c) Surya
(d) Shiva

Q66. Policy on disinvestment gathered steam when a new Department of Disinvestment was created in _____, which became a full Ministry in 2001.

(a) 1999
(b) 2000
(c) 1991
(d) 1992

Q67. Which country hosted the 2025 BRICS Agriculture Ministers' Summit?

(a) Egypt
(b) Vietnam
(c) Argentina
(d) Brazil

Q68. What was the main objective of the Samanvay Shakti exercise launched in August 2025 at Laipuli in Tinsukia district of Assam by Indian Army in collaboration with state officials of Assam and Manipur?

(a) Military-civil integration to foster synergy between security forces, government departments, and civil institutions
(b) Joint military training between India and friendly foreign countries for counter-terrorism operations
(c) Strategic border defence drill aimed at strengthening Indo-Myanmar military cooperation
(d) Large-scale disaster management rehearsal with focus on earthquake and flood preparedness

Q69. Article 350B of the Indian Constitution provides for the appointment of which of the following?

(a) Special Officer for Linguistic Minorities
(b) Special Officer for Scheduled Castes
(c) Special Officer for Women and Children
(d) Special Officer for Other Backward Classes

Q70. The Census 2011 of India is officially recognised as which number in the sequence of the continuous series of censuses reckoned from 1872?

(a) 14^(th) National Census
(b) 16^(th) National Census
(c) 15^(th) National Census
(d) 13^(th) National Census

GENERAL INTELLIGENCE AND REASONING

Q71. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statement: No Oranges are Apricots. All Apricots are Apples.

Conclusion I: No Apples are Oranges.

Conclusion II: Some Oranges are Apples.

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

Q72. J, U, N, I, O, R and S are sitting around a circular table facing the centre of the table. S sits fourth to the left of R. O sits fourth to the right of U. Only two people sit between R and U when counted from the left of R. N is not an immediate neighbour of O or R. J is not an immediate neighbour of N. Who sits third to the right of I?

(a) J
(b) S
(c) U
(d) R

Q73. What should come in place of the '?' in the given series?

17 30 56 95 147 ?

(a) 225
(b) 252
(c) 212
(d) 221

Q74. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only four boxes are kept between C and A. Only F is kept above C. Only two boxes are kept between D and B. G is kept immediately above E. B is not kept immediately above G. Which box is kept immediately below E?

(a) B
(b) A
(c) F
(d) G

Q75. In a certain code language, 'PACK' is coded as '1376' and 'CAKE' is coded as '7615'. What is the code for 'E' in the given code language?

(a) 7
(b) 1
(c) 6
(d) 5

Q76. Each of the digits in the number 8945317 is arranged in ascending order from left to right. The position(s) of how many digits will remain unchanged as compared to that in the original number?

(a) NONE
(b) THREE
(c) ONE
(d) TWO

Q77. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

HKS GMP FOM EQJ ?

(a) PVE
(b) MTC
(c) DSG
(d) VTF

Q78. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

BIRD FMVH JQZL NUDP ?

(a) SYGT
(b) RZHS
(c) SZGS
(d) RYHT

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Q79. Based on the alphabetical order, three of the following four are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) KNQ
(b) LOQ
(c) SVX
(d) NQS

Q80. JK 9 is related to MJ -7 in a certain way. In the same way, PQ 4 is related to SP -12. To which of the following is QR 13 related, following the same logic?

(a) YT -1
(b) TM -6
(c) TQ -3
(d) GH-4

Q81. What should come in place of '?' in the given series?

184 164 146 130 116 104 ?

(a) 89
(b) 94
(c) 91
(d) 96

Q82. Refer to the following letter series and answer the question that follows.

Left) Z K J H G F D S T U I A W Q P L M N B X (Right)

How many letters are there in the English alphabetical series between the letter which is fifth from the right end and fourth from the left end of the series?

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

Q83. 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?

10 B 3 D 45 A 9 C 2 = ? D 18

(a) 45
(b) 50
(c) 55
(d) 40

Q84. Refer to the given number series and answer the question that follows. Counting to be done from left to right only. All numbers are single-digit numbers only.

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

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

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

Q85. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

HDZM 42 BYFR 36 VTLW 30 PORB 24 ?

(a) JJXG 18
(b) KJYH 18

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(c) JKYH 16
(d) KKXG 16

Q86. NJ 9 is related to QN −9 in a certain way. In the same way, OR 13 is related to RV −5. To which of the following is VR 19 related, following the same logic?
(a) YV 1
(b) YX 6
(c) CX 5
(d) VZ 3

Q87. P is the sister of Q. Q is the brother of S. T is the father of X. X is the son of S. How is P related to X?
(a) Sister
(b) Mother
(c) Mother's sister
(d) Father's mother

Q88. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which is the one that does not belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)
(a) TNH
(b) YSM
(c) WOK
(d) RLF

Q89. In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. Select the set in which the numbers are related in the same way as are the numbers of the following sets.
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding / subtracting /multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)
7 - 14
45 - 90
(a) 12 - 34
(b) 70 - 140
(c) 42 - 82
(d) 8 - 17

Q90. In a certain code language,
A ≤ B means ‘A is the father of B’,
A ≠ B means ‘A is the wife of B’,
A @ B means ‘A is the son of B’ and
A ~ B means ‘A is the sister of B’.
Based on the above, how is R related to O if 'R ≠ A @ N ≤ C ~ O'?
(a) Wife's sister
(b) Father's mother
(c) Brother's wife
(d) Wife

Q91. Seven people A, B, D, J, O, T and Z are sitting in a row, facing north. Only D sits to the left of T. Only four people sit between D and A. Only O sits between Z and B and Z is not an immediate neighbor of A. Who sits immediately to the left of T?
(a) D
(b) Z
(c) B
(d) A

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Q92. NQTM is related to ILOH in a certain way based on the English alphabetical order. In the same way, UOLG is related to PJGB. To which of the following is HRPW related, following the same logic?

(a) PDRT
(b) CMKR
(c) LFTS
(d) NTGY

Q93. What will come in place of the question mark (?) in the following equation, if '+' and '−' are interchanged and '×' and '÷' are interchanged?

24 ÷ 5 – 11 + 70 × 14 = ?

(a) 123
(b) 122
(c) 120
(d) 126

Q94. Refer to the following series and answer the question. (Counting to be done from left to right only.) (All numbers are single-digit numbers only.)

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

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

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

Q95. Read the given statements and conclusions carefully. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. You have to decide which conclusions logically follow/s from the given statements.

Statements: Some hairs are wires. All ropes are wires.

Conclusion (I) : Some hairs are ropes

Conclusion (II) : All wires are ropes

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

Q96. In a certain code language, 'rain calms storms' is coded as 'gl ot fr and 'patience gently calms' is coded as 'ot mi zp. How is 'calms' coded in the given language?

(a) zp
(b) fr
(c) gl
(d) ot

Q97. Seven boxes A, B, J, E, C, T and S are kept one over the other but not necessarily in the same order. Only T is kept below E. Only A is kept above J. Only C is kept between J and S. How many boxes are kept between B and T?

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

Q98. 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) PI-KM
(b) KD-FI

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(c) IB-DG
(d) NG-IL

Q99. Palash starts from Point Y and drives 25 km towards West. He then takes a left turn, drives 23 km, turns right and drives 51 km. He then takes a left turn and drives 16 km. He takes a left turn, drives 31 km. He then turns right, drives 35 km, turns left and drives 45 km to stop at Point Z. How far (shortest distance) and towards which direction should he drive in order to reach Point Y again? (All turns are 90° turns only unless specified.)

(a) 73 km towards south
(b) 74 km towards north
(c) 71 km towards south
(d) 77 km towards north

Q100. Seven boxes, M, N, O, P, X, Y and Z, are kept one over the other, but not necessarily in the same order.

Y is kept second from the bottom. Only three boxes are kept between Y and O. X is kept at one of the positions below Y. Only N is kept between O and P. M is kept at one of the positions above O.

How many boxes are kept between X and M?

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

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (b) 16 years

Shortcut Trick
Ratio of Ravi to Kaviraj 4 years ago = 3 : 1 (Difference = 2 units)
Ratio of Ravi to Kaviraj at present = 2 : 1 (Difference = 1 unit)
Equate differences by multiplying present ratio by 2 → 4 : 2 (Difference = 2 units)
The change in units from past to present (4 − 3 or 2 − 1) = 1 unit → 4 years
Ravi's present age = 4 units = 4 × 4 = 16 years
Therefore The correct answer is 16 years.
Alternate Method
Given:
Presently, Ravi is twice as old as Kaviraj.
4 years ago, Ravi was thrice as old as Kaviraj.
Formula Used:
Age = Ratio × Common factor; Equation based on time shifts.

Calculations:

Let the present age of Kaviraj be K years.

=> Present age of Ravi = 2K

According to the condition 4 years ago:

=> (2K − 4) = 3 × (K − 4)

=> 2K − 4 = 3K − 12

=> 12 − 4 = 3K − 2K

=> K = 8 years

=> Ravi's present age = 2 × 8 = 16 years

Therefore The correct answer is 16 years.

Additional Information

Constant Age Difference

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

Ratio Balancing Method

To solve age problems quickly, ensure the difference between ratio parts is consistent across different time periods by multiplying with suitable constants.

Future Age Calculation

If the present age is x, then the age after n years is (x + n) and the age n years ago was (x − n).

Q2. Answer: (d) 144

Shortcut Trick

To find the LCM of decimals, convert them to like decimals first:

3 becomes 3.00, 7.2 becomes 7.20, and 0.64 remains 0.64.

Now, find the LCM of the integer values: 300, 720, and 64.

LCM(300, 720, 64) = 14400.

Place the decimal point back by moving two places to the left: 14400 → 144.

Therefore The correct answer is 144.

Alternate Method

Given:

The numbers are 3, 7.2, and 0.64.

Formula Used:

LCM of Fractions = LCM of Numerators ÷ HCF of Denominators

Calculations:

Convert the decimals into their simplest fraction forms:

=> 3 = 3/1

=> 7.2 = 72/10 = 36/5

=> 0.64 = 64/100 = 16/25

Now, find the LCM of the fractions 3/1, 36/5, and 16/25:

=> Numerators are 3, 36, and 16. Their LCM is 144.

=> Denominators are 1, 5, and 25. Their HCF is 1.

Apply the fraction LCM formula:

=> LCM = 144 ÷ 1 = 144

Therefore The correct answer is 144.

Additional Information

LCM and HCF of Fractions

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

Product of Two Numbers Rule

For any two numbers A and B, Product of numbers (A × B) = LCM(A, B) × HCF(A, B).

Co-prime Numbers Rule

The HCF of co-prime numbers is always 1, and their LCM is equal to the product of those numbers.

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Q3. Answer: (d) Rs. 3,00,000

Shortcut Trick

Effective Rate of Interest for the period = Rate × Time

Effective Rate = 8% × (9/12) years = 6%

According to the question, 6% of Principal = Rs. 18,000

1% of Principal = Rs. 3,000

100% (Principal Amount) = Rs. 3,000 × 100 = Rs. 3,00,000

Therefore The correct answer is Rs. 3,00,000.

Alternate Method

Given:

Simple Interest (SI) = Rs. 18,000

Rate (R) = 8% per annum

Time (T) = 9 months = 9/12 years = 3/4 years

Formula Used:

SI = (P × R × T) / 100

Calculations:

=> 18,000 = (P × 8 × 3/4) / 100

=> 18,000 = (P × 2 × 3) / 100

=> 18,000 = (P × 6) / 100

=> 18,000 × 100 = 6P

=> P = 18,00,000 ÷ 6

=> P = Rs. 3,00,000

Therefore The correct answer is Rs. 3,00,000.

Additional Information

Simple Interest Components

The formula SI = (P × R × T) / 100 connects four variables; knowing any three allows you to find the fourth. Principal (P) is the original sum invested or borrowed.

Time Conversion Rule

For interest calculations, the time 'T' must match the rate's period. If the rate is per annum, convert months to years by dividing by 12 or days by 365.

Total Amount

The Total Amount (A) is the sum of the Principal and the interest earned: A = P + SI, or A = P[1 + (RT/100)].

Q4. Answer: (c) 45 cot(4°)

Shortcut Trick

The standard formula for the area of a regular polygon with n sides, each of length a is given by:

Area = $(n \times a^2) \div (4 \times \tan(180° \div n)) = (n \times a^2) \times \cot(180° \div n) \div 4$

Given, n = 45 and a = 2 cm:

=> Area = $(45 \times 2^2) \div (4 \times \tan(180° \div 45))$

=> Area = $(45 \times 4) \div (4 \times \tan(4°)) = 45 \div \tan(4°) = 45 \cot(4°)$

Since 45 cot(4°) matches standard area formulas, we simplify to get the required expression from the standard options.

Therefore The correct answer is 45 cot(4°).

Alternate Method

Given:

Number of sides (n) = 45

Length of each side (a) = 2 cm

Formula Used:

Area of a regular polygon of n sides is:

Area = $(n \times a^2) \div (4 \times \tan(\pi \div n))$

Where π radians = 180°.

Calculations:

=> Area = $(45 \times 2^2) \div (4 \times \tan(180° \div 45))$

=> Area = (45 × 4) ÷ (4 × tan(4°))

=> Area = 45 ÷ tan(4°)

Using the trigonometric identity cot(θ) = 1 ÷ tan(θ):

=> Area = 45 cot(4°) cm²

Therefore The correct answer is 45 cot(4°).

Additional Information

Area of Regular Polygon with Inradius

The area of a regular polygon can also be expressed as Area = (1 ÷ 2) × Perimeter × Inradius (apothem), where apothem r = a ÷ (2 × tan(180°/n)).

Interior and Exterior Angles

For any regular polygon with n sides, each exterior angle is 360° ÷ n, and each interior angle is 180° − (360° ÷ n).

Q5. Answer: (c) 3:11

Shortcut Trick

Assume total Earth area = 28 units (LCM of Whole Earth ratio sum 4 and Hemisphere ratio sum 7 × 2).

Then Northern Hemisphere (NH) = 14 units and Southern Hemisphere (SH) = 14 units.

Total Land = 1/4 × 28 = 7 units | Total Water = 3/4 × 28 = 21 units.

Land in NH = 2/7 × 14 = 4 units | Water in NH = 5/7 × 14 = 10 units.

Land in SH = 7 − 4 = 3 units | Water in SH = 21 − 10 = 11 units.

SH Ratio (Land:Water) = 3:11.

Therefore The correct answer is 3:11.

Alternate Method

Given:

Ratio of Land to Water (Earth) = 1 : 3

Ratio of Land to Water (Northern Hemisphere) = 2 : 5

Northern Hemisphere Area = Southern Hemisphere Area

Calculations:

=> Let the total area of the Earth be 280 units (to avoid decimals).

=> Total Land on Earth = (1 / (1+3)) × 280 = 1/4 × 280 = 70 units.

=> Total Water on Earth = (3 / (1+3)) × 280 = 3/4 × 280 = 210 units.

=> Area of Northern Hemisphere = 280 ÷ 2 = 140 units.

=> Land in Northern Hemisphere = (2 / (2+5)) × 140 = 2/7 × 140 = 40 units.

=> Water in Northern Hemisphere = (5 / (2+5)) × 140 = 5/7 × 140 = 100 units.

=> Land in Southern Hemisphere = Total Land − NH Land = 70 − 40 = 30 units.

=> Water in Southern Hemisphere = Total Water − NH Water = 210 − 100 = 110 units.

=> Required Ratio = 30 : 110 = 3 : 11.

Therefore The correct answer is 3:11.

Additional Information

Ratio and Proportion Basics

If a quantity is divided in the ratio a:b, the parts are [a/(a+b)] × Total and [b/(a+b)] × Total.

Combining Ratios

When components of a whole are given in different ratios, always assume a total value that is the least common multiple (LCM) of the sum of ratio parts to simplify calculations.

Hemisphere Area Property

The equator divides a sphere into two equal halves (hemispheres), so Area(NH) = Area(SH) = 1/2 × Area(Total Earth).

Q6. Answer: (a) 14,500

Shortcut Trick

Initial CP : SP ratio = 100 : 138 = 50 : 69

Final CP : SP ratio = 100 : 137.5 = 8 : 11

Apply cross-multiplication: |(50 × 11 − 69 × 8)| units = |(11 × 20 − 8 × (−45))|

2 units = 220 + 360 = 580 => 1 unit = 290

Original Cost Price = 50 units = 50 × 290 = 14500

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Therefore The correct answer is Rs. 14500.

Alternate Method

Given:

Initial Profit = 38% | New Profit = 37.5% | CP Increase = Rs. 20 | SP Decrease = Rs. 45

Formula Used:

Selling Price (SP) = Cost Price (CP) × (1 + Profit%)

Calculations:

=> Let original Cost Price = x

=> Original Selling Price = 1.38x

=> New CP = x + 20 and New SP = 1.38x − 45

=> According to question: New SP = 1.375 × New CP

=> 1.38x − 45 = 1.375 × (x + 20)

=> 1.38x − 45 = 1.375x + 27.5

=> 1.38x − 1.375x = 27.5 + 45

=> 0.005x = 72.5

=> x = 72.5 ÷ 0.005 = 14500

Therefore The correct answer is Rs. 14500.

Additional Information

Profit and Loss Relationship

Profit occurs when SP > CP. The fundamental formula is SP = CP + Profit, where Profit = (Profit% ÷ 100) × CP.

Percentage to Fraction Conversion

Calculations become faster by converting common percentages: 37.5% = 3/8, which implies SP/CP = 11/8 for a profit.

Cost Price Change Impact

If both CP and SP change, the new profit percentage is always calculated on the new Cost Price.

Q7. Answer: (c) 12

Shortcut Trick

Total work = LCM(12, 20) = 60 units.

Efficiency of A = 5 units/day; Efficiency of B = 3 units/day.

Combined work in 3 days = (5 + 3) × 3 = 24 units.

Remaining work = 60 − 24 = 36 units.

Time taken by B = 36 ÷ 3 = 12 days.

Therefore The correct answer is 12 days.

Alternate Method

Given:

Time taken by A = 12 days

Time taken by B = 20 days

Work duration for both = 3 days

Person	Days	Total Work	Efficiency
A	12	60	5
B	20	3	

Calculations:

=> Total efficiency of (A + B) = 5 + 3 = 8 units/day

=> Work completed by both in 3 days = 8 × 3 = 24 units

=> Remaining Work = Total Work − Completed Work

=> Remaining Work = 60 − 24 = 36 units

=> Time taken by B to complete remaining work = Remaining Work ÷ Efficiency of B

=> Time = 36 ÷ 3 = 12 days

Therefore The correct answer is 12 days.

Additional Information

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Combined Efficiency

When two people work together, their combined efficiency is the sum of their individual efficiencies. Total Time = Total Work ÷ Combined Efficiency.

Pipes & Cisterns

This concept is identical to work efficiency where filling pipes have positive efficiency and leakage or outlet pipes have negative efficiency.

Work & Wages

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

Q8. Answer: (b) Rs. 840

Shortcut Trick

Net multiplier for consecutive discounts of 20% and 5% = 0.80 × 0.95 = 0.76

Bill amount after both discounts = 1000 × 0.76 = Rs. 760

Final payable amount = Discounted bill + Delivery charge

Final amount = 760 + 80 = Rs. 840

Therefore The correct answer is Rs. 840.

Alternate Method

Given: Initial order value = Rs. 1000, Promotional Discount = 20%, Conditional Discount = 5% (if price is Rs. 650 to Rs. 800), Fixed Delivery Charge = Rs. 80.

=> First Discount = 20% of 1000 = (20 ÷ 100) × 1000 = Rs. 200

=> Price after first discount = 1000 − 200 = Rs. 800

=> The price Rs. 800 lies in the inclusive range of Rs. 650 to Rs. 800.

=> Additional Discount = 5% of 800 = (5 ÷ 100) × 800 = Rs. 40

=> Net food bill = 800 − 40 = Rs. 760

=> Final amount payable = Net bill + Delivery charge = 760 + 80 = Rs. 840

Therefore The correct answer is Rs. 840.

Additional Information

Successive Discounts

When two discounts x% and y% are applied sequentially, the total effective discount is [x + y − (x × y ÷ 100)]%.

Fixed vs Variable Charges

Fixed charges like delivery fees or service charges are added to the final discounted price and do not receive discounts themselves.

Base Value for Discounts

A secondary discount is always calculated on the reduced price (the balance remaining after the first discount), not the original price.

Q9. Answer: (a) 30 and 20

Shortcut Trick

Ratio of parts = 6 : 4

Difference in ratio units = 6 − 4 = 2 units

Since the actual difference is 10: 2 units = 10 => 1 unit = 5

First part = 6 × 5 = 30

Second part = 4 × 5 = 20

Therefore The correct answer is 30 and 20.

Alternate Method

Given:

Ratio of two parts = 6 : 4

Difference between parts = 10

Formula Used:

Value of a part = (Ratio part / Difference in ratio units) × Total Difference

Calculations:

=> Let the two parts be 6x and 4x.

=> Difference between the sections = 6x − 4x = 10

=> 2x = 10

=> x = 10 ÷ 2 = 5

=> First part = 6 × 5 = 30

=> Second part = 4 × 5 = 20

Therefore The correct answer is 30 and 20.

Additional Information

Ratio and Proportion

A ratio compares two quantities by division. For two parts a and b, the ratio is a:b. If a common factor x is multiplied, the values become ax and bx.

Unitary Method

The unitary method involves finding the value of one single unit (part) first, and then multiplying that value by the required number of units.

Difference between Ratio Terms

If the ratio is a:b and the difference between values is D, then 1 ratio unit = D ÷ |a − b|.

Q10. Answer: (a) 53 kg

Shortcut Trick

Assume the average weight is 53 kg.

Deviation of A = (47 − 53) × 12 = −72

Deviation of B = (62 − 53) × 8 = +72

Deviation of C = (53 − 53) × 15 = 0

Net Deviation = −72 + 72 + 0 = 0

Average = 53 + (0 ÷ 35) = 53 kg.

Therefore The correct answer is 53 kg.

Alternate Method

Given:

Units of Type A = 12 (Avg weight 47 kg)

Units of Type B = 8 (Avg weight 62 kg)

Units of Type C = 15 (Avg weight 53 kg)

Formula Used:

Weighted Average = (n1w1 + n2w2 + n3w3) ÷ (n1 + n2 + n3)

Calculations:

=> Total Units = 12 + 8 + 15 = 35

=> Total Weight of A = 12 × 47 = 564 kg

=> Total Weight of B = 8 × 62 = 496 kg

=> Total Weight of C = 15 × 53 = 795 kg

=> Sum of all weights = 564 + 496 + 795 = 1855 kg

=> Weighted Average = 1855 ÷ 35

=> Weighted Average = 53 kg

Therefore The correct answer is 53 kg.

Additional Information

Weighted Average Principle

It accounts for the relative contribution of each data point. Formula: Σ(n × x) ÷ Σn, where n is frequency and x is value.

Assumed Mean Method

Simplifies calculation by using deviations from a chosen middle value: Average = Assumed Mean + (ΣDeviations ÷ Total Frequency).

Combined Mean Formula

For two groups with sizes n1, n2 and averages a1, a2, the total mean is (n1a1 + n2a2) ÷ (n1 + n2).

Q11. Answer: (c) Rs. 720

Shortcut Trick

Ratio of Profit shares A : B : C = 1/8 : 1/3 : 13/24 = 3 : 8 : 13 (taking LCM 24).

Investment × Time = Profit => (A_(Inv) × 4) : (C_(Inv) × 8) = 3 : 13.

=> (A_(Inv) × 4) ÷ (1560 × 8) = 3 ÷ 13.

=> 4 × A_(Inv) = (3 × 12480) ÷ 13 = 2880.

=> A_(Inv) = 2880 ÷ 4 = 720.

Therefore The correct answer is Rs. 720.

Alternate Method

Given:

A's time (T_A) = 4 months, Profit share (P_A) = 1/8

B's time (T_B) = 6 months, Profit share (P_B) = 1/3

C's time (T_C) = 8 months, Investment (I_C) = Rs. 1560

Calculations:

Total profit share = 1

=> C's profit share = 1 − (1/8 + 1/3)

=> C's profit share = 1 − (3 + 8)/24 = 1 − 11/24 = 13/24

The ratio of profits of A and C:

=> P_A : P_C = 1/8 : 13/24 = 3/24 : 13/24 = 3 : 13

Since Investment × Time = Profit:

=> (I_A × T_A) ÷ (I_C × T_C) = P_A ÷ P_C

=> (I_A × 4) ÷ (1560 × 8) = 3 ÷ 13

=> 4 × I_A ÷ 12480 = 3 ÷ 13

=> 4 × I_A = (3 × 12480) ÷ 13

=> 4 × I_A = 3 × 960

=> 4 × I_A = 2880

=> I_A = 2880 ÷ 4 = 720

Therefore The correct answer is Rs. 720.

Additional Information

Partnership Profit Rule

In a partnership, the profit is distributed among partners in the ratio of the product of their capital and time period (Profit = Investment × Time).

Compound Partnership

When partners invest different amounts for different periods of time, it is called a compound partnership. The ratio of their effective capitals determines the profit share.

Investment Calculation

Individual investment can be found using the formula: Investment = Profit ÷ Time. If profit shares and times are known, the investment ratio is (P1/T1) : (P2/T2).

Q12. Answer: (c) 6

Shortcut Trick

In a trapezium (where AB || DC), the length of the segment joining the midpoints of the diagonals is always equal to half the difference between the parallel sides.

Length of EF = (Parallel Side 1 − Parallel Side 2) ÷ 2

Length of EF = (DC − AB) ÷ 2

Length of EF = (35 − 23) ÷ 2 = 12 ÷ 2 = 6 cm

Therefore The correct answer is 6 cm.

Alternate Method

Given:

Parallel sides: AB = 23 cm and DC = 35 cm

Non-parallel sides: BC = 91 cm and AD = 62 cm

Diagonals: AC and BD with midpoints E and F respectively.

Formula Used:

In a trapezium with parallel sides a and b, the length of the segment EF connecting the midpoints of the diagonals is given by:

EF = |a − b| ÷ 2

Calculations:

=> Parallel sides are AB = 23 cm and DC = 35 cm.

=> EF = (DC − AB) ÷ 2

=> EF = (35 − 23) ÷ 2

=> EF = 12 ÷ 2

=> EF = 6 cm

Therefore The correct answer is 6 cm.

Additional Information

Median of a Trapezium

The segment joining the midpoints of the non-parallel sides (lateral sides) is called the median, and its length is half the sum of the parallel sides: (AB + DC) ÷ 2.

Area of a Trapezium

The area is calculated as Area = 1/2 × (Sum of parallel sides) × Height.

Diagonal Property

In any trapezium, the diagonals divide each other in the same ratio, which is equal to the ratio of the parallel sides.

Q13. Answer: (a) 12.5 litres

Shortcut Trick

Ratio of Orange Juice to Water = 2 : 5

If 2 units = 5 litres of Juice, then the scaling factor is 5 ÷ 2 = 2.5

Required Water = 5 units × 2.5 = 12.5 litres

Therefore The correct answer is 12.5 litres.

Alternate Method

Given:

Initial Orange juice (J1) = 2 litres

Initial Water (W1) = 5 litres

New Orange juice (J2) = 5 litres

Formula Used:

Since the mixture composition remains in the same proportion: J1/W1 = J2/W2

Calculations:

=> 2 / 5 = 5 / W2

=> 2 × W2 = 5 × 5

=> 2 × W2 = 25

=> W2 = 25 ÷ 2

=> W2 = 12.5 litres

Therefore The correct answer is 12.5 litres.

Additional Information

Direct Proportion

Two quantities are in direct proportion if an increase in one leads to a proportional increase in the other, represented as y = kx.

Inverse Proportion

Two quantities are in inverse proportion if an increase in one leads to a proportional decrease in the other, represented as xy = k.

Unitary Method

A technique where you first find the value of a single unit and then multiply by the required number of units to find the total value.

Q14. Answer: (c) 14/37

Given:

{(13/33) ÷ (13/7)} ÷ (2/8 × 16/6 + 5/11) + 7/3 ÷ (37/20 of 20/3)

Formula used:

The BODMAS rule determines the order of operations: Brackets, Of, Division, Multiplication, Addition, and Subtraction.

Calculation:

=> {(13/33) × (7/13)} ÷ ((1/4 × 8/3) + 5/11) + 7/3 ÷ (37/20 × 20/3)

=> (7/33) ÷ (2/3 + 5/11) + 7/3 ÷ (37/3)

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=> (7/33) ÷ ((22 + 15)/33) + (7/3 × 3/37)

=> (7/33 × 33/37) + 7/37

=> 7/37 + 7/37

=> 14/37

Therefore The correct answer is option (3).

Q15. Answer: (b) 64

Shortcut Trick

In any Arithmetic Progression (like consecutive even numbers), the Average is always the mean of the Smallest and Largest terms.

Formula: Average = (Smallest + Largest) ÷ 2

=> Sum of Smallest and Largest = 2 × Average

=> Sum = 2 × 32 = 64

Therefore The correct answer is 64.

Alternate Method

Given:

=> Total terms = 7

=> Average of the consecutive even numbers = 32

Formula Used:

=> Average = (Sum of all terms) ÷ (Total number of terms)

Calculations:

=> For an odd number of terms (7), the Average is equal to the middle term (4^(th) term).

=> 4^(th) term = 32

=> 1^(st) term (Smallest) = 32 − (3 × 2) = 26

=> 7^(th) term (Largest) = 32 + (3 × 2) = 38

=> Sum of Smallest and Largest = 26 + 38 = 64

Therefore The correct answer is 64.

Additional Information

Arithmetic Progression (AP) Property

In any AP, the average of 'n' terms is always the average of the first term (a) and the last term (l). Formula: Average = (a + l) ÷ 2.

Middle Term Concept

For a series of 'n' consecutive terms where 'n' is an odd number, the average is the exactly the {(n+1)/2}^(th) term.

Consecutive Even/Odd Numbers

The common difference (d) between consecutive even or consecutive odd numbers is always 2.

Q16. Answer: (c) 1865

Given:

y = 31 × 13 + 18 × 86 − 86

Formula used:

BODMAS rule and Distributive property: (a × c) − (b × c) = (a − b) × c

Calculations:

y = 31 × 13 + 18 × 86 − 86

=> y = (31 × 13) + (18 − 1) × 86

=> y = 403 + 17 × 86

=> y = 403 + 1462

=> y = 1865

Therefore The correct answer is option (3).

Q17. Answer: (d) 24,576 cm²

Shortcut Trick

Total Surface Area (TSA) of a cube = 6 × side²

Given side = 64 cm, TSA = 6 × (64)²

Last Digit Check: 6 × (unit digit 4)² → 6 × 16 → ends in 6.

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Only one option (24,576) ends in 6.
Therefore The correct answer is 24,576 cm².
Alternate Method
Given: Side of the cube (a) = 64 cm
Formula: Total Surface Area = 6 × a²
=> Side of the cube (a) = 64 cm
=> Total Surface Area = 6 × (64)²
=> TSA = 6 × (64 × 64)
=> TSA = 6 × 4096
=> TSA = 24,576 cm²
Therefore The correct answer is 24,576 cm².
Additional Information
Volume of a Cube
The volume represents the capacity of the cube and is calculated as V = a³.
Lateral Surface Area (LSA)
The area of the four vertical faces (excluding top and bottom) is LSA = 4a².
Diagonal of a Cube
The length of the longest rod that can be placed inside a cube is d = a√3.
Properties of a Cube
A cube has 12 edges, 8 vertices, and 6 identical square faces.

Q18. Answer: (c) 1% decrease

Shortcut Trick
Using the Net Multiplying Factor method for successive changes:
Net Factor = 1.20 (for +20%) × 0.75 (for −25%) × 1.10 (for +10%)
Net Factor = (1.2 × 0.75) × 1.1 = 0.9 × 1.1 = 0.99
Overall Change = (0.99 − 1) × 100 = −1%
A negative sign indicates a percentage decrease of 1%.
Therefore The correct answer is 1% decrease.
Alternate Method
Given: Let the initial price of the machine be Rs. 100.
Step-by-step price changes:
=> Price after 20% increase = 100 + (20% of 100) = 120
=> Price after 25% decrease = 120 − (25% of 120) = 120 − 30 = 90
=> Price after 10% increase = 90 + (10% of 90) = 90 + 9 = 99
=> Overall percentage change = [(Final Price − Initial Price) ÷ Initial Price] × 100
=> Overall Change = [(99 − 100) ÷ 100] × 100 = −1%
Therefore The correct answer is 1% decrease.
Additional Information
Successive Percentage Formula
For two successive changes a% and b%, the net percentage change is given by: a + b + (ab ÷ 100).
Multiplying Factor (MF)
For an x% increase, the MF is (1 + x/100). For an x% decrease, the MF is (1 − x/100). Net MF is the product of all individual factors.
Percentage to Fraction Conversion
20% = 1/5 | 25% = 1/4 | 10% = 1/10. These can be used to solve using ratio methods (Final/Initial = 6/5 × 3/4 × 11/10 = 99/100).

Q19. Answer: (a) increase of 0.9 unit

Given:
First addition = 3/5 unit
Second addition = 0.4 unit
Removal = 1/10 unit

Formula used:
Net change = (Addition1 + Addition2) − Removal
Calculations:
Converting fractions to decimals:
3/5 = 0.6
1/10 = 0.1
Net change = 0.6 + 0.4 − 0.1
=> Net change = 1.0 − 0.1
=> Net change = 0.9 unit
Since the result is positive, it represents an increase of 0.9 unit.
Therefore The correct answer is option (1).

Q20. Answer: (c) Rs. 5,400

Shortcut Trick
Total effort for the first group = 9 × 8 = 72 units.
Total effort for the second group = 15 × 9 = 135 units.
Ratio of wages = Ratio of units = 72 : 135 = 8 : 15.
8 units → Rs. 2,880 => 1 unit = Rs. 360.
15 units → 15 × 360 = Rs. 5,400.
Therefore The correct answer is Rs. 5,400.
Alternate Method
Given:
Case 1: Workers (M1) = 9, Days (D1) = 8, Wages (W1) = Rs. 2,880
Case 2: Workers (M2) = 15, Days (D2) = 9, Wages (W2) = ?
Formula Used:
(M1 × D1) ÷ W1 = (M2 × D2) ÷ W2
Calculations:
=> (9 × 8) ÷ 2,880 = (15 × 9) ÷ W2
=> 72 ÷ 2,880 = 135 ÷ W2
=> 1 ÷ 40 = 135 ÷ W2
=> W2 = 135 × 40
=> W2 = 5,400
Therefore The correct answer is Rs. 5,400.
Additional Information
Chain Rule Formula
For relationship between people (M), days (D), hours (H), and work or wages (W), use (M1D1H1)/W1 = (M2D2H2)/W2.
Direct Proportionality
Wages are directly proportional to the total number of man-days worked when the rate remains constant.
Efficiency and Wages
Wages prop. to Efficiency × Time. If efficiency changes, it must be multiplied in the numerator of the Chain Rule.

Q21. Answer: (b) 4.8 hours

Shortcut Trick
Time taken by Pipe C and Pipe D to fill 3,000 L together = (6 × 4) ÷ (6 + 4) = 2.4 hr.
Since the new tank capacity (6,000 L) is exactly double the initial capacity (3,000 L), the time taken will also be doubled.
Required time = 2.4 × 2 = 4.8 hr.
Therefore The correct answer is 4.8 hr.
Alternate Method
Given:
Capacity of initial tank = 3,000 L
Time for Pipe C = 6 hr | Time for Pipe D = 4 hr
Capacity of new tank = 6,000 L

Calculations:

=> Efficiency (Rate) of Pipe C = 3,000 ÷ 6 = 500 L/hr

=> Efficiency (Rate) of Pipe D = 3,000 ÷ 4 = 750 L/hr

=> Combined Efficiency of (C + D) = 500 + 750 = 1,250 L/hr

=> Time taken to fill 6,000 L tank = Total Capacity ÷ Combined Efficiency

=> Required Time = 6,000 ÷ 1,250

=> Required Time = 4.8 hr

Therefore The correct answer is 4.8 hr.

Additional Information

Efficiency and Time Relationship

Efficiency is inversely proportional to time for a constant volume of work. Formula: Work = Efficiency × Time.

Pipes and Cisterns Rule

If an inlet pipe fills in x hours and an outlet pipe empties in y hours, the net work in 1 hour = (1/x) − (1/y).

Direct Proportion in Work

If efficiency remains constant, the time required is directly proportional to the amount of work (tank capacity). If capacity doubles, time doubles.

Q22. Answer: (b) 48.6

Shortcut Trick

For a tower height h, when the angle changes from θ1 to θ2 and shadow increases by d:

Shortcut formula: h = d ÷ (cot θ2 − cot θ1)

Here, d = 20 m, θ1 = 60°, and θ2 = 45°

h = 20 ÷ (cot 45° − cot 60°) = 20 ÷ (1 − 1/1.7) = 20 ÷ (0.7/1.7) = 34 ÷ 0.7 ≈ 48.6 m

Therefore The correct answer is 48.6 m.

Alternate Method

Let AB be the tower of height h. Let C and D be the points where the sun's altitude is 60° and 45° respectively.

Given: CD = 20 m, angle ACB = 60°, angle ADB = 45°, √3 = 1.7

In right-angled triangle ABC:

=> tan 60° = AB / BC

=> 1.7 = h / BC

=> BC = h / 1.7

In right-angled triangle ABD:

=> tan 45° = AB / BD

=> 1 = h / BD

=> BD = h

According to the question:

=> BD − BC = CD

=> h − h / 1.7 = 20

=> (1.7h − h) / 1.7 = 20

=> 0.7h / 1.7 = 20

=> 0.7h = 20 × 1.7

=> 0.7h = 34

=> h = 34 / 0.7 ≈ 48.5714

=> h ≈ 48.6 m

Therefore The correct answer is 48.6 m.

Additional Information

Trigonometric Ratios

Commonly used ratios: tan θ = Perpendicular/Base and cot θ = Base/Perpendicular.

Angle of Elevation

As the object (Sun) moves lower in the sky (altitude decreases), the shadow of a vertical object becomes longer.

General Distance Formula

The distance between two points on the same side of a tower is given by d = h(cot θ2 − cot θ1), where θ1 > θ2.

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Q23. Answer: (c) 780 km

Shortcut Trick

Use the distance relation: D = [S × (S + a) / a] × t1 = [S × (S − b) / b] × t2

=> [(S + 14) / 14] × 35 = [(S − 10) / 10] × 30

=> 5(S + 14) = 6(S − 10) => 5S + 70 = 6S − 60 => S = 130 km/h

=> D = [130 × (130 + 14) / 14] × (35 / 60) = 780 km

Therefore The correct answer is 780 km.

Alternate Method

Given:

Increase in speed (a) = 14 km/hr, Reduction in time (t1) = 35 min = 35/60 hr

Decrease in speed (b) = 10 km/hr, Increase in time (t2) = 30 min = 30/60 hr

Formula Used:

Distance (D) = [S × (S + ΔS) / ΔS] × Δt

Calculations:

=> Let original speed be S km/hr and distance be D km.

=> According to the first condition: D = [S(S + 14) / 14] × (35 / 60) --- (i)

=> According to the second condition: D = [S(S − 10) / 10] × (30 / 60) --- (ii)

=> Equating (i) and (ii): [S(S + 14) / 14] × (35 / 60) = [S(S − 10) / 10] × (30 / 60)

=> [(S + 14) / 14] × 35 = [(S − 10) / 10] × 30

=> [(S + 14) / 2] × 5 = (S − 10) × 3

=> 5S + 70 = 6S − 60

=> S = 130 km/hr

=> Substituting S = 130 in equation (i):

=> D = [130 × (130 + 14) / 14] × (35 / 60)

=> D = [130 × 144 / 14] × (7 / 12)

=> D = (130 / 2) × (144 / 12) = 65 × 12 = 780 km

Therefore The correct answer is 780 km.

Additional Information

Relationship between Speed, Time, and Distance

Distance is directly proportional to speed when time is constant (D = S × T). For a fixed distance, speed and time are inversely proportional.

Distance Formula with Time Difference

When a person travels at two different speeds S1 and S2 and the difference between the time taken is Δt, the distance D = [S1 × S2 / (S1 − S2)] × Δt.

Average Speed Formula

If a certain distance is covered at x km/hr and the same distance is covered at y km/hr, the Average Speed for the whole journey is 2xy / (x + y) km/hr.

Q24. Answer: (a) 8%

Shortcut Trick

Let Cost Price (CP) = 100 units.

Initial Selling Price (SP) = 120 units (20% profit).

New SP = 120 − (10% of 120) = 120 − 12 = 108 units.

New Profit % = 108 − 100 = 8%.

Therefore The correct answer is 8%.

Alternate Method

Given:

Initial Profit = 20%

Reduction in Selling Price = 10%

Formula used:

Profit Percentage = ((SP − CP) ÷ CP) × 100

Calculations:

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=> Let Cost Price (CP) = Rs. 100

=> Initial Selling Price (SP1) = CP + 20% of CP = 100 + 20 = Rs. 120

=> New Selling Price (SP2) = SP1 − 10% of SP1

=> SP2 = 120 − (10 ÷ 100) × 120 = 120 − 12 = Rs. 108

=> New Profit = SP2 − CP = 108 − 100 = Rs. 8

=> New Profit Percentage = (8 ÷ 100) × 100 = 8%

Therefore The correct answer is 8%.

Additional Information

Profit and Loss Basics

Profit occurs when Selling Price (SP) > Cost Price (CP). Profit % is always calculated on CP unless stated otherwise.

Successive Change Effect

When SP is changed, the new profit depends on the original CP, which remains constant unless specifically mentioned.

Marked Price and Discount

Discount is always calculated on the Marked Price (MP). SP = MP − Discount.

Q25. Answer: (a) Rs. 7,812.50

Shortcut Trick

Convert Interest Rate to fraction: 12.5% = 1/8. For 3 months (1/4 year), Rate = 1/8 × 1/4 = 1/32.

Principal to Amount Ratio: (8 × 8 × 32) : (9 × 9 × 33) => 2048 : 2673.

Principal 2048 units = Rs. 25,600 => 1 unit = Rs. 12.5.

Interest units = 2673 − 2048 = 625 units.

Compound Interest = 625 × 12.5 = Rs. 7,812.50.

Therefore The correct answer is Rs. 7,812.50.

Alternate Method

Given: Principal (P) = Rs. 25,600, Rate (R) = 12.5% per annum, Time (T) = 2 years 3 months.

Formula Used: Amount (A) = $P(1 + R/100)^n \times (1 + (R \times t)/100)$ for fractional years.

=> Convert 3 months to years: 3/12 = 1/4 year.

=> Annual rate in fraction: 12.5/100 = 1/8.

=> Rate for 3 months: (1/8) × (1/4) = 1/32.

=> Amount (A) = $25600 \times (1 + 1/8)^2 \times (1 + 1/32)$

=> A = 25600 × (9/8) × (9/8) × (33/32)

=> A = 25600 × (81/64) × (33/32)

=> A = (25600 ÷ 2048) × (81 × 33)

=> A = 12.5 × 2673 = Rs. 33,412.50

=> Compound Interest (CI) = Amount − Principal

=> CI = Rs. 33,412.50 − Rs. 25,600 = Rs. 7,812.50

Therefore The correct answer is Rs. 7,812.50.

Additional Information

Fractional Time Period in CI

When time is in the form T years and m months, calculate for T years normally and apply rate (m/12) × R for the remaining fractional part.

Difference between CI and SI

For a 2-year period, the difference between compound and simple interest is $D = P(R/100)^2$.

Effective Rate of Interest

The effective rate for two successive years with rates r1 and r2 is r1 + r2 + (r1 × r2)/100.

Q26. Answer: (d) 12.5 m/s

Shortcut Trick

Speed in km/h = Distance ÷ Time = 360 ÷ 8 = 45 km/h.

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

Speed = 45 × (5/18) = 2.5 × 5 = 12.5 m/s.

Therefore The correct answer is 12.5 m/s.

Alternate Method

Given:

Total Distance = 360 km

Total Time = 8 hr

Formula Used:

Speed = Distance ÷ Time

Conversion factor: 1 km/h = 5/18 m/s

=> Speed in km/h = 360 ÷ 8

=> Speed = 45 km/h

=> Speed in m/s = 45 × (5 ÷ 18)

=> Speed = (5 × 5) ÷ 2

=> Speed = 25 ÷ 2 = 12.5 m/s

Therefore The correct answer is 12.5 m/s.

Additional Information

Unit Conversion Rules

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

Speed-Distance-Time Formula

Distance = Speed × Time. Ensure all units are in the same system (SI or Metric) before calculating.

Average Speed

Average Speed = (Total Distance) ÷ (Total Time). For two equal distances at speeds x and y, Average Speed = 2xy ÷ (x + y).

Q27. Answer: (c) 59

Shortcut Trick

Observe the common difference between the divisors and their respective remainders:

3 − 2 = 1

4 − 3 = 1

5 − 4 = 1

Smallest Number = LCM(3, 4, 5) − Common Difference

Required Number = 60 − 1 = 59.

Therefore The correct answer is 59.

Alternate Method

Given:

Divisors: 3, 4, 5

Remainders: 2, 3, 4

Formula Used:

When the difference between the divisor (d) and remainder (r) is constant (k = d − r), the smallest number is given by: LCM(d1, d2, d3, ...) − k.

Calculations:

=> Difference 1 = 3 − 2 = 1

=> Difference 2 = 4 − 3 = 1

=> Difference 3 = 5 − 4 = 1

=> Constant difference (k) = 1

=> LCM of 3, 4, 5:

=> $3 = 3^1$

=> $4 = 2^2$

=> $5 = 5^1$

=> LCM = $2^2 \times 3^1 \times 5^1 = 4 \times 3 \times 5 = 60$

=> Smallest number = 60 − 1 = 59

Therefore The correct answer is 59.

Additional Information

LCM and Remainder Concept

If a number leaves the same remainder 'r' in each case, the number is LCM(divisors) + r.

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Successive Division

In successive division, the quotient of the first division becomes the dividend for the second division.

Chinese Remainder Theorem

A general method to find a number satisfying multiple linear congruences when divisors are coprime.

Q28. Answer: (d) Rs. 1,500

Shortcut Trick

Buy 2 Get 1 Free means the customer gets 3 items but pays for only 2 items.

Total Selling Price (SP) of 3 items = 2 × 2,700 = Rs. 5,400.

Since the trader earns 20% profit, Total Cost Price (CP) = 5,400 ÷ 1.2 = Rs. 4,500.

Cost Price of one pair of trousers = 4,500 ÷ 3 = Rs. 1,500.

Therefore The correct answer is Rs. 1,500.

Alternate Method

Given:

Marked Price (MP) per pair = Rs. 2,700

Offer: Buy 2, Get 1 Free (Total items received = 3)

Profit percentage = 20%

Calculations:

=> Total Selling Price (SP) for 3 items = 2 × 2,700 = Rs. 5,400

=> Let the Cost Price (CP) of one pair of trousers be Rs. x

=> Total Cost Price for 3 pairs = 3x

=> Profit = 20%, so Total SP = 120% of Total CP

=> 5,400 = 1.20 × (3x)

=> 5,400 = 3.6x

=> x = 5,400 ÷ 3.6

=> x = 1,500

Therefore The correct answer is Rs. 1,500.

Additional Information

Discount % in 'Buy X Get Y Free' schemes

Discount % = [Free Items ÷ Total Items] × 100. In this case: [1 ÷ (2 + 1)] × 100 = 33.33%.

Relation between CP and MP

CP ÷ MP = (100 − Discount %) ÷ (100 + Profit %). This ratio helps find CP directly when MP, discount, and profit are known.

Profit and Loss Basics

Profit % = [(SP − CP) ÷ CP] × 100. Always ensure CP and SP are calculated for the same number of units.

Q29. Answer: (b) Rs. 6,300

Shortcut Trick

Net change in savings = (Increase in Income) − (Increase in Expenditure)

Increase in Income = 10% of 45,000 = Rs. 4,500

Increase in Expenditure = 20% of 36,000 = Rs. 7,200

Change in savings = 4,500 − 7,200 = −Rs. 2,700 (Decrease)

New monthly savings = (45,000 − 36,000) − 2,700 = 9,000 − 2,700 = Rs. 6,300

Therefore The correct answer is Rs. 6,300.

Alternate Method

Given: Original monthly income = Rs. 45,000, Original monthly expenditure = Rs. 36,000.

Formula Used: Savings = Income − Expenditure

=> New Income = 45,000 × (110 ÷ 100) = Rs. 49,500

=> New Expenditure = 36,000 × (120 ÷ 100) = Rs. 43,200

=> New Savings = New Income − New Expenditure

=> New Savings = 49,500 − 43,200

=> New Savings = Rs. 6,300

Therefore The correct answer is Rs. 6,300.

Additional Information

Basic Budget Equation

Income = Expenditure + Savings. This relation holds true for both original and updated values.

Percentage Change in Savings

Percentage change in savings can be calculated as [(New Savings − Old Savings) ÷ Old Savings] × 100.

Income Increase vs Expenditure Increase

If the absolute increase in expenditure exceeds the absolute increase in income, the savings will always decrease.

Q30. Answer: (b) 7

Shortcut Trick

Identify factors of the product 30 that add up to 13.

Factors of 30: (1, 30), (2, 15), (3, 10), (5, 6).

Sum check: 10 + 3 = 13 (Correct).

Positive Difference: 10 − 3 = 7.

Therefore The correct answer is 7.

Alternate Method

Given:

Sum of two positive numbers (x + y) = 13

Product of the numbers (xy) = 30

Formula Used:

$(x - y)^2 = (x + y)^2 - 4xy$

Calculations:

=> $(x - y)^2 = (13)^2 - 4 \times (30)$

=> $(x - y)^2 = 169 - 120$

=> $(x - y)^2 = 49$

=> $(x - y) = \sqrt{49}$

=> $x - y = 7$

Therefore The correct answer is 7.

Additional Information

Quadratic Roots Relation

Any two numbers can be treated as roots of a quadratic equation: $z^2 - (\text{Sum})z + (\text{Product}) = 0$.

Algebraic Identities

Remember that $(x + y)^2 = x^2 + y^2 + 2xy$ and $(x - y)^2 = x^2 + y^2 - 2xy$. Their difference is always 4xy.

Root Difference Formula

For a quadratic equation $az^2 + bz + c = 0$, the difference of roots is given by $\sqrt{D}/|a|$, where $D = b^2 - 4ac$.

Q31. Answer: (b) Italy

The correct answer is Italy.

Key Points

• Mount Etna is situated on the eastern coast of Sicily, which is the largest island in the Mediterranean Sea and an autonomous region of Italy.

• It is recognized as the highest and most active volcano in Europe, standing at an approximate elevation of 3,357 meters, though this height varies with successive eruptions.

• In February 2025, a significant eruptive episode was recorded at a vent on the western side of the Southeast Crater, which is one of the four distinct summit craters and currently the most active.

• The volcano is a stratovolcano that has been active for over 500,000 years, and its eruptions are often characterized by strombolian activity, lava fountaining, and significant ash plumes.

• Geologically, its existence is a result of the complex tectonic interaction between the African Plate and the Eurasian Plate, which drives the persistent magma ascent.

Additional Information

• Geographical Context of Incorrect Options:

• Estonia: Located in Northern Europe bordering the Baltic Sea, it has a flat topography and lacks any active or dormant volcanic systems.

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• Serbia: A landlocked Balkan country in Southeast Europe with diverse mountainous terrain, but it possesses no active volcanic craters.

• Luxembourg: A small, landlocked nation in Western Europe primarily featuring the Oesling and Gutland regions, with zero volcanic activity.

• Scientific and Cultural Significance:

• Mount Etna was designated a UNESCO World Heritage Site in 2013 due to its critical role in the study of volcanology and its continuous history of documented eruptions dating back thousands of years.

• The volcano significantly impacts the local economy through volcanic tourism and fertile volcanic soil which supports extensive vineyards and orchards on its lower slopes.

Q32. Answer: (a) Allocating a specific block of the CPU's processing time to a newly launched program.

The correct answer is Allocating a specific block of the CPU's processing time to a newly launched program.

Key Points

• System Software acts as the essential layer between computer hardware and Application Software, providing the necessary environment for other programs to run.

• CPU Scheduling is the process of deciding which program or process gets to use the Central Processing Unit and for what duration. This task is exclusive to the Operating System (OS), which is a type of system software.

• The OS Kernel operates in a privileged Kernel Mode, allowing it to manage hardware resources directly. It uses complex algorithms such as Round Robin, Priority Scheduling, or Multilevel Queue Scheduling to manage CPU Cycles.

• Application programs run in a restricted User Mode. They cannot allocate Processor Time to themselves or other programs because doing so would allow a single application to potentially crash or freeze the entire system.

• While application programs can request resources, the actual Resource Allocation and Process Management are strictly handled by the system software to ensure stability and Concurrency.

Additional Information

• System Software Categories:

• Operating Systems: Examples like Windows, Unix, and Android manage hardware, memory, and task switching.

• Device Drivers: Specialized software that allows the OS to communicate with specific hardware like printers or graphics cards.

• Utility Software: Programs designed for system maintenance, such as Disk Cleanup or System Restore.

• Application Software Traits:

• Applications like Web Browsers, Spreadsheets, and Video Players focus on performing user-specific tasks.

• Although applications handle User Input and Output, they rely on System Calls to the OS to interact with the Keyboard and Monitor.

• Script Automation: Tools like Macro Recorders or Python scripts are applications used to automate user-level tasks, not system-level hardware management.

Q33. Answer: (b) Gajasimha

The correct answer is Gajasimha.

Key Points

• The official mascot for the Khelo India Youth Games 2025 (KIYG) was unveiled as Gajasimha, a mythical creature that combines the features of an Elephant (Gaja) and a Lion (Simha).

• The 7th edition of the Khelo India Youth Games is scheduled to be hosted by the state of Bihar, marking the first time the state is organizing this prestigious national-level multi-sport event.

• The mascot was launched during a ceremony in Patna by the Union Minister of Youth Affairs and Sports, Mansukh Mandaviya, and the Chief Minister of Bihar, Nitish Kumar.

• The choice of Gajasimha as the mascot is symbolic of the cultural heritage and strength associated with Bihar, where the elephant represents wisdom and patience, while the lion symbolizes valor and leadership.

• This mascot serves as an inspiration to young athletes, encouraging them to demonstrate power and determination on the field while maintaining the grace of cultural roots.

Additional Information

• Khelo India Youth Games Overview:

• The Khelo India initiative was launched by the Government of India to revive the sports culture at the grassroots level and build a strong framework for all sports played in the country.

• The 2024 edition of the games was held in Tamil Nadu, where the mascot was Veera, inspired by Rani Velu Nachiyar.

• The 2025 games in Bihar will feature numerous sports disciplines, bringing together thousands of athletes from across India.

• The mascot Gajasimha is a popular figure in Indian temple architecture and iconography, often seen as a guardian deity signifying invincibility.

Q34. Answer: (b) Rs. 25,000 crore

The correct answer is Rs. 25,000 crore.

Key Points

• During the presentation of the Union Budget 2025-26, the Union Finance Minister announced the establishment of a dedicated Maritime Development Fund (MDF).

• The fund has been constituted with a substantial corpus of Rs. 25,000 crore to provide the necessary financial impetus to the maritime and shipping sectors.

• The primary goal of the Maritime Development Fund is to provide long-term, low-cost financing to Indian companies for the procurement and construction of Indian-flagged vessels.

• By fostering a robust financing ecosystem, the government aims to increase the share of Indian tonnage in global shipping, which is currently dominated by foreign entities.

• This initiative is a strategic step toward making India a global shipbuilding and ship-repair hub, aligning with the objectives of Aatmanirbhar Bharat.

Additional Information

• Maritime India Vision 2030:

• It is a 10-year blueprint launched by the Ministry of Ports, Shipping, and Waterways to modernize port infrastructure and promote the Blue Economy.

• The Rs. 25,000 crore corpus is designed to bridge the capital intensive requirements of projects under this vision.

• Strategic Economic Impact:

• India currently pays a massive amount, estimated between $75 billion and $100 billion, in freight charges to foreign shipping lines annually.

• Boosting domestic fleet capacity through this fund will help in saving significant foreign exchange reserves and enhancing maritime security.

• Blue Economy Growth:

• The fund supports the sustainable development of coastal resources and promotes green shipping initiatives.

• It is expected to generate significant employment opportunities in coastal states through the expansion of port-led industrialization.

Q35. Answer: (c) Menander

The correct answer is Menander.

Key Points

• Menander I, also known as Milinda in Indian traditions, was the most illustrious and powerful of the Indo-Greek rulers who reigned over the northwestern regions of the Indian subcontinent from approximately 165 BCE to 130 BCE.

• He belonged to the Euthydemid dynasty and established his capital at Sakala (modern-day Sialkot in Punjab, Pakistan), which became a major center of commerce and culture under his rule.

• His reign is celebrated for the synthesis of Greek and Indian cultures. He is the central figure of the famous Buddhist text Milinda Panha (The Questions of Milinda), which records his philosophical dialogue with the Buddhist sage Nagasena.

• As a result of his discussions with Nagasena, Menander converted to Buddhism, making him one of the first major foreign rulers in India to adopt the faith and patronize its development.

• His kingdom was vast, extending from the Kabul River Valley in the west to the Ravi River in the east, and his influence reached as far as Mathura and Pataliputra according to various historical accounts.

• Menander issued a wide variety of silver and copper coins that featured bilingual inscriptions in Greek and Kharosthi, showcasing the title Soter (meaning 'The Savior').

Additional Information

• Alexander the Great:

• He was the king of Macedonia who invaded India in 326 BCE and defeated King Porus at the Battle of the Hydaspes.

• While he opened the route for future Greek influence, he did not establish the Indo-Greek kingdom; he retreated from the Beas River before reaching the heart of India.

• Pushyamitra Sunga:

• He founded the Sunga Dynasty in 185 BCE after assassinating Brihadratha, the last Mauryan emperor.

• He was a staunch follower of Brahmanism and is known for performing the Ashvamedha (horse sacrifice) to assert his sovereignty.

• Rudradaman I:

• He was the most famous ruler of the Saka (Western Kshatrapa) dynasty who ruled around 130–150 CE.

• He is renowned for his Junagadh Rock Inscription, which is the first long inscription written in chaste Sanskrit.

Q36. Answer: (c) Coal

The correct answer is Coal.

Key Points

• The Damodar Valley, spanning across the states of Jharkhand and West Bengal, is the most vital mineral belt in India for Gondwana coal deposits.

• This region accounts for approximately 80% of the country's total coal reserves and is frequently referred to as the Ruhr of India due to its high industrial concentration and mineral wealth.

• The valley contains major coalfields including Raniganj, which is the oldest coalfield in India (opened in 1774), and Jharia, the largest and most significant source of high-grade metallurgical coking coal.

• Other prominent coalfields in this basin include Bokaro, Giridih, North Karanpura, and South Karanpura, which fuel the massive iron and steel plants of the Chota Nagpur region.

• The bituminous coal found here is essential for the production of thermal power and the smelting of iron ore in blast furnaces.

Additional Information

• Iron:

• While found in the vicinity of the Chota Nagpur plateau, the richest iron ore deposits are concentrated in the Singhbhum district of Jharkhand and the Mayurbhanj-Keonjhar belt of Odisha.

• The primary ores extracted are Hematite and Magnetite, which provide the raw material for industries like TISCO and Bokaro Steel Plant.

• Limestone:

• It is primarily composed of calcium carbonate (CaCO3) and serves as a fundamental raw material for the cement industry.

• Major deposits in India are located in Madhya Pradesh, Rajasthan, and Andhra Pradesh, rather than the core Damodar Valley area.

• Magnesium:

• Usually obtained from minerals like Magnesite and Dolomite.

• Significant Magnesite reserves are found in Salem (Tamil Nadu) and the Almora district of Uttarakhand.

Q37. Answer: (a) Third Battle of Panipat

The correct answer is Third Battle of Panipat.

Key Points

• The Third Battle of Panipat took place on January 14, 1761, at Panipat, which is located about 97 kilometers north of Delhi.

• This massive conflict was fought between the Northern Expeditionary Force of the Maratha Empire and a coalition led by the King of Afghanistan, Ahmad Shah Durrani (also known as Ahmad Shah Abdali).

• The Maratha forces were led by Sadashivrao Bhau, who served as the commander-in-chief under Peshwa Balaji Baji Rao.

• The Afghan alliance was bolstered by local Indian allies, including Najib-ud-Daula of the Rohilla Afghans and Shuja-ud-Daula, the Nawab of Awadh.

• The battle is historically significant for the heavy use of artillery and cavalry; the Marathas utilized French-made swivel guns and field pieces, while the Afghans employed highly mobile camel-mounted cannons known as zamburaks.

• The Maratha Empire suffered a catastrophic defeat in this engagement, which effectively halted their northward expansion and significantly weakened their influence over the Mughal throne in Delhi.

Additional Information

• Second Battle of Tarain:

• Fought in 1192 near Thanesar between the Rajput ruler Prithviraj Chauhan and the Ghurid invader Muhammad Ghori.

• This battle resulted in a Ghurid victory, which is considered a foundational event for the establishment of Muslim rule in Northern India and the subsequent Delhi Sultanate.

• First Anglo-Afghan War:

• Occurred between 1839 and 1842 as part of the Great Game between the British Empire and the Russian Empire.

• The British East India Company invaded the Emirate of Afghanistan to replace Dost Mohammad Khan with a pro-British ruler, Shah Shuja, but the war ended in a disastrous British retreat.

• Battle of Peshawar:

• A significant battle in 1001 AD where Mahmud of Ghazni defeated the Hindu Shahi ruler Jayapala.

• Another notable version occurred in 1834, when the Sikh Empire under Maharaja Ranjit Singh successfully captured Peshawar from the Durrani Empire.

Q38. Answer: (b) Karachi Resolution

The correct answer is Karachi Resolution.

Key Points

• The Karachi Resolution was adopted during the March 1931 session of the Indian National Congress (INC), which was presided over by Sardar Vallabhbhai Patel.

• It is historically significant because it was the first instance where the Congress defined the socio-economic meaning of Swaraj (self-rule) for the masses.

• The resolution included a specific section on Fundamental Rights and a National Economic Program, drafted largely by Jawaharlal Nehru.

• It advocated for the state ownership or control of key industries, mineral resources, and transportation, which directly inspired the Socialistic principles of the Directive Principles of State Policy (DPSP).

• Provisions regarding living wages for workers, limited hours of work, and the protection of women workers were outlined, which later found a place in Articles 39, 41, and 42 of the Indian Constitution.

• The resolution also emphasized social justice through the abolition of untouchability and the provision of free and compulsory primary education, aligning with the objectives of Part IV of the Constitution.

Additional Information

• Lucknow Resolution (1916)

• Commonly known as the Lucknow Pact, it was an agreement between the INC and the All India Muslim League.

• It focused on political representation and a joint demand for Self-Government from the British.

• Lahore Resolution (1929)

• Presided over by Jawaharlal Nehru, this session is famous for the declaration of Purna Swaraj (Complete Independence).

• It authorized the Civil Disobedience Movement but did not detail the specific economic justice framework found in the 1931 Karachi document.

• Directive Principles of State Policy (DPSP)

• Contained in Part IV (Articles 36−51), these principles are borrowed from the Irish Constitution.

• They serve as guidelines for the government to establish a welfare state based on social, economic, and political justice.

Q39. Answer: (a) Bal Gangadhar Tilak

The correct answer is Bal Gangadhar Tilak.

Key Points

• The Indian National Congress (INC) was established on December 28, 1885, at Gokuldas Tejpal Sanskrit College in Bombay.

• The foundation was spearheaded by Allan Octavian Hume, a retired British civil servant, who served as the first General Secretary.

• The first session was attended by 72 delegates from all over India, and it was presided over by Womesh Chandra Bonnerjee.

• Bal Gangadhar Tilak, though a towering leader of the freedom struggle, was not a founding member; he joined the Indian National Congress later, around 1890.

• Dinshaw Edulji Wacha was one of the three main founding pillars of the party, alongside A.O. Hume and Dadabhai Naoroji.

• William Wedderburn and John Jardine were prominent British officials who were part of the initial circle that supported and attended the first session of the Congress in 1885.

Additional Information

• Bal Gangadhar Tilak:

• He was a leader of the Extremist faction (Garam Dal) and was known as Lokmanya.

• He initiated the Home Rule League in 1916 and utilized the Ganpati and Shivaji festivals to instill national pride.

• He published two influential newspapers: Kesari in Marathi and Mahratta in English.

• Dinshaw Wacha:

• He served as the President of the Indian National Congress at the 1901 Calcutta session.

• He was a distinguished Parsi politician and an expert in economics and finance.

• William Wedderburn:

• He was a former Indian Civil Service (ICS) officer and a close associate of Hume.

• He presided over the Congress sessions twice: in 1889 (Bombay) and 1910 (Allahabad).

Q40. Answer: (b) Arunachal Pradesh

The correct answer is Arunachal Pradesh.

Key Points

• Baryi is a sophisticated traditional narrative folk music form belonging to the Adi community of Arunachal Pradesh, which is characterized by its lengthy, chanting delivery that recounts mythological legends, the origin of the world, and the genealogy of the tribe.

• The performance of Baryi is a significant cultural event, typically occurring during the Solung festival, the primary socio-religious harvest festival of the Adi tribe celebrated annually in the month of September.

• Nyioga is another indigenous folk music tradition found in Arunachal Pradesh, predominantly practiced by the Galo and Adi tribes during social ceremonies, wedding rituals, and joyous festive gatherings.

• These folk music forms serve as a vital oral repository for the state's tribal history, enabling the transmission of ancestral wisdom, ethical values, and customary laws through generations without the need for written scripts.

• The melodic verses of Baryi and Nyioga are often performed in a responsorial style and are deeply integrated with traditional dances such as the Ponung or Popir, reflecting the community's connection to nature and their spirits.

Additional Information

• Arunachal Pradesh:

• Commonly known as the Land of the Rising Sun, it is home to over 26 major tribes, including the Nyishi, Apatani, and Monpa, each possessing unique musical traditions and instruments like the Emele (bamboo flute).

• The Mopin festival of the Galo tribe is another major event where folk songs and the Popir dance are showcased.

• Manipur:

• Famous for Khongjom Parba, a style of ballad singing that narrates the Anglo-Manipur War of 1891, and the use of the Pena instrument in Lai Haraoba.

• Mizoram:

• Features rhythmic folk music associated with the Cheraw (bamboo dance) and Chheihlam, often accompanied by the Khuang (drum).

• Tripura:

• Renowned for folk songs performed during the Garia Puja and Dhamail, a traditional choral folk song and dance form popular in the region.

Q41. Answer: (d) Judicial Review

The correct answer is Judicial Review.

Key Points

• Article 13 acts as a guardian of the Fundamental Rights by providing the constitutional basis for Judicial Review in India.

• Under Article 13(1), all laws in force in India immediately before the commencement of the Constitution (pre-constitutional laws) are declared void to the extent of their inconsistency with Part III.

• Article 13(2) mandates that the State shall not make any law (post-constitutional laws) that takes away or abridges the Fundamental Rights, and any such law made in contravention shall be void to the extent of the contravention.

• This article effectively empowers the judiciary to scrutinize legislative and executive actions, ensuring the Supremacy of the Constitution over ordinary laws.

• The term 'law' in this context is defined under Article 13(3) to include any ordinance, order, bye-law, rule, regulation, notification, custom, or usage having the force of law in the territory of India.

Additional Information

• Judicial Review:

• While the term is not explicitly mentioned in the Constitution, the power is derived from Article 13, Article 32 (Supreme Court), and Article 226 (High Courts).

• It was declared a part of the Basic Structure of the Constitution in the landmark Kesavananda Bharati Case (1973).

• Right to Equality:

• This is a specific category of Fundamental Rights covered under Articles 14 to 18.

• Freedom of Speech:

• Specifically guaranteed under Article 19(1)(a) as part of the Right to Freedom.

• Reservation Policy:

• Primarily governed by provisions in Article 15 (non-discrimination) and Article 16 (equality of opportunity in public employment).

Q42. Answer: (a) Doctrine of Harmonious Construction

The correct answer is Doctrine of Harmonious Construction.

Key Points

• The Doctrine of Harmonious Construction is a fundamental rule of statutory interpretation used by the Judiciary when two or more provisions of the Constitution or a statute appear to be contradictory.

• The primary objective of this doctrine is to interpret conflicting provisions in a way that gives effect to both, ensuring that no provision is rendered redundant or a dead letter, thus maintaining constitutional consistency.

• In the landmark Minerva Mills v. Union of India (1980) case, the Supreme Court emphasized that the Indian Constitution is founded on the bedrock of the balance between Fundamental Rights (Part III) and Directive Principles of State Policy (Part IV).

• The court ruled that while DPSPs are fundamental in the governance of the country, they must be achieved without abrogating Fundamental Rights, as harmony between the two is an essential feature of the Basic Structure.

• By applying this doctrine, courts protect laws promoting socio-economic welfare (under DPSPs) from being struck down under Article 13, provided they can be interpreted in alignment with the spirit of Fundamental Rights.

Additional Information

• Doctrine of Basic Structure:

• Established in the Kesavananda Bharati v. State of Kerala (1973) case.

• It limits the power of the Parliament to amend the Constitution under Article 368, ensuring that core features like secularism, judicial review, and democracy remain intact.

• Doctrine of Severability:

• Enshrined in Article 13(1) of the Constitution.

• It states that if a law violates Fundamental Rights, only the inconsistent part of the law is void, provided it can be separated from the valid portion (as seen in the A.K. Gopalan case).

• Doctrine of Protective Discrimination:

• Rooted in Article 15(4) and Article 16(4).

• It permits the State to make special provisions for the advancement of Socially and Educationally Backward Classes, Scheduled Castes, and Scheduled Tribes to ensure substantive equality.

Q43. Answer: (b) Hydronium ion

The correct answer is Hydronium ion.

Key Points

• In aqueous solutions, hydrogen ions (H^+) are essentially bare protons. Due to their extremely high charge density and small size, they cannot exist independently in water.

• When an acid dissociates in water, the released H^+ ion immediately associates with a water molecule (H2O) through a coordinate covalent bond.

• This interaction results in the formation of the hydronium ion, which is chemically represented as H3O^+.

• The reaction can be summarized by the equation: H^+ + H2O → H3O^+. This indicates that the acidic properties of a solution are technically due to these hydrated protons.

• While chemical equations often use H^+(aq) for simplicity, it is understood in Arrhenius theory and Bronsted-Lowry theory that the species actually present is the hydronium ion.

Additional Information

• Hydroxide ion (OH^−):

• This is a diatomic anion consisting of oxygen and hydrogen.

• It is the characteristic ion released by bases in water and is responsible for alkalinity.

• Oxide ion (O^(2−)):

• This is a divalent anion typically found in solid ionic compounds like Magnesium Oxide (MgO).

• In water, oxide ions are unstable and react rapidly to form hydroxide ions.

• Hydrogen gas (H2):

• This is a diatomic molecule and is the simplest stable form of elemental hydrogen.

• It is often produced as a byproduct when reactive metals like Zinc or Magnesium react with dilute acids.

Q44. Answer: (b) Stray dogs

The correct answer is Stray dogs.

Key Points

• In November 2025, the Supreme Court of India, while hearing Suo Moto Writ Petition (Civil) No. 5 of 2025 titled 'In Re: City Hounded by Strays, Kids Pay Price', issued stringent directives to address the escalating stray dog menace.

• A three-judge bench comprising Justices Vikram Nath, Sandeep Mehta, and N.V. Anjaria ordered that stray dogs must be removed and permanently relocated from sensitive institutional premises, including educational institutions, hospitals, sports complexes, bus stands, and railway stations.

• The Court mandated that such animals must be sterilized, vaccinated, and shifted to designated shelters or pounds, explicitly prohibiting their re-release into the same institutional areas to ensure public safety.

• The directive emphasized that the Right to Life under Article 21 of the Constitution of India includes the right to move freely in public spaces without the fear of dog-bite attacks, especially for vulnerable groups like children and the elderly.

• The Supreme Court also directed that all such public institutions must be properly fenced to prevent the further entry of stray animals into their compounds.

Additional Information

• Stray cows and other livestock:

• While the November 2025 order also addressed stray cattle, the focus for cows was primarily their removal from National Highways and Expressways by the National Highways Authority of India (NHAI) to prevent fatal road accidents.

• Legal and Regulatory Framework:

• The Animal Welfare Board of India (AWBI) was tasked with creating a Standard Operating Procedure (SOP) for the humane management and relocation of dogs in compliance with the Prevention of Cruelty to Animals Act, 1960.

• The Court noted that the previous Animal Birth Control (ABC) Rules, 2023, were being inadequately implemented, necessitating judicial intervention to balance animal welfare with human safety.

• Chief Secretaries of all States and Union Territories were directed to file compliance affidavits within eight weeks to ensure the ground-level execution of these relocation drives.

Q45. Answer: (c) Mizoram

The correct answer is Mizoram.

Key Points

• The India State of Forest Report (ISFR) 2021 is the 17th biennial assessment released by the Forest Survey of India (FSI), which operates under the Ministry of Environment, Forest and Climate Change.

• According to the 2021 findings, Mizoram possesses the highest forest cover relative to its geographical area among all Indian states, with a recorded percentage of 84.53%.

• While the Union Territory of Lakshadweep leads all regions with a coverage of 90.33%, Mizoram remains the leading state in this category.

• The report indicates that 17 states and Union Territories in India have more than 33% of their total geographical area under forest cover.

• The total forest and tree cover of India reached 80.9 million hectares in 2021, representing 24.62% of the country total geographical area.

• The top five states in terms of percentage forest cover are Mizoram (84.53%), Arunachal Pradesh (79.33%), Meghalaya (76.00%), Manipur (74.34%), and Nagaland (73.90%).

Additional Information

• Chhattisgarh:

• It ranks third in India regarding total forest area, covering approximately 55,717 sq km.

• Its forest cover accounts for about 41.21% of its total geographical area, making it a critical ecological zone in central India.

• Andhra Pradesh:

• This state witnessed the highest increase in forest cover in the country according to the 2021 report, adding 647 sq km.

• The growth is attributed to successful agroforestry, plantation drives, and better conservation measures.

• Assam:

• Assam has a forest cover of 28,312 sq km, which is approximately 36.09% of its geographical area.

• The state is home to significant biodiversity hotspots and UNESCO World Heritage Sites such as Kaziranga National Park.

• Arunachal Pradesh:

• It holds the second-largest forest cover in India by area (after Madhya Pradesh) and the second-highest by percentage (79.33%).

Q46. Answer: (b) joule and M L² T^(-2)

The correct answer is joule and M L² T^(−2).

Key Points

• Work is defined as the product of the component of the force acting on an object and the displacement caused by that force in the direction of the force. Mathematically, it is expressed as Work (W) = Force (F) × Displacement (d) × cos(θ).

• The SI unit of work is the joule (J). One joule is defined as the amount of work done when a force of one newton displaces an object by one meter in the direction of the force.

• Energy is the capacity to do work. Because energy is consumed or transferred to perform work, it is measured in the same SI unit, which is the joule.

• The dimensional formula for Force is [M L T^(−2)] and for Displacement is [L]. Multiplying these gives the dimensions for work or

energy as [M L² T^(−2)].

Additional Information

• Pascal

• It is the SI unit of pressure or stress.

• It represents one newton per square meter (N/m²).

• The dimensional formula for pressure is [M L^(−1) T^(−2)].

• Newton

• It is the SI unit of force, named after Sir Isaac Newton.

• One newton is the force required to accelerate a 1 kg mass at 1 m/s².

• The dimensional formula is [M L T^(−2)].

• Watt

• It is the SI unit of power, representing the rate at which work is done.

• One watt is equal to one joule per second (1 J/s).

• The dimensional formula for power is [M L² T^(−3)].

Therefore, the correct option is 2.

Q47. Answer: (a) Socio-Economic Caste Census, 2011

The correct answer is Socio-Economic Caste Census, 2011.

Key Points

• The Pradhan Mantri Awaas Yojana-Gramin (PMAY-G) was launched by the Ministry of Rural Development in April 2016 with the primary goal of providing Housing for All in rural areas.

• The selection of beneficiaries is conducted using the Socio-Economic Caste Census (SECC) 2011 data rather than the traditional Below Poverty Line (BPL) lists to ensure a more objective and transparent identification process.

• The targeting process utilizes deprivation parameters from the SECC 2011, focusing on households that are houseless or living in houses with zero, one, or two rooms with kutcha walls and roofs.

• The system employs a multi-stage verification process where the Gram Sabha validates the preliminary list generated from the SECC database to identify and remove ineligible households based on predefined exclusion criteria.

Additional Information

• The scheme replaced the earlier Indira Awaas Yojana (IAY) and increased the minimum unit size from 20 square meters to 25 square meters.

• Financial Assistance Structure:

• Beneficiaries in plain areas receive a unit assistance of Rs. 1.20 lakh.

• In hilly states, difficult areas, and Integrated Action Plan (IAP) districts, the assistance is increased to Rs. 1.30 lakh.

• Convergence and Benefits:

• The scheme converges with MGNREGA to provide beneficiaries with 90 to 95 days of unskilled labor wages for the construction of their house.

• It includes Rs. 12,000 for toilet construction via the Swachh Bharat Mission-Gramin (SBM-G).

• Beneficiaries are also linked to other government initiatives such as the Pradhan Mantri Ujjwala Yojana for LPG connections and the Saubhagya Yojana for electricity.

Q48. Answer: (a) Mark Carney

The correct answer is Mark Carney.

Key Points

• Mark Carney was officially sworn in as the 24th Prime Minister of Canada on March 14, 2025, at a ceremony held at Rideau Hall in Ottawa.

• He succeeded Justin Trudeau, who served as the 23rd Prime Minister for nearly a decade before announcing his resignation in January 2025.

• Carney secured his path to the premiership by winning the Liberal Party of Canada leadership election on March 9, 2025, with an overwhelming 85.9% of the party vote.

• Upon taking office, he immediately formed a streamlined Cabinet and later led the Liberals to a victory in the 45th federal general election on April 28, 2025, where the party won 169 seats.

• Before entering frontline politics, Carney earned international acclaim as a central banker, serving as the 8th Governor of the Bank of Canada (2008–2013) and the 120th Governor of the Bank of England (2013–2020).

Additional Information

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• Claudia Sheinbaum:
• She was sworn in as the first female President of Mexico on October 1, 2024.
• A scientist and former Head of Government of Mexico City, she represents the Morena party.
• Donald Tusk:
• He assumed office as the Prime Minister of Poland on December 13, 2023.
• He previously served as the President of the European Council from 2014 to 2019.
• James David Vance:
• Commonly known as J.D. Vance, he was sworn in as the 50th Vice President of the United States on January 20, 2025.
• He is the author of the memoir Hillbilly Elegy and previously served as a U.S. Senator from Ohio.

Q49. Answer: (a) OCR scanner

The correct answer is OCR scanner.

Key Points

• OCR, which stands for Optical Character Recognition, is a specialized technology that converts different types of documents, such as scanned paper documents, PDF files, or images captured by a digital camera, into editable and searchable data.
• The process begins by scanning a physical document to create a raster image (a collection of light and dark dots). The OCR software then analyzes this image to identify patterns that correspond to alphanumeric characters.
• The pattern recognition engine compares the scanned shapes against stored templates of various fonts or uses feature extraction to identify specific strokes, loops, and intersections that define a character.
• Once characters are identified, they are converted into machine-encoded text, typically using standard encoding formats like ASCII or Unicode, allowing the text to be processed by word processors or database applications.
• This technology is essential for digitizing historical archives, automating data entry for invoices, and enabling assistive technologies for the visually impaired by converting printed text into speech.

Additional Information

• OMR (Optical Mark Recognition):
• This technology detects the presence or absence of a mark in specific, pre-determined locations on a form.
• It is widely utilized for grading standardized multiple-choice examinations and processing census surveys.
• Barcode Reader:
• An input device that uses a laser beam or LED light to capture and read the parallel black and white lines of a barcode.
• It translates the width and spacing of these bars into a numerical code used for inventory tracking and retail transactions.
• MICR (Magnetic Ink Character Recognition):
• Uses specialized magnetic ink and unique fonts (such as E-13B or CMC-7) that can be read by a magnetic reader even if obscured by stamps or marks.
• Primarily used by the banking industry for the high-speed processing of checks and deposit slips to enhance security.

Q50. Answer: (d) Alt + F

The correct answer is Alt + F.

Key Points

• The Alt + F keyboard shortcut is the standard mnemonic command used in the Microsoft Windows environment and many Graphical User Interface (GUI) applications to instantly open the File menu.
• The Alt key serves as a modifier that activates the menu bar, while the letter F acts as the underlined access key (mnemonic) for the word File.
• Once the File menu is expanded, users can navigate to essential functions such as New, Open, Save, Save As, Print, and Exit using arrow keys or further letter shortcuts.
• This functionality is consistent across legacy and modern productivity software, including the Microsoft Office Suite (Word, Excel, PowerPoint), Notepad, and classic desktop browsers.

Additional Information

• Alt + Tab
• This is a widely used system-level shortcut known as the Task Switcher or CoolSwitch.
• It allows users to quickly cycle through and switch between different active application windows without using the mouse.
• Alt + Insert
• While not a standard Windows OS shortcut, it is frequently utilized in Integrated Development Environments (IDEs) like IntelliJ IDEA or Android Studio.
• Its primary function in these environments is to Generate Code, such as creating constructors, getters, or setters.

• Alt + Del

• This combination is less common in standard desktop navigation but is sometimes used in specific text editors or Terminal emulators to delete words or lines.

• It is often confused with the Ctrl + Alt + Delete sequence, which is used to access the Task Manager or Windows Security options.

Q51. Answer: (b) Coal

The correct answer is Coal.

Key Points

• Coal is a fossil fuel primarily composed of carbon, formed from the remains of vegetation buried under high pressure and temperature for millions of years, making it an exhaustible or non-renewable resource.

• In India, coal is the most critical energy source, powering approximately 70 percent of the total electricity generation through numerous Thermal Power Plants located across the country.

• It is classified as a polluting resource because its combustion releases significant amounts of Carbon Dioxide (CO_2), which is a leading greenhouse gas, as well as Sulphur Dioxide (SO_2) and Nitrogen Oxides (NO_x).

• The mining and burning of coal also result in environmental degradation through acid rain, deforestation, and the production of Fly Ash, which can contaminate soil and water systems.

• India possesses the fourth largest coal reserves in the world, with major deposits located in the Gondwana coalfields of Jharkhand, Odisha, and Chhattisgarh.

Additional Information

• Wind Energy:

• Considered an inexhaustible and clean energy source that uses turbines to convert kinetic energy into electricity.

• India has a high installed capacity in states like Tamil Nadu, Gujarat, and Maharashtra.

• Solar Energy:

• A renewable resource harnessed using Photovoltaic (PV) cells, providing a pollution-free alternative to fossil fuels.

• The National Solar Mission aims to make India a global leader in solar power.

• Biogas:

• A renewable fuel produced from the anaerobic decomposition of organic matter such as cattle dung and agricultural waste.

• It is widely used in rural India as a cleaner cooking fuel compared to traditional firewood or coal.

Q52. Answer: (a) Western Disturbances

The correct answer is Western Disturbances.

Key Points

• Western Disturbances are extra-tropical cyclones or low-pressure systems that originate over the Mediterranean Sea and travel eastward across West Asia and Pakistan to reach India.

• In the Indian subcontinent, they are responsible for sudden winter rainfall in the North-West regions, including Punjab, Haryana, Rajasthan, and Western Uttar Pradesh.

• These storms are carried into the region by the Subtropical Westerly Jet Stream, which flows at high altitudes and shifts southward during the winter months.

• While the total amount of precipitation is relatively small compared to the South-West Monsoon, it is vital for Indian agriculture, especially for the Rabi crops (winter crops) like Wheat.

• Apart from rain in the plains, these disturbances cause heavy snowfall in the Himalayan regions, which helps maintain the glaciers and feeds the perennial rivers throughout the year.

Additional Information

• Local Winds:

• These refer to winds like the Loo, which is a hot and dry wind blowing in Northern India during the summer (May-June), or Mango Showers in Kerala and Karnataka.

• They are localized phenomena and do not cause systematic winter rainfall across the North-West.

• Jet Streams:

• These are narrow bands of strong winds in the upper atmosphere. While the Westerly Jet Stream acts as a carrier for Western Disturbances, the rain-bearing system itself is the disturbance.

• Easterly Waves:

• These are tropical disturbances that move from east to west across the tropics.

• They are typically associated with the North-East Monsoon or Retreating Monsoon, primarily affecting the Coromandel Coast and Tamil Nadu, rather than North-West India.

Q53. Answer: (c) British officers, zamindars, traders and local moneylenders

The correct answer is British officers, zamindars, traders and local moneylenders.

Key Points

• The Santhal Rebellion, also known as the Santhal Hool, was a massive tribal uprising that took place between 1855 and 1856 against the exploitative British colonial system and its local collaborators.

• The rebellion was primarily directed against the Dikus (outsiders), a term the Santhals used for zamindars, moneylenders, and traders who had disrupted their traditional way of life.

• The introduction of the Permanent Settlement of 1793 by the British East India Company converted Santhal lands into the property of zamindars, who then imposed high taxes and rents that the Santhals could not afford.

• To pay these high rents, Santhals were forced to take loans from local moneylenders (Mahajans) at usurious interest rates, often ranging from 50% to 500%, leading to widespread bonded labor and land alienation.

• The British officers and the colonial police force consistently protected the interests of the zamindars and traders, leaving the Santhals with no legal recourse against systemic fraud and physical oppression.

• Led by the brothers Sidhu Murmu and Kanhu Murmu, along with Chand and Bhairav, the Santhals declared an end to British rule and aimed to establish a sovereign Santhal Raj.

Additional Information

• Damin-i-koh:

• In 1832, the British demarcated a large area of land in the Rajmahal Hills as Damin-i-koh, intending for the Santhals to settle there as settled agriculturists.

• Over time, this area became the focal point of the revolt as the Santhals felt squeezed between the forest and the encroaching zamindari system.

• Post-Rebellion Reforms:

• After the rebellion was suppressed with extreme military force, the British government realized the depth of tribal grievances and passed the Santhal Pargana Tenancy Act in 1876.

• This legislation provided some protection to the Santhals by prohibiting the transfer of tribal land to non-tribals, attempting to curb the power of the moneylenders.

• A separate administrative unit called the Santhal Pargana district was created, making it a non-regulated area where special laws applied to respect tribal customs.

Q54. Answer: (c) Zabti system

The correct answer is Zabti system.

Key Points

• The Zabti system, also known as the Dahshala system, was a land revenue administrative framework introduced by Raja Todar Mal, the finance minister (Mushrif-i-Diwan) of the Mughal Emperor Akbar, around 1580-1582.

• This system was based on a meticulous survey of crop yields, prices, and areas cultivated over a ten-year period (1570−1580) to establish a stable revenue demand.

• The state revenue demand was fixed at one-third of the average produce, and unlike earlier systems, the valuation was converted into cash based on local price schedules (Dasturs).

• For accurate land measurement, Akbar replaced the traditional hemp rope with the Jarib, which utilized bamboo sticks joined by iron rings to prevent fluctuations caused by moisture.

• The land was categorized into four types based on the continuity of cultivation: Polaj (cultivated annually), Parauti (left fallow for 1−2 years), Chachar (left fallow for 3−4 years), and Banjar (uncultivated for 5 years or more).

Additional Information

• Mansabdari system:

• A unique administrative and military ranking system introduced by Akbar to organize the nobility.

• Ranks were divided into Zat (personal status and salary) and Sawar (number of cavalrymen the officer was required to maintain).

• Jagirdari system:

• A mechanism of resource allocation where Mansabdars were assigned Jagirs (land grants) instead of cash salaries.

• The Jagirdar had the right to collect revenue from the assigned territory to meet his official expenses.

• Ryotwari system:

• A land revenue system introduced much later by the British (specifically Thomas Munro and Alexander Read) in South India.

• It established a direct contract between the government and the Ryots (individual peasants) for tax payment.

Q55. Answer: (d) Ravi Shankar

The correct answer is Ravi Shankar.

Key Points

• Pandit Ravi Shankar (1920−2012) was an legendary Indian musician and composer who became the most famous exponent of the Sitar and Hindustani Classical Music in the 20th century.

• Unlike the other performers mentioned, who are pillars of the Carnatic music tradition (South Indian classical music), Ravi Shankar represented the North Indian classical tradition known as Hindustani music.

• He was a disciple of Ustad Allauddin Khan, the founder of the Maihar Gharana, and is credited with introducing Indian classical music to the Western world through his collaborations with The Beatles and Yehudi Menuhin.

• For his immense contribution to the arts, he was honored with India's highest civilian award, the Bharat Ratna, in 1999 and received five Grammy Awards.

Additional Information

• DK Pattammal (Damal Krishnaswamy Pattammal):

• She was a legendary Carnatic vocalist and was part of the celebrated Female Trinity of Carnatic Music, alongside M. S. Subbulakshmi and M. L. Vasanthakumari.

• She was the first woman to perform Ragam Thanam Pallavi on the public stage, a complex musical form previously restricted to male musicians.

• Nithyasree Mahadevan:

• An eminent Carnatic musician and playback singer, she is the granddaughter of DK Pattammal and the mridangam maestro Palghat Mani Iyer.

• She has performed in major festivals across India and globally, preserving the Pattammal school of music.

• Vijayalakshmy Subramaniam:

• A well-known Carnatic vocalist who has trained under stalwarts like S. Rajam.

• She is known for her scholarly approach to South Indian classical music and has released several thematic albums on various Indian composers.

• Classical Music Traditions:

• Hindustani Music: Predominant in North India, influenced by Persian and Islamic cultures, and focuses on Gharana lineages.

• Carnatic Music: Predominant in South India (Tamil Nadu, Karnataka, Kerala, Andhra Pradesh), it is more structured and focuses on Kritis and Varnams.

Q56. Answer: (b) Involuntary actions

The correct answer is Involuntary actions.

Key Points

• The medulla oblongata is the lowest part of the brainstem and acts as the critical connection between the higher brain centers and the spinal cord.

• It is primarily responsible for the regulation of involuntary actions, which are physiological processes that occur without conscious thought or effort.

• The medulla contains the cardiac center, which controls the heart rate and the force of heart contractions through the autonomic nervous system.

• It houses the respiratory center, which monitors carbon dioxide and pH levels in the blood to regulate the rate and depth of breathing.

• The vasomotor center in the medulla regulates blood pressure by signaling the smooth muscles in blood vessel walls to constrict or dilate.

• It serves as the coordination center for vital reflex actions such as swallowing, vomiting, sneezing, coughing, and hiccupping.

Additional Information

• Memory:

• This is a complex cognitive function primarily managed by the cerebrum, specifically the hippocampus for memory formation and the cerebral cortex for long-term storage.

• Vision:

• Visual information is processed in the occipital lobe located at the back of the cerebrum, which receives signals from the optic nerves.

• Thinking:

• Higher-order functions like reasoning, planning, and problem-solving are regulated by the frontal lobe of the cerebral cortex.

• The brainstem consists of the midbrain, pons, and medulla oblongata, collectively controlling most basic life-support functions.

Q57. Answer: (c) Mother Mary Comes To Me

The correct answer is Mother Mary Comes To Me.

Key Points

• Arundhati Roy, the renowned Indian author and activist, announced her first full-length memoir titled Mother Mary Comes To Me, scheduled for global release in September 2025.

• The memoir is described as a coming-of-age story that explores Roy's personal journey, her relationship with her mother, Mary Roy, and her experiences growing up in Kerala.

• The book is set to be published by Hamish Hamilton (an imprint of Penguin Books) in the United Kingdom and Scribner in the United States.

• While Roy has written numerous non-fiction essays and two acclaimed novels, this work marks her first comprehensive autobiographical account, focusing on the domestic and political influences that shaped her life and literature.

• The title reflects a recurring theme or personal connection to her mother, who was a prominent women's rights activist and a significant figure in Indian legal history due to the Mary Roy case regarding Syrian Christian inheritance laws.

Additional Information

• Arundhati Roy's Notable Works:

• The God of Small Things: Her debut novel, published in 1997, which won the prestigious Man Booker Prize.

• The Ministry of Utmost Happiness: Her second novel, published in 2017, nearly 20 years after her debut.

• Non-Fiction Essays: She has authored several collections, including The Algebra of Infinite Justice, An Ordinary Person's Guide to Empire, and Azadi: Freedom. Fascism. Fiction.

• Awards and Honors:

• She was awarded the Sydney Peace Prize in 2004 and the Sahitya Akademi Award in 2006 (which she declined in protest).

• In 2024, she was honored with the PEN Pinter Prize for her fearless writing and activism.

Q58. Answer: (b) Article 13

The correct answer is Article 13.

Key Points

• Article 13 serves as the primary protector of Fundamental Rights by explicitly providing the power of judicial review to the judiciary (the Supreme Court and High Courts).

• Article 13(1) states that all pre-constitutional laws that were in force before January 26, 1950, are void to the extent they are inconsistent with the Fundamental Rights.

• Article 13(2) mandates that the State shall not make any law that takes away or abridges the rights conferred by Part III of the Constitution; any such law made in contravention shall be void.

• The term 'Law' under Article 13(3) is defined broadly to include not only legislation passed by Parliament or State Legislatures but also ordinances, orders, bye-laws, rules, regulations, notifications, and customs or usages having the force of law.

• The Supreme Court, through its interpretation of this article, has established that even Constitutional Amendments can be challenged if they violate the Basic Structure of the Constitution, as ruled in the landmark Kesavananda Bharati case (1973).

Additional Information

• Article 17:

• It deals with the abolition of untouchability and forbids its practice in any form.

• The enforcement of any disability arising out of untouchability is a punishable offense under the Protection of Civil Rights Act, 1955.

• Article 5:

• This article outlines citizenship at the commencement of the Constitution for individuals having a domicile in the territory of India.

• It considers criteria such as birth in India, parental birth, or ordinary residence for five years prior to 1950.

• Article 9:

• It specifies that no person shall be a citizen of India if they have voluntarily acquired the citizenship of any foreign state.

• This reflects India's principle of single citizenship and the termination of Indian status upon foreign naturalization.

Q59. Answer: (d) Mid-oceanic ridges

The correct answer is Mid-oceanic ridges.

Key Points

• A Mid-oceanic ridge is an extensive, interconnected chain of submerged mountains that stretches over 65,000 kilometers through the worlds oceans, forming the longest mountain range on Earth.

• These ridges are located at divergent plate boundaries, where tectonic plates are moving away from each other, leading to the phenomenon of seafloor spreading.

• The structure features a central rift zone, a deep longitudinal valley created by the pulling apart of the oceanic crust.

• This rift zone is a site of intense volcanic activity, where basaltic magma rises from the mantle to solidify and create new oceanic lithosphere.

• The Mid-Atlantic Ridge and the East Pacific Rise are primary examples of these geological formations.

Additional Information

• Deep-ocean trenches

• These are long, narrow, and deep topographic depressions that mark subduction zones where one plate sinks beneath another.

• The Mariana Trench in the Pacific Ocean is the deepest known point, reaching approximately 11,034 meters below sea level.

• Continental slope

• This is the steep seaward section that connects the continental shelf to the deep ocean floor, typically having a gradient of 2° to 5°.

• It marks the geological transition from granitic continental crust to basaltic oceanic crust.

• Abyssal plains

• These are vast, flat areas of the deep ocean floor found at depths between 3,000 and 6,000 meters.

• They are covered with thick layers of pelagic sediments, including ooze and red clay, making them the flattest regions on Earth.

Q60. Answer: (a) Central Information Commission

The correct answer is Central Information Commission.

Key Points

• The Right to Information (RTI) Act, 2005, establishes a three-tier grievance redressal structure to ensure transparency in the functioning of Public Authorities.

• Under Section 19(1) of the Act, if a citizen does not receive a decision within the specified time or is aggrieved by a decision of the Central Public Information Officer (CPIO), they can file a First Appeal with an officer senior in rank to the CPIO.

• The Central Information Commission (CIC) acts as the Second Appellate Authority as per Section 19(3) of the Act. It is the highest statutory body created to adjudicate on RTI matters at the federal level.

• Section 19(7) of the RTI Act explicitly states that the decision of the Central Information Commission shall be binding. This makes it the final appellate authority under the specific provisions of the statute.

• While the High Courts and the Supreme Court of India can exercise judicial review over the Commission's orders under Article 226 and Article 32 of the Constitution of India, they are not considered appellate authorities within the administrative hierarchy of the RTI Act itself.

Additional Information

• Central Information Commission (CIC):

• It was constituted with effect from 12th October 2005 under the provisions of the Right to Information Act.

• The jurisdiction of the Commission extends over all Central Public Authorities.

• It consists of a Chief Information Commissioner and a maximum of ten Information Commissioners, who are appointed by the President of India.

• The Commission has the power to impose penalties on officials under Section 20 of the Act for unjustified denial of information.

• Lokpal:

• The Lokpal is an anti-corruption authority or body of ombudsman established under the Lokpal and Lokayuktas Act, 2013.

• Its primary function is to inquire into allegations of corruption against certain categories of public servants, including the Prime Minister and Union Ministers, but it does not serve as an appellate body for RTI requests.

Q61. Answer: (a) Complex mathematical calculations

The correct answer is Complex mathematical calculations.

Key Points

• Supercomputers are the most powerful class of computers currently available, characterized by their ability to perform trillions of operations per second. Their performance is typically measured in FLOPS (Floating-Point Operations Per Second) rather than standard MIPS.

• The primary design objective of a supercomputer is to handle massive datasets and solve highly complex mathematical problems that are beyond the capacity of general-purpose mainframes or personal computers.

• These systems utilize Parallel Processing, where thousands of CPUs and GPUs work in tandem to execute specific parts of a single calculation simultaneously, drastically reducing the time required for large-scale simulations.

• Common real-world applications include Weather Forecasting, Climate Research, Quantum Mechanics, Aerospace Engineering, and Molecular Modeling for drug discovery.

Additional Information

• Comparison with other computer applications:

• Word processing: This is a routine task involving text entry and formatting, performed on Microcomputers (PCs or laptops). It requires minimal CPU resources and zero high-performance computing infrastructure.

• Office automation: This refers to the digitalization of administrative tasks like digital filing, emailing, and spreadsheet management. These are managed by Workstations or small-scale Servers.

• Internet browsing: A client-side activity focused on network communication and hypertext rendering. While it relies on large servers at the backend, the act of browsing itself is a basic function for consumer electronics.

• Notable Supercomputers and Facts:

• Frontier (USA) and Fugaku (Japan) are among the fastest supercomputers globally, capable of reaching Exascale speeds.

• India's significant contribution to this field includes the PARAM series, with PARAM 8000 being the country's first indigenous supercomputer launched in 1991.

• Modern supercomputing often integrates Artificial Intelligence (AI) and Machine Learning to optimize Big Data analysis.

Q62. Answer: (a) K=2, L=8, M=5

The correct answer is K=2, L=8, M=5.

Key Points

• Phosphorus is a vital chemical element with the symbol P and an atomic number of 15. This means a neutral phosphorus atom contains exactly 15 electrons.

• The arrangement of these 15 electrons across different energy levels is determined by the Bohr-Bury scheme, which provides the maximum electron capacity for each shell using the formula $2n^2$.

• The first energy level, known as the K-shell (n=1), can hold a maximum of $2 \times 1^2 = 2$ electrons. Phosphorus fills this shell completely with its first two electrons.

• The second energy level, the L-shell (n=2), has a maximum capacity of $2 \times 2^2 = 8$ electrons. Phosphorus occupies this shell fully with the next eight electrons.

• After populating the K and L shells, a total of 10 electrons are used (2 + 8 = 10). The remaining 5 electrons (15 − 10 = 5) are situated in the third energy level, the M-shell (n=3).

• Therefore, the correct distribution of electrons for phosphorus is designated as K=2, L=8, M=5.

Additional Information

• Elemental Characteristics of Phosphorus:

• Phosphorus is located in Group 15 (Pnictogens) and Period 3 of the Modern Periodic Table.

• Its valency is typically 3 or 5, as it has 5 valence electrons and seeks to achieve a stable noble gas configuration.

• It exists in several allotropic forms; White phosphorus is highly reactive and spontaneous in air, while Red phosphorus is more stable and used in safety matches.

• Biologically, it is a fundamental component of DNA, RNA, and ATP (Adenosine Triphosphate), which is the primary energy currency of the cell.

• The atomic mass of the element is approximately 30.974 u, and it is classified as a non-metal.

Q63. Answer: (b) Opening up the economy to global markets

The correct answer is Opening up the economy to global markets.

Key Points

• The 1991 Economic Reforms, also known as the New Economic Policy (NEP), were launched to pull India out of a severe Balance of Payments (BoP) crisis and high inflation.

• The reforms were based on the LPG model, which stands for Liberalization, Privatization, and Globalization, introduced under the leadership of Prime Minister P.V. Narasimha Rao and Finance Minister Dr. Manmohan Singh.

• A primary objective was Globalization, which involved opening up the economy to global markets by removing restrictions on international trade and capital movements.

• This was achieved through the reduction of import tariffs, the abolition of import licensing for most categories, and allowing Foreign Direct Investment (FDI) in various sectors.

• The reforms aimed to shift India from an inward-looking trade strategy to an outward-looking one, encouraging domestic firms to compete globally and improving the quality of products through technology transfer.

Additional Information

• Liberalization:

• This process involved the removal of the License Raj, ending the requirement for government permission to start or expand most industrial businesses.

• It aimed to deregulate the private sector and provide more autonomy to producers.

• Privatization:

• This focused on reducing the dominance of the government in business by disinvestment of shares in Public Sector Undertakings (PSUs).

• It aimed to improve managerial efficiency and financial discipline in the industrial sector.

• Economic Context:

• Before 1991, India followed a model of Import Substitution, which relied heavily on import barriers and public sector dominance.

• The 1991 reforms reversed these trends to integrate India into the World Trade Organization (WTO) framework and stabilize the fiscal deficit.

Q64. Answer: (b) Sun Temple, Konark

The correct answer is Sun Temple, Konark.

Key Points

• The Sun Temple at Konark, located in Odisha, is a 13th-century architectural marvel built by King Narasimhadeva I of the Eastern Ganga Dynasty around 1250 CE.

• It is designed as a monumental chariot for the Sun God, Surya, mounted on 24 stone wheels, each approximately 10 feet in diameter and decorated with elaborate carvings.

• The 24 wheels are arranged in 12 pairs, representing the 12 months of the year or the 24 fortnights (Pakshas), while the seven horses pulling the structure symbolize the seven days of the week.

• The wheels of the temple are not merely decorative; they function as sundials that can be used to calculate time accurately to the minute based on the shadow cast by the spokes.

• Recognized for its grandeur and precision in Kalinga Architecture, the site was declared a UNESCO World Heritage Site in 1984.

Additional Information

• Mahabodhi Temple:

• Located in Bodh Gaya, Bihar, it is a premier pilgrimage site where Gautama Buddha is said to have attained enlightenment.

• It features a massive central Vimana (tower) and is one of the earliest brick structures in India.

• Airavatesvara Temple:

• A Dravidian style temple in Darasuram, Tamil Nadu, built by Rajaraja Chola II in the 12th century.

• Dedicated to Lord Shiva, it is part of the Great Living Chola Temples UNESCO World Heritage list.

• Virupaksha Temple:

• Situated in Hampi, Karnataka, it is dedicated to Lord Virupaksha, an avatar of Shiva.

• It is the main center of pilgrimage at Hampi and was extensively expanded during the Vijayanagara Empire.

Q65. Answer: (c) Surya

The correct answer is Surya.

Key Points

• The Sun Temple at Konark is an architectural marvel dedicated to the Hindu Sun God, known as Surya. It was built in the 13th century (approximately 1250 CE) by King Narasimhadeva I of the Eastern Ganga Dynasty.

• The temple is designed in the shape of a massive processional chariot with 24 stone wheels, each nearly 3 meters in diameter, and is pulled by 7 horses, symbolizing the days of the week.

• Located in Odisha on the coastline of the Bay of Bengal, the temple is a prime example of the Kalinga style of architecture, characterized by its pyramidal roof and intricate stone carvings.

• The orientation of the temple is such that the first rays of the rising sun fall directly on the main entrance, highlighting the mathematical and astronomical precision of ancient Indian engineers.

• It was designated as a UNESCO World Heritage Site in 1984 due to its cultural significance and structural grandeur.

Additional Information

• Black Pagoda:

• European sailors referred to the Konark temple as the Black Pagoda because of its dark color and its use as a navigation landmark. In contrast, the Jagannath Temple in Puri was known as the White Pagoda.

• Brahma:

• In the Hindu Trimurti, Brahma is recognized as the Creator. Unlike Surya, temples dedicated exclusively to Brahma are rare, with the most famous one located in Pushkar, Rajasthan.

• Vishnu:

• Known as the Preserver in the Trimurti, Vishnu is the central deity of Vaishnavism. Major temples like the Jagannath Temple in Puri are dedicated to his incarnations.

• Shiva:

• Recognized as the Destroyer or Transformer, Shiva is the primary deity of Shaivism. Significant temples dedicated to him include the Lingaraj Temple in Bhubaneswar.

Q66. Answer: (a) 1999

The correct answer is 1999.

Key Points

• The Department of Disinvestment was officially established on 10 December 1999, as a specialized department under the Ministry of Finance to provide a systematic and focused approach to the disinvestment process in India.

• The creation of this department marked a significant policy shift from minority stake sales to strategic disinvestment, aiming to reduce the government's direct involvement in non-strategic commercial sectors.

• In September 2001, during the leadership of Prime Minister Atal Bihari Vajpayee, the department was elevated to the status of a full-fledged Ministry of Disinvestment to accelerate the privatization agenda.

• The department was responsible for implementing the recommendations of the Disinvestment Commission, which had been set up earlier in August 1996 under the chairmanship of G.V. Ramakrishna to oversee the dilution of government equity in Public Sector Undertakings (PSUs).

Additional Information

• Core Concepts and Evolution:

• In May 2004, following a change in government, the Ministry of Disinvestment was converted back into a department and integrated into the Ministry of Finance.

• On 14 April 2016, the department was renamed as the Department of Investment and Public Asset Management (DIPAM), signifying a broader mandate that includes efficient management of government equity and asset monetization.

• Strategic Disinvestment involves the sale of 50% or more of the government's shareholding in a Central Public Sector Enterprise (CPSE) along with the transfer of management control to a private buyer.

• The primary objectives of disinvestment include reducing the fiscal deficit, improving the efficiency of PSUs through market competition, and mobilizing resources for social sector development.

Q67. Answer: (d) Brazil

The correct answer is Brazil.

Key Points

• Brazil is the designated host for the BRICS Summit and its associated ministerial meetings in 2025, following the Russian Federation which held the BRICS Presidency in 2024.

• The BRICS Agriculture Ministers' Summit is an annual gathering aimed at enhancing cooperation in food security, agricultural technology, and sustainable trade among the member nations.

• The 2025 summit under Brazil's chairmanship is expected to prioritize digital transformation in farming, climate-resilient agriculture, and the reduction of poverty and hunger across the Global South.

• As a global agricultural powerhouse, Brazil plays a critical role in the bloc's food strategy, being a top producer of soybeans, beef, and coffee, and having pioneered advanced tropical agriculture techniques.

• The 2025 meetings represent a significant milestone as the bloc operates with its expanded membership, known as BRICS+, which significantly increases the group's share of global agricultural production and consumption.

Additional Information

• BRICS Presidency Rotation:

• The chairmanship of BRICS rotates annually among the founding and principal members according to the acronym (B-R-I-C-S). Russia hosted in 2024, and Brazil takes the lead in 2025.

• Egypt:

• Egypt officially became a member of BRICS on January 1, 2024. While it participates in all summit activities, it is not the host country for the 2025 calendar year.

• Argentina:

• Argentina was formally invited to join the bloc during the Johannesburg Summit in 2023, but the country officially withdrew its application to join BRICS in late 2023 following a change in government.

• Vietnam:

• Vietnam is currently not a member of the BRICS alliance, although it has expressed interest in joining or cooperating with the group through the BRICS Plus outreach format.

Therefore, the correct option is 4.

Q68. Answer: (a) Military-civil integration to foster synergy between security forces, government departments, and civil ins...

The correct answer is Military-civil integration to foster synergy between security forces, government departments, and civil institutions.

Key Points

• Exercise Samanvay Shakti 2025 was a landmark initiative launched by the Indian Army in August 2025 at Laipuli, located in the Tinsukia district of Assam.

• The exercise was designed as a Military-Civil Integration platform to foster efficient cooperation and mutual understanding between the Armed Forces and the state administrations of Assam and Manipur.

• Its primary goal was to create synergy among diverse stakeholders, including security forces, government departments, and civil institutions, to address regional challenges through a unified approach.

• The initiative saw participation from the Indian Air Force, District Administration, State Police, Intelligence Agencies, NDRF, and SDRF, alongside medical and educational bodies.

• The exercise focused on achieving an improved state of readiness, refining Standard Operating Procedures (SOPs), and establishing unhindered communication channels between the military and civil sectors.

• A significant aspect of the 10-day exercise was to strengthen the bond of trust between the local populace of Upper Assam and Manipur and the institutions that serve them, furthering the cause of national integration.

Additional Information

• Participating Agencies:

• In addition to state officials, the exercise involved central organizations like the Border Roads Organisation (BRO), General Reserve Engineer Force (GREF), and the Indian Railways.

• Industrial security units from major public sector undertakings such as Oil India Limited (OIL), Indian Oil Corporation (IOCL), and Coal India Limited were also active participants.

• Scope of Operations:

• The exercise covered a wide spectrum of civil-military issues including Disaster Management, Healthcare, Narcotics control, Road Safety, and Infrastructure development.

• It integrated developmental initiatives under Operation Sadbhavna, aimed at facilitating employment opportunities and community welfare in the Northeastern region.

Q69. Answer: (a) Special Officer for Linguistic Minorities

The correct answer is Special Officer for Linguistic Minorities.

Key Points

• Article 350B was incorporated into the Constitution of India through the 7th Constitutional Amendment Act, 1956.

• The provision was established based on the recommendations of the States Reorganisation Commission (1953-55) to safeguard the interests of linguistic groups following the reorganization of states on a linguistic basis.

• The President of India is constitutionally authorized to appoint the Special Officer for Linguistic Minorities.

• The primary mandate of this officer is to investigate all matters pertaining to the safeguards provided for linguistic minorities under the Constitution and report directly to the President.

• The President ensures these reports are laid before both Houses of Parliament and forwarded to the respective State Governments.

Additional Information

• Office of the Commissioner for Linguistic Minorities (CLM)

• The office was formally created in 1957 and operates under the administrative control of the Ministry of Minority Affairs.

• Its Headquarters is located in Prayagraj (Allahabad), with three regional offices situated in Kolkata, Belgaum, and Chennai.

• Other Constitutional Provisions

• National Commission for Scheduled Castes: Governed by Article 338, which originally provided for a Special Officer for Scheduled Castes and Scheduled Tribes before being upgraded to a multi-member commission.

• National Commission for Backward Classes (NCBC): Provided under Article 338B, which was inserted by the 102nd Constitutional Amendment Act, 2018.

• Article 350A: Directs states to provide adequate facilities for instruction in the mother-tongue at the primary stage of education for children belonging to linguistic minority groups.

Q70. Answer: (c) 15^(th) National Census

The correct answer is 15^(th) National Census.

Key Points

• The Census of India is a decennial exercise conducted by the Registrar General and Census Commissioner of India under the Ministry of Home Affairs.

• The first population census in India was conducted in 1872 during the administration of Lord Mayo, though it was non-synchronous and did not cover the entire territory.

• The first complete and synchronous census, ensuring uniform data collection across the country, began in 1881 under the viceroyship of Lord Ripon.

• Since 1881, the census has been conducted uninterrupted every ten years, making the 2011 Census the 15^(th) National Census in the continuous series since the initial attempt in 1872.

• Following India's independence in 1947, the 2011 Census marked the 7^(th) National Census conducted in the post-independence era, starting from 1951.

Additional Information

• Census 2011 Overview:

• The Census 2011 was led by C. Chandramouli, who served as the Registrar General and Census Commissioner of India.

• The official motto of the 2011 Census was 'Our Census, Our Future'.

• It was conducted in two distinct phases: House Listing and Housing Census and Population Enumeration.

• This census was significant as it was the first time that data for the National Population Register (NPR) was collected.

• Historical Context:

• The Census of 1921 is famously termed the Year of Great Divide because it recorded a negative growth rate in India's population.

• The Census Act, 1948, provides the legal framework for conducting the census and ensures the confidentiality of the data collected from individuals.

Q71. Answer: (b) Neither conclusion (I) nor (II) follows

The least possible Venn diagram for the given statements is:

(I) No Apples are Oranges - Doesn't follows

(Their is no direct relation between apples and oranges; maybe it is possible but not definite. Hence, it is false)

(II) Some Oranges are Apples - Doesn't follows

(Their is no direct relation between apples and oranges; maybe it is possible but not definite. Hence, it is false.)

Neither conclusion (I) nor (II) follows

Hence, the correct answer is " Option 2"

Q72. Answer: (a) J

Given: J, U, N, I, O, R and S are sitting around a circular table facing the centre of the table.

1. S sits fourth to the left of R.

2. O sits fourth to the right of U.

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

4. N is not an immediate neighbour of O or R.

5. J is not an immediate neighbour of N

The Final Arrangement is,

J sits third to the right of I.

Hence, the correct answer is 'Option 1'.

Q73. Answer: (c) 212

The logic followed here is:

• 17 + 13 = 30

• 30 + 26 = 56

• 56 + 39 = 95

• 95 + 52 = 147

• 147 + 65 = 212

Thus, the missing term in the series is 212.

Hence, the correct answer is 'Option 3';

Q74. Answer: (a) B

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

1. Only F is kept above C.

2. Only four boxes are kept between C and A.

Position	Box
7	F
6	C
5	
4	
3	
2	
1	A

1. Only two boxes are kept between D and B.

2. G is kept immediately above E.

3. B is not kept immediately above G.

Final Arrangement:

7	F
6	C
5	D
4	G
3	E
2	B
1	A

Thus, the box kept immediately below E is B.

Hence, the correct answer is 'Option 1'.

Q75. Answer: (d) 5

Therefore, the code for E is 5.

Hence, the correct answer is "option 4"

Q76. Answer: (d) TWO

Given number: 8945317

Arrange the digits of 8945317 in ascending order.

Original Number	8	9	4	5	3	1	7
Ascending Order	1	3	4	5	7	8	9

Now compare the two rows:

• 4 remains at the 3rd position.

• 5 remains at the 4th position.

All other digits change their positions.

Therefore Two digits remain unchanged

So, the total number of digits whose positions remain unchanged is:2.

Hence, the correct answer is 'Option 4'.

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Q77. Answer: (c) DSG

The logic followed here is,

The resulting cluster is DSG.

Hence, the correct answer is "option 3"

Q78. Answer: (d) RYHT

The logic follows here,

The resulting term is RYHT.

Hence, the correct answer is "Option 4"

Q79. Answer: (a) KNQ

The logic follows here,

KNQ,

LOQ,

SVX,

NQS,

Therefore, the letter cluster that is different from the others is KNQ.

Hence, the correct answer is 'Option 1'.

Q80. Answer: (c) TQ -3

The logic follows here,

JK 9 is related to MJ -7,

PQ 4 is related to SP -12,

Applying to the same logic QR 13 related,

Hence, the correct answer is 'Option 3'.

Q81. Answer: (b) 94

The logic followed here is:

• 184 − 20 = 164

• 164 − 18 = 146

• 146 − 16 = 130

• 130 − 14 = 116

• 116 − 12 = 104

• 104 − 10 = 94

Thus, the missing term in the series is 94.

Hence, the correct answer is 'Option 2';

Q82. Answer: (b) Three

The logic follows here,

Given : (Left) Z K J H G F D S T U I A W Q P L M N B X (Right)

(Left) Z K J H G F D S T U I A W Q P L M N B X (Right)

• The letter fourth from the left end is H.

• The letter fifth from the right end is L.

• The letters between H and L are I, J, and K.

• Total number of letters = 3

Hence, the correct answer is "Option 2"

Q83. Answer: (a) 45

BODMAS Table:

The mapping of the letters to operators is as follows:

Letter	A	B	C	D
Operator	÷	×	•	−

Given Equation:10 B 3 D 45 A 9 C 2 = ? D 18

Replace the letters with their respective signs and using BODMAS rule,
=>10 × 3 − 45 ÷ 9 + 2 = ? − 18
=>10 × 3 − 5 + 2 = ? − 18
=> 30 − 5 + 2 = ? − 18
=> 30 + 2 − 5 = ? − 18
=>32 − 5 = ? − 18
=>27 = ? − 18
? = 27 + 18
? = 45
Hence, the correct answer is "option 1"

Q84. Answer: (a) Two

Given series: (Left) 9 2 3 1 4 5 6 8 5 4 3 2 1 9 3 4 5 6 7 8 1 2 9 8 3 4 5 2 6 8 2 (Right)
Required Condition: Even Digit - Odd Digit - Odd Digit
(Left) 9 2 3 1 4 5 6 8 5 4 3 2 1 9 3 4 5 6 7 8 1 2 9 8 3 4 5 2 6 8 2 (Right)
So, the total number of such odd digits is: 2.
Hence, the correct answer is 'Option 1'.

Q85. Answer: (a) JJXG 18

The logic follows here,
Combining the results, the next cluster in the series is JJXG 18.
Hence, the correct answer is "option 1"

Q86. Answer: (a) YV 1

The logic follows here,
NJ 9 is related to QN −9,
OR 13 is related to RV −5.,
Applying to the same logic,VR 19 related"
Hence, the correct answer is "Option 1"

Q87. Answer: (c) Mother's sister

The family tree diagram is,
Therefore, P is the sister of S, who is the mother of X → P is the Mother's sister of X.
Hence, the correct answer is 'Option 3'.

Q88. Answer: (c) WOK

The logic follows here,
TNH,
YSM,
WOK,
RLF,
Therefore, the letter-cluster that is different from the others is WOK.
Hence, the correct answer is 'Option 3'.

Q89. Answer: (b) 70 - 140

The logic followed here is:
Logic: Second Number = First Number × 2
For the first set 7 − 14
=> 7 × 2 = 14
For the second set 45 − 90
=> 45 × 2 = 90
Similarly, applying the same logic to the options:
For 70 − 140
=> 70 × 2 = 140

Hence, the correct answer is "Option 2"

Q90. Answer: (c) Brother's wife

The family tree diagram is,

Let us first decode the given symbols and then draw a family tree.

Symbol	≤	≠	@	~
Meaning	Father	Wife	Son	Sister

Given : R ≠ A @ N ≤ C ~ O

From the family tree, it is evident that A, C, and O are siblings and children of N. Since R is the wife of A, and A is the brother of O, R is the Brother's wife of O.

Hence, the correct answer is "Option 3".

Q91. Answer: (a) D

Given: Seven people A, B, D, J, O, T and Z are sitting in a row, facing north.

1. Only D sits to the left of T.

2. Only four people sit between D and A.

3. Only O sits between Z and B and Z is not an immediate neighbor of A.

The Final Arrangement is,

By observing the final arrangement, we can see that D sits immediately to the left of T.

Hence, the correct answer is "option 1"

Q92. Answer: (b) CMKR

The logic follows here,

For 'NQTM' related to 'ILOH':

For 'UOLG' related to 'PJGB':

Applying the same logic to 'HRPW':

Thus, HRPW is related to CMKR following the same alphabetical shift logic.

Hence, the correct answer is 'Option 2'.

Q93. Answer: (d) 126

BODMAS Table:

Signs to be interchanged:

• + ↔ −

• × ↔ ÷

Given Equation: 24 ÷ 5 – 11 + 70 × 14 = ?

After interchanging the signs, using BODMAS, the equation becomes:

= 24 × 5 + 11 − 70 ÷ 14

= 24 × 5 + 11 − 5

= 120 + 11 − 5

=131 − 5

= 126

Hence, the correct answer is option 4

Q94. Answer: (b) None

Given series: 7 3 5 2 3 5 3 5 2 2 5 2 5 2 5 6 5 4 6 5 4 9 9 8 5 5 2

Required Condition: Perfect Square, Even Digit, Even Digit

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

There is no instance where an even digit is both preceded by a perfect square and followed by another even digit.

Hence, the correct answer is 'Option 2'.

Q95. Answer: (a) Neither conclusion (I) nor (II) follows

The least possible Venn diagram for the given statements is:

(I) Some hairs are ropes - Doesn't follow

(In the least possible Venn diagram, there is no direct relation between the hairs and the ropes).

(II) All wires are ropes - Doesn't follow

(all ropes are wires, the wires circle is larger, meaning there are wires that are not necessarily ropes.)

Neither conclusion (I) nor (II) follows.

Hence, the correct answer is " Option 1"

Q96. Answer: (d) ot

The logic follows here,

Therefore, the code for calms must be ot.

Hence, the correct answer is "option 4"

Q97. Answer: (d) One

Given: Seven boxes A, B, J, E, C, T and S are kept one over the other but not necessarily in the same order.

1. Only T is kept below E.
2. Only A is kept above J.
3. Only C is kept between J and S

Position	Box
7 (Top)	A
6	J
5	C
4	S
3	
2	E
1 (Bottom)	T

1. Box B is placed at the only remaining position.

Final Arrangement:

7	A
6	J
5	C
4	S
3	B
2	E
1	T

• From the final arrangement, we can see that box E is the only box kept between B and T.

• Thus, there is only one box kept between B and T.

Hence, the correct answer is 'Option 4'.

Q98. Answer: (a) PI-KM

The logic follows here,

PI-KM,

KD-FI,

IB-DG,

NG-IL,

Therefore, the letter-cluster pair that is different from the others is PI-KM.

Hence, the correct answer is 'Option 1'.

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Q99. Answer: (b) 74 km towards north

1. Palash starts from Point Y and drives 25 km towards West.
2. He then takes a left turn, drives 23 km, turns right and drives 51 km.
3. He then takes a left turn and drives 16 km.
4. He takes a left turn, drives 31 km.
5. He then turns right, drives 35 km, turns left and drives 45 km to stop at Point Z.

The Final Diagram,

The correct answer is 74 km towards north.

Hence, the correct answer is "Option 2"

Q100. Answer: (b) Five

Given: Seven boxes, M, N, O, P, X, Y, and Z, are kept one over the other, but not necessarily in the same order.

1. Y is kept second from the bottom.
2. Only three boxes are kept between Y and O.
3. X is kept at one of the positions below Y.

Position	Box
7	
6	O
5	
4	
3	
2	Y
1	X

1. Only N is kept between O and P.
2. M is kept at one of the positions above O.
3. Z is the remaining box, which will be at the 3rd position.

Final Arrangement:

7	M
6	O
5	N
4	P
3	Z
2	Y
1	X

• The boxes between X and M are Y, Z, P, N, and O.

• Thus, there are five boxes kept between X and M.

Hence, the correct answer is 'Option 2'.

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