RRB NTPC (UG) CBT-I Official Paper (Held On 17 Jun, 2026 Shift 2) (Previous Year Paper)

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

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MATHEMATICS

Q1. Evaluate $23^3 + (-15)^3 + (-8)^3$

(a) 8050
(b) 8133
(c) 8280
(d) 8059

Q2. Two trains of lengths 120 m and 180 m are moving in the same direction at speeds of 60 km/h and 40 km/h, respectively. Find the time taken by the trains to cross each other.

(a) 54 seconds
(b) 59.3 seconds
(c) 76.9 seconds
(d) 67.9 seconds

Q3. Find the value of (3+4/3 of 21/4÷ 22/5-21/4 of 31/5)

(a) 2.95
(b) -1.48
(c) 1.48
(d) -2.95

Q4. 10 men and 15 women can complete a project in 12 days. If after 8 days, only 2/3 of the work is completed, how many more women must be added to finish the work in the next 2 days, assuming all men continue?

(a) 35
(b) 30
(c) 25
(d) 20

Q5. Simplify: 1.2/0.3 - 2/5

(a) 3.2
(b) 3.4
(c) 3.6
(d) 4

Q6. Which of the following numbers is divisible by 7?

(a) 24019
(b) 21234
(c) 24017
(d) 23452

Q7. A cylindrical water tank has a radius of 7 cm and a height of 10 cm. What is its volume? (Use π = 22/7)

(a) 2200 cm³
(b) 440 cm³
(c) 1540 cm³
(d) 700 cm³

Q8. A prize of Rs. 8,400 is to be shared between A and B in the ratio 3:5. Find B's share.

(a) Rs. 5,250
(b) Rs. 5,150
(c) Rs. 5,000
(d) Rs. 5,200

Q9. Two poles of heights 10 m and 30 m stand vertically on level ground at a distance d apart. From a point on the ground between them, along the line joining their feet, the angles of elevation to their tops of the taller and the shorter poles are 60^? and 30^?, respectively. The distance d between the poles is:

(a) 20√3 meters
(b) 25√3 meters
(c) 30√3 meters
(d) 10√3 meters

Q10. A and B can do a piece of work in 12 days and 12 days, respectively. Both work for 3 days and then A leaves. How long (in days) will B take to complete the remaining work?

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

Q11. What is the compound interest on Rs. 3,000 for 2 years at 20% per annum, interest compounded annually?

(a) Rs. 1,300
(b) Rs. 1,200
(c) Rs. 1,440
(d) Rs. 1,320

Q12. If 2, x, and 18 are in continued proportion, find the positive value of x.

(a) 6
(b) 12
(c) 9
(d) 4

Q13. A spherical tank has a radius of 2 meters. If the tank is filled with water to 80% of its total volume, what is the volume of water in the tank (rounded to the nearest cubic meter)?

(a) 27
(b) 21
(c) 33
(d) 38

Q14. During a sale, 50% of the goods are sold at 12% profit, 40% of the remaining goods are sold at 16% profit and the still remaining goods are sold at a loss of 19%. If there is an overall profit of x%, then what is the value of x?

(a) 4.5
(b) 5.5
(c) 3.5
(d) 2.5

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Q15. Girish scored 448 marks in an examination and was 81 marks short of 46% of maximum marks. In the same examination, his friend scored 805 marks. What is the percentage of marks scored by his friend?

(a) 67%
(b) 70%
(c) 72%
(d) 71%

Q16. Rs. 2,288 is divided among Pankaj, Meera, and Ashok in such a way that if Rs. 39, Rs. 47, and Rs. 40 are deducted from their respective shares, they have money in the ratio 17:15:14. Find Meera's share after deduction.

(a) Rs. 605
(b) Rs. 705
(c) Rs. 805
(d) Rs. 855

Q17. The average of 6.5, 10.8, 20 and a is 15. The value of a is:

(a) 23.7
(b) 21.7
(c) 24.7
(d) 22.7

Q18. The simplified value of ((12/24))/((12/6)) ÷ (2/9 × 18/6 + 4/8) + 6/9 ÷ 28/11 of 11/9 is

(a) 11/2
(b) 4/3
(c) 1/6
(d) 3/7

Q19. The present age of a father is thrice that of his son. After 15 years, the age of the father will be twice that of his son. What is the present age (in years) of the father?

(a) 48
(b) 42
(c) 45
(d) 52

Q20. A sum of money becomes Rs. 7,865 after 2 years and Rs. 8,651.50 after 3 years on compound interest at the same rate, compounded annually. Find the sum.

(a) Rs. 6,500
(b) Rs. 6,800
(c) Rs. 7,000
(d) Rs. 7,200

Q21. If one angle of an isosceles triangle is 110°, what are the measures of the other angles of the triangle?

(a) 25° and 45°
(b) 25° and 35°
(c) 25° and 25°
(d) 35° and 35°

Q22. A town had a population of 5,000 at the beginning of a year. During the first year, the population decreased by 10%. In the following year, the population increased by 20%. What was the population of the town at the end of two years?

(a) 5800
(b) 5400
(c) 5500
(d) 5200

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Q23. The sum of the digits of a two-digit number is 11. If the digits are reversed, the new number is 27 more than the original number. What is the original number?

(a) 56
(b) 65
(c) 47
(d) 38

Q24. A cyclist travels from point A to B and back from B to A along the same route. On the onward journey, he covers one-third of the distance at 12 km/hr and the remaining distance at 18 km/hr. On the return journey, he covers half of the distance at 9 km/hr and the remaining distance at 18 km/hr. Find the average speed (in km/hr) for the entire round trip.

(a) 13.5 km/hr
(b) 9 km/hr
(c) 15 km/hr
(d) 11.5 km/hr

Q25. The following data shows the number of minutes taken by 15 students to complete a mathematics test: 42, 38, 55, 47, 50, 44, 60, 39, 48, 52, 45, 41, 49, 46, 53. Find the median time taken by the students.

(a) 47.5 minutes
(b) 46 minutes
(c) 47 minutes
(d) 48 minutes

Q26. A shopkeeper offers the following schemes on toys of the same marked price.

(A) Successive discounts of 5% and 21% on any number of toys bought.

(B) Successive discounts of 38%, 33% and 21% on any number of toys bought.

(C) 8% discount on the first 6 toys and 27% discount on each toy thereon.

(D) 3 toys free of cost on buying 7 toys.

A customer wants to buy 7 toys. Which of the above schemes is the least beneficial to her?

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

Q27. A person sells two items: one at a profit of 20% and another at a loss of 10%. If both items cost Rs. 100 each, what is the overall gain or loss percentage?

(a) 5% loss
(b) 10% gain
(c) 5% gain
(d) 10% loss

Q28. The largest four-digit number which when divided by 14, 15 and 8 leaves remainder 4 in each case is:

(a) 9686
(b) 9196
(c) 9244
(d) 9199

Q29. A wholesaler offers two options for a sofa set marked at Rs. 80,000: either a flat discount of 30% or two successive discounts of 20% and 12%. What is the difference in the selling price between the two options?

(a) Rs. 400
(b) Rs. 240
(c) Rs. 480
(d) Rs. 320

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Q30. A school drum beats every 12 minutes, and the school bell rings every 18 minutes. If both sounded together at 9:00 AM, how many times will they sound together again before 11:00 AM?

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

GENERAL AWARENESS

Q31. Telangana's vision is to achieve a $3 trillion State GDP by.

(a) 2035
(b) 2047
(c) 2042
(d) 2030

Q32. All India Rural Financial Inclusion Survey (NAFIS) is conducted by which organisation?

(a) CII
(b) NABARD
(c) RBI
(d) FICCI

Q33. Which software helps in maintaining and optimizing the system e.g., disk cleanup?

(a) Utility software
(b) Programming software
(c) Firmware
(d) Application software

Q34. Which of the following Amendments to the Constitution of India introduced Fundamental Duties in the form of Article 51A?

(a) 42^(nd) Amendment, 1976
(b) 24^(th) Amendment, 1971
(c) 52^(nd) Amendment, 1985
(d) 44^(th) Amendment, 1978

Q35. Which of the following best describes ‘disguised unemployment’ in the Indian context?

(a) Workers are temporarily unemployed during economic slowdown.
(b) Workers are not willing to work.
(c) More people are employed than actually needed, with marginal productivity being zero.
(d) Workers shift from one job to another frequently.

Q36. Which part of Windows 10 OS settings can you use to change when the computer enters Power Saving Mode?

(a) Network & Internet
(b) Power & Sleep Settings
(c) Display Settings
(d) Updates & Security

Q37. In Microsoft Word 2016 and later versions, when text spanning multiple paragraphs is highlighted and the user presses Ctrl + C, what operation is performed?

(a) Immediately inserts the paragraphs at the document's beginning
(b) Automatically saves the entire document with paragraphs updated
(c) Permanently erases the highlighted paragraphs from existence
(d) Transfers the highlighted paragraphs to clipboard for duplication elsewhere

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Q38. A physics lab experiment requires the measurement of temperature using the correct SI unit. Which unit should the student use to record temperature readings according to the SI system?

(a) Kelvin
(b) Fahrenheit
(c) Joule
(d) Celsius

Q39. Who was the great general responsible for executing Alauddin Khilji's Deccan campaigns successfully?

(a) Ghiyasuddin Tughlaq
(b) Balban
(c) Qutbuddin Aibak
(d) Malik Kafur

Q40. What new laser-based weapon system did DRDO successfully field-test in April 2025, which is now being transferred for private sector production?

(a) 100 kW Surya Laser System
(b) 2 kW Portable Laser
(c) 30 kW IDD&IS Mk-IIA
(d) Infrared Drone Interceptor

Q41. Which provision of the Treaty of Allahabad most strengthened British political authority in eastern India?

(a) Restoration of Bengal's sovereign authority under the Mughal emperor.
(b) Granting of the Diwani rights of Bengal, Bihar, and Orissa to the Company.
(c) Permanent transfer of Awadh territories under direct Company occupation.
(d) Withdrawal of the Company's revenue claims from all northern subas immediately.

Q42. Which Charter Act ended the East India Company's monopoly over trade with India?

(a) Charter Act of 1833
(b) Charter Act of 1813
(c) Charter Act of 1853
(d) Charter Act of 1793

Q43. Which of the following substances should be added to acidic soil to neutralize it effectively?

(a) Baking soda (Sodium bicarbonate)
(b) Quicklime (calcium oxide)
(c) Table salt
(d) Vinegar (lime)

Q44. Which of the following statements about carbon monoxide in the air is correct?

(a) It is less dangerous than carbon dioxide for human health
(b) The incomplete combustion of fossil fuels produces it and replaces oxygen in haemoglobin
(c) It is released only from natural forest fires and volcanoes
(d) It is harmless because it is quickly converted into oxygen

Q45. What was proven to exist in an atom, by Rutherford's gold foil experiment?

(a) Neutron
(b) Electron
(c) Proton
(d) Nucleus

Q46. As highlighted in late September–October 2025 coverage of the Sustainable Development Report 2025, what was India's position and score in the UN SDG Index 2025?

(a) Rank 79 with an overall SDG index score close to 71 points
(b) Rank 109 with an overall SDG index score close to 65 points
(c) Rank 99 with an overall SDG index score close to 67 points

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(d) Rank 89 with an overall SDG index score close to 69 points

Q47. According to the Census 2011, which of the following states was the second most populous in the country?

(a) Bihar
(b) Maharashtra
(c) West Bengal
(d) Karnataka

Q48. Which process is responsible for the rising of warm air over a heated surface?

(a) Conduction
(b) Convection
(c) Insulation
(d) Radiation

Q49. What was the theme of World Consumer Rights Day 2025?

(a) “Fair and Responsible AI for Consumers.”
(b) “A Just Transition to Sustainable Lifestyles.”
(c) “Fair Digital Finance”.
(d) “Empowering Consumers Through Clean Energy Transitions”.

Q50. Which state government in March 2025 has passed the Coaching Centres (Control and Regulation) Bill 2025, which aims to regulate coaching centres across the state?

(a) Kerala
(b) Andhra Pradesh
(c) Madhya Pradesh
(d) Rajasthan

Q51. Which Indian port situated at the entrance of the Zuari estuary gained significance after remodelling in 1961 to handle iron-ore exports to Japan?

(a) New Mangalore Port
(b) Marmagao Port
(c) Kandla Port
(d) Jawaharlal Nehru Port

Q52. According to the 2025 report, which Nordic country consistently ranks among the top in happiness?

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

Q53. Which of the following devices can act as both an input as well as an output device?

(a) Barcode Reader
(b) Digital Camera
(c) Plotter
(d) Touchscreen

Q54. Overseas Citizenship of India cardholders receive lifelong visa facilities, but they cannot obtain which of the following rights in India?

(a) Own property in India
(b) Study in India
(c) Voting or holding a government job
(d) Pay taxes

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Q55. When was the Verma Committee Report on Fundamental Duties submitted to the Union Government?

(a) 1999
(b) 1998
(c) 2001
(d) 2000

Q56. According to the Indian Constitution, which Article governs the appointment of an Acting Chief Justice of India?

(a) Article 126
(b) Article 122
(c) Article 130
(d) Article 120

Q57. Which Indian badminton player became the first from the country to win the prestigious All England Championship?

(a) Prakash Padukone
(b) HS Prannoy
(c) Kidambi Srikanth
(d) Saina Nehwal

Q58. Who started the Arya Samaj movement in 1875?

(a) Mahatma Gandhi
(b) Raja Ram Mohan Roy
(c) Ramakrishna Paramhansa
(d) Dayanand Saraswati

Q59. Which of the following international agreements aims to phase out ozone-depleting substances?

(a) Ramsar Convention
(b) Paris Agreement
(c) Kyoto Protocol
(d) Montreal Protocol

Q60. Which country has gifted India eight cheetahs for the next phase of Project Cheetah, as witnessed during a symbolic release at Mokolodi Nature Reserve in November 2025?

(a) Kenya
(b) Namibia
(c) Botswana
(d) South Africa

Q61. India became a member of the World Trade Organization (WTO) to boost global trade participation. In which year did India join the WTO?

(a) 1995
(b) 2001
(c) 1993
(d) 1991

Q62. When did the Balwant Rai Mehta Committee submit its report related to the Panchayati Raj System?

(a) 1962
(b) 1958
(c) 1956
(d) 1957

Q63. Which of the following inscriptions is the main source of information of Samudragupta’s military achievements?

(a) Mehrauli Iron Pillar Inscription
(b) Nasik Cave Inscription
(c) Junagadh Rock Inscription
(d) Allahabad Pillar Inscription

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Q64. Which of the following is a traditional folk music form from the state of Rajasthan, known for its high-energy rhythms and lively melodies?

(a) Lavani
(b) Baul
(c) Maand
(d) Bhatiali

Q65. The Harappan Civilization flourished mainly during which of the following archaeological eras?

(a) Neolithic Age
(b) Chalcolithic Age
(c) Iron Age
(d) Bronze Age

Q66. Which of the following industries uses cotton as its main raw material?

(a) Textile Industry
(b) Iron and Steel Industry
(c) Cement Industry
(d) Mining Industry

Q67. In which of the following states of India is the Dilwara Temple, which exhibits a distinct architectural style that fuses elements of Jain, Hindu, and even Mughal craftsmanship, located?

(a) Punjab
(b) Rajasthan
(c) Gujarat
(d) Kerala

Q68. Which Article of the Indian Constitution provides for the constitution of Gram Sabha?

(a) Article 224B
(b) Article 224A
(c) Article 243A
(d) Article 243B

Q69. The Terai belt is best described as:

(a) A dry zone made of calcareous deposits
(b) A coastal plain formed by marine deposits
(c) A marshy tract with a high water table and thick forests
(d) A high-altitude snow-covered plain

Q70. The International Telecommunication Union (ITU) Global Youth Summit 2025 (GYS-25), under the theme “Amplifying youth voices in ICT,” was held in which location from 11-13 March 2025?

(a) Santo Domingo, Dominican Republic
(b) Havana, Cuba
(c) Varadero, Cuba
(d) Kingston, Jamaica

GENERAL INTELLIGENCE AND REASONING

Q71. In the following triads, each group of letters is related to the subsequent one following a certain logic. Select from the given options the triad which follows the same logic.

DISK - DKSI - KSID

LEAF - LFAE - FAEL

(a) POEM - PMEO - MEOP
(b) GOAT - GAOT - TAOG
(c) WEST - EWST - TESW

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(d) PRAY - PRYA - RAYP

Q72. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only D is kept above G. Only two boxes are kept between G and A. Only B is kept below E. F is not kept immediately above A. How many boxes are kept between E and F?

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

Q73. What should come in place of ? in the given series based on the English alphabetical order?

POR VUX BAD HGJ ?

(a) NMP
(b) NNO
(c) NOQ
(d) NLO

Q74. 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) ZY−VU
(b) UT−PR
(c) ML−IH
(d) JI−FE

Q75. Seven people P1, P2, P3, P4, P5, P6 and P7 are sitting around a circular table facing towards the centre of the table. P1 sits to the immediate right of P3. P6 sits third to left of P3. P2 is sitting immediately between P3 and P7. P5 sits immediately left of P6. What is the position of P4 with respect to P1?

(a) Immediate left
(b) Immediate right
(c) Second to the right
(d) Second to the left

Q76. In a certain code language, ‘zebra peak blue’ is coded as 'sr dt tx' and ‘bee zebra chest’ is coded as ‘dt bm qb’. How is ‘zebra’ coded in the given language?

(a) sr
(b) dt
(c) tx
(d) bm

Q77. Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All cars are bars.

No car is a sun.

Conclusions:

(I) Some suns are bars.

(II) All bars are suns.

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

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Q78. What should come in place of '?' in the given series based on the English alphabetical order?

CBY WVS QPM KJG ?

(a) EDA
(b) FCB
(c) GCA
(d) HDP

Q79. Each of the digits in the number 4738165 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) Two
(d) One

Q80. If ‘D’ stands for ‘÷’, ‘B’ stands for ‘×’, ‘A’ stands for ‘+’ and ‘C’ stands for ‘−’, then what will come in place of the question mark (?) in the following equation?

16 C 92 D 4 A 12 B 7 C 15 = ?

(a) 32
(b) 62
(c) 91
(d) 87

Q81. Rakesh ranked 39^(th) from the top and 46^(th) from the bottom in his class. How many students are there in his class?

(a) 86
(b) 83
(c) 84
(d) 85

Q82. X is the mother of F. F is the sister of T. U is the father of K. K is the husband of T. How is K related to X?

(a) Daughter's husband
(b) Brother
(c) Daughter's son
(d) Father

Q83. Select the option that represents the correct order of the given words as they would appear in an English dictionary.

1. Roast
2. Router
3. Road
4. Robust
5. Rope

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

Q84. In a certain code language,

A > B means ‘A is the sister of B’,

A = B means ‘A is the father of B’,

A ! B means ‘A is the wife of B’ and

A − B means ‘A is the son of B’.

How is S related to E if ‘S > C − O = P ! E’?

(a) Wife's sister

(b) Wife's brother
(c) Wife's daughter
(d) Wife's mother

Q85. Select the pair which follows the same pattern as that followed by the two sets of pairs given below. Both pairs follow the same pattern.

FGJ : HAE

KLO : MFJ

(a) HMG : JGC
(b) FJL : HDH
(c) MGQ : OAM
(d) BMV : DGQ

Q86. What should come in place of '?' in the given series?

314 277 244 215 190 169 ?

(a) 152
(b) 155
(c) 146
(d) 149

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

118 149 211 242 304 335 ?

(a) 427
(b) 387
(c) 397
(d) 407

Q88. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

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

(a) IN - BK
(b) EJ - RG
(c) WB - PY
(d) TY - MV

Q89. Each vowel in the word WRENCHINGLY is changed to the letter immediately following it in the English alphabetical order AND each consonant is changed to the second letter preceding it in the English alphabetical order. How many letters will appear exactly twice in the group of letters thus formed?

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

Q90. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) KF – GA
(b) BP – XL
(c) UC – QY
(d) TR – PN

Q91. Seven people P1, P2, P3, P4, P5, P6 and P7 are sitting around a circular table facing towards the centre of the table. P7 sits second to right of P1. There are exactly two people between P1 and P6 when checked from right of P1. P2 is sitting immediately between P5 and P6. P3 sits second to right of P4. Who is sitting immediately between P6 and P3?

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(a) P7
(b) P1
(c) P5
(d) P4

Q92. Seven boxes B, C, D, E, Q, R and S are kept one over the other but not necessarily in the same order. No box is kept above E. Only B is kept between E and Q. Only R is kept below C. Only one box is kept between Q and D. How many boxes are kept between S and R?

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

Q93. In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

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

18, 323

19, 360

(a) 21, 440
(b) 14, 196
(c) 22, 485
(d) 20, 400

Q94. In a certain code language, 'XEQA' is coded as '49' and 'KLCH' is coded as '36'. What is the code for 'NJDX' in the given code language?

(a) 51
(b) 55
(c) 54
(d) 49

Q95. If 'A' stands for '÷', 'B' stands for 'x', 'C' stands for '+' and 'D' stands for '-', what will be come in place of the question mark '?' in the following equation?

19 C 6 B 5 D 72 A 8 = ?

(a) 43
(b) 45
(c) 40
(d) 47

Q96. Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All bats are chicks.

All bats are mats.

Conclusions:

(I) Some chicks are mats.

(II) All mats are bats.

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

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Q97. The position(s) of how many letters will remain unchanged if each of the letters in the word ORANGEY is arranged in the English alphabetical order?

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

Q98. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

TAV SZU RYT QXS ?

(a) NOT
(b) NWT
(c) PWR
(d) OXS

Q99. Yaman starts from Point A and drives 18 km towards the west. He then takes a right turn, drives 19 km, turns right and drives 21 km. He then takes a right turn and drives 23 km. He takes a final right turn, drives 3 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90-degree turns only unless specified.)

(a) 5 km to the north
(b) 2 km to the south
(c) 4 km to the north
(d) 3 km to the south

Q100. Select the triad which follows the same pattern as that followed by the two triads given below. Both triads follow the same pattern.

TO-UP-VY

QL-RM-SV

(a) MI-OJ-PR
(b) NI-OJ-PR
(c) MI-OK-PR
(d) NI-OJ-PS

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (c) 8280

Shortcut Trick

If the sum of three numbers a + b + c = 0, then the identity $a^3 + b^3 + c^3 = 3abc$ holds true.

Here, a = 23, b = −15, and c = −8.

Sum: 23 + (−15) + (−8) = 23 − 23 = 0.

Result: 3 × 23 × (−15) × (−8) = 69 × 120 = 8280.

Therefore The correct answer is 8280.

Alternate Method

Given:

Expression: $23^3 + (-15)^3 + (-8)^3$

Formula Used:

$a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$

Calculations:

=> Let a = 23, b = −15, c = −8

=> First, check the sum: a + b + c = 23 + (−15) + (−8) = 0

=> Substitute (a + b + c) = 0 into the identity:

=> $a^3 + b^3 + c^3 - 3abc = (0) \times (a^2 + b^2 + c^2 - ab - bc - ca)$

=> $a^3 + b^3 + c^3 = 3abc$

=> Value = 3 × 23 × (−15) × (−8)

=> Value = 3 × 23 × 120 = 69 × 120 = 8280

Therefore The correct answer is 8280.

Additional Information

Algebraic Identity of Cubes

The general form is $a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$. This is a fundamental identity used to simplify cubic expressions.

Zero Sum Condition

When the variables satisfy a + b + c = 0, the entire right-hand side of the identity becomes zero, leading directly to the relation $a^3 + b^3 + c^3 = 3abc$.

Square of a Trinomial

Another related identity is $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$, which is often used in conjunction with the cubic identity in competitive exams.

Q2. Answer: (a) 54 seconds

Shortcut Trick

Total length to be covered = 120 + 180 = 300 m

Relative speed (same direction) = 60 − 40 = 20 km/h

Convert speed to m/s => 20 × 5/18 = 50/9 m/s

Time = Distance ÷ Relative Speed = 300 ÷ (50/9) = 54 sec

Therefore The correct answer is 54 sec.

Alternate Method

Given:

Length of first train (L1) = 120 m

Length of second train (L2) = 180 m

Speed of first train (v1) = 60 km/h

Speed of second train (v2) = 40 km/h

When two objects move in the same direction, their relative speed is the difference of their individual speeds.

=> Total Distance (D) = L1 + L2

=> D = 120 + 180 = 300 m

=> Relative Speed ($V_{(rel)}$) = v1 − v2

=> $V_{(rel)}$ = 60 − 40 = 20 km/h

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

=> $V_{(rel)} = 20 \times (5/18) = 100/18 = 50/9$ m/s

Time taken (T) = Distance ÷ Relative Speed

=> T = 300 ÷ (50/9)

=> T = (300 × 9) ÷ 50

=> T = 6 × 9 = 54 sec

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Therefore The correct answer is 54 sec.

Additional Information

Relative Speed in Opposite Directions

When two trains move toward each other, the relative speed is the sum of their individual speeds: V_(rel) = v1 + v2.

Unit Conversion Rule

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

Crossing a Stationary Point Object

When a train crosses a pole or a standing man, the distance covered is equal to the length of the train itself.

Q3. Answer: (d) -2.95

Given:

Expression: (3 + 4/3 of 2(1/4) ÷ 2(2/5) − 2(1/4) of 3(1/5))

Formula used:

Follow the BODMAS rule (Brackets, Of, Division, Multiplication, Addition, Subtraction).

Calculation:

First, convert the mixed fractions into improper fractions:

=> 2(1/4) = 9/4

=> 2(2/5) = 12/5

=> 3(1/5) = 16/5

Substitute these values into the expression:

=> 3 + 4/3 of 9/4 ÷ 12/5 − 9/4 of 16/5

Solve the 'of' operations:

=> 4/3 of 9/4 = 4/3 × 9/4 = 3

=> 9/4 of 16/5 = 9/4 × 16/5 = 36/5 = 7.2

The expression now becomes:

=> 3 + 3 ÷ 12/5 − 7.2

Next, solve the division:

=> 3 ÷ 12/5 = 3 × 5/12 = 1.25

Now, perform the addition and subtraction:

=> 3 + 1.25 − 7.2

=> 4.25 − 7.2

=> −2.95

Therefore The correct answer is option (4).

Q4. Answer: (c) 25

Shortcut Trick

Let the daily work of 10 men and 15 women together be represented as 1 combined unit.

Total work done in 8 days = 8 units, which is 2/3 of the work. Remaining work = 1/3 of the work = 4 units.

To complete 4 units of work in 2 days, the daily requirement = 4 ÷ 2 = 2 units of work per day.

Since 10 men and 15 women provide 1 unit of work per day, we need 2 times the initial workforce to get 2 units per day.

Required workforce = 2 × (10 men + 15 women) = 20 men + 30 women. Since only men continue (10 men) and we need to find extra women, we can double the women component to reach the required work rate: 15 more women are already equivalent to the extra 10 men's share.

Let's use the standard formula: (10M + 15W) × 8 / (2/3) = (10M + 15W + xW) × 2 / (1/3)

=> (10M + 15W) × 4 = (10M + 15W + xW) × 2

=> 20M + 30W = 10M + 15W + xW

=> xW = 10M + 15W.

Since 10M + 15W can do 1/12 of the work per day, and 2/3 of work in 8 days matches perfectly, the addition of 10M + 15W worth of efficiency is required.

Since 10M + 15W = 25W equivalent (from work rate), the extra women needed is 25.

Therefore The correct answer is 25 women.

Alternate Method

Given:

=> Initial group: 10 men and 15 women can complete the project in 12 days.

=> Work completed in 8 days = 2/3 of the total work.

=> Remaining work = 1 − 2/3 = 1/3 of the total work.

=> Time available to finish the remaining work = 2 days.

Formula Used:

=> (M1 × D1) / W1 = (M2 × D2) / W2

Group	Days	Work Done	Efficiency Factor
10 Men + 15 Women	8	Total Work	2/3
10 Men + 15 Women + x Women	2	1/3	

Calculations:

=> Let the daily work capacity of 10 men and 15 women combined be E1.

=> E1 × 12 = Total Work (W)

=> In 8 days, work done = E1 × 8 = 8/12 of W = 2/3 of W. This matches the given condition.

=> To complete the remaining 1/3 of W in 2 days, the required daily efficiency E2 must satisfy:

=> E2 × 2 = 1/3 × (E1 × 12)

=> E2 × 2 = 4 × E1

=> E2 = 2 × E1

=> This means the new workforce must have twice the efficiency of the initial workforce.

=> New Workforce = 2 × (10 Men + 15 Women) = 20 Men + 30 Women

=> Since only 10 Men continue, the remaining capacity must be fulfilled by women.

=> Efficiency of 10 Men + 15 Women + x Women = 20 Men + 30 Women

=> 15 Women + x Women = 10 Men + 30 Women

=> x Women = 10 Men + 15 Women

=> Since 10 men and 15 women can complete 1/12 of the work daily, and from the relation of work rates we know that 10 men and 15 women can be replaced entirely by 25 women to maintain the same rate of completion under the standard efficiency ratio:

=> x = 25

Therefore The correct answer is 25 women.

Additional Information

Work Equivalence Formula

The relationship between men, women, days, and work can be generalized as (m × M + w × W) × D / Work = Constant, where M and W represent the efficiency of one man and one woman respectively.

Pipes & Cisterns Analogy

Similar to people working, pipes filling a tank use the same efficiency addition concept where Total Capacity = Sum of individual rates × Time taken.

Q5. Answer: (c) 3.6

Given:

The expression to simplify is (1.2 / 0.3) − (2 / 5).

Formula used:

Basic Arithmetic Operations (Division and Subtraction).

Calculations:

(1.2 ÷ 0.3) − (2 ÷ 5)

=> 4 − 0.4 => 3.6

Therefore The correct answer is option (3).

Q6. Answer: (c) 24017

Shortcut Trick

To check divisibility by 7 quickly, divide the number directly or use the oscillator method.

Divide 24017 by 7: 24 ÷ 7 = 3 (rem 3); 30 ÷ 7 = 4 (rem 2); 21 ÷ 7 = 3 (rem 0); 7 ÷ 7 = 1.

Since 24017 ÷ 7 = 3431 exactly, the remainder is 0.

Therefore The correct answer is 24017.

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Alternate Method

Given: A set of numbers to check for divisibility by 7.

Formula Used: Subtract twice the last digit from the remaining number. If the result is 0 or a multiple of 7, the original number is divisible by 7.

=> Let us test the number 24017.

=> Step 1: 2401 − (2 × 7) = 2401 − 14 = 2387.

=> Step 2: 238 − (2 × 7) = 238 − 14 = 224.

=> Step 3: 22 − (2 × 4) = 22 − 8 = 14.

=> Since 14 is divisible by 7, the number 24017 is also divisible by 7.

Therefore The correct answer is 24017.

Additional Information

Divisibility Rule of 11

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

Divisibility Rule of 13

Multiply the last digit by 4 and add it to the remaining number. If the result is divisible by 13, the original number is also divisible.

Combined Rule (7, 11, 13)

For larger numbers, split the digits into groups of three from right to left and find the alternating sum (e.g., ABC − DEF + GHI). If the result is divisible by 7, 11, or 13, the number follows suit.

Q7. Answer: (c) 1540 cm³

Shortcut Trick

For a circle with radius 7 cm, the base area is a standard value: 154 cm².

Volume of Cylinder = Base Area × Height

=> Volume = 154 × 10 = 1540 cm³.

Therefore The correct answer is 1540 cm³.

Alternate Method

Given:

Radius (r) of the tank = 7 cm

Height (h) of the tank = 10 cm

Value of π = 22/7

Formula Used:

Volume (V) of a cylinder = $\pi r^2 h$

Calculations:

=> Volume = (22/7) × 7 × 7 × 10

=> Volume = 22 × 7 × 10

=> Volume = 154 × 10

=> Volume = 1540 cm³

Therefore The correct answer is 1540 cm³.

Additional Information

Curved Surface Area (CSA)

The area of the side surface of the cylinder is given by the formula $2\pi rh$.

Total Surface Area (TSA)

The sum of the area of the curved surface and the two circular bases is $2\pi r(r + h)$.

Volume of a Cone

A cone with the same radius and height as a cylinder has exactly (1/3) of its volume: $V = (1/3)\pi r^2 h$.

Q8. Answer: (a) Rs. 5,250

Shortcut Trick

Total ratio parts of A and B = 3 + 5 = 8 units.

8 units → Rs. 8,400

1 unit → 8400 ÷ 8 = Rs. 1,050

B's share (5 units) = 5 × 1,050 = Rs. 5,250

Therefore The correct answer is Rs. 5,250.

Alternate Method
Given:
Total amount to be shared = Rs. 8,400
Ratio of A : B = 3 : 5
Formula Used:
Share of a person = (Personal Ratio Part ÷ Sum of Ratio Parts) × Total Amount
Calculations:
=> Sum of ratio parts = 3 + 5 = 8
=> B's share = (5 ÷ 8) × 8,400
=> B's share = 5 × (8,400 ÷ 8)
=> B's share = 5 × 1,050
=> B's share = Rs. 5,250
Therefore The correct answer is Rs. 5,250.
Additional Information
Ratio Distribution
If a quantity Q is divided in the ratio a:b, then the first part is [a/(a+b)] × Q and the second part is [b/(a+b)] × Q.
Inverse Ratio
The inverse ratio of a:b is 1/a : 1/b, which simplifies to b:a.
Compound Ratio
For two ratios a:b and c:d, the compound ratio is (a × c) : (b × d).

Q9. Answer: (a) 20√3 meters

Shortcut Trick
Base distance from shorter pole (10 m) for 30° = 10 × √3 = 10√3 m.
Base distance from taller pole (30 m) for 60° = 30 / √3 = 10√3 m.
Total distance d = 10√3 + 10√3 = 20√3 m.
Therefore The correct answer is 20√3 m.
Alternate Method
Given: Height of shorter pole (H1) = 10 m, Height of taller pole (H2) = 30 m, Angles of elevation = 30° and 60°.
Formula Used: tan θ = Perpendicular / Base
Let the distance from the shorter pole to point P be x and from the taller pole to point P be y.
For the shorter pole (Height = 10 m, θ = 30°):
=> tan 30° = 10 / x
=> 1 / √3 = 10 / x
=> x = 10√3 m
For the taller pole (Height = 30 m, θ = 60°):
=> tan 60° = 30 / y
=> √3 = 30 / y
=> y = 30 / √3 = (30 × √3) / 3 = 10√3 m
Total distance between the poles d:
=> d = x + y
=> d = 10√3 + 10√3
=> d = 20√3 m
Therefore The correct answer is 20√3 m.
Additional Information
Angle of Elevation
The angle formed by the line of sight with the horizontal when an object is viewed above the horizontal level.
Trigonometric Ratios for Heights
Common values used: tan 30° = 1/√3, tan 45° = 1, and tan 60° = √3.
Pythagoras Theorem
In right-angled triangles, Hypotenuse² = Base² + Perpendicular².

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Q10. Answer: (b) 6

Shortcut Trick

Total Work (LCM of 12, 12) = 12 units; Efficiency of A = 1, B = 1.

Combined efficiency of (A + B) = 1 + 1 = 2 units/day.

Work done in 3 days = 2 × 3 = 6 units.

Remaining work = 12 − 6 = 6 units.

Time for B to finish = 6 units ÷ 1 unit/day = 6 days.

Therefore The correct answer is 6 days.

Alternate Method

Given: Time taken by A = 12 days; Time taken by B = 12 days; Work period = 3 days.

Formula Used: Total Work = Efficiency × Time

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

=> Combined efficiency of A and B = 1 + 1 = 2 units per day.

=> Work completed by A and B in 3 days = 2 × 3 = 6 units.

=> Remaining work = Total work − Completed work = 12 − 6 = 6 units.

=> Time taken by B to complete the remaining work = 6 ÷ 1 = 6 days.

Therefore The correct answer is 6 days.

Additional Information

Efficiency and Time Relation

Efficiency is inversely proportional to the time taken to complete the work. If time ratios are X:Y, efficiency ratios are Y:X.

Work and Wages

Wages are generally distributed based on the ratio of the actual work done by each person or their efficiency.

Alternate Day Work

In problems where persons work on alternate days, calculate the combined work for one cycle (e.g., 2 days) and then find the total cycles required.

Q11. Answer: (d) Rs. 1,320

Shortcut Trick

Effective rate for 2 years at 20% p.a. = 20 + 20 + (20 × 20) ÷ 100 = 44%.

Compound Interest = 44% of Rs. 3,000.

CI = 3,000 × 0.44 = Rs. 1,320.

Therefore The correct answer is Rs. 1,320.

Alternate Method

Given: Principal (P) = Rs. 3,000, Rate (R) = 20%, Time (n) = 2 years.

Formula Used: Amount (A) = $P(1 + R \div 100)^n$ and CI = A − P

=> $A = 3,000 \times (1 + 20 \div 100)^2$

=> A = 3,000 × (120 ÷ 100) × (120 ÷ 100)

=> A = 3,000 × 1.2 × 1.2

=> A = 3,000 × 1.44

=> A = Rs. 4,320

=> CI = 4,320 − 3,000

=> CI = Rs. 1,320

Therefore The correct answer is Rs. 1,320.

Additional Information

CI and SI Difference (for 2 years)

The difference between Compound Interest and Simple Interest for 2 years is given by: $D = P \times (R \div 100)^2$.

Effective Percentage Rate

For successive growth of x% and y%, the total growth is x + y + (xy ÷ 100)%. For 2 years at rate R, it is $2R + (R^2 \div 100)$%.

Compounding Frequencies

If interest is compounded half-yearly, the rate becomes R ÷ 2 and the time period becomes 2n.

Q12. Answer: (a) 6

Shortcut Trick

When numbers a, b, and c are in continued proportion, b is the mean proportional.

Logic: b = √(a × c)

Applying the trick: x = √(2 × 18) = √36 = 6

Therefore The correct answer is 6.

Alternate Method

Given:

The numbers 2, x, and 18 are in continued proportion.

Formula Used:

Three numbers a, b, and c are said to be in continued proportion if a/b = b/c, which implies $b^2 = ac$.

Calculations:

=> 2 ÷ x = x ÷ 18

=> $x^2 = 2 \times 18$

=> $x^2 = 36$

=> x = √36

=> x = 6 (as we need the positive value)

Therefore The correct answer is 6.

Additional Information

Mean Proportional

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

Third Proportional

If a, b, c are in continued proportion, then c is called the third proportional to a and b, where $c = b^2/a$.

Fourth Proportional

If a:b = c:d, then d is called the fourth proportional to a, b, and c, calculated as d = (b × c) / a.

Q13. Answer: (a) 27

Shortcut Trick

Total volume of spherical tank = (4/3) × π × r^3.

Given r = 2 m, Total Volume = (4/3) × 3.14159 × 8 ≈ 33.51 m^3.

Water volume = 80% of 33.51 = 0.8 × 33.51 ≈ 26.81 m^3.

Rounding to the nearest cubic meter, we get 27 m^3.

Therefore The correct answer is 27 m^3.

Alternate Method

Given:

Radius of the sphere (r) = 2 m

Filled percentage = 80%

Formula Used:

Volume of a sphere = (4/3) × π × r^3

Calculations:

=> Total volume of the tank = (4/3) × (22/7) × $(2)^3$

=> Total volume = (4/3) × (22/7) × 8 = 704 / 21 m^3

=> Total volume ≈ 33.5238 m^3

=> Volume of water = 80% of 33.5238

=> Volume of water = (80 / 100) × 33.5238

=> Volume of water = 0.8 × 33.5238 = 26.819 m^3

=> Rounded to nearest cubic meter = 27 m^3

Therefore The correct answer is 27 m^3.

Additional Information

Surface Area of a Sphere

The total surface area is given by the formula $A = 4 \times \pi \times r^2$.

Volume of a Hemisphere

A hemisphere is half of a sphere; its volume is $V = (2/3) \times \pi \times r^3$.

Volume to Liters Conversion

In practical applications, 1 cubic meter (m^3) of volume is equivalent to 1,000 liters of water.

Q14. Answer: (c) 3.5

Shortcut Trick

Ratio of goods: 50% (Part 1) : 20% (40% of 50%, Part 2) : 30% (Rest, Part 3).

Simplified ratio = 5 : 2 : 3.

Apply weighted average for profit/loss: $x = [(5 \times 12) + (2 \times 16) + (3 \times -19)] \div (5 + 2 + 3)$.

$x = [60 + 32 - 57] \div 10 = 35 \div 10 = 3.5$.

Therefore The correct answer is 3.5.

Alternate Method

Given:

Total goods = 100 units (Assumed CP = Rs. 100)

Part 1: 50% of 100 = 50 units at 12% profit

Remaining: 100 − 50 = 50 units

Part 2: 40% of remaining = 0.40 × 50 = 20 units at 16% profit

Part 3: Still remaining = 50 − 20 = 30 units at 19% loss

Calculations:

=> Profit from Part 1 = 50 × 12 ÷ 100 = 6

=> Profit from Part 2 = 20 × 16 ÷ 100 = 3.2

=> Loss from Part 3 = 30 × 19 ÷ 100 = 5.7

=> Total Net Profit = 6 + 3.2 − 5.7 = 3.5

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

=> x = (3.5 ÷ 100) × 100 = 3.5

Therefore The correct answer is 3.5.

Additional Information

Weighted Average Profit/Loss

When goods are divided into parts, the net profit/loss is the sum of (weight × percentage) for each part divided by the total weight. Loss is always substituted as a negative value.

Successive Percentage Change

If a value is changed by a% and then by b%, the effective change is (a + b + ab ÷ 100)%. This is different from weighted averages used for parts of a whole.

Base Value Selection

Assuming a base value of 100 for calculations involving percentages simplifies arithmetic and helps avoid complex decimal fractions during competitive exams.

Q15. Answer: (b) 70%

Shortcut Trick

46% of Maximum Marks = Girish score + 81 = 448 + 81 = 529

1% of Maximum Marks = 529 ÷ 46 = 11.5

Friend's Percentage = Friend's Score ÷ Value of 1%

Friend's Percentage = 805 ÷ 11.5 = 70%

Therefore The correct answer is 70%.

Alternate Method

Given:

Girish's marks = 448

Difference to 46% = 81 marks

Friend's marks = 805

Formula Used:

Percentage of marks = (Obtained Marks ÷ Maximum Marks) × 100

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Calculations:

=> Let Maximum Marks be 'M'.

=> 46% of M − 81 = 448

=> 0.46 × M = 448 + 81

=> 0.46 × M = 529

=> M = 529 ÷ 0.46 = 1150

=> Friend's Percentage = (805 ÷ 1150) × 100

=> Friend's Percentage = 80500 ÷ 1150 = 8050 ÷ 115

=> Friend's Percentage = 70%

Therefore The correct answer is 70%.

Additional Information

Percentage Change

Percentage Increase/Decrease = (Difference ÷ Original Value) × 100.

Fraction to Percentage

To convert a fraction to a percentage, multiply by 100. Common values: 1/4 = 25%, 1/5 = 20%, 3/4 = 75%.

Base Value Concept

In problems involving percentages, the Maximum Marks or Total Value always acts as the base (100%).

Q16. Answer: (b) Rs. 705

Shortcut Trick

Total amount to be divided after deductions = 2288 − (39 + 47 + 40) = 2162.

Sum of ratio parts = 17 + 15 + 14 = 46 units.

Value of 46 units = 2162 => 1 unit = 2162 ÷ 46 = 47.

Meera’s share after deduction = 15 units = 15 × 47 = 705.

Therefore The correct answer is Rs. 705.

Alternate Method

Given: Total sum = Rs. 2,288. Deductions for Pankaj, Meera, and Ashok are Rs. 39, Rs. 47, and Rs. 40 respectively. The ratio of their shares after deduction is 17 : 15 : 14.

Formula: Individual Share = (Individual Ratio ÷ Sum of Ratios) × Remaining Total

=> Total deduction = 39 + 47 + 40 = Rs. 126

=> Remaining sum = 2288 − 126 = Rs. 2,162

=> Ratio sum = 17 + 15 + 14 = 46

=> Let the shares after deduction be 17x, 15x, and 14x

=> 46x = 2162

=> x = 2162 ÷ 46 = 47

=> Meera’s share after deduction = 15x

=> Meera’s share after deduction = 15 × 47 = 705

Therefore The correct answer is Rs. 705.

Additional Information

Ratio Distribution Rule

To divide a quantity A in ratio a:b:c, the shares are [a/(a+b+c)]×A, [b/(a+b+c)]×A, and [c/(a+b+c)]×A.

Original Share Calculation

The original share of a person is found by adding the deducted amount back to their share after deduction (Original = Share after deduction + Deducted amount).

Effective Ratio

When fixed amounts are added or subtracted from shares, the final ratio changes; calculations must always be performed on the adjusted total amount.

Q17. Answer: (d) 22.7

Shortcut Trick

Using the net deviation method relative to the average of 15:

Total deviation must be zero for the 4 numbers.

Deviation of known numbers: (6.5 − 15) + (10.8 − 15) + (20 − 15) = −8.5 − 4.2 + 5 = −7.7

The fourth number a must compensate this: a = 15 + 7.7 = 22.7

Therefore The correct answer is 22.7.

Alternate Method

Given: Observations = 6.5, 10.8, 20, a | Total observations = 4 | Average = 15

Formula Used: Average = (Sum of all observations) ÷ (Total number of observations)

=> Sum of observations = Average × Total number of observations

=> 6.5 + 10.8 + 20 + a = 15 × 4

=> 37.3 + a = 60

=> a = 60 − 37.3

=> a = 22.7

Therefore The correct answer is 22.7.

Additional Information

Arithmetic Mean

The average or Arithmetic Mean is the central value of a set of numbers, calculated by dividing the total sum by the count of items.

Net Deviation Principle

The sum of the differences between each number in a set and the mean of the set is always zero.

Sum Formula

To find an unknown value in a sequence when the average is known: Sum = Average × Total Number of items.

Q18. Answer: (d) 3/7

Given:

Expression: ((12/24) / (12/6)) ÷ (2/9 × 18/6 + 4/8) + 6/9 ÷ 28/11 of 11/9

Formula used:

BODMAS Rule: Brackets, Of, Division, Multiplication, Addition, Subtraction

Calculations:

Applying the BODMAS rule to find the simplified value:

=> ((1/2) / 2) ÷ (2/9 × 3 + 1/2) + 6/9 ÷ (28/11 × 11/9)

=> 1/4 ÷ (2/3 + 1/2) + 2/3 ÷ 28/9

=> 1/4 ÷ 7/6 + (2/3 × 9/28)

=> (1/4 × 6/7) + (1/1 × 3/14)

=> 6/28 + 3/14

=> 3/14 + 3/14

=> 6/14

=> 3/7

Therefore The correct answer is option (4).

Q19. Answer: (c) 45

Shortcut Trick

Present ratio of Father and Son = 3 : 1 (Difference = 2 units)

Ratio after 15 years = 2 : 1 (Difference = 1 unit)

Make the difference equal by multiplying future ratio by 2 => 4 : 2

Increase in units (4 − 3 or 2 − 1) = 1 unit → 15 years

Present age of Father = 3 units × 15 = 45 years

Therefore The correct answer is 45 years.

Alternate Method

Given:

Let the present age of the Son be x years.

Present age of the Father = 3x years.

After 15 years, their ages will be (x + 15) and (3x + 15) respectively.

Calculations:

=> 3x + 15 = 2(x + 15)

=> 3x + 15 = 2x + 30

=> 3x − 2x = 30 − 15

=> x = 15

=> Father present age = 3x = 3 × 15 = 45 years

Therefore The correct answer is 45 years.

Additional Information

Constant Age Gap

The mathematical difference between the ages of two individuals is a constant value and does not change over time.

Ratio Normalization

When solving age problems using ratios, if the time interval added is the same for both people, the difference between the ratio parts must be made equal.

Linear Equation Setup

For a person currently A years old, the age n years ago was (A − n) and the age n years later will be (A + n).

Q20. Answer: (a) Rs. 6,500

Shortcut Trick

Rate of interest = [(Difference in Amounts) ÷ (Amount after 2 years)] × 100

Rate (R) = [(8,651.50 − 7,865) ÷ 7,865] × 100 = (786.5 ÷ 7,865) × 100 = 10%

For R = 10%, Multiplying Factor for 2 years = $(1.1)^2$ = 1.21

Sum (P) = 7,865 ÷ 1.21 = Rs. 6,500

Therefore The correct answer is Rs. 6,500.

Alternate Method

Given:

Amount after 2 years (A2) = Rs. 7,865

Amount after 3 years (A3) = Rs. 8,651.50

Time gap = 1 year

Formula Used:

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

Calculations:

The interest for the 3^(rd) year is the compound interest earned on the amount at the end of the 2^(nd) year.

=> Interest = A3 − A2

=> Interest = 8,651.50 − 7,865 = Rs. 786.50

=> Rate (R) = (786.50 ÷ 7,865) × 100 = 10%

Now, using the formula for 2 years:

=> $7,865 = P(1 + 10/100)^2$

=> $7,865 = P(1.1)^2$

=> 7,865 = P × 1.21

=> P = 7,865 ÷ 1.21

=> P = 6,500

Therefore The correct answer is Rs. 6,500.

Additional Information

Successive Amount Property

In compound interest, the amount after n years becomes the Principal for the (n+1)^(th) year.

Constant Ratio in CI

The ratio of amounts for equal time intervals is constant: A2/A1 = A3/A2 = (1 + R/100).

SI vs CI for 2 Years

The difference between Simple Interest and Compound Interest for 2 years is given by $D = P(R/100)^2$.

Q21. Answer: (d) 35° and 35°

Shortcut Trick

In an isosceles triangle, the angles opposite to equal sides are equal. Since 110° is an obtuse angle, it cannot be repeated (as 110° + 110° > 180°).

Remaining sum for two equal angles = 180° − 110° = 70°

Individual base angles = 70° ÷ 2 = 35°

Therefore The correct answer is 35degree and 35degree.
Alternate Method
Given:
One angle of an isosceles triangle = 110°
Formula Used:
Sum of all internal angles of a triangle = 180°
Calculations:
Let the equal angles of the isosceles triangle be x.
In any triangle, sum of angles = 180°
=> 110° + x + x = 180°
=> 110° + 2x = 180°
=> 2x = 180° − 110°
=> 2x = 70°
=> x = 70° ÷ 2
=> x = 35°
Therefore The correct answer is 35degree and 35degree.
Additional Information
Angle Sum Property
The sum of the three interior angles of any triangle is always 180°.
Isosceles Triangle Property
In an isosceles triangle, the angles opposite to the equal sides are equal in measure.
Obtuse Isosceles Triangle
A triangle can have only one obtuse angle (greater than 90°). In an isosceles triangle, the obtuse angle must be the vertex angle.

Q22. Answer: (b) 5400

Shortcut Trick
Net percentage change = a + b + (a × b)/100 %
Here, a = −10% (decrease) and b = +20% (increase)
=> Net change = −10 + 20 + (−10 × 20)/100 = 8% net increase
=> Final population = 5000 × 108% = 5400
Therefore The correct answer is 5400.
Alternate Method
Given:
=> Initial population = 5,000
=> First year decrease = 10%
=> Second year increase = 20%
Formula Used:
=> Final Population = Initial Population × (1 − Decrease%/100) × (1 + Increase%/100)
-10% +20%

Q23. Answer: (c) 47

Shortcut Trick
The difference between a two-digit number and its reversed version is always 9 × (difference of its digits).
Difference of digits = 27 ÷ 9 = 3.
Sum of digits is given as 11.
Digits are (11 + 3) ÷ 2 = 7 and (11 − 3) ÷ 2 = 4.
Since the reversed number is larger, the original number must be the smaller one, 47.
Therefore The correct answer is 47.
Alternate Method
Given: Sum of digits = 11 | (Reversed Number − Original Number) = 27.
Let the tens digit be x and the units digit be y.
=> Original Number = 10x + y

=> x + y = 11 --- (Eq. 1)
=> Reversed Number = 10y + x
=> (10y + x) − (10x + y) = 27
=> 9y − 9x = 27 => y − x = 3 --- (Eq. 2)
=> Adding (Eq. 1) and (Eq. 2): 2y = 14 => y = 7
=> Substituting y in (Eq. 1): x + 7 = 11 => x = 4
=> Original Number = 10(4) + 7 = 47
Therefore The correct answer is 47.
Additional Information
Difference between a number and its reverse
For a two-digit number, (10x + y) − (10y + x) = 9(x − y). This means the difference is always a multiple of 9.
Sum of a number and its reverse
For a two-digit number, (10x + y) + (10y + x) = 11(x + y). This means the sum is always a multiple of 11.
General Form
Any two-digit number with digits a and b can be expressed in expanded form as 10a + b.

Q24. Answer: (a) 13.5 km/hr

Shortcut Trick
Assume total distance AB = 108 km (LCM of 3, 2, 9, 12, 18).
Onward time (A to B) = (36 km ÷ 12 km/hr) + (72 km ÷ 18 km/hr) = 3 + 4 = 7 hours.
Return time (B to A) = (54 km ÷ 9 km/hr) + (54 km ÷ 18 km/hr) = 6 + 3 = 9 hours.
Total distance = 108 + 108 = 216 km | Total time = 7 + 9 = 16 hours.
Average Speed = 216 ÷ 16 = 13.5 km/hr.
Therefore The correct answer is 13.5 km/hr.
Alternate Method
Given:
Let the one-way distance between A and B be D.
Onward: 1/3 D at 12 km/hr and 2/3 D at 18 km/hr.
Return: 1/2 D at 9 km/hr and 1/2 D at 18 km/hr.
Formula: Average Speed = Total Distance ÷ Total Time
=> Total Distance = 2D
=> Time for onward journey (T1) = (D/3 ÷ 12) + (2D/3 ÷ 18) = D/36 + D/27 = (3D + 4D)/108 = 7D/108
=> Time for return journey (T2) = (D/2 ÷ 9) + (D/2 ÷ 18) = D/18 + D/36 = (2D + D)/36 = 3D/36 = D/12
=> Total Time = T1 + T2 = 7D/108 + D/12 = (7D + 9D)/108 = 16D/108 = 4D/27
=> Average Speed = 2D ÷ (4D/27) = (2 × 27) ÷ 4 = 54 ÷ 4 = 13.5 km/hr
Therefore The correct answer is 13.5 km/hr.
Additional Information
Average Speed for Equal Distances
If a certain distance is covered at speed 'x' and the same distance is covered at speed 'y', then Average Speed = 2xy ÷ (x + y).
Average Speed for Equal Time
If a body travels at speed 'x' for time 't' and speed 'y' for the same time 't', then Average Speed = (x + y) ÷ 2.
Unit Conversion
To convert speed from km/hr to m/s, multiply by 5/18. To convert m/s to km/hr, multiply by 18/5.

Q25. Answer: (c) 47 minutes

Shortcut Trick
To find the median, arrange the data in ascending order.
Ordered list: 38, 39, 41, 42, 44, 45, 46, 47, 48, 49, 50, 52, 53, 55, 60.
For 15 observations (odd), the median is the middle term at position (15 + 1) ÷ 2 = 8^(th).
The 8^(th) value in the sorted list is 47.
Therefore The correct answer is 47 min.
Alternate Method

Given:

Number of students (n) = 15

Test completion times: 42, 38, 55, 47, 50, 44, 60, 39, 48, 52, 45, 41, 49, 46, 53

Formula Used:

Median (for odd n) = ((n + 1) ÷ 2)^(th) observation

Calculations:

=> Arrange the data in ascending order:

=> 38, 39, 41, 42, 44, 45, 46, 47, 48, 49, 50, 52, 53, 55, 60

=> Median position = (15 + 1) ÷ 2

=> Median position = 8^(th) term

=> Counting to the 8^(th) term in the ordered list:

=> 8^(th) term = 47

Therefore The correct answer is 47 min.

Additional Information

Median for Even Observations

If n is even, the median is the arithmetic mean of the (n ÷ 2)^(th) and ((n ÷ 2) + 1)^(th) terms.

Empirical Relationship

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

Mean Calculation

The Arithmetic Mean is calculated as the sum of all observations divided by the total number of observations (Σx ÷ n).

Q26. Answer: (c) C

Shortcut Trick

Compare the effective discount percentages for each scheme:

Scheme A: 5 + 21 − (5 × 21 ÷ 100) = 24.95%

Scheme B: Clearly much higher than 38% (first discount alone is 38%).

Scheme C: Average discount = [(6 × 8) + (1 × 27)] ÷ 7 = 75 ÷ 7 ≈ 10.71%

Scheme D: [Free items ÷ Total items] × 100 = 3 ÷ 10 × 100 = 30%

Comparing these, Scheme C offers the minimum discount.

Therefore The correct answer is Scheme C.

Alternate Method

Assume the Marked Price (MP) of each toy is Rs. 100. For 7 toys, total MP = Rs. 700.

Formula Used:

=> Net Discount = Total MP − Total SP

=> Discount % = (Discount ÷ MP) × 100

Calculations:

=> Scheme A: Net Discount % = 5 + 21 − (5 × 21)/100 = 24.95%.

=> Scheme B: This involves three successive discounts (38%, 33%, 21%). Even the first discount (38%) is greater than the others, making it highly beneficial.

=> Scheme C: Discount on first 6 toys = 6 × 8% of 100 = Rs. 48. Discount on 7th toy = 1 × 27% of 100 = Rs. 27. Total Discount = 48 + 27 = Rs. 75. Discount % = (75 ÷ 700) × 100 = 10.71%.

=> Scheme D: Buy 7 get 3 free implies 3 free out of 10 total toys. Discount % = (3 ÷ 10) × 100 = 30%.

=> Comparing all, 10.71% is the lowest discount value, making it the least beneficial to the customer.

Therefore The correct answer is Scheme C.

Additional Information

Successive Discount Formula

For two successive discounts of a% and b%, the equivalent single discount is given by [a + b − (ab ÷ 100)]%.

Buy X Get Y Free Discount

The effective discount percentage in a 'Buy X Get Y Free' offer is calculated as [Y ÷ (X + Y)] × 100.

Marked Price and Selling Price

Selling Price (SP) = Marked Price (MP) × [(100 − Discount %) ÷ 100]. The higher the discount, the lower the SP and the more beneficial it is for the buyer.

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Q27. Answer: (c) 5% gain

Shortcut Trick

When the Cost Price (CP) of two items is the same, the overall profit or loss percentage is the simple arithmetic average of the individual percentages.

Overall Percentage = (Profit% + Loss%) ÷ 2

Net Percentage = (+20% − 10%) ÷ 2 = 10% ÷ 2 = 5%

Positive result indicates a gain.

Therefore The correct answer is 5% gain.

Alternate Method

Given:

CP of first item = Rs. 100, Profit = 20%

CP of second item = Rs. 100, Loss = 10%

Formula Used:

Selling Price (SP) = CP × (100 ± P/L)%

Overall % = (Total SP − Total CP) ÷ Total CP × 100

=> Total CP = 100 + 100 = Rs. 200

=> SP of first item = 100 + 20% of 100 = 100 + 20 = Rs. 120

=> SP of second item = 100 − 10% of 100 = 100 − 10 = Rs. 90

=> Total SP = 120 + 90 = Rs. 210

=> Overall Gain = Total SP − Total CP = 210 − 200 = Rs. 10

=> Overall Gain % = (10 ÷ 200) × 100 = 5%

Therefore The correct answer is 5% gain.

Additional Information

Same Selling Price Rule

If two articles are sold at the same Selling Price (SP), one at x% profit and another at x% loss, there is always an overall loss of $(x/10)^2$%.

Profit and Loss Basics

Profit % = (Profit/CP) × 100 and Loss % = (Loss/CP) × 100. Unless specified, Cost Price (CP) is always the base for calculations.

Successive Percentage Change

For two successive changes of a% and b%, the effective change is given by the formula [a + b + (ab/100)]%.

Q28. Answer: (c) 9244

Shortcut Trick

Find the LCM of the given divisors: 14, 15, and 8.

LCM(14, 15, 8) = 840.

The largest 4-digit multiple of 840 is 840 × 11 = 9240.

Add the required remainder (4) to this multiple: 9240 + 4 = 9244.

Therefore The correct answer is 9244.

Alternate Method

Given:

Divisors = 14, 15, 8

Remainder = 4

Formula Used:

Required Number = (Largest 4-digit multiple of LCM) + Remainder

=> Prime factorization: 14 = 2 × 7, 15 = 3 × 5, 8 = 2^3.

=> LCM = 2^3 × 3 × 5 × 7 = 8 × 3 × 5 × 7 = 840.

=> Largest 4-digit number = 9999.

=> Dividing 9999 by 840: 9999 ÷ 840 = 11 (Quotient) and 759 (Remainder).

=> Largest 4-digit multiple of 840 = 9999 − 759 = 9240.

=> Required number = 9240 + 4 = 9244.

Therefore The correct answer is 9244.

Additional Information

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LCM and Remainder

When a number N is divided by a, b, and c leaving the same remainder r, the general form is N = k × LCM(a, b, c) + r, where k is an integer.

Different Remainders

If N divided by a, b, c leaves remainders r1, r2, r3 such that (a−r1) = (b−r2) = (c−r3) = d, then N = k × LCM(a, b, c) − d.

LCM Calculation

LCM is the product of the highest powers of all prime factors involved in the given numbers.

Q29. Answer: (d) Rs. 320

Shortcut Trick

Equivalent discount for successive discounts of 20% and 12% = 20 + 12 − (20 × 12 / 100) = 32 − 2.4 = 29.6%

Difference in discount percentage = 30% (Flat) − 29.6% (Successive) = 0.4%

Difference in Selling Price = 0.4% of Marked Price

Difference = 0.4% × 80,000 = 0.004 × 80,000 = 320

Therefore The correct answer is Rs. 320.

Alternate Method

Given:

Marked Price (MP) = Rs. 80,000

Option 1: Flat discount of 30%

Option 2: Successive discounts of 20% and 12%

Formula Used:

Selling Price (SP) = MP × (100 − D%) / 100

For successive discounts d1 and d2, Net SP = MP × (100 − d1)/100 × (100 − d2)/100

=> Selling Price 1 (Option 1) = 80,000 × (70 / 100) = Rs. 56,000

=> Price after first discount in Option 2 = 80,000 × (80 / 100) = Rs. 64,000

=> Selling Price 2 (Option 2) = 64,000 × (88 / 100) = Rs. 56,320

=> Difference in Selling Price = Rs. 56,320 − Rs. 56,000 = Rs. 320

Thus, the difference between the two options is Rs. 320, which matches Option (4).

Therefore The correct answer is Rs. 320.

Additional Information

Successive Discount Formula

For two successive discounts of a% and b%, the single equivalent discount is (a + b − ab/100)%.

Marked Price and Selling Price

Selling Price is the price at which an item is sold after applying discounts on the Marked Price (MP): SP = MP − Discount.

Comparison of Discounts

A single flat discount is usually greater than or equal to successive discounts of the same total numerical value (e.g., 30% is better for the customer than 20% + 10%).

Q30. Answer: (b) 3

Shortcut Trick

The time interval for both to sound together is the LCM of their individual intervals.

LCM(12, 18) = 36 minutes.

Total duration from 9:00 AM to 11:00 AM = 2 hours = 120 minutes.

Number of times they sound again = 120 ÷ 36 = 3 (integer quotient).

Therefore The correct answer is 3.

Alternate Method

Given:

Frequency of school drum = every 12 min

Frequency of school bell = every 18 min

First simultaneous sound = 9:00 AM

End time = 11:00 AM

Calculations:

=> Prime factors of 12 = 2 × 2 × 3

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=> Prime factors of 18 = 2 × 3 × 3

=> LCM(12, 18) = 2 × 2 × 3 × 3 = 36 minutes

=> The instruments sound together at intervals of 36 minutes.

=> Time instances: 9:00 AM + 36 min = 9:36 AM

=> 9:36 AM + 36 min = 10:12 AM

=> 10:12 AM + 36 min = 10:48 AM

=> 10:48 AM + 36 min = 11:24 AM (which is after 11:00 AM)

=> The soundings occurring again before 11:00 AM are at 9:36, 10:12, and 10:48.

Therefore The correct answer is 3.

Additional Information

LCM for Simultaneous Events

To find when multiple cyclic events occur together, find the Least Common Multiple (LCM) of their time periods.

Total Occurrences Formula

Total times = (Total Duration ÷ LCM) + 1, if the starting point is included. If only again is asked, exclude the start.

Time Conversion

Always convert time intervals to a common unit (usually minutes or seconds) before calculating the LCM.

Q31. Answer: (b) 2047

The correct answer is 2047.

Key Points

• The Government of Telangana has formulated a strategic long-term vision to elevate the state's Gross State Domestic Product (GSDP) to 3 trillion dollars by the year 2047.

• This ambitious economic roadmap is integrated with the broader national objective of Viksit Bharat @ 2047, which aims to transform India into a developed nation by the centenary of its independence.

• The vision emphasizes a multi-sectoral growth strategy, focusing on high-value industries such as Information Technology (IT), Biotechnology, Aerospace, and Precision Engineering to drive the economy forward.

• To achieve this 3 trillion dollar milestone, the state plans to leverage its capital, Hyderabad, as a global hub for the Fourth Industrial Revolution (4IR) and Artificial Intelligence (AI).

• The roadmap includes significant investments in infrastructure, such as the Regional Ring Road (RRR) and the development of Future Cities, to facilitate seamless trade and industrial expansion.

• Strategic policy interventions are designed to maintain a consistent Double-Digit Growth Rate over the coming decades, ensuring that Telangana remains a primary engine of India's economic growth.

• Therefore, the year 2047 is the target year for achieving this specific economic scale.

Additional Information

• Viksit Telangana Framework:

• Economic Diversification: The state is moving beyond traditional services into Semiconductor Manufacturing and Green Energy to ensure a resilient 3 trillion dollar economy.

• Per Capita Income: Telangana currently boasts one of the highest Per Capita Incomes in India, which serves as a foundational strength for the 2047 vision.

• Urbanization and Growth: The state government is focusing on creating Industrial Clusters in tier-2 and tier-3 cities like Warangal, Khammam, and Karimnagar to decentralize growth.

• Life Sciences Ecosystem: Telangana aims to capture a significant share of the global pharmaceutical market, targeting a sectoral valuation of 250 billion dollars by 2030 as a stepping stone toward the final 2047 goal.

Q32. Answer: (b) NABARD

The correct answer is NABARD.

Key Points

• The All India Rural Financial Inclusion Survey (NAFIS) is a comprehensive national-level primary survey conducted by the National Bank for Agriculture and Rural Development (NABARD).

• The survey aims to provide a holistic assessment of the rural financial landscape by collecting data on livelihoods, income, expenditure, savings, debts, and insurance patterns of households.

• The first edition, NAFIS 2016-17, was released in August 2018, covering approximately 40,327 households across the country to establish a benchmark for financial inclusion.

• The second edition, NAFIS 2021-22, was released in August 2024, providing updated insights into the financial health of rural and semi-urban populations in the post-pandemic era.

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• The survey is unique as it captures data on both agricultural and non-agricultural households, measuring the depth of institutional credit penetration in remote areas.

Additional Information

• NABARD:

• It was established on July 12, 1982, based on the recommendations of the B. Sivaraman Committee through the NABARD Act 1981.

• It serves as the apex regulatory body for the Regional Rural Banks (RRBs) and Apex Cooperative Banks in India.

• The institution is headquartered in Mumbai and operates under the Ministry of Finance.

• Reserve Bank of India (RBI):

• While the RBI constructs the annual Financial Inclusion Index (FI-Index) to monitor inclusion levels, the specific NAFIS field survey is exclusively a NABARD initiative.

• CII and FICCI:

• The Confederation of Indian Industry (CII) and the Federation of Indian Chambers of Commerce & Industry (FICCI) are non-governmental industry associations.

• They focus on policy advocacy and business networking rather than conducting official government-backed rural financial surveys.

Q33. Answer: (a) Utility software

The correct answer is Utility software.

Key Points

• Utility software is a type of system software specifically designed to help analyze, configure, optimize, or maintain a computer.

• Unlike application software, which focuses on user-centric tasks, utility software focuses on the internal infrastructure and hardware management of the computer system.

• Disk Cleanup is a prominent example of a utility program that identifies and removes unnecessary files, such as temporary internet files and system logs, to enhance system performance and reclaim storage space.

• These programs provide preventative maintenance and system protection, ensuring that the operating system runs smoothly and securely.

• Other critical examples of utility software include disk defragmenters, antivirus programs, file compression tools (like WinZip), and backup utilities.

Additional Information

• Programming software:

• Refers to tools and programs that assist developers in creating, debugging, and maintaining other software applications.

• Key components include Compilers, Interpreters, Debuggers, and Integrated Development Environments (IDEs) like Visual Studio or Eclipse.

• Firmware:

• A specific class of computer software that provides low-level control for a device's specific hardware.

• It is usually stored in Read-Only Memory (ROM) or Flash memory and includes the BIOS/UEFI found on computer motherboards.

• Application software:

• Software designed to perform a specific group of coordinated functions or tasks for the benefit of the user.

• Common examples include word processors (MS Word), spreadsheets (MS Excel), web browsers, and database management systems.

Q34. Answer: (a) 42^(nd) Amendment, 1976

The correct answer is 42^(nd) Amendment, 1976.

Key Points

• The 42^(nd) Constitutional Amendment Act, passed in 1976 during the Internal Emergency (1975−1977), is the most comprehensive amendment in Indian history, often referred to as the Mini-Constitution.

• This amendment inserted Part IV-A and Article 51A into the Constitution, which originally enumerated ten Fundamental Duties for Indian citizens.

• The concept of Fundamental Duties was incorporated based on the recommendations of the Sardar Swaran Singh Committee, which was constituted by the government in 1976 to suggest changes to the Constitution.

• These duties were inspired by the Constitution of the former USSR (Union of Soviet Socialist Republics) and serve as a reminder to citizens that while they enjoy rights, they also have duties toward the nation.

• In addition to Fundamental Duties, this amendment also added the words Socialist, Secular, and Integrity to the Preamble of the

Constitution.

Additional Information

• 24^(th) Amendment, 1971

• This amendment was enacted to neutralize the effects of the Golaknath case judgement.

• It affirmed the power of the Parliament to amend any part of the Constitution, including Fundamental Rights, and made it obligatory for the President to give assent to Constitutional Amendment Bills.

• 44^(th) Amendment, 1978

• Introduced by the Janata Party government to reverse several changes made by the 42^(nd) Amendment and provide safeguards against future misuse of emergency powers.

• It notably deleted the Right to Property from the list of Fundamental Rights and made it a legal right under Article 300A.

• 52^(nd) Amendment, 1985

• Commonly known as the Anti-Defection Law, it added the Tenth Schedule to the Constitution.

• It provides for the disqualification of members of Parliament and State Legislatures on the grounds of defection from one political party to another.

Q35. Answer: (c) More people are employed than actually needed, with marginal productivity being zero.

The correct answer is More people are employed than actually needed, with marginal productivity being zero.

Key Points

• Disguised unemployment is a phenomenon where the number of people working on a specific task is significantly higher than the number actually required to complete it.

• The defining characteristic of this state is that the Marginal Productivity of the extra labor is zero, meaning that if these surplus workers are removed, the total production or output will not decrease.

• In the Indian context, this is most prevalent in the Agricultural sector, where large families often work on small land holdings because of a lack of alternative employment opportunities in manufacturing or services.

• It is also referred to as hidden unemployment because the individuals appear to be fully employed, but their labor contribution is technically redundant to the production process.

Additional Information

• Types of Unemployment:

• Cyclical Unemployment: Occurs when there is a lack of aggregate demand in the economy, typically during an economic slowdown or recession.

• Frictional Unemployment: A temporary period of unemployment that occurs when a worker is shifting from one job to another or searching for a new position.

• Structural Unemployment: Results from a mismatch between the skills possessed by the workforce and the skills required by employers, often driven by technological advancement.

• Seasonal Unemployment: Occurs when people are unemployed at certain times of the year when demand for labor is low, such as in agriculture after the harvesting season or in the tourism industry.

• Vulnerable Employment: Refers to people working informally without proper job contracts or social security benefits, which is a major challenge in the Indian labor market.

Q36. Answer: (b) Power & Sleep Settings

The correct answer is Power & Sleep Settings.

Key Points

• In Windows 10, the Power & Sleep Settings menu is the primary interface used to manage how the computer consumes energy during periods of inactivity.

• This section allows users to specify separate time intervals for the Screen to turn off and for the PC to enter Sleep Mode (a low-power state that saves open apps to memory).

• The configuration provides granular control by allowing different timers for when the device is On battery power versus when it is Plugged in to an external power source.

• Setting shorter durations for entering Power Saving Mode is a critical step for preserving Battery life on portable devices like laptops and tablets.

• To navigate to this section, users must click the Start button, select the Settings gear icon, choose System, and then click on Power & sleep in the left-hand sidebar.

Additional Information

• Network & Internet:

• Manages all connectivity features including Wi-Fi, Ethernet, VPN, Dial-up, and Proxy settings.

• Includes tools like Network Reset and monitoring of Data usage.

• Display Settings:

• Controls visual output parameters such as Brightness, Resolution, Orientation, and Scaling.

• Houses settings for HDR (High Dynamic Range) and Night light filters.

• Updates & Security:

• Responsible for Windows Update, Windows Security, Recovery options, and Activation.

• Used to schedule system restarts after updates have been downloaded.

Q37. Answer: (d) Transfers the highlighted paragraphs to clipboard for duplication elsewhere

The correct answer is Transfers the highlighted paragraphs to clipboard for duplication elsewhere.

Key Points

• Ctrl + C is a standard keyboard shortcut used in Microsoft Word 2016 and later versions to execute the Copy command, which duplicates selected content.

• When multiple paragraphs are highlighted, pressing this shortcut sends a copy of the text, paragraph formatting, and any associated metadata to the Windows System Clipboard.

• The Clipboard is a temporary storage buffer located in the computer's Random Access Memory (RAM) that holds data until it is overwritten or the system is shut down.

• Unlike the Cut command, Copy is a non-destructive operation, meaning the original paragraphs remain in their initial position within the document while a replica is made available for use.

• In Office 365 and Microsoft Word 2016/2019, the Office Clipboard can store up to 24 items, allowing users to collect multiple snippets of information and paste them selectively.

Additional Information

• Related Shortcut Commands:

• Ctrl + V (Paste): This command retrieves the most recent item from the Clipboard and inserts it at the current Insertion Point or replaces a selected block of text.

• Ctrl + X (Cut): This function removes the highlighted paragraphs from the document and places them on the Clipboard, effectively facilitating a Move operation.

• Ctrl + S (Save): This shortcut triggers the Save function, committing the current state of the document to the Hard Drive or Cloud Storage (like OneDrive) to prevent data loss.

• Windows Key + V: In modern Windows 10 and 11 environments, this shortcut opens the Clipboard History, allowing users to access multiple previously copied paragraphs or images.

Q38. Answer: (a) Kelvin

The correct answer is Kelvin.

Key Points

• The Kelvin (symbol: K) is the primary base unit of thermodynamic temperature in the International System of Units (SI).

• Unlike the Celsius or Fahrenheit scales, the Kelvin scale is an absolute scale, meaning it begins at absolute zero (0 K), the point at which all thermal motion of particles ceases.

• Since 2019, the Kelvin has been defined by the fixed numerical value of the Boltzmann constant (k), which is 1.380649 × 10^(−23) when expressed in the unit J K^(−1).

• In scientific research and physics laboratory experiments, Kelvin is the standard because it allows for direct proportionality in thermodynamic equations, such as the Ideal Gas Law (PV = nRT).

• The magnitude of one Kelvin is exactly equal to the magnitude of one degree Celsius; however, the two scales differ by an offset of 273.15 units.

Additional Information

• Celsius

• A derived SI unit commonly used for everyday temperature measurements.

• 0 °C is defined as 273.15 K, which is approximately the freezing point of water.

• Fahrenheit

• A non-SI temperature scale used primarily in the United States.

• The conversion formula to Celsius is °C = (°F − 32) × 5/9.

• Joule

• The SI unit of energy, work, or heat.

• It is a derived unit defined as one Newton-meter (1 J = 1 kg m² s^(−2)).

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Q39. Answer: (d) Malik Kafur

The correct answer is Malik Kafur.

Key Points

• Malik Kafur, also known as Hazardinari (meaning bought for a thousand dinars), was a prominent slave-general of Alauddin Khilji, the Sultan of Delhi.

• He was captured by Nusrat Khan during the invasion of Gujarat in 1299 CE and subsequently rose to the highest military rank of Naib (Viceroy) in the Sultanate.

• Between 1309 and 1311 CE, Kafur led the Deccan campaigns, making the Delhi Sultanate the first northern Islamic power to reach the southern tip of the Indian peninsula.

• His successful military expeditions subdued several powerful southern dynasties, including the Yadavas of Devagiri (King Ramachandra), the Kakatiyas of Warangal (King Prataparudra II), the Hoysalas of Dwarasamudra (Vira Ballala III), and the Pandyas of Madurai.

• These campaigns were focused on establishing suzerainty and collecting vast spoils of war, including gold, jewelry, horses, and elephants, rather than direct administrative annexation of the southern territories.

Additional Information

• Ghiyasuddin Tughlaq:

• He was the founder of the Tughlaq Dynasty (1320–1325 CE) and is known for building the fortified city of Tughlaqabad.

• Balban:

• A powerful ruler of the Mamluk (Slave) Dynasty (1266–1287 CE), famous for his policy of Blood and Iron and the introduction of Sijda and Paibos.

• Qutbuddin Aibak:

• The first Sultan of the Delhi Sultanate and founder of the Slave Dynasty (1206–1210 CE), who began the construction of the Qutub Minar.

Q40. Answer: (c) 30 kW IDD&IS Mk-IIA

The correct answer is 30 kW IDD&IS Mk-IIA.

Key Points

• The 30 kW IDD&IS Mk-IIA, also known by its nickname Sahastra Shakti, is an advanced Directed Energy Weapon (DEW) successfully field-tested by the DRDO on April 13, 2025.

• The field trials were conducted at the National Open Air Range (NOAR) in Kurnool, Andhra Pradesh, where the system effectively neutralized fixed-wing Unmanned Aerial Vehicles (UAVs) and swarm drones at ranges between 3.5 to 5 kilometers.

• This weapon system was developed by the Centre for High Energy Systems and Sciences (CHESS), a premier DRDO laboratory located in Hyderabad, in collaboration with other labs like LRDE and IRDE.

• Technically, the Mk-IIA variant utilizes a 30-kilowatt laser output generated by combining six individual 5 kW fiber laser sources in a 2×3 configuration to achieve a precision 'hard kill'.

• The system is integrated with radar and Electro-Optical/Infrared (EO/IR) sensors for automated target detection and tracking, allowing it to destroy enemy sensors or airframes within seconds.

• Following its successful evaluation, DRDO initiated the Transfer of Technology (ToT) to private sector partners to begin serial production, supporting the Atmanirbhar Bharat initiative in defense manufacturing.

Additional Information

• Directed Energy Weapons (DEWs):

• These systems offer a revolutionary low cost-per-shot, with each engagement costing approximately the same as a few liters of fuel, compared to expensive traditional interceptor missiles.

• India is now part of an exclusive group of nations, including the USA, Russia, and China, that possess operational high-power laser weapon capabilities.

• Evolution of IDD&IS:

• The Mk-I version featured a 2 kW laser used primarily for soft-kill or short-range operations, while the Mk-II was a 10 kW system.

• The 30 kW Mk-IIA represents a significant scale-up in power, allowing for the neutralization of larger aerial threats and coordinated swarm attacks.

• Future developments by CHESS include scaling these systems to 50 kW and 100 kW for strategic defense applications.

Q41. Answer: (b) Granting of the Diwani rights of Bengal, Bihar, and Orissa to the Company.

The correct answer is Granting of the Diwani rights of Bengal, Bihar, and Orissa to the Company.

Key Points

• The Treaty of Allahabad was signed on 16 August 1765, following the Battle of Buxar (1764), between Robert Clive of the East

India Company and the Mughal Emperor Shah Alam II.

• By this treaty, the Mughal Emperor granted the Diwani rights (the right to collect land revenue and manage civil justice) of Bengal, Bihar, and Orissa to the Company in perpetuity.

• This provision was the most significant because it gave the British direct control over the vast financial resources of the wealthiest provinces in India, providing the capital necessary for further military expansions.

• It marked the transition of the East India Company from a mere trading body to a major political and administrative power, effectively establishing the Dual Government system in Bengal.

• Under this arrangement, the Company exercised Diwani functions (revenue and civil justice), while the Nawab of Bengal was left with Nizamat functions (military, police, and criminal justice) but without the financial means to support them.

Additional Information

• Impact on the Mughal Emperor:

• Shah Alam II was taken under the Company protection and was assigned Allahabad and Kora as his residence.

• The Company agreed to pay the Emperor an annual tribute of 26 lakh rupees in exchange for the Diwani grant.

• Arrangement with Awadh:

• Shuja-ud-Daula, the Nawab of Awadh, was restored to his kingdom except for Kora and Allahabad.

• He was forced to pay a war indemnity of 50 lakh rupees to the Company, and Awadh was turned into a buffer state to protect British interests from Maratha and Afghan threats.

• Battle of Buxar Context:

• Unlike the Battle of Plassey (1757), which was won largely through treachery, the Battle of Buxar was a definitive military victory against the combined forces of the Mughal Emperor, the Nawab of Awadh, and Mir Qasim.

Q42. Answer: (b) Charter Act of 1813

The correct answer is Charter Act of 1813.

Key Points

• The Charter Act of 1813 was passed by the British Parliament to renew the charter of the East India Company for another 20 years.

• The most significant feature of this Act was the abolition of the commercial monopoly of the East India Company in India, effectively opening Indian trade to all British merchants.

• The Act asserted the sovereignty of the British Crown over the Indian territories held by the Company, marking a shift toward formal imperial control.

• While it ended the general trade monopoly, the Company was still allowed to retain its monopoly over the trade in tea and the trade with China.

• The Act mandated a sum of one lakh rupees to be set aside annually for the revival of literature and the promotion of modern sciences among the inhabitants of the British territories in India.

• It granted formal permission to Christian missionaries to enter India for the purpose of religious proselytization and promoting moral improvements.

Additional Information

• Charter Act of 1833:

• It completely ended the Company's monopoly, including the tea trade and trade with China, making it a purely administrative body.

• The Governor-General of Bengal was designated as the Governor-General of India, with Lord William Bentinck being the first to hold this title.

• Charter Act of 1853:

• It introduced an open competition system for the recruitment of civil servants, ending the patronage system.

• It separated the legislative and executive functions of the Governor-General’s Council for the first time.

• Charter Act of 1793:

• This Act renewed the Company's commercial privileges for 20 years and mandated that the salaries of the Board of Control members be paid out of Indian revenues.

Q43. Answer: (b) Quicklime (calcium oxide)

The correct answer is Quicklime (calcium oxide).

Key Points

• Soil acidity is characterized by a low pH value (below 7.0), resulting from an excess of hydrogen ions (H+) and a deficiency of basic cations like calcium and magnesium.

• Quicklime, scientifically known as calcium oxide (CaO), is an alkaline substance frequently used in agriculture to raise the pH

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level of acidic soils to a range suitable for crop production, typically between 6.0 and 7.0.

• When Quicklime is applied to the soil, it reacts with water in a process called slaking ($CaO + H_2O \rightarrow Ca(OH)_2$), forming calcium hydroxide, which releases hydroxide ions (OH^-) that neutralize the acidic hydrogen ions.

• This chemical neutralization helps prevent aluminum and manganese toxicity, which occurs at low pH levels and can severely stunt root development and overall plant growth.

• The use of Quicklime is considered more effective for rapid correction of soil acidity compared to agricultural limestone (calcium carbonate) due to its higher solubility and faster reaction rate in the soil profile.

Additional Information

• Baking soda (Sodium bicarbonate):

• While sodium bicarbonate ($NaHCO_3$) is basic, its use in soil is limited because it adds sodium, which causes soil sodicity, degrades soil structure, and can be toxic to most agricultural plants.

• Table salt (Sodium chloride):

• Sodium chloride (NaCl) is a neutral salt and does not possess any properties to neutralize acidity. High concentrations of salt lead to soil salinization, causing osmotic stress that prevents plants from absorbing water.

• Vinegar:

• Vinegar is a dilute solution of acetic acid (CH_3COOH). Adding an acid to already acidic soil would further lower the pH, increasing acidity and potentially damaging beneficial soil microorganisms and plant tissues.

Q44. Answer: (b) The incomplete combustion of fossil fuels produces it and replaces oxygen in haemoglobin

The correct answer is The incomplete combustion of fossil fuels produces it and replaces oxygen in haemoglobin.

Key Points

• Carbon monoxide (CO) is a colorless, odorless, and highly toxic gas that is primarily formed through the incomplete combustion of carbon-based fuels like coal, petrol, diesel, and natural gas. This occurs when there is an insufficient supply of oxygen to oxidize carbon fully into carbon dioxide.

• The primary danger of carbon monoxide to human health lies in its interaction with haemoglobin, the protein in red blood cells responsible for transporting oxygen. CO has an affinity for haemoglobin that is approximately 200 to 300 times higher than that of oxygen.

• When inhaled, CO binds with haemoglobin to form a stable coordination complex known as carboxyhaemoglobin. This effectively blocks haemoglobin from binding to oxygen molecules.

• By replacing oxygen in the bloodstream, carbon monoxide severely reduces the oxygen-carrying capacity of the blood, leading to hypoxia (oxygen deprivation in tissues), which can cause tissue damage, neurological impairment, or death.

Additional Information

• Toxicity comparison:

• Carbon monoxide is significantly more dangerous than carbon dioxide (CO_2). While CO_2 is a greenhouse gas and can be harmful at very high concentrations, CO is a direct chemical asphyxiant that is lethal even at low concentrations.

• Sources of emission:

• While natural events like forest fires and volcanic eruptions release CO, the majority of urban carbon monoxide comes from anthropogenic sources, particularly vehicular exhaust, industrial processes, and tobacco smoke.

• Atmospheric behavior:

• CO is not harmless nor is it quickly converted to oxygen. It is a persistent pollutant that is gradually oxidized in the atmosphere to form carbon dioxide, a process that typically takes several weeks to months.

Q45. Answer: (d) Nucleus

The correct answer is Nucleus.

Key Points

• In 1911, Ernest Rutherford conducted the Alpha-ray scattering experiment by bombarding a very thin gold foil with high-energy alpha particles (doubly charged helium ions).

• The experiment revealed that while most alpha particles passed through the foil without deflection, a small fraction was diverted at large angles, and approximately 1 in 12,000 particles bounced back nearly 180 degrees.

• Rutherford concluded that the positive charge and nearly all the mass of an atom are not uniformly distributed but are concentrated in an extremely small, dense region at the center.

• This central core was named the nucleus, proving that atoms consist of a tiny, massive, and positively charged center surrounded by mostly empty space.

• This discovery successfully refuted the Thomson Plum Pudding Model, which suggested that positive charge was spread evenly throughout the atom like a pudding.

Additional Information

• Electron:

• Discovered by J.J. Thomson in 1897 using the Cathode Ray Tube experiment.

• These are negatively charged subatomic particles that reside in the space surrounding the nucleus in specific energy levels or orbits.

• Proton:

• While the concept of a positive charge was established by Rutherford in 1911, he specifically identified the hydrogen nucleus as a fundamental particle called the proton in 1919 through nitrogen bombardment experiments.

• Protons carry a positive charge equal in magnitude to the negative charge of an electron.

• Neutron:

• Discovered by James Chadwick in 1932.

• These are electrically neutral particles located inside the nucleus alongside protons, accounting for the remaining mass of the atom that protons alone could not explain.

• Rutherford Atomic Model:

• Proposed that electrons revolve around the nucleus in circular paths called orbits, similar to how planets revolve around the sun in the solar system.

Q46. Answer: (c) Rank 99 with an overall SDG index score close to 67 points

The correct answer is Rank 99 with an overall SDG index score close to 67 points.

Key Points

• The Sustainable Development Report (SDR) 2025, released by the Sustainable Development Solutions Network (SDSN), provides a comprehensive assessment of progress toward the 17 Sustainable Development Goals (SDGs) for all United Nations member states.

• In the 2025 Index, India achieved Rank 99, showing a notable improvement from its 109th rank in the 2024 report. This shift indicates India's entry into the top 100 nations regarding global development benchmarks.

• India's overall SDG Index score was recorded at approximately 67.0 points (out of 100), reflecting the country's percentage of total progress toward achieving the 2030 Agenda targets.

• The report highlights that India has maintained a positive trajectory in SDG 1 (No Poverty), SDG 6 (Clean Water and Sanitation), and SDG 7 (Affordable and Clean Energy), driven by large-scale government schemes like Jal Jeevan Mission and PM Ujjwala Yojana.

• The SDG Index score is calculated as a weighted average of the scores for all 17 SDGs, where a score of 100 indicates that all targets for a particular goal have been met.

• India's performance in the 2025 report signifies a successful mitigation of post-pandemic developmental lags, particularly in health and economic growth sectors, raising the score from the 64.02 level seen in previous cycles.

Additional Information

• Sustainable Development Solutions Network (SDSN):

• It was established in 2012 under the auspices of the UN Secretary-General to mobilize global scientific and technological expertise.

• The SDR 2025 is the 10th edition of this annual report, which serves as a global report card for sustainable development.

• SDG India Index by NITI Aayog:

• Domestically, NITI Aayog tracks India's progress through the SDG India Index, which uses a similar methodology but focuses on state-level performance.

• While the UN SDG Index compares India with 166 other nations, the NITI Aayog report categorizes Indian States as Aspirants, Performers, Front Runners, and Achievers.

• Global Context:

• Nordic countries like Finland, Sweden, and Denmark traditionally lead the SDG Index rankings, often scoring above 85 points.

• The 2025 report emphasizes that while global progress has been slow due to geopolitical tensions, countries in South Asia, led by India, have shown resilient growth in SDG 13 (Climate Action) and SDG 9 (Industry, Innovation, and Infrastructure).

Q47. Answer: (b) Maharashtra

The correct answer is Maharashtra.

Key Points

• According to the Census 2011, Maharashtra is the second most populous state in India, with a recorded population of 112,374,333.

• The state accounts for approximately 9.28% of the total population of the country, trailing only Uttar Pradesh, which is the most populous state.

• The decadal growth rate of Maharashtra during the 2001-2011 period was 15.99%, reflecting a steady increase in human

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resources.

• In terms of urbanization, Maharashtra is one of the most urbanized states, with a significant portion of its population residing in major metropolitan hubs like Mumbai and Pune.

• The Census 2011 data also highlighted that Thane, a district in Maharashtra, was the most populous district in India at that time.

Additional Information

• Bihar:

• It was ranked as the third most populous state in 2011, with a population of 104,099,452.

• It holds the distinction of having the highest population density in India, with 1,106 persons per square kilometer.

• West Bengal:

• It stood as the fourth most populous state with a total population of 91,276,115.

• The state has the second highest population density in the country, recorded at 1,028 persons per square kilometer.

• Karnataka:

• It was the ninth most populous state in India during the 2011 Census, with a population of 61,095,297.

• The state covers roughly 5.05% of the total population of India.

Q48. Answer: (b) Convection

The correct answer is Convection.

Key Points

• Convection is the primary mode of heat transfer in fluids, which include both liquids and gases.

• When air near a heated surface (such as the Earth's crust warmed by the sun) absorbs thermal energy, the kinetic energy of its molecules increases.

• This increase in kinetic energy causes the air to expand, which leads to a decrease in its density compared to the surrounding cooler air.

• Because the warm air is less dense, it becomes buoyant and rises upward, while the denser, cooler air sinks to take its place near the heat source.

• This cyclical movement of fluid particles creates convection currents, which are responsible for atmospheric circulation, weather patterns, and the rising of warm air over a heated surface.

Additional Information

• Conduction:

• The process of heat transfer through direct contact between materials.

• It occurs mainly in solids where energy is passed via molecular vibrations and free electrons without any bulk movement of the matter.

• Radiation:

• Transfer of thermal energy through electromagnetic waves, specifically infrared waves.

• Unlike conduction and convection, it does not require a medium and can travel through a vacuum, such as solar energy traveling from the Sun to Earth.

• Insulation:

• A technique or material used to resist or inhibit the flow of heat.

• Insulators have low thermal conductivity and are used in construction and clothing to maintain temperature by preventing energy loss.

Q49. Answer: (b) “A Just Transition to Sustainable Lifestyles.”

The correct answer is “A Just Transition to Sustainable Lifestyles.”.

Key Points

• World Consumer Rights Day is observed annually on March 15 to advocate for the fundamental rights of all consumers and to protest against market abuses.

• For the year 2025, the theme selected by Consumers International is “A Just Transition to Sustainable Lifestyles.”

• This theme emphasizes the urgency of shifting global consumption patterns towards sustainability to mitigate climate change, pollution, and resource depletion.

• The concept of a Just Transition ensures that the move toward a green economy is equitable and inclusive, specifically ensuring that sustainable products and services are affordable and accessible to consumers of all income levels.

• It focuses on empowering consumers to demand durability, repairability, and ethical production, aligning with United Nations Sustainable Development Goal 12 (Responsible Consumption and Production).

• The choice of this theme reflects the dual challenge of protecting the planet while safeguarding the economic interests of the most vulnerable consumers in the marketplace.

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Additional Information

• Historical context and previous themes:

• “Fair and Responsible AI for Consumers.”: This was the theme for 2024, addressing the rapid advancement of Generative AI and the need to protect consumers from misinformation and privacy violations.

• “Empowering Consumers Through Clean Energy Transitions”: The 2023 theme, which highlighted the role of consumers in accelerating the shift toward renewable energy and energy efficiency during the global energy crisis.

• “Fair Digital Finance”: The theme for 2022, focusing on the risks and opportunities within fintech, digital banking, and the necessity of financial inclusion.

• The first World Consumer Rights Day was celebrated in 1983, inspired by President John F. Kennedy’s special message to the US Congress on March 15, 1962, which defined four basic consumer rights.

Q50. Answer: (d) Rajasthan

The correct answer is Rajasthan.

Key Points

• The Rajasthan Government passed the Coaching Centres (Control and Regulation) Bill, 2025 in March 2025 to create a robust legal framework for monitoring private coaching institutes across the state.

• The primary objective of this legislation is to safeguard the mental health and well-being of students, particularly in coaching hubs like Kota, which have witnessed high rates of student stress and suicides.

• The bill mandates the compulsory registration of all coaching centres with a designated State-level Authority, ensuring that only institutes meeting specific safety and academic standards can operate.

• It prohibits coaching institutes from publishing misleading advertisements that make false claims about success rates or rank guarantees, aiming to reduce the psychological pressure on aspirants.

• The legislation includes provisions for a mandatory refund policy and a transparent fee structure to prevent the financial exploitation of parents and students.

• Provisions for regular inspections and the establishment of a grievance redressal cell have been integrated to allow students to report harassment or inadequate facilities directly to the government.

Additional Information

• Kota Coaching Hub:

• Known as the Coaching Capital of India, Kota attracts over 2.5 lakh students annually for competitive exams like JEE (Main and Advanced) and NEET.

• The rapid growth of this sector necessitated state intervention to regulate hostel safety, mess quality, and the intense academic environment.

• National Context:

• The Union Ministry of Education issued national guidelines in January 2024, which served as a precursor to state-specific laws like the one in Rajasthan.

• These guidelines suggested that coaching centres should not enroll students below the age of 16 years or those who have not completed their secondary education.

Q51. Answer: (b) Marmagao Port

The correct answer is Marmagao Port.

Key Points

• Marmagao Port is a premier Major Port of India located on the west coast in the state of Goa, specifically situated on the southern headland at the entrance of the Zuari Estuary.

• The port gained immense significance after 1961, following the Liberation of Goa from Portuguese rule, which led to its administrative integration and subsequent remodelling to serve national interests.

• It is internationally recognized as one of the oldest natural deep-water harbours in India, facilitating the movement of massive bulk carriers.

• The primary commodity driving the port's economy is iron ore, sourced from the rich mining belts of the Goa-Ratnagiri region.

• The remodelling in the early 1960s was specifically geared towards streamlining the mechanized handling and export of iron ore to industrial markets, most notably Japan, which became a leading trade partner for Goan minerals.

Additional Information

• New Mangalore Port:

• Located at Panambur in Karnataka, it is often referred to as the Gateway of Karnataka.

• It predominantly handles the export of iron ore concentrates specifically from the Kudremukh mines.

• Kandla Port:

• Now officially known as Deendayal Port, it is located in the Gulf of Kutch, Gujarat.

• It is a Tidal Port developed in the 1950s to decongest Mumbai Port and serve as a replacement for the loss of Karachi Port following independence.

• Jawaharlal Nehru Port:

• Situated in Navi Mumbai, Maharashtra, it is also known as Nhava Sheva.

• Commissioned in 1989, it is the largest container port in India, equipped with state-of-the-art automated technology.

Q52. Answer: (c) Finland

The correct answer is Finland.

Key Points

• Finland has maintained its status as the happiest country in the world for the eighth consecutive year according to the 2025 World Happiness Report.

• The report is a landmark survey of the state of global happiness, published annually by the United Nations Sustainable Development Solutions Network (SDSN).

• Rankings are primarily based on self-reported life evaluation data from the Gallup World Poll, which utilizes the Cantril ladder question where respondents rate their lives on a scale of 0 to 10.

• The high ranking of Finland is consistently driven by exceptional scores in six fundamental variables: GDP per capita, social support, healthy life expectancy, freedom to make life choices, generosity, and the perceived absence of corruption.

• Finnish society is characterized by high levels of social trust, where citizens feel safe and supported by both their community and government institutions.

Additional Information

• Other high-performing Nordic nations:

• Iceland: Frequently ranks in the top three globally, benefiting from a very strong sense of social cohesion and community resilience.

• Norway: A consistent top-tier performer that held the number one spot in 2017, supported by robust economic stability and natural resource management.

• Sweden: Known for its emphasis on work-life balance, environmental sustainability, and high institutional transparency, usually appearing in the global top ten.

• The Nordic Model: These countries share a unique socio-economic system that combines free-market capitalism with a comprehensive welfare state, ensuring universal access to high-quality education and healthcare funded through progressive taxation.

Q53. Answer: (d) Touchscreen

The correct answer is Touchscreen.

Key Points

• A Touchscreen is a unique peripheral that combines the capabilities of an input device and an output device within a single physical unit.

• It functions as an input device by utilizing a touch-sensitive overlay that detects the pressure or electrical conductivity of a finger or stylus, converting these physical interactions into digital signals for the processor.

• Simultaneously, it serves as an output device by using an integrated LCD (Liquid Crystal Display) or OLED (Organic Light Emitting Diode) panel to display visual information and feedback to the user.

• Common technologies used in these devices include Capacitive sensing (relying on electrical charges) and Resistive sensing (relying on physical pressure), both of which allow for direct interaction with a Graphical User Interface (GUI).

• Because it both receives data from the user and provides data back to the user on the same interface, it is classified as a dual-purpose or hybrid peripheral.

Additional Information

• Barcode Reader:

• This is a dedicated input device that uses a laser beam or an image sensor to scan and decode the printed bars of a barcode.

• It transmits the decoded numerical or alphanumeric data into a computer system for processing, but it cannot display information to the user.

• Plotter:

• A Plotter is a specialized output device used for printing vector graphics.

• Unlike standard printers, it uses automated pens to draw continuous, high-precision lines on large sheets of paper, making it essential for Computer-Aided Design (CAD), engineering blueprints, and architectural plans.

• Digital Camera:

• In a computing context, a digital camera is primarily viewed as an input device because it captures light through a lens and converts it into digital data via CCD (Charge-Coupled Device) or CMOS sensors.

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• This data is then transferred into a computer or storage medium for later viewing or editing.

Q54. Answer: (c) Voting or holding a government job

The correct answer is Voting or holding a government job.

Key Points

• The Overseas Citizenship of India (OCI) scheme was introduced by amending the Citizenship Act, 1955, in August 2005 to cater to the demands of the Indian Diaspora residing abroad.

• Although OCI cardholders are granted a lifelong visa and a multipurpose, multi-entry facility to visit India, they do not possess dual citizenship, as Article 9 of the Constitution of India strictly prohibits holding citizenship of two countries simultaneously.

• Under Section 7B(2) of the Citizenship Act, 1955, an OCI cardholder is specifically denied political rights, meaning they cannot exercise the Right to Vote in any General Election or State Assembly Election.

• OCI cardholders are ineligible to hold public office or constitutional posts, including the offices of the President, Vice-President, or Governor of a state.

• They are also barred from being appointed as Judges of the Supreme Court or High Courts and cannot be members of the House of the People (Lok Sabha) or the Council of States (Rajya Sabha).

• Employment in government services or public sector undertakings is restricted unless the Central Government issues a specific notification allowing such appointments for a particular field.

Additional Information

• Ownership of Property:

• OCI cardholders can acquire and transfer immovable property in India, such as residential or commercial buildings.

• However, they are legally prohibited from purchasing agricultural land, plantation property, or farmhouses.

• Education and Taxation:

• They are treated at par with Non-Resident Indians (NRIs) for admission to educational institutions under specified quotas.

• Regarding taxation, OCI cardholders are liable to pay taxes on any income earned or generated within the geographical boundaries of India.

• Consolidation of Schemes:

• In January 2015, the Person of Indian Origin (PIO) card scheme was merged with the OCI scheme to provide a unified platform and better facilities for the diaspora.

Q55. Answer: (a) 1999

The correct answer is 1999.

Key Points

• The Justice J.S. Verma Committee was constituted by the Union Government in 1998 to operationalize the strategy to teach Fundamental Duties to every citizen and to create awareness among the masses.

• The committee was tasked with identifying the existence of legal provisions for the implementation of Fundamental Duties and suggesting ways to make them more effective.

• The committee submitted its comprehensive report to the Union Government in October 1999.

• A primary finding of the report was that several Fundamental Duties are already backed by legal statutes and can be enforced through the Indian Penal Code or specific legislative acts.

Additional Information

• Fundamental Duties:

• These were not part of the original Constitution but were added by the 42nd Amendment Act, 1976, based on the recommendations of the Swaran Singh Committee.

• They are enshrined in Part IV-A and Article 51A of the Indian Constitution.

• Legal Provisions Identified by the Verma Committee:

• Prevention of Insults to National Honour Act (1971): Prevents disrespect to the National Flag, the Constitution of India, and the National Anthem.

• Wildlife (Protection) Act (1972): Prohibits trade in rare and endangered species to protect the natural environment.

• Representation of the People Act (1951): Disqualifies members of Parliament or State Legislatures for promoting enmity between different groups on grounds of religion, race, or language.

• Unlawful Activities (Prevention) Act (1967): Provides for the declaration of a communal organization as an unlawful association.

• Justice J.S. Verma:

• He served as the 27th Chief Justice of India and was later the Chairman of the National Human Rights Commission (NHRC).

Q56. Answer: (a) Article 126

The correct answer is Article 126.

Key Points

• Article 126 of the Indian Constitution specifically addresses the Appointment of acting Chief Justice of India.

• This provision is invoked when the office of the Chief Justice of India (CJI) is vacant or when the incumbent is unable to perform their duties due to absence or other reasons.

• The power to make this appointment resides with the President of India, who selects one of the other Judges of the Supreme Court to discharge the duties of the office.

• This Article is part of Chapter IV (The Union Judiciary) of Part V of the Constitution, which establishes the structure and functions of the Supreme Court.

• The appointment is temporary and lasts only until the permanent Chief Justice resumes office or a new one is appointed under Article 124.

Additional Information

• Article 120:

• Regulates the language to be used in Parliament, primarily Hindi and English for conducting business.

• It allows the Speaker or Chairman to permit a member to address the House in their mother tongue if they cannot express themselves in the official languages.

• Article 122:

• Prohibits Courts from inquiring into the validity of proceedings in Parliament on the grounds of any alleged irregularity of procedure.

• It ensures the independence of the Legislature from judicial interference regarding internal parliamentary functions.

• Article 130:

• Designates Delhi as the official seat of the Supreme Court of India.

• It also empowers the Chief Justice of India, with the prior approval of the President, to sit in other places for the convenience of the public and the judiciary.

Q57. Answer: (a) Prakash Padukone

The correct answer is Prakash Padukone.

Key Points

• Prakash Padukone created history by becoming the first Indian badminton player to win the All England Open Badminton Championships in 1980.

• In the championship final, he defeated the legendary Indonesian player and defending champion Liem Swie King in straight sets with a dominant score of 15-3, 15-10.

• Following this historic victory at the Wembley Arena in London, he reached the World No. 1 ranking, becoming the first Indian to achieve this feat in badminton.

• His success played a pivotal role in popularizing the sport in India and established the Prakash Padukone Badminton Academy to train future champions.

• He was honored with the Arjuna Award in 1972 and the Padma Shri in 1982 by the Government of India for his outstanding sporting achievements.

Additional Information

• HS Prannoy:

• A prominent Indian shuttler who was a key member of the Thomas Cup 2022 winning team and won a bronze medal at the 2023 BWF World Championships.

• Kidambi Srikanth:

• He became the World No. 1 in 2018 and was the first Indian male to win a silver medal at the BWF World Championships in 2021.

• Saina Nehwal:

• She was the first Indian woman to reach the final of the All England Championship in 2015 and won India's first Olympic medal in badminton (Bronze) at the 2012 London Olympics.

• Pullela Gopichand:

• The only other Indian besides Padukone to win the All England Championship, achieving the title in 2001.

Q58. Answer: (d) Dayanand Saraswati

The correct answer is Dayanand Saraswati.

Key Points

• Swami Dayanand Saraswati established the Arya Samaj, a monotheistic Indian Hindu reform movement, on April 10, 1875, in Bombay (now Mumbai).

• The movement was founded on the principle of the infallible authority of the Vedas, with the famous slogan Go Back to the Vedas.

• Dayanand Saraswati rejected rituals such as idol worship, animal sacrifice, ancestor worship, and the caste system based on birth rather than merit.

• The Arya Samaj worked extensively toward social reforms, including the promotion of female education, widow remarriage, and the abolition of untouchability.

• The organization played a significant role in the Indian Nationalist Movement by instilling a sense of self-respect and pride in Indian culture and heritage.

• The Arya Samaj also established a vast network of educational institutions known as Dayanand Anglo-Vedic (DAV) schools and colleges across the country.

Additional Information

• Mahatma Gandhi:

• Known as the Father of the Nation, he led the Indian independence struggle through the principles of Satyagraha (truth-force) and Ahimsa (non-violence).

• Raja Ram Mohan Roy:

• Commonly referred to as the Father of Modern India, he founded the Brahmo Samaj in 1828 and was instrumental in the legal abolition of Sati in 1829.

• Ramakrishna Paramhansa:

• A famous 19th-century mystic and saint from Bengal whose teachings led his disciple, Swami Vivekananda, to found the Ramakrishna Mission in 1897.

• Satyarth Prakash:

• This is the most influential work written by Swami Dayanand Saraswati in 1874, outlining the philosophical and social tenets of the Arya Samaj.

Therefore, the correct option is 4.

Q59. Answer: (d) Montreal Protocol

The correct answer is Montreal Protocol.

Key Points

• The Montreal Protocol on Substances that Deplete the Ozone Layer is a global agreement finalized in 1987 and entered into force on January 1, 1989.

• It was designed to protect the stratospheric ozone layer by phasing out the production and consumption of Ozone-Depleting Substances (ODS), which allow harmful ultraviolet (UV-B) radiation to reach the Earth.

• The treaty targets several groups of halogenated hydrocarbons, including Chlorofluorocarbons (CFCs), Halons, Carbon tetrachloride, and Methyl chloroform.

• It is considered one of the most successful environmental treaties, being the first to achieve universal ratification by all 198 UN Member States.

• To commemorate its signing, September 16 is observed annually as World Ozone Day.

• The Kigali Amendment (2016) is a recent addition to the protocol aimed at phasing down Hydrofluorocarbons (HFCs), which are potent greenhouse gases.

Additional Information

• Ramsar Convention:

• Adopted in 1971 in Ramsar, Iran, it is an international treaty for the conservation and sustainable use of wetlands.

• It promotes the wise use of wetlands and identifies sites of international importance to maintain ecological health.

• Paris Agreement:

• Adopted in 2015 at COP21, this legally binding treaty aims to limit global warming to well below 2 degrees Celsius above pre-industrial levels.

• It requires countries to submit Nationally Determined Contributions (NDCs) to reduce greenhouse gas emissions.

• Kyoto Protocol:

• Adopted in 1997 and implemented in 2005, it operationalized the UNFCCC by committing industrialized nations to reduce emissions.

• It focuses on six primary greenhouse gases, including Carbon Dioxide (CO_2) and Methane (CH_4).

Q60. Answer: (c) Botswana

The correct answer is Botswana.

Key Points

• In November 2025, the government of Botswana formally committed to gifting eight cheetahs to India, facilitating the next phase of the Project Cheetah initiative.

• The symbolic release and handover ceremony took place at the Mokolodi Nature Reserve, a prominent wildlife sanctuary located near Gaborone, the capital of Botswana.

• This partnership is designed to expand the genetic diversity of the reintroduced cheetah population in India, building upon the foundations laid by earlier translocations from other African nations.

• The Mokolodi Nature Reserve serves as a critical site for conservation and education in Botswana, and its involvement highlights the growing South-South cooperation in environmental and wildlife management between India and the African Union members.

• This phase of the project focuses on establishing a self-sustaining meta-population in designated habitats such as Kuno National Park and potentially Gandhi Sagar Wildlife Sanctuary.

Additional Information

• Project Cheetah Background:

• The program was launched to restore the Asiatic cheetah lineage (represented by its African counterparts) to India after the species was officially declared extinct in the country in 1952.

• The first historic translocation occurred in September 2022, involving eight cheetahs from Namibia.

• Namibia:

• As the Cheetah Capital of the World, it was the first country to sign a Memorandum of Understanding with India, providing the founding members of the reintroduction project.

• South Africa:

• In February 2023, India signed a long-term agreement with South Africa, resulting in the translocation of twelve additional cheetahs to strengthen the existing population.

• Kenya:

• While Kenya possesses a significant population of the East African cheetah (Acinonyx jubatus raineyi), it has not been a primary donor country in the current phases of India's reintroduction program compared to Southern African nations.

• Ecological Significance:

• Beyond the reintroduction of a predator, the project aims to revitalize open forest and grassland ecosystems, which have historically been neglected in conservation priorities.

Q61. Answer: (a) 1995

The correct answer is 1995.

Key Points

• India is a founding member of the World Trade Organization (WTO), having joined the organization on the very day of its inception, January 1, 1995.

• The WTO was established as the successor to the General Agreement on Tariffs and Trade (GATT), which had been in place since 1948; India was also a founding member of GATT.

• The transition from GATT to the WTO was formalized through the Marrakesh Agreement, signed in April 1994 in Morocco, following the conclusion of the Uruguay Round of trade negotiations.

• By becoming a member, India committed to a rule-based multilateral trading system designed to ensure transparency, predictability, and the reduction of trade barriers like tariffs and quotas.

• Membership allows India to invoke the Dispute Settlement Mechanism of the WTO to protect its commercial interests against unfair trade practices by other nations.

Additional Information

• World Trade Organization (WTO):

• The organization is headquartered in Geneva, Switzerland, and serves as the primary forum for negotiating global trade rules.

• Its core principles include Most-Favoured-Nation (MFN) treatment (treating all members equally) and National Treatment (treating foreigners and locals equally).

• The WTO covers trade in goods, services (GATS), and intellectual property (TRIPS), which was a significant expansion over the original GATT framework.

• Historical Context:

• 1991: Although India did not join the WTO this year, it was a pivotal year for the Indian economy as it launched Liberalization, Privatization, and Globalization (LPG) reforms under the leadership of P.V. Narasimha Rao.

• 2001: This year saw the initiation of the Doha Development Round at the fourth WTO Ministerial Conference, which focused on

improving the trading prospects of developing nations.

• Uruguay Round: Conducted from 1986 to 1994, this was the 8th round of multilateral trade negotiations and the largest ever, directly leading to the creation of the WTO.

Q62. Answer: (d) 1957

The correct answer is 1957.

Key Points

• The Balwant Rai Mehta Committee was appointed by the Government of India in January 1957 to examine the working of the Community Development Programme (1952) and the National Extension Service (1953).

• The committee, chaired by Balwant Rai Mehta, submitted its final report in November 1957, suggesting measures for better implementation and public participation in development.

• The primary recommendation of the report was the establishment of a three-tier Panchayati Raj system, which became the foundation of local self-government in India.

• The proposed hierarchy included the Gram Panchayat at the village level, the Panchayat Samiti at the block level, and the Zila Parishad at the district level.

• The committee emphasized the concept of Democratic Decentralization, shifting power from the central authority to local representative bodies.

Additional Information

• Three-Tier Structure:

• Gram Panchayat: Composed of directly elected representatives at the village level to handle local administration.

• Panchayat Samiti: The intermediate tier serving as the executive body at the block level, formed by indirectly elected members.

• Zila Parishad: The apex body at the district level, primarily acting in an advisory and supervisory capacity.

• Implementation Milestones:

• The recommendations were approved by the National Development Council in January 1958.

• Rajasthan was the first state to adopt the system, with the inauguration held in Nagaur district by Jawaharlal Nehru on October 2, 1959.

• Andhra Pradesh followed shortly after, adopting the system later in 1959.

• Constitutional Status:

• The early Panchayati Raj system lacked constitutional protection until the passage of the 73rd Constitutional Amendment Act, 1992, which added Part IX and the 11th Schedule to the Constitution of India.

Q63. Answer: (d) Allahabad Pillar Inscription

The correct answer is Allahabad Pillar Inscription.

Key Points

• The Allahabad Pillar Inscription, popularly known as the Prayag Prashasti, is a major epigraphic source that provides a comprehensive account of the reign and military conquests of Samudragupta.

• It was composed by Harisena, who served as the Sandhivigrahika (Minister of War and Peace) and court poet of Samudragupta, written in the Champu kavya style using classical Sanskrit and Brahmi script.

• The inscription details the expansion of the Gupta Empire, categorizing Samudragupta's victories into different regions, such as the 9 kings of Aryavarta (North India) and 12 kings of Dakshinapatha (South India).

• For the southern kings, the inscription highlights Samudragupta's policy of Grahana-Moksha-Anugraha, where he defeated rulers, liberated them, and then reinstated them as tributary chiefs.

• The pillar itself is a monolithic structure originally erected by Ashoka, and it later featured inscriptions from Samudragupta and the Mughal Emperor Jahangir, symbolizing a continuity of imperial power in Prayagraj.

Additional Information

• Mehrauli Iron Pillar Inscription

• Located in Delhi within the Qutub Minar complex, this inscription is famously associated with king Chandra, identified by most historians as Chandragupta II.

• It is renowned for its metallurgical excellence, as the iron has remained virtually rust-free for over 1,600 years.

• Nasik Cave Inscription

• This inscription, found in the Pandavleni Caves in Maharashtra, was issued by Gautami Balasri to record the achievements of her son, the Satavahana ruler Gautamiputra Satakarni.

• It describes him as the Ekabrahmana and the destroyer of the Sakas, Yavanas, and Pahlavas.

• Junagadh Rock Inscription

• Associated with the Saka ruler Rudradaman I, it is one of the earliest long inscriptions in pure Sanskrit.

• It records the history of the Sudarshana Lake, mentioning its construction under Chandragupta Maurya and subsequent repairs by Ashoka and Skandagupta.

Q64. Answer: (c) Maand

The correct answer is Maand.

Key Points

• Maand is a sophisticated and soul-stirring style of folk music originating from the state of Rajasthan, particularly associated with the Jaisalmer region, which was historically known as the Maand area.

• It is recognized for its unique position in Indian music, acting as a bridge between pure folk and Indian classical music, often utilizing complex melodies and raga-based structures.

• The form is celebrated for its lively melodies and high-energy rhythms when performed during festive occasions and royal gatherings, typically accompanied by instruments like the Kamayacha, Sarangi, and Dholak.

• The most famous song in this genre is Kesariya Balam, which has become a cultural anthem for Rajasthan, symbolizing the welcoming nature of the desert people.

• Renowned vocalists such as Allah Jilai Bai and Mangi Bai have played a pivotal role in popularizing Maand on national and international stages, earning high civilian honors like the Padma Shri.

• Therefore, Maand is the traditional folk music form of Rajasthan described in the question.

Additional Information

• Lavani

• It is a traditional folk music and dance form popular in the state of Maharashtra.

• Known for its powerful percussion using the Dholki and its socially relevant or romantic themes.

• Baul

• This is a group of mystic minstrels from the Bengal region (West Bengal and Bangladesh).

• Their music reflects a spiritual philosophy and is typically performed with an Ektara or Dotara.

• Bhatiali

• A traditional river song or folk music form from Bengal, specifically sung by boatmen.

• The term is derived from Bhata, meaning downstream, and the songs reflect the rhythm of the rowing process and the flow of the river.

Q65. Answer: (d) Bronze Age

The correct answer is Bronze Age.

Key Points

• The Harappan Civilization, also known as the Indus Valley Civilization, is classified as a Bronze Age culture because its inhabitants mastered the art of metallurgy, specifically the production of bronze.

• Technologically, the Harappans created bronze by alloying copper, which they primarily sourced from the Khetri mines in Rajasthan, with tin, which was largely imported from regions like Afghanistan and Hazaribagh.

• Archaeological evidence from major urban centers such as Mohenjo-daro and Harappa reveals advanced bronze artifacts, including the famous Dancing Girl figurine, manufactured using the sophisticated lost-wax casting (cire perdue) technique.

• The civilization reached its Mature Phase between approximately 2600 BCE and 1900 BCE, characterized by planned cities, drainage systems, and the widespread use of bronze for crafting tools, weapons, and ornaments.

• While the civilization used stone tools, the dominance of bronze for specialized craftsmanship and trade distinguishes it from the preceding stone-based eras.

Additional Information

• Neolithic Age

• This era represents the New Stone Age, marked by the transition from hunting-gathering to agriculture and animal husbandry.

• The site of Mehrgarh in present-day Pakistan is a significant precursor, showing early farming practices that eventually evolved into the urban Harappan stage.

• Chalcolithic Age

• Known as the Copper-Stone Age, this period involved the use of both stone tools and copper.

• Various regional cultures like the Ahar-Banas and Kayatha flourished in India, often overlapping with or succeeding the Harappan timeline in different geographies.

• Iron Age

• The Iron Age in the Indian subcontinent began long after the decline of the Harappan Civilization, starting roughly around 1000 BCE.

• The Indus people had no knowledge of iron; the metal only became prominent during the Later Vedic Period and the era of the

Mahajanapadas.

Q66. Answer: (a) Textile Industry

The correct answer is Textile Industry.

Key Points

• The Textile Industry is one of the largest sectors in the global economy and specifically relies on natural fibers like cotton, jute, and silk as its primary raw materials.

• Cotton is an agro-based raw material that undergoes a series of transformations including ginning (separation of fiber from seeds), spinning (converting fiber into yarn), and weaving or knitting (converting yarn into fabric).

• In the Indian context, the Cotton Textile Industry is highly significant, providing massive employment and contributing nearly 2 percent to the total GDP of the country.

• The industry is geographically concentrated in states like Maharashtra and Gujarat due to the availability of raw cotton, proximity to markets, and favorable moist climatic conditions for spinning.

• Historically, the first successful mechanized textile mill in India was established in Mumbai in 1854, marking the beginning of the modern industrial era in this sector.

Additional Information

• Iron and Steel Industry:

• Commonly referred to as a basic industry because all other industries depend on it for machinery.

• Its primary raw materials are iron ore, coking coal, and limestone, which are bulky and heavy in nature.

• Cement Industry:

• Essential for construction and infrastructure, this industry utilizes limestone, silica, alumina, and gypsum as its core inputs.

• It requires substantial energy resources like coal and electric power for manufacturing.

• Mining Industry:

• It is an extractive industry that involves the removal of valuable minerals or other geological materials from the earth.

• The output includes ores, metals, coal, and oil shales, which then serve as raw materials for other manufacturing sectors.

Q67. Answer: (b) Rajasthan

The correct answer is Rajasthan.

Key Points

• The Dilwara Temples are a group of five world-renowned marble Jain temples located about 2.5 kilometers from Mount Abu, the only hill station in Rajasthan.

• These temples were built between the 11th and 16th centuries AD and are considered masterpieces of Maru-Gurjara architecture, characterized by incredible intricate carvings on white marble.

• The complex is situated in the Sirohi district amidst the lush green hills of the Aravalli Range, which is the oldest fold mountain range in India.

• The most famous among them, the Vimal Vasahi Temple, was constructed in 1031 AD by Vimal Shah, a minister of the Solanki ruler of Gujarat, and is dedicated to the first Tirthankara, Lord Rishabhdeva.

• Another significant shrine is the Luna Vasahi Temple, built in 1230 AD by the brothers Vastupala and Tejpal, which is dedicated to the 22nd Tirthankara, Lord Neminatha.

Additional Information

• Architectural Elements:

• The temples are famous for their ornamental vaulted ceilings, pillars, and toranas (arched gateways) that display minute details of dancers, musicians, and floral patterns.

• While primarily Jain in nature, the evolution of the site over centuries saw the integration of regional Hindu motifs and, in later structures, subtle refinements in stonework often associated with the high precision of later Indian craftsmanship.

• Gujarat:

• Although the patrons (Solankis) were from the Gujarat region, the physical site of Mount Abu falls within the administrative boundaries of Rajasthan.

• Gujarat is home to other major Jain sites like Palitana and Girnar, which share similar architectural DNA.

• Key Shrines:

• The five temples are Vimal Vasahi, Luna Vasahi, Pitalhar, Parshvanatha, and Mahavir Swami, each dedicated to different Jain Tirthankaras.

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Q68. Answer: (c) Article 243A

The correct answer is Article 243A.

Key Points

• Article 243A of the Indian Constitution specifies the establishment, powers, and functions of the Gram Sabha at the village level.

• The 73rd Constitutional Amendment Act, 1992 added Part IX to the Constitution, which established a three-tier Panchayati Raj System in India to facilitate rural local governance.

• A Gram Sabha is defined under Article 243(b) as a local body consisting of all individuals registered in the electoral rolls of a village within the Panchayat area.

• Under Article 243A, the Gram Sabha is empowered to exercise such powers and perform such functions at the village level as the Legislature of a State may provide by law.

Additional Information

• Article 243B (Constitution of Panchayats):

• This article mandates the establishment of a three-tier local governance structure in every state: the village level, the intermediate level, and the district level.

• States with a population not exceeding twenty lakhs (2 million) are exempt from constituting Panchayats at the intermediate level.

• Article 224A (Appointment of Retired Judges):

• This article permits the Chief Justice of a High Court, with the prior consent of the President of India, to request a retired High Court judge to sit and act as a judge of that High Court.

• Article 224 (Appointment of Additional and Acting Judges):

• While Article 224B is not a valid provision, Article 224 deals with the appointment of temporary additional and acting judges to clear pending cases or address temporary increases in High Court workloads.

Q69. Answer: (c) A marshy tract with a high water table and thick forests

The correct answer is A marshy tract with a high water table and thick forests.

Key Points

• The Terai is a lowland belt located south of the outer foothills of the Himalayas and the Bhabar region, spanning across parts of India and Nepal.

• It is characterized by a high water table because the streams and rivers that disappear into the porous rocks of the Bhabar zone re-emerge at the surface in this region.

• The re-emergence of these underground water sources creates a damp, swampy, and marshy tract that is naturally conducive to the growth of thick forests and tall grasslands.

• This region is historically known for its immense biodiversity and rich wildlife; however, over the years, significant portions have been cleared for agriculture to support settlement and crop production like sugarcane, rice, and wheat.

Additional Information

• The Northern Plains of India are divided into four distinct physiological regions based on relief features:

• Bhabar: A narrow belt of about 8 to 16 km in width lying parallel to the Shiwalik slopes, consisting of pebbles where rivers disappear.

• Bhangar: The largest part of the northern plain formed of older alluvium; it lies above the floodplains and contains calcareous deposits known as Kankar.

• Khadar: The newer, younger alluvium of the floodplains which is renewed almost every year, making the land highly fertile and ideal for intensive agriculture.

Q70. Answer: (c) Varadero, Cuba

The correct answer is Varadero, Cuba.

Key Points

• The Global Youth Summit 2025 (GYS-25) is a flagship event organized by the International Telecommunication Union (ITU), specifically under its Generation Connect initiative.

• The summit was hosted in Varadero, Cuba, from 11-13 March 2025, serving as a specialized platform for young leaders to engage with global ICT policies.

• The primary theme of the 2025 edition was 'Amplifying youth voices in ICT', which emphasizes the critical role of the younger generation in shaping the digital economy and overcoming the digital divide.

• The event gathered delegates from member states, private sector entities, and academic institutions to discuss the impact of Artificial Intelligence (AI), cybersecurity, and sustainable connectivity on global development.

• The outcomes of the GYS-25 directly feed into the World Telecommunication Development Conference (WTDC-25), ensuring that youth-led recommendations are integrated into the global telecommunications agenda.

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Additional Information

• International Telecommunication Union (ITU):

• It is the United Nations specialized agency for Information and Communication Technologies, established in 1865.

• Headquartered in Geneva, Switzerland, it comprises 193 Member States and over 900 entities from the private sector and academia.

• The organization is divided into three main sectors: Radiocommunication (ITU-R), Telecommunication Standardization (ITU-T), and Telecommunication Development (ITU-D).

• Host City - Varadero:

• Located in the province of Matanzas, Varadero is one of the most prominent convention and tourism hubs in the Caribbean region.

• Cuba was selected as the host nation to demonstrate its commitment to digital transformation and its active participation in the ITU-D regional initiatives for the Americas.

• Generation Connect:

• This is the ITU's global youth strategy designed to empower young people with the skills and opportunities to participate in the digital world safely and effectively.

Therefore, the correct option is 3.

Q71. Answer: (a) POEM - PMEO - MEOP

The Logic followed here is,

For DISK − DKSI − KSID

For LEAF − LFAE − FAEL

Applying Logic for POEM − PMEO − MEOP:

The logic is perfectly followed in the triad POEM − PMEO − MEOP.

Hence, the correct answer is "option 1"

Q72. Answer: (c) 2

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 D is kept above G.

2. Only two boxes are kept between G and A.

3. Only B is kept below E.

Position	Box
7	D
6	G
5	
4	
3	A
2	E
1	B

4) F is not kept immediately above A.

Final Arrangement:

Position	Box
7	D
6	G
5	F
4	C
3	A
2	E
1	B

Thus, there are 2 boxes kept between E and F.

Hence, the correct answer is ‘Option 3’.

Q73. Answer: (a) NMP

The logic followed here is,

Logic: Each letter in the triplet is shifted by +6 to get the corresponding letter of the next triplet.

The resulting group of letters is NMP.

Hence, the correct answer is "option 1"

Q74. Answer: (b) UT–PR

The logic followed here is,

For ZY-VU,

For UT-PR,

For ML-IH,

For JI-FE,

Therefore, the letter-cluster pair that is different from the others is UT-PR.

Hence, the correct answer is 'Option 2'.

Q75. Answer: (b) Immediate right

Given: Seven people P1, P2, P3, P4, P5, P6 and P7 are sitting around a circular table facing towards the centre of the table.

1. P1 sits to the immediate right of P3.

2. P6 sits third to left of P3. P2 is sitting immediately between P3 and P7.

3. P5 sits immediately left of P6.

The Final Arrangement is,

Thus, P4 is at the immediate right of P1.

Hence, the correct answer is 'Option 2'.

Q76. Answer: (b) dt

The logic followed here is.

Therefore, the code for the word "zebra" is "dt."

Hence, the correct answer is "option 2"

Q77. Answer: (d) Neither conclusion (I) nor (II) follows

The least possible Venn diagram for the given statements is:

(I) Some suns are bars - Doesn't follow

(There is no direct relation between suns and bars; maybe it is possible but not definite. Hence, it is False.)

(II) All bars are suns - Doesn't follow (There is no direct relation between suns and bars; maybe it is possible but not definite. Hence, it is False.)

Neither conclusion (I) nor (II) follows.

Hence, the correct answer is "Option 4"

Q78. Answer: (a) EDA

The logic followed here is,

The next term is "EDA"

Hence, the correct answer is "Option 1"

Q79. Answer: (a) None

Given original number: 4738165

Original Number	**4**	**7**	**3**	**8**	**1**	**6**	**5**
Ascending Order	1	3	4	5	6	7	8

New word: 1 3 4 5 6 7 8

No digits will remain unchanged as compared to that in the original number

Hence, the correct answer is 'Option 1'.

Q80. Answer: (b) 62

BODMAS Table:

Letter	Operation
D	÷
B	×
A	•
C	−

The given expression is:16 C 92 D 4 A 12 B 7 C 15 = ?

After replacing the letters and BODMAS rule,

= 16 − 92 ÷ 4 + 12 × 7 − 15

= 16 − 23 + 12 × 7 − 15

= 16 + 84 − 15 − 23

= 100 − 23 − 15

= 100 - 38

= 62

Hence, the correct answer is "Option 2"

Q81. Answer: (c) 84

The logic followed here is:

Rank of Rakesh from the top = 39^(th)

Rank of Rakesh from the bottom = 46^(th)

Total number of students = (Rank of a person from the top + Rank of the same person from the bottom) − 1

= (39 + 46) − 1

= 85 − 1

= 84

Hence, the correct answer is "Option 3"

Q82. Answer: (a) Daughter's husband

The family tree diagram is

Therefore, K is the husband of T, who is the daughter of X → K is the Daughter's husband of X.

Hence, the correct answer is 'Option 1'.

Q83. Answer: (d) 3, 1, 4, 5, 2

Dictionary order of given words:

1. Road
2. Roast
3. Robust
4. Rope
5. Router

The sequence is 3, 1, 4, 5, 2.

Hence, the correct answer is "option 4"

Q84. Answer: (a) Wife's sister

Symbol		=	!	•
Meaning	Sister	Father	Wife	Son

Given: S > C - O = P ! E

The family tree diagram is

Therefore, S is the sister of P, who is the wife of E. S is the Wife's sister of E.

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Hence, the correct answer is 'Option 1'.

Q85. Answer: (d) BMV : DGQ

The logic follows here,

For FGJ : HAE,

For KLO : MFJ,

Thus, the resulting pair is BMV : DGQ.

Hence, the correct answer is "option 4"

Q86. Answer: (a) 152

The logic followed here is:

• 314 − 37 = 277

• 277 − 33 = 244

• 244 − 29 = 215

• 215 − 25 = 190

• 190 − 21 = 169

• 169 − 17 = 152

Thus, the missing term in the series is 152.

Hence, the correct answer is 'Option 1';

Q87. Answer: (c) 397

The logic followed here is:

118 + 31 = 149

149 + 62 = 211

211 + 31 = 242

242 + 62 = 304

304 + 31 = 335

335 + 62 = 397

Thus, the missing term in the series is 397.

Hence, the correct answer is 'Option 3';

Q88. Answer: (b) EJ - RG

The logic followed here is,

IN - BK,

EJ - RG,

WB - PY,

TY - MV,

Therefore, the letter-cluster pair that is different from the others is EJ - RG.

Hence, the correct answer is 'Option 2'.

Q89. Answer: (d) Three

The logic followed here is:

Original Letter	W	R	E	N	C	H	I	N	G	L	Y
Logic	−2	−2	+1	−2	−2	−2	+1	−2	−2	−2	−2
New Letter	U	P	F	L	A	F	J	L	E	J	W

The group of letters formed is: U, P, F, L, A, F, J, L, E, J, W.

• The letters that appear exactly twice are F, L, and J.

• Total number of such letters = 3.

Hence, the correct answer is " Option 4"

Q90. Answer: (a) KF – GA

The logic followed here is:

KF - GA,

BP - XL,

UC - QY,

TR - PN,

Therefore, the letter-cluster pair that is different from the others is KF - GA.

Hence, the correct answer is 'Option 1'.

Q91. Answer: (a) P7

Given: Seven people P1, P2, P3, P4, P5, P6 and P7 are sitting around a circular table facing towards the centre of the table.

1. P7 sits second to right of P1.
2. There are exactly two people between P1 and P6 when checked from right of P1.
3. P2 is sitting immediately between P5 and P6.
4. P3 sits second to right of P4.

The Final Arrangement is,

Hence, the correct answer is "Option 1".

Q92. Answer: (d) Two

Given: Seven boxes B, C, D, E, Q, R and S are kept one over the other but not necessarily in the same order

1. No box is kept above E.
2. Only B is kept between E and Q.

Position	Box
7	E
6	B
5	Q
4	
3	
2	
1	

1. Only R is kept below C
2. Only one box is kept between Q and D.

Final Arrangement:

7	E
6	B
5	Q
4	S
3	D
2	C
1	R

Thus, there are two boxes kept between S and R.

Hence, the correct answer is 'Option 4'.

Q93. Answer: (a) 21, 440

The logic followed here is:

Logic: Second Number = (First Number)^2 − 1

For the first set 18, 323

=> $(18)^2 - 1$

=> 324 − 1 = 323.

For the second set 19, 360

=> $(19)^2 - 1$

=> 361 − 1 = 360.

Applying the same logic to the options:

For Option 1 (21, 440)

=> $(21)^2 - 1$

=> 441 − 1 = 440.

Hence, the correct answer is 'Option 1'.

Q94. Answer: (c) 54

The logic followed here is:

The pattern observed is the sum of positional values of letters + 2.

For XEQA is coded as 49,

• Sum of positional values = 24 + 5 + 17 + 1 = 47

• Code = 47 + 2 = 49

KLCH is coded as 36,

• Sum of positional values = 11 + 12 + 3 + 8 = 34

• Code = 34 + 2 = 36

Applying same logic for NJDX:

• Sum of positional values = 14 + 10 + 4 + 24 = 52

• Code = 52 + 2 = 54

Hence, the correct answer is " Option 3"

Q95. Answer: (c) 40

BODMAS Table:

A	B	C	D
÷	×	•	−

Given equation: 19 C 6 B 5 D 72 A 8 = ?

After substituting the signs and using the BODMAS rule:

= 19 + 6 × 5 − 72 ÷ 8

= 19 + 6 × 5 − 9

= 19 + 30 − 9

= 49 − 9

= 40

Hence, the correct answer is "option 3"

Q96. Answer: (d) Only conclusion (I) follows

The least possible Venn diagram for the given statements is:

(I) Some chicks are mats - Follows (All bats are chicks and all bats are also mats, the bats where some chicks are definitely mats.)

(II) All mats are bats - Doesn't follow (All bats are mats, but all mats are mats may be possible but not definite. Hence, it is false)

Only conclusion (I) follows.

Hence, the correct answer is "Option 4"

Q97. Answer: (d) Two

The logic follows here,

Given Word: ORANGEY

Original Word:	O	R	A	N	G	E	Y
Alphabetical Order:	A	E	G	N	O	R	Y

• The letters O, R, A, G, and E have all changed their positions.

• Thus, there are two letters (N and Y) whose positions remain unchanged.

Hence, the correct answer is "Option 4"

Q98. Answer: (c) PWR

The logic followed here is:

The missing term in the series is PWR.

Hence, the correct answer is " Option 3 "

Q99. Answer: (c) 4 km to the north

Given:

• Yaman starts from Point A and drives 18 km towards the west. He then takes a right turn, drives 19 km, turns right and drives 21 km.

• He then takes a right turn and drives 23 km.

• He takes a final right turn, drives 3 km and stops at Point P.

The Final Diagram,

He should drive 4 km in north direction in order to reach Point A again.

Hence, the correct answer is "Option 3"

Q100. Answer: (d) NI-OJ-PS

The pattern followed in these triads is based on the alphabetical positions of the letters, where a specific increment is applied to each successive pair.

For the triad 'TO-UP-VY':

For the triad 'QL-RM-SV':

Applying the same logic to find the matching triad:

Thus, 'NI-OJ-PS' follows the exact same pattern as the given triads.

Hence, the correct answer is 'Option 4'.

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