RRB NTPC (UG) CBT-I Official Paper (Held On 14 Jun, 2026 Shift 1) (Previous Year Paper)

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

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MATHEMATICS

Q1. The sum of the digits of a two digit number is 11. If 27 is added to the number its digits are reversed. Find the ratio between the original number to the number obtained on reversing the digits.

(a) 74:47
(b) 29:23
(c) 23:29
(d) 47:74

Q2. ABCD is a quadrilateral in which AB||DC, and E and F are the mid points of the diagonals AC and BD, respectively. If AB = 24 cm, BC = 62 cm, DC = 92 cm, and AD = 95 cm, then what is the length (in cm) of EF?

(a) 34
(b) 36
(c) 39
(d) 29

Q3. If 27 and 81 are the first two terms of a proportion and the third proportional to these numbers is used as the length of a rectangle whose width is 4 units, what is the numeric value of the area of the rectangle?

(a) 729
(b) 6561
(c) 486
(d) 972

Q4. A bus covers 150 km at 60 km/hr, 120 km at 80 km/hr, and 180 km at 90 km/hr without any stops. What is the average speed of the bus for the entire journey?

(a) 75 km/hr
(b) 85 km/hr
(c) 70 km/hr
(d) 72 km/hr

Q5. If cosx - sinx = a and cosx + sinx = b, then the value of $(1 - \tan^2 x)/(1 + \tan^2 x)$ is

(a) ab
(b) $a^2 + b^2$
(c) $a^2 - b^2$
(d) -ab

Q6. Find the value of m which satisfies

$(14/5)^{11} \times (5/14)^{(17)} \times (14/5)^{(14)} = (5/14)^{(3m+7)}$

(a) -7
(b) -25
(c) -14
(d) -5

Q7. What is the smallest number that must be added to 45873 so that the sum is divisible by 11?

(a) 9
(b) 8
(c) 6
(d) 4

Q8. What is the correct ascending order of the following ratios?

11:15, 23:55, 32:33, 4:11, 26:35

(a) 4:11, 23:55, 26:35, 11:15, 32:33
(b) 4:11, 23:55, 11:15, 26:35, 32:33
(c) 4:11, 26:35, 11:15, 23:55, 32:33
(d) 4:11, 11:15, 23:55, 26:35, 32:33

Q9. The simple interest on a sum is 25% of the sum in 5 years. Find the rate of interest.

(a) 4%
(b) 5%
(c) 25%
(d) 3%

Q10. The price of sugar is increased by 3%. How much percent the consumption of sugar must be reduced so as not to increase the expenditure on sugar? (correct your answer to one decimal place)

(a) 2.6%
(b) 2.9%
(c) 1.9%
(d) 1.7%

Q11. After successive discounts of 15% and 10%, a customer pays Rs. 3,672. What was the marked price?

(a) Rs. 4,800
(b) Rs. 4,700
(c) Rs. 4,850
(d) Rs. 4,750

Q12. Arpit buys 3 bed sheets for Rs. 3,951. He sells the first at a profit of Rs. 300, the second at a loss of Rs. 50, and the third at a profit of Rs. 200. What is the overall profit or loss percentage?

(Round off your result to two decimal places)

(a) 11.39% loss
(b) 11.39% profit
(c) 10.93% loss
(d) 10.93% profit

Q13. A and B can do a piece of work in 12 days and 18 days, respectively. Both work for 2 days and then A leaves. How long (in days) will B take to complete the remaining work?

(a) 14
(b) 12
(c) 15
(d) 13

Q14. The price of an item is increased by 15% and then by 20%. Now the price of the item is decreased so that the overall effective increment in the price is 5%. The price is decreased approximately by ____%.

(a) 21.39
(b) 23.91
(c) 21.93
(d) 23.19

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Q15. At a health club, 40% of the members are women and 60% of the members are men. If the average age of the men is 51 years and the average age of the women is 55 years, what is the average age (in years) of all the members?

(a) 52.6
(b) 53.2
(c) 52.4
(d) 53.6

Q16. Two inlet pipes A and B can fill a cistern in 15 hours and 20 hours respectively. An outlet pipe C can empty the cistern in 30 hours. All three pipes are opened together, but the outlet pipe is closed after 5 hours. The total time (in hours) required to fill the cistern completely is

(a) 92/3
(b) 91/3
(c) 9
(d) 10

Q17. The simplified value of the expression $0.5^2 \times 5^{\wedge}5 \times 2^{\wedge}(-4) \times 4^{\wedge}4 \times 10^{\wedge}(-3) \div a$ is 1, then the value of a is _____.

(a) 50
(b) 25
(c) 6.25
(d) 12.5

Q18. Three numbers are in the ratio 11 : 3 : 2, and their LCM is 2706. Their HCF is:

(a) 30
(b) 50
(c) 82
(d) 41

Q19. Meena and her mother visit a shop. The shopkeeper tells them that the price of 5 identical dresses is Rs. 4,955. Meena buys 9 such dresses. Find the total cost of the 9 dresses.

(a) Rs. 8,099
(b) Rs. 8,991
(c) Rs. 8,919
(d) Rs. 8,199

Q20. Two trains are moving in opposite directions at speeds of 36 km/h and 54 km/h. If their lengths are 100 m and 150 m, respectively, how much time will they take to cross each other completely?

(a) 8 seconds
(b) 12 seconds
(c) 15 seconds
(d) 10 seconds

Q21. The ratio of the age of a father and his son at present is 6:1. After 5 years from now, the ratio will become 7:2. Find the present age of the son.

(a) 4 years
(b) 8 years
(c) 5 years
(d) 7 years

Q22. Find the value of $\{1/0.01\} \times\{[(5/8)+(0.25)] \times(4/5)\}$.

(a) 0.8
(b) 70
(c) 0.7
(d) 80

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Q23. Evaluate $25^3 + (-20)^3 + (-5)^3$

(a) 7360
(b) 7500
(c) 7467
(d) 7244

Q24. A shopkeeper offers the following schemes on toys of the same marked price.

(A) Successive discounts of 45% and 44% on any number of toys bought.

(B) Successive discounts of 36%, 41% and 45% on any number of toys bought.

(C) 49% discount on the first 4 toys and 19% discount on each toy thereon.

(D) 7 toys free of cost on buying 10 toys.

A customer wants to buy 10 toys. Which of the above schemes is the least beneficial to her?

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

Q25. A new cuboid is formed by placing three cuboids of length 10.5 cm, breadth 6.4 cm, and height 2 cm, one on top of the other. What is the volume of the new cuboid?

(a) 303.2 cm^3
(b) 413.2 cm^3
(c) 403.2 cm^3
(d) 503.2 cm^3

Q26. The average of 6.5, 10.8, 19.9 and a is 18. The value of a is:

(a) 35.8
(b) 34.8
(c) 36.8
(d) 33.8

Q27. A sum of Rs. 10,000 is invested at a compound interest rate of 10% per annum for 2 years, compounded annually. What is the compound interest earned?

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

Q28. Find the surface area of a sphere of radius 7 cm. (Take $\pi = 22/7$)

(a) 704 sq cm
(b) 588 sq cm
(c) 484 sq cm
(d) 616 sq cm

Q29. A person sold an article at a loss of 10%. Had he sold it for Rs. 60 more, he would have gained 5%. Find the cost price of the article.

(a) Rs. 480
(b) Rs. 440
(c) Rs. 400
(d) Rs. 420

Q30. Rs. 9,520 is divided among X, Y, and Z in the ratio 1 half colon 1 fourth colon 5 over 16. What is the share of Y?

(a) Rs. 3,200
(b) Rs. 4,000
(c) Rs. 2,240

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(d) Rs. 2,600

GENERAL AWARENESS

Q31. In September 2025, what principle did the Supreme Court affirm in Competition Commission of India v. Kerala Film Exhibitors Federation?

(a) CCI may impose only monetary fines on enterprises
(b) CCI may impose remedies and fix liability on office-bearers
(c) CCI orders need prior clearance from the Union Cabinet
(d) CCI may drop cases against trade bodies at its discretion

Q32. Which article of the Indian Constitution contains the provision for the Council of Ministers to aid and advise the President in the exercise of his powers?

(a) Article 84
(b) Article 94
(c) Article 64
(d) Article 74

Q33. In which regions of India has canal irrigation seen the most extensive expansion?

(a) Areas with coastal sandy soil
(b) Areas with heavy rainfall and steep slopes
(c) Desert areas with rocky terrain
(d) Alluvial plains with perennial rivers

Q34. At the 57th meeting of the Monetary Policy Committee (MPC) of the RBI held from 29 September to 1 October 2025, what decision was taken on the policy repo rate and stance?

(a) Repo rate hiked to 6.00% with a hawkish monetary policy stance
(b) Repo rate kept at 5.50% with a neutral monetary policy stance
(c) Repo rate kept at 5.00% with a calibrated tightening stance
(d) Repo rate cut to 4.50% with an accommodative stance

Q35. On April 9, 2025, the Reserve Bank of India's Monetary Policy Committee (MPC) announced a cut in the repo rate by:

(a) 50 basis points
(b) 25 basis points
(c) 100 basis points
(d) 75 basis points

Q36. Which of the following celebrated Sanskrit poets and playwrights was one of the Navaratnas in the court of Chandragupta II?

(a) Kalidasa
(b) Bhavabhuti
(c) Bhasa
(d) Bana

Q37. Which case recognised judicial review as part of the basic structure?

(a) Menaka Gandhi case
(b) Keshavananda Bharati case
(c) Indra Sawhney case
(d) Minerva Mills case

Q38. The Naval Anti-Ship missile *(*NASM-SR), tested in February 2025, has what special feature?

(a) Nuclear warhead
(b) Man-in-loop retargeting via infrared seeker
(c) Laser guidance from space

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(d) Underwater launch capability

Q39. At the age of 92, Paul Biya became the world's oldest head of state after winning his eighth presidential term in October 2025. He is the president of which of the following countries?

(a) Nigeria
(b) Chad
(c) Cameroon
(d) Sudan

Q40. According to the International Renewable Energy Agency (IRENA) RE Statistics 2025, India holds the 3rd global rank in the installed capacity of which renewable energy category?

(a) Wind Power
(b) Solar Power
(c) Bio Power
(d) Hydropower

Q41. Globalisation of the Indian economy has NOT resulted in which of the following?

(a) Increased Consumer Choice
(b) Global Integration
(c) Technological Advancement
(d) Negative Cultural Impact

Q42. Which is the main difference between Sleep and Hibernate modes in Windows 11?

(a) Hibernate keeps programs open on the screen.
(b) Sleep completely shuts down the system.
(c) Sleep uses more power than Hibernate.
(d) Sleep saves data on hard disk; Hibernate saves in RAM.

Q43. Why were the early Congress leaders described as "Moderates" during the period 1885–1905?

(a) They supported organised resistance through secret groups to push for administrative changes.
(b) They rejected council participation and insisted on mass mobilisation to secure wider reforms.
(c) They adopted constitutional methods such as petitions and discussions to seek political reforms.
(d) They pursued immediate self-rule through direct political confrontation with colonial authorities.

Q44. Which computing pioneer is credited with the concept of the "stored program architecture" (where both program instructions and data are held in the same memory), a design that forms the basis of nearly all modern computers?

(a) Alan Turing
(b) Charles Babbage
(c) Blaise Pascal
(d) John von Neumann

Q45. According to the Ministry of Statistics and Programme Implementation (MoSPI), the Unemployment Rate (UR) for persons aged 15 years and above declined to _____ in November 2025.

(a) 4.4%
(b) 4.6%
(c) 4.5%
(d) 4.7%

Q46. The early Iron Age in North India is most prominently associated with which pottery culture?

(a) Ochre Coloured Pottery and Black Slipped Ware
(b) Painted Grey Ware and Black-and-Red Ware
(c) Northern Black Polished Ware and Red Ware
(d) Painted Grey Ware and Northern Black Polished Ware

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Q47. When was the Congress Socialist Party (CSP) formed within the Indian National Congress?

(a) 1947
(b) 1934
(c) 1942
(d) 1952

Q48. Under the proposed Budget, what is the fiscal deficit target for FY 2025-26?

(a) 4.4% of GDP
(b) 5.0% of GDP
(c) 6.2% of GDP
(d) 3.8% of GDP

Q49. Which of the following animals is associated with tundra-type natural vegetation?

(a) Walrus
(b) Iberian Lynx
(c) Jackal
(d) Desert horned viper

Q50. Which of the following is the correct full form of CD?

(a) Computer Drive
(b) Control Disk
(c) Central Data
(d) Compact Disk

Q51. Which of the following initiatives is primarily focused on enhancing road connectivity through expressways and economic corridors?

(a) PM Gati Shakti
(b) Smart Cities Mission
(c) Bharatmala Pariyojana
(d) Sagarmala Programme

Q52. According to the Constitution of India, the ‘Right to Equality’ is guaranteed under which exact set of five consecutive Articles?

(a) Articles 19, 20, 21, 22 and 23
(b) Articles 12, 13, 14, 15 and 16
(c) Articles 23, 24, 25, 26 and 27
(d) Articles 14, 15, 16, 17 and 18

Q53. Which computer application enables real-time inventory tracking using automated identification?

(a) RFID-driven supply chain systems
(b) Presentation software
(c) OCR-based text editing
(d) Email-based notification

Q54. Modern telecommunication systems use optical fibres to transmit data efficiently. Which optical phenomenon enables this high-speed data transmission?

(a) Dispersion of light
(b) Interference of light
(c) Total Internal Reflection
(d) Refraction of light

Q55. A student mixes aqueous solutions of barium chloride and sodium sulphate. A white curd-like substance forms instantly. What type of chemical reaction is primarily responsible for this observation?

(a) Precipitation reaction forming insoluble barium sulphate
(b) Redox reaction resulting in electron transfer

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(c) Decomposition of sodium sulphate by barium chloride catalyst
(d) Evolution of SO2 gas during a displacement reaction

Q56. What type of joint allows the widest range of movement, including medial and lateral rotation, as in the shoulder and hip?
(a) Hinge Joint
(b) Gliding Joint
(c) Pivot Joint
(d) Ball and Socket Joint

Q57. Which achievement is correctly attributed to Vallabhbhai Patel during the freedom struggle?
(a) Organising the Punjab protests during the anti-Rowlatt agitations
(b) Drafting the Lucknow Pact to unite moderates and extremists
(c) Commanding the INA forces during the Burma campaign
(d) Leading the Bardoli Satyagraha that established him as the “Sardar”

Q58. Why does iron replace copper when an iron nail is dipped in copper sulphate solution?
(a) Iron is less reactive
(b) Copper is insoluble in water
(c) Both are equally reactive
(d) Iron is more reactive

Q59. What modification was made to Article 171(1) of the Indian Constitution by the seventh amendment?
(a) Term "one-half" was replaced with "one-fourth"
(b) Term "one-fourth" was replaced with "one-half"
(c) Term "one-fourth" was replaced with "one-third"
(d) Term "one-third" was replaced with "one-fourth"

Q60. The Eleventh Scheduled of the Constitution places how many functions within the purview of the Panchayati Raj bodies?
(a) 23
(b) 32
(c) 35
(d) 29

Q61. Shi Yuqi, who won the men’s singles final at the BWF World Championships held at Paris in August 2025, belongs to which country?
(a) Indonesia
(b) Japan
(c) China
(d) Malaysia

Q62. In which article of the Directive Principles of State Policy is the term 'social welfare' primarily mentioned?
(a) Article 41
(b) Article 42
(c) Article 38
(d) Article 40

Q63. Who is traditionally regarded as the author of the classical Tamil work 'Tirukkural'?
(a) Thiruvalluvar
(b) Avvaiyar
(c) Ilango Adigal
(d) Kambar

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Q64. Which branch of the monsoon brings rainfall to India's Western Coast?

(a) Western Disturbances
(b) South-West Monsoon Arabian Sea branch
(c) South-West Monsoon Bay of Bengal branch
(d) North-East Monsoon

Q65. Which dancer given below, honoured with the Nritya Natak Sangeet Drishya Kala Akademy Award from the Government of West Bengal, is known for expertise in both Bharatanatyam and Mohiniyattam?

(a) Thankamani Kutty
(b) Elam Endira Devi
(c) Aruna Mohanty
(d) Radha Reddy

Q66. Which process mainly helps in the formation of V-shaped valleys in mountainous regions?

(a) Wind erosion
(b) Wave action
(c) River erosion
(d) Glacier movement

Q67. Which of the following compositions in Hindustani music is especially associated with Sufi devotional music?

(a) Qawwali
(b) Tarana
(c) Dhrupad
(d) Tappa

Q68. In which of the following states is the Ambubachi Mela held every year during the monsoon?

(a) Assam
(b) Bihar
(c) Jharkhand
(d) Chhattisgarh

Q69. Which of the following organizations publishes the annual World Report 2025 reviewing global human rights practices?

(a) Human Rights Watch
(b) International Criminal Court
(c) Amnesty International
(d) United Nations Human Rights Council

Q70. Which of the following northern state crops is an example of Rabi crops?

(a) Wheat
(b) Cotton
(c) Bajra
(d) Rice

GENERAL INTELLIGENCE AND REASONING

Q71. Kiran starts from Point A and drives 23 km towards the north. She then takes a right turn, drives 9 km, turns right and drives 31 km. She then takes a right turn and drives 17 km. She takes a final right turn, drives 8 km and stops at Point P.

How far (shortest distance) and towards which direction should she drive in order to reach Point A again? (All turns are 90-degree turns only unless specified.)

(a) 9 km to the east
(b) 9 km to the west
(c) 8 km to the east
(d) 8 km to the west

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Q72. JS 12 is related to MO -3 in a certain way. In the same way, LW 9 is related to OS -6. To which of the following is BT 6 related, following the same logic?

(a) PT -11
(b) TR 10
(c) EP -9
(d) YT 8

Q73. Seven people, N, H, C, D, E, R and G, are sitting in a row, facing north.

Only one person sits to the left of R. G sits fourth from the right end. Only two people sit between R and E. D sits to the immediate left of N. H does not sit to the left of C.

How many people sit between C and D?

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

Q74. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statement: All Corns are Cauliflowers. No Cauliflowers are Spinaches.

Conclusion (I): No Spinaches are Corns.

Conclusion (II): Some Spinaches are Corns.

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

Q75. Seven boxes, U, V, W, X, A, B and C, are kept one over the other, but not necessarily in the same order.

Only U is kept below W. Only A is kept between V and X. Only C is kept between B and X. Box B is kept at the top-most position.

Which box is kept at the third position from the bottom?

(a) X
(b) C
(c) A
(d) V

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

37 57 81 109 141 177 ?

(a) 205
(b) 214
(c) 217
(d) 211

Q77. HI 26 is related to FF 11 in a certain way. In the same way, MG 22 is related to KD 7. To which of the following is KF 14 related, following the same logic?

(a) IB −3
(b) IC −1
(c) HB −3
(d) HC −1

Q78. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only G is kept above A. Only two boxes are kept between A and C. Only D is kept below E. F is not kept immediately above C. How many boxes are kept between E and F?

(a) 1

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

Q79. 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) ON - QP
(b) UT - WX
(c) LK - NM
(d) SR - UT

Q80. Each of the digits in the number 3164857 is arranged in ascending order from left to right. What will be the sum of the digits that are third from the left and third from the right in the new number thus formed?

(a) 12
(b) 10
(c) 9
(d) 8

Q81. Each of the digits in the number 9342156 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) Three
(b) Two
(c) None
(d) One

Q82. Seven boxes X, Y, Z, W, V, U and T are kept one over the other but not necessarily in the same order. Y is placed at the bottommost position. Exactly three boxes are kept between T and W. W is kept on one of the positions above T. Box U is kept immediately above Z. Box X is kept immediately below W. Box V is kept immediately above W. Which box is second from the bottom?

(a) T
(b) V
(c) W
(d) U

Q83. What should come in place of the question mark (?) in the given series?

17 40 61 80 97 112 ?

(a) 130
(b) 122
(c) 127
(d) 125

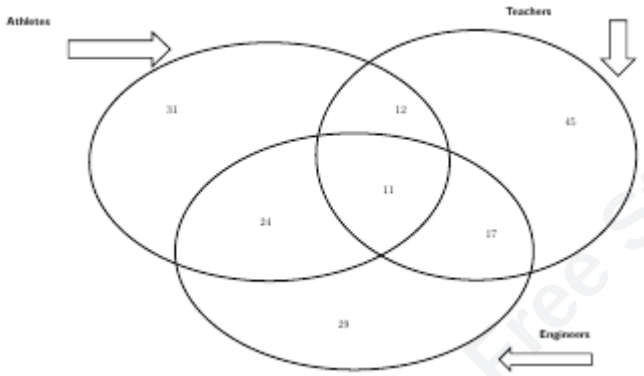
Q84. Based on the English alphabetical order, three of the following four letter clusters are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) BEI
(b) VZC
(c) HKO
(d) ZCG

Q85. Study the given diagram carefully and answer the question. The numbers in different sections indicate the number of persons in a room. (NOTE: You have to take the given data to be true even if it seems to be at variance from commonly known facts.)

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How many such engineers are there who are also athletes but not teachers?

(a) 24
(b) 28
(c) 23
(d) 35

Q86. 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.)

(99, 103, 111)

(157, 161, 169)

(a) (196, 198, 206)
(b) (112, 117, 125)
(c) (208, 212, 220)
(d) (323, 328, 336)

Q87. R, E, A, D, I, N and G are sitting around a circular table, facing the centre of the table.

D sits third to the left of R. A sits second to the left of G. Only R sits between I and A. E is not an immediate neighbor of D.

How many people sit between N and A when counted from the right of N?

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

Q88. If 2 is added to each odd digit and 2 is subtracted from each even digit in the number 7213546, what will be difference between the highest and lowest digits in the number thus formed?

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

Q89. In a certain code language, "VINP" is coded as "61" and "FSKA" is coded as "85". What is the code for "TOYG" in the given language?

(a) 69
(b) 55
(c) 61
(d) 63

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Q90. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

ZQF 19, DUJ 28, HYN 37, LCR 46, ?

(a) QHU 57
(b) RFW 52
(c) QFU 60
(d) PGV 55

Q91. Refer to the following letter series and answer the question that follows.

(Left) X P S A D U G L O E J F K I M C R T Q (Right)

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

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

Q92. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

HEP 27, MCN 41, RAL 55, WYJ 69, ?

(a) CVH 83
(b) AWG 81
(c) BXG 81
(d) BWH 83

Q93. Refer to the following letter series and answer the question. (Counting to be done from left to right only.)

(Left) E S I C X Z O W G U K A Q D F T B Y M R H (Right)

How many such consonants are there, each of which is immediately preceded by a vowel and also immediately followed by a vowel?

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

Q94. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) QNJ
(b) GKN
(c) BFI
(d) PTW

Q95. Bablu is the husband of Chetna. Anita is the daughter of Bablu. Ekam is the brother of Anita. Manu is the son of Anita. Kunal is the brother of Manu. How is Chetna related to Kunal?

(a) Mother's mother
(b) Father's mother
(c) Daughter
(d) Mother

Q96. In a certain code language,

A @ B means ‘A is the mother of B’,

A × B means ‘A is the wife of B’,

A + B means ‘A is the brother of B’ and

A ÷ B means ‘A is the father of B’.

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How is S related to H if 'S × D + R ÷ Y @ H'?

(a) Father's brother's wife
(b) Mother's father's brother's daughter
(c) Brother's wife
(d) Mother's father's brother's wife

Q97. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

EV21 IS33 MP45 QM57 ?

(a) VJ69
(b) UJ69
(c) UK71
(d) VK71

Q98. RS 4 is related to UR −11 in a certain way. In the same way, IJ 8 is related to LI −7. To which of the following is MN 12 related, following the same logic?

(a) HY −7
(b) IO −5
(c) MK −4
(d) PM −3

Q99. Refer to the given letter series and answer the question that follows. Counting to be done from left to right only.

(Left) O K I Y C R L U K V I E H L Y V O N Q O S Z (Right)

How many such consonants are there, each of which is immediately preceded by a vowel and also immediately followed by a vowel?

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

Q100. In a certain code language, 'MAKI' is coded as '2468' and 'MASK' is coded as '2496'. What is the code for 'S' in the given code language?

(a) 9
(b) 4
(c) 2
(d) 8

ANSWER KEY

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

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SOLUTIONS

Q1. Answer: (d) 47:74

Shortcut Trick

Difference between the digits = Difference in numbers ÷ 9 = 27 ÷ 9 = 3.

Sum of digits is given as 11.

Smaller digit (Tens place) = (Sum − Difference) ÷ 2 = (11 − 3) ÷ 2 = 4.

Larger digit (Units place) = (Sum + Difference) ÷ 2 = (11 + 3) ÷ 2 = 7.

Original Number = 47 and Reversed Number = 74.

The required ratio = 47 : 74.

Therefore The correct answer is 47:74.

Alternate Method

Given:

Sum of digits of a two-digit number = 11

Original Number + 27 = Reversed Number

=> Let the two-digit number be 10x + y, where x is the tens digit and y is the units digit.

=> According to the first condition: x + y = 11 → (Equation 1)

=> According to the second condition: (10x + y) + 27 = 10y + x

=> 10y − y + x − 10x = 27

=> 9y − 9x = 27

=> y − x = 3 → (Equation 2)

=> Adding (1) and (2): (x + y) + (y − x) = 11 + 3 => 2y = 14 => y = 7

=> Substituting y = 7 in (1): x + 7 = 11 => x = 4

=> Original number = 10(4) + 7 = 47

=> Number on reversing = 10(7) + 4 = 74

=> Ratio = 47 : 74

Therefore The correct answer is 47:74.

Additional Information

Two-Digit Number Properties

Any two-digit number can be represented as 10x + y. The difference between the number and its reverse is always 9 × (x − y).

Divisibility of the Sum

The sum of a two-digit number and its reverse is always divisible by 11 and is equal to 11 × (x + y).

Finding Digits

If the sum (S) and difference (D) of two digits are known, the digits are (S + D) ÷ 2 and (S − D) ÷ 2.

Q2. Answer: (a) 34

Shortcut Trick

In a trapezium (where AB || DC), the distance between the midpoints of the diagonals is half the difference of the parallel sides.

Length of EF = 1/2 × |DC − AB|

=> EF = 1/2 × |92 − 24|

=> EF = 1/2 × 68 = 34 cm

Therefore The correct answer is 34 cm.

Alternate Method

Given:

Quadrilateral ABCD where AB || DC (Trapezium).

Parallel sides: AB = 24 cm, DC = 92 cm.

Non-parallel sides: AD = 95 cm, BC = 62 cm.

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

Formula Used:

The length of the line segment joining the midpoints of the diagonals of a trapezium is given by:

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

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Calculations:

=> AB = 24 cm (Shorter parallel side)

=> DC = 92 cm (Longer parallel side)

=> Length of EF = (DC − AB) ÷ 2

=> EF = (92 − 24) ÷ 2

=> EF = 68 ÷ 2

=> EF = 34 cm

Therefore The correct answer is 34 cm.

Additional Information

Median of a Trapezium

The segment joining the midpoints of the non-parallel sides is parallel to the bases and its length is the average of the bases: MN = (a + b) / 2.

Distance between Midpoints of Diagonals

For any trapezium with parallel sides a and b, the segment connecting the diagonal midpoints lies on the median and has length |a − b| / 2.

Area of a Trapezium

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

Q3. Answer: (d) 972

Shortcut Trick

The ratio of the first two terms is 27 : 81 → 1 : 3.

The third proportional (length) follows the same ratio: 81 × 3 = 243 units.

Area of rectangle = Length × Width = 243 × 4 = 972 units.

Therefore The correct answer is 972 units.

Alternate Method

Given:

First term (a) = 27

Second term (b) = 81

Width of rectangle (w) = 4 units

Formula Used:

For a continued proportion a : b :: b : c, the third proportional is $c = b^2 \div a$.

Area of Rectangle = Length (l) × Width (w)

Calculations:

=> Third proportional (Length) = (81 × 81) ÷ 27

=> Length = 3 × 81 = 243 units

=> Area of rectangle = 243 × 4

=> Area = 972 units

Therefore The correct answer is 972 units.

Additional Information

Third Proportional

For two numbers a and b, the third proportional c is such that a/b = b/c, resulting in $c = b^2/a$.

Mean Proportional

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

Fourth Proportional

For three numbers a, b, and c, the fourth proportional d is such that a/b = c/d, resulting in d = (b × c) / a.

Q4. Answer: (a) 75 km/hr

Shortcut Trick

Total Distance = 150 + 120 + 180 = 450 km

Total Time = (150 ÷ 60) + (120 ÷ 80) + (180 ÷ 90) = 2.5 + 1.5 + 2 = 6 hours

Average Speed = Total Distance ÷ Total Time = 450 ÷ 6 = 75 km/hr

Therefore The correct answer is 75 km/hr.

Alternate Method

Given:
Distances (d1, d2, d3) = 150 km, 120 km, 180 km
Speeds (s1, s2, s3) = 60 km/hr, 80 km/hr, 90 km/hr
Formula Used:
Time = Distance ÷ Speed
Average Speed = Total Distance ÷ Total Time
Calculations:
=> Time taken for first part (t1) = 150 ÷ 60 = 2.5 hours
=> Time taken for second part (t2) = 120 ÷ 80 = 1.5 hours
=> Time taken for third part (t3) = 180 ÷ 90 = 2.0 hours
=> Total Time (T) = 2.5 + 1.5 + 2.0 = 6 hours
=> Total Distance (D) = 150 + 120 + 180 = 450 km
=> Average Speed = 450 ÷ 6 = 75 km/hr
Therefore The correct answer is 75 km/hr.
Additional Information
Average Speed for Equal Distances
If a journey covers two equal distances at speeds x and y, the average speed is 2xy ÷ (x + y). For three equal distances at speeds x, y, and z, it is 3xyz ÷ (xy + yz + zx).
Unit Conversion
To convert speed from km/hr to m/s, multiply by 5/18. To convert from m/s to km/hr, multiply by 18/5.
Relative Speed
If two objects move in the same direction, relative speed is s1 − s2. If they move in opposite directions, relative speed is s1 + s2.

Q5. Answer: (a) ab

Shortcut Trick
Recognize that the expression $(1 - \tan^2 x) / (1 + \tan^2 x)$ is equal to $\cos(2x)$.
We know $\cos(2x) = \cos^2 x - \sin^2 x$.
This expands as $(\cos x - \sin x)(\cos x + \sin x)$.
Given $\cos x - \sin x = a$ and $\cos x + \sin x = b$, we simply multiply them.
Required value = $a \times b = ab$.
Therefore The correct answer is ab.
Alternate Method
Given:
=> $\cos x - \sin x = a$
=> $\cos x + \sin x = b$
Formula Used:
=> $(1 - \tan^2 x) / (1 + \tan^2 x) = \cos(2x)$
=> $\cos(2x) = \cos^2 x - \sin^2 x$
=> $\cos^2 x - \sin^2 x = (\cos x - \sin x)(\cos x + \sin x)$
Calculations:
=> $(1 - \tan^2 x) / (1 + \tan^2 x) = (1 - \sin^2 x/\cos^2 x) / (1 + \sin^2 x/\cos^2 x)$
=> $((\cos^2 x - \sin^2 x)/\cos^2 x) / ((\cos^2 x + \sin^2 x)/\cos^2 x)$
=> $(\cos^2 x - \sin^2 x) / (\cos^2 x + \sin^2 x)$
=> Since $\cos^2 x + \sin^2 x = 1$, the expression simplifies to $\cos^2 x - \sin^2 x$.
=> $\cos^2 x - \sin^2 x = (\cos x - \sin x)(\cos x + \sin x)$
=> Substituting the given values: $a \times b = ab$.
Therefore The correct answer is ab.
Additional Information
Double Angle Identities
$\cos(2x) = \cos^2 x - \sin^2 x = 2\cos^2 x - 1 = 1 - 2\sin^2 x = (1 - \tan^2 x) / (1 + \tan^2 x)$.
Pythagorean Identity
$\sin^2 x + \cos^2 x = 1$ is the fundamental identity used to convert between sine and cosine squares.

Tangent Double Angle

sin(2x) = 2 tan x / (1 + tan²x) and tan(2x) = 2 tan x / (1 − tan²x).

Q6. Answer: (d) -5

Given:

(14/5)¹¹ × (5/14)^(17) × (14/5)^(14) = (5/14)^(3m + 7)

Formula used:

1. Reciprocal rule: (a/b)ⁿ = (b/a)^(−n)

2. Law of exponents: a^x × a^y × a^z = a^(x + y + z)

Calculations:

(14/5)¹¹ × (5/14)^(17) × (14/5)^(14) = (5/14)^(3m + 7)

Convert all terms to the same base (5/14) using the reciprocal rule:

=> (5/14)^(−11) × (5/14)^(17) × (5/14)^(−14) = (5/14)^(3m + 7)

Applying the law of exponents for multiplication to add the powers:

=> (5/14)^((−11 + 17 − 14)) = (5/14)^(3m + 7)

=> (5/14)^(−8) = (5/14)^(3m + 7)

Since the bases are identical, equate the exponents:

=> −8 = 3m + 7

=> 3m = −8 − 7

=> 3m = −15

=> m = −15 ÷ 3

=> m = −5

The value of m that satisfies the equation is −5.

Therefore The correct answer is option (4).

Q7. Answer: (b) 8

Shortcut Trick

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

Sum of digits at odd positions (4, 8, 3) = 15

Sum of digits at even positions (5, 7) = 12

Current difference = 15 − 12 = 3

To make the difference 11 (the next multiple), we need to add 8 to the odd positions sum (3 + 8 = 11).

Therefore The correct answer is 8.

Alternate Method

Given: Number = 45873, Divisor = 11

Formula Used: Smallest number to be added = Divisor − Remainder

=> 45873 ÷ 11

=> 11 × 4170 = 45870

=> Remainder = 45873 − 45870 = 3

=> Required number to add = 11 − 3

=> Required number to add = 8

Therefore The correct answer is 8.

Additional Information

Divisibility Rule of 11

A number is divisible by 11 if the difference between the sum of digits at odd places and the sum of digits at even places is either 0 or a multiple of 11.

Smallest Number to Subtract

To find the smallest number to subtract so a number becomes divisible, the answer is simply the Remainder itself (in this case, 3).

Divisibility Rule of 9

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

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Q8. Answer: (b) 4:11, 23:55, 11:15, 26:35, 32:33

Given:

The ratios are 11:15, 23:55, 32:33, 4:11, and 26:35.

Formula used:

To arrange ratios in ascending order, convert each into its decimal equivalent.

Calculations:

Converting ratios to decimal values:

4:11 = 4 ÷ 11 ≈ 0.3636

23:55 = 23 ÷ 55 ≈ 0.4181

11:15 = 11 ÷ 15 ≈ 0.7333

26:35 = 26 ÷ 35 ≈ 0.7428

32:33 = 32 ÷ 33 ≈ 0.9696

Comparison of decimals:

0.3636 < 0.4181 < 0.7333 < 0.7428 < 0.9696

=> 4:11 < 23:55 < 11:15 < 26:35 < 32:33

Therefore The correct answer is option (2).

Q9. Answer: (b) 5%

Shortcut Trick

The total simple interest accumulated over 5 years is 25% of the Principal.

Since Simple Interest is calculated linearly every year, the Rate of Interest per annum is the total percentage divided by the number of years.

=> Rate of Interest = 25% ÷ 5

=> Rate of Interest = 5%

Therefore The correct answer is 5%.

Alternate Method

Given:

Let the Principal (P) be 100.

Simple Interest (SI) = 25% of 100 = 25.

Time (T) = 5 years.

Formula Used:

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

Calculations:

=> 25 = (100 × R × 5) ÷ 100

=> 25 = R × 5

=> R = 25 ÷ 5

=> R = 5%

Therefore The correct answer is 5%.

Additional Information

Simple Interest (SI) Formula

The basic formula is SI = (P × R × T) ÷ 100, where P is Principal, R is Rate per annum, and T is Time in years.

Amount in Simple Interest

The total Amount (A) after T years is calculated as A = P + SI or A = P × (1 + RT ÷ 100).

Rate of Interest Definition

The Rate of Interest is the interest earned on a Principal of 100 units for a period of 1 year.

Linear Growth

Unlike Compound Interest, Simple Interest remains constant every year because it is always calculated on the original Principal.

Q10. Answer: (b) 2.9%

Shortcut Trick

Required percentage Reduction in Consumption = [r ÷ (100 + r)] × 100%

Given Price Increase (r) = 3%

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Reduction = [3 ÷ (100 + 3)] × 100 = [3 ÷ 103] × 100

Reduction ≈ 2.912% ≈ 2.9% (rounded to one decimal place)

Therefore The correct answer is 2.9%.

Alternate Method

Given: The Price of Sugar is increased by 3%.

Formula Used: Expenditure = Price × Consumption

=> Let the Initial Price of sugar be Rs. 100 and the Initial Consumption be 100 kg. => Initial Expenditure = 100 × 100 = Rs. 10,000. => New Price = 100 + 3% of 100 = Rs. 103. => Since Expenditure must remain constant, the New Expenditure = Rs. 10,000. => New Consumption = Total Expenditure ÷ New Price = 10,000 ÷ 103. => New Consumption ≈ 97.087 kg. => Reduction in Consumption = 100 − 97.087 = 2.913 kg. => Percentage Reduction = (2.913 ÷ 100) × 100 = 2.913% ≈ 2.9%.

Therefore The correct answer is 2.9%.

Additional Information

Inverse Variation

When the product of two quantities is constant, an increase in one requires a proportional decrease in the other (Price prop. to 1/Consumption).

Percentage Decrease Formula

If a value increases by r%, the percentage decrease required to return to the original value is [r ÷ (100 + r)] × 100%.

Successive Percentage Changes

The net effect of two successive percentage changes a% and b% is given by the formula [a + b + (a × b ÷ 100)]%.

Therefore The correct answer is 2.9%.

Q11. Answer: (a) Rs. 4,800

Shortcut Trick

Effective Discount % = 15 + 10 − (15 × 10) ÷ 100 = 23.5%.

Net Selling Price = 100% − 23.5% = 76.5% of Marked Price.

76.5% of MP = Rs. 3,672 => MP = 3,672 ÷ 0.765 = Rs. 4,800.

Therefore The correct answer is Rs. 4,800.

Alternate Method

Given:

First Successive Discount (d1) = 15%

Second Successive Discount (d2) = 10%

Final Selling Price (SP) = Rs. 3,672

Formula Used:

SP = MP × (100 − d1)/100 × (100 − d2)/100

=> 3,672 = MP × (100 − 15)/100 × (100 − 10)/100

=> 3,672 = MP × 85/100 × 90/100

=> 3,672 = MP × 17/20 × 9/10

=> 3,672 = MP × 153/200

=> MP = (3,672 × 200) ÷ 153

=> MP = 24 × 200

=> MP = 4,800

Therefore The correct answer is Rs. 4,800.

Additional Information

Successive Discount Formula

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

Selling Price Calculation

SP = MP − Discount. If multiple discounts are applied, the base for the second discount is the price after the first discount.

Marked Price (List Price)

The price indicated on the product before any discount is applied. Discounts are always calculated on the Marked Price.

Q12. Answer: (b) 11.39% profit

Shortcut Trick

Net Profit = Sum of individual profits and losses

Net Profit = 300 − 50 + 200 = Rs. 450
Overall profit percentage = (Net Profit ÷ Total CP) × 100
Profit % = (450 ÷ 3,951) × 100 ≈ 11.39%
Therefore The correct answer is 11.39% profit.
Alternate Method
Given:
Total Cost Price (CP) of 3 bed sheets = Rs. 3,951
Profit on 1^(st) sheet = Rs. 300
Loss on 2^(nd) sheet = Rs. 50
Profit on 3^(rd) sheet = Rs. 200
Formula Used:
Overall Profit/Loss = Sum of individual Profit/Loss
Profit Percentage = (Overall Profit ÷ Total CP) × 100
Calculations:
=> Total Overall Profit = 300 − 50 + 200
=> Total Overall Profit = Rs. 450
=> Overall Profit Percentage = (450 ÷ 3,951) × 100
=> Profit % = 45000 ÷ 3,951
=> Profit % ≈ 11.3895...
=> Rounding off to two decimal places, we get 11.39%.
Therefore The correct answer is 11.39% profit.
Additional Information
Profit and Loss Percentage
Profit % is always calculated on the Cost Price (CP) unless stated otherwise. Formula: Profit % = (Profit ÷ CP) × 100.
Successive Profit/Loss
When multiple items are sold, the net profit is the algebraic sum of individual profits (positive) and losses (negative).
Rounding Rule
To round to two decimal places, look at the third decimal digit; if it is 5 or more, increase the second decimal digit by 1.

Q13. Answer: (d) 13

Shortcut Trick
Efficiency of A = 3 and B = 2 (taking Total Work as 36 units).
Combined work of A + B for 2 days = (3 + 2) × 2 = 10 units.
Remaining work to be done = 36 − 10 = 26 units.
Time taken by B alone = 26 ÷ 2 = 13 days.
Therefore The correct answer is 13 days.
Alternate Method
Given: Time taken by A = 12 days, Time taken by B = 18 days, Duration of joint work = 2 days.
Formula Used: Efficiency = Total Work ÷ Time taken; Work Done = Efficiency × Time.

Person	Days	Total Work	Efficiency
A	12	36 (LCM of 12, 18)	3
B	18	2	

=> Efficiency of A = 3 units/day
=> Efficiency of B = 2 units/day
=> Total work done by A and B in 2 days = (3 + 2) × 2 = 10 units
=> Remaining work = Total Work − Work Done = 36 − 10 = 26 units
=> Time taken by B to complete the remaining work = 26 ÷ 2 = 13 days
Therefore The correct answer is 13 days.
Additional Information
Relationship between Efficiency and Time

Efficiency is inversely proportional to the time taken to complete a work. If the ratio of time taken by two people is x : y, the ratio of their efficiencies will be y : x.

Work and Wages

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

Combined Work Formula

If A can do a work in x days and B in y days, together they can do the work in (x × y) ÷ (x + y) days.

Q14. Answer: (b) 23.91

Shortcut Trick

Net percentage Increase after 15% and 20% = 15 + 20 + (15 × 20 ÷ 100) = 38%.

Let the initial Price be 100, then the current Price = 138.

Required Price for 5% Overall Effective Increment = 105.

Percentage Decrease needed = (138 − 105) ÷ 138 × 100 ≈ 23.91%.

Therefore The correct answer is 23.91%.

Alternate Method

Given: First Increase = 15%, Second Increase = 20%, Target Effective Increment = 5%.

=> Let the initial Price of the Item = 100.

=> Price after first 15% Increase = 100 + 15 = 115.

=> Price after second 20% Increase = 115 + (20 ÷ 100 × 115) = 115 + 23 = 138.

=> Required Final Price with 5% Overall Effective Increment = 100 + 5 = 105.

=> Absolute Decrease needed from the current price = 138 − 105 = 33.

=> Approximate Percentage Decrease = (33 ÷ 138) × 100.

=> Percentage Decrease = 23.913% ≈ 23.91%.

Therefore The correct answer is 23.91%.

Additional Information

Successive Percentage Formula

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

Multiplier Method

The final value after multiple changes can be calculated using multipliers: Final Value = Initial Value × (1 ± r1/100) × (1 ± r2/100).

Base for Percentage Decrease

When calculating a percentage decrease to return to a target value, the denominator must always be the current (larger) value.

Q15. Answer: (a) 52.6

Shortcut Trick

Ratio of Men to Women = 60% : 40% = 3 : 2

Using Weighted Average shortcut:

Average = (Ratio_(Men) × Avg_(Men) + Ratio_(Women) × Avg_(Women)) ÷ Total Ratio

Average = (3 × 51 + 2 × 55) ÷ (3 + 2) = (153 + 110) ÷ 5 = 263 ÷ 5 = 52.6

Therefore The correct answer is 52.6 years.

Alternate Method

Given:

Percentage of Men = 60%

Percentage of Women = 40%

Average age of Men = 51 years

Average age of Women = 55 years

Formula Used:

Combined Average = (n1x1 + n2x2) ÷ (n1 + n2)

Calculations:

Assume total members in the health club = 100

=> Number of Men = 60% of 100 = 60

=> Number of Women = 40% of 100 = 40

=> Total age of Men = 60 × 51 = 3060 years

=> Total age of Women = 40 × 55 = 2200 years

=> Total age of all members = 3060 + 2200 = 5260 years

=> Average age of all members = 5260 ÷ 100

=> Average age = 52.6 years

Therefore The correct answer is 52.6 years.

Additional Information

Weighted Average Formula

It is used when two groups with different averages are combined. Formula: A_(avg) = (w1a1 + w2a2) ÷ (w1 + w2), where w represents weight/number and a represents average.

Net Deviation Method

Assume a baseline average and calculate the net increase or decrease relative to that baseline, then distribute the net change over the total number of items.

Alligation Rule

(Quantity 1) ÷ (Quantity 2) = (Average 2 − Combined Average) ÷ (Combined Average − Average 1). This is useful for finding ratios or combined means.

Q16. Answer: (d) 10

Shortcut Trick

Assume Total Capacity of the cistern = LCM(15, 20, 30) = 60 units.

Efficiencies: Pipe A = 4, Pipe B = 3, Pipe C = −2 (outlet).

Net efficiency for first 5 hours = 4 + 3 − 2 = 5 units/hr. Work done = 5 × 5 = 25 units.

Remaining work = 60 − 25 = 35 units. Time taken by (A + B) = 35 ÷ 7 = 5 hours.

Total time = 5 hr (initial) + 5 hr (remaining) = 10 hours.

Therefore The correct answer is 10 hr.

Alternate Method

Given: Filling time for Pipe A = 15 hr, Pipe B = 20 hr; Emptying time for Pipe C = 30 hr.

Pipe	Time (hr)	Total Work (LCM)	Efficiency
A (Inlet)	15	60	4
B (Inlet)	20	3	
C (Outlet)	30	−2	

=> Work done by A, B, and C together in 5 hours = 5 × (4 + 3 − 2)

=> Work done = 5 × 5 = 25 units

=> Remaining Work to be filled = Total Work − Completed Work

=> Remaining Work = 60 − 25 = 35 units

=> Since Pipe C is closed, only A and B will fill the remaining cistern.

=> Combined efficiency of (A + B) = 4 + 3 = 7 units/hr

=> Time taken to fill remaining part = 35 ÷ 7 = 5 hours

=> Total Time = Initial 5 hours + Remaining 5 hours = 10 hours

Therefore The correct answer is 10 hr.

Additional Information

Inlet and Outlet Pipes

Inlet pipes add water (positive efficiency), while outlet pipes remove water (negative efficiency). Net work is the algebraic sum of their efficiencies.

Time and Efficiency Relationship

Efficiency is inversely proportional to the time taken to complete the work. Efficiency = Total Work ÷ Time.

Pipes and Cisterns Concept

If an inlet pipe fills a tank in x hours and an outlet pipe empties it in y hours, the net work done in 1 hour when both are open is (1/x − 1/y).

Q17. Answer: (d) 12.5

Given:

Expression: $0.5^2 \times 5^5 \times 2^{(-4)} \times 4^4 \times 10^{(-3)} \div a = 1$

Formula used:

1. $x^m \times x^n = x^{(m+n)}$
2. $(x^m)^n = x^{(m \times n)}$
3. $x^{(-n)} = 1/x^n$

Calculation:

$0.5^2 \times 5^5 \times 2^{(-4)} \times 4^4 \times 10^{(-3)} \div a = 1$

$\Rightarrow a = (1/2)^2 \times 5^5 \times 2^{(-4)} \times (2^2)^4 \times (2 \times 5)^{(-3)}$

$\Rightarrow a = 2^{(-2)} \times 5^5 \times 2^{(-4)} \times 2^8 \times 2^{(-3)} \times 5^{(-3)}$

$\Rightarrow a = 2^{((-2 - 4 + 8 - 3))} \times 5^{((5 - 3))}$

$\Rightarrow a = 2^{(-1)} \times 5^2$

$\Rightarrow a = (1/2) \times 25$

$\Rightarrow a = 12.5$

The simplified value of the variable a is 12.5.

Therefore The correct answer is option (4).

Q18. Answer: (d) 41

Shortcut Trick

Let the HCF of the three numbers be x.

Since the ratio is 11 : 3 : 2, and 11, 3, and 2 are co-prime numbers, their LCM will be $11 \times 3 \times 2 \times x$.

$\Rightarrow 66x = 2706$

$\Rightarrow x = 2706 \div 66$

$\Rightarrow x = 41$

Therefore The correct answer is 41.

Alternate Method

Given:

$\Rightarrow$ Ratio of three numbers = 11 : 3 : 2

$\Rightarrow$ LCM of the numbers = 2706

Formula Used:

$\Rightarrow$ Numbers = (Ratio Part) × HCF

$\Rightarrow$ LCM of (ax, bx, cx) = x × LCM(a, b, c), where x is the HCF.

Calculations:

Let the common multiplier (which is the HCF) be x.

$\Rightarrow$ First number = 11x

$\Rightarrow$ Second number = 3x

$\Rightarrow$ Third number = 2x

$\Rightarrow$ LCM (11x, 3x, 2x) = x × LCM (11, 3, 2)

$\Rightarrow$ Since 11, 3, and 2 have no common factors other than 1, their LCM is $11 \times 3 \times 2 = 66$.

$\Rightarrow 66x = 2706$

$\Rightarrow x = 2706 \div 66$

$\Rightarrow x = 41$

Therefore The correct answer is 41.

Additional Information

HCF (Highest Common Factor)

The greatest number that divides two or more numbers without leaving a remainder. For numbers in a ratio, the HCF is the common multiplier.

LCM (Least Common Multiple)

The smallest positive integer that is divisible by each of the given numbers. LCM = HCF × product of remaining co-prime factors.

Property of Two Numbers

For any two numbers A and B: A × B = HCF(A, B) × LCM(A, B). This property does not directly apply to more than two numbers.

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Q19. Answer: (c) Rs. 8,919

Shortcut Trick

To find the total cost of 9 items when the cost of 5 items is given, find the price per item and multiply by the required quantity.

Cost per dress = 4955 ÷ 5 = 991

Cost of 9 dresses = 991 × 9 = 8919

Therefore The correct answer is Rs. 8,919.

Alternate Method

Given:

Price of 5 identical dresses = Rs. 4,955

Number of dresses Meena buys = 9

Formula Used:

Unitary Method: Value of 1 unit = Total Value ÷ Total Units

Total Required Value = Value of 1 unit × Required Units

Calculations:

=> Cost of 5 dresses = Rs. 4,955

=> Cost of 1 dress = 4955 ÷ 5

=> Cost of 1 dress = Rs. 991

=> Cost of 9 dresses = 991 × 9

=> Cost of 9 dresses = Rs. 8,919

Therefore The correct answer is Rs. 8,919.

Additional Information

Unitary Method

A technique for solving a problem by first finding the value of a single unit, and then finding the necessary value by multiplying the single unit value.

Direct Proportion

When two quantities increase or decrease at the same rate. In this case, more dresses lead to a higher cost: x1/y1 = x2/y2.

Inverse Proportion

When an increase in one quantity results in a decrease in the other. Product remains constant: x1 × y1 = x2 × y2.

Q20. Answer: (d) 10 seconds

Shortcut Trick

Relative Speed in opposite directions = S1 + S2 = 36 + 54 = 90 km/h.

Convert Relative Speed to m/s: 90 × (5/18) = 25 m/s.

Total distance to be covered = Sum of lengths of trains = 100 + 150 = 250 m.

Required Time = Total Distance ÷ Relative Speed = 250 ÷ 25 = 10 sec.

Therefore The correct answer is 10 sec.

Alternate Method

Given:

Length of Train 1 (L1) = 100 m

Length of Train 2 (L2) = 150 m

Speed of Train 1 (S1) = 36 km/h

Speed of Train 2 (S2) = 54 km/h

Formula Used:

Time = Total Distance ÷ Relative Speed

Relative Speed (Opposite Direction) = S1 + S2

Calculations:

=> Total Distance = L1 + L2 = 100 + 150 = 250 m

=> Relative Speed = S1 + S2 = 36 + 54 = 90 km/h

=> Convert km/h to m/s: 90 × (5/18) m/s

=> Relative Speed = 5 × 5 = 25 m/s

=> Time taken = 250 ÷ 25

=> Time taken = 10 sec

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Therefore The correct answer is 10 sec.

Additional Information

Relative Speed Concepts

When two objects move in opposite directions, their relative speed is the sum of their individual speeds (S1 + S2). If they move in the same direction, the relative speed is the difference between their speeds (|S1 − S2|).

Unit Conversion

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

Crossing Different Objects

When a train crosses a stationary point/pole, distance = length of train. When it crosses a platform or bridge, distance = length of train + length of platform.

Q21. Answer: (c) 5 years

Shortcut Trick

Present Ratio (Father : Son) = 6 : 1 (Difference = 5 units)

Ratio after 5 years = 7 : 2 (Difference = 5 units)

Increase in units for both = 7 − 6 = 1 unit (or 2 − 1 = 1 unit).

This 1 unit increase corresponds to the 5-year time gap.

=> 1 unit = 5 years.

Son's present age = 1 unit = 5 years.

Therefore The correct answer is 5 years.

Alternate Method

Given:

Present ratio of Father and Son = 6 : 1

Ratio after 5 years = 7 : 2

Calculations:

Let the present age of the Father be 6x and the Son be x.

=> Age of Father after 5 years = 6x + 5

=> Age of Son after 5 years = x + 5

According to the given ratio after 5 years:

=> (6x + 5) ÷ (x + 5) = 7 ÷ 2

=> 2 × (6x + 5) = 7 × (x + 5)

=> 12x + 10 = 7x + 35

=> 12x − 7x = 35 − 10

=> 5x = 25

=> x = 5

Present age of the Son = x = 5 years.

Therefore The correct answer is 5 years.

Additional Information

Constant Age Difference

The difference between the ages of two individuals remains the same throughout their lives. In ratio problems, ensure the unit difference between the two terms is balanced across time periods.

Ratio Balancing Method

If the differences between ratio terms (e.g., 6−1=5 and 7−2=5) are already equal, the change in units directly represents the time interval. If not equal, multiply ratios by the other ratio's difference to balance them.

Linear Equation in Ages

For 'n' years ago, subtract n from the present age; for 'n' years hence, add n to the present age to form the required equation.

Q22. Answer: (b) 70

Given:

Expression: {1 / 0.01} × {[(5 / 8) + 0.25] × (4 / 5)}

Formula used:

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

Calculations:

{1 / 0.01} × {[(5 / 8) + 0.25] × (4 / 5)}
=> 100 × {[(5 / 8) + (2 / 8)] × (4 / 5)}
=> 100 × {7 / 8 × 4 / 5}
=> 100 × 28 / 40
=> 100 × 7 / 10
=> 10 × 7
=> 70
Therefore The correct answer is option (2).

Q23. Answer: (b) 7500

Shortcut Trick
The sum of cubes property states that if a + b + c = 0, then $a^3 + b^3 + c^3 = 3abc$.
Here, the sum of the base values is 25 + (−20) + (−5) = 0.
Applying the trick: 3 × 25 × (−20) × (−5) = 75 × 100 = 7500.
Therefore The correct answer is 7500.
Alternate Method
Given:
Expression: $25^3 + (-20)^3 + (-5)^3$
Let a = 25, b = −20, and c = −5.
Formula Used:
The Algebraic Identity used is: $a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$.
Calculations:
=> First, calculate the sum of the variables: a + b + c = 25 + (−20) + (−5)
=> a + b + c = 25 − 20 − 5 = 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 × 25 × (−20) × (−5)
=> Value = 75 × 100
=> Value = 7500
Therefore The correct answer is 7500.
Additional Information
Conditional Identity
When the sum of three variables is zero, their sum of cubes is always equal to three times their product (3abc).
Sum of Cubes Formula
The factorized form is $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$, useful for binomial cubic expressions.
Trinomial Square Identity
The square of a sum is given by $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$.

Q24. Answer: (b) C

Shortcut Trick
Scheme A: Net Discount = 45 + 44 − (45 × 44)/100 = 69.2%
Scheme B: Net Discount = 100 − (64% × 59% × 55%) ≈ 79.2%
Scheme C: Total Discount = [(4 × 49) + (6 × 19)] / 10 = 31%
Scheme D: Discount = 7 ÷ (10 + 7) × 100 ≈ 41.2%
Comparing all, Scheme C offers the minimum discount (31%).
Therefore The correct answer is Scheme C.
Alternate Method
Assume the Marked Price (MP) of each toy is Rs. 100.
For a customer buying 10 toys, the total MP = 10 × 100 = Rs. 1000.
Formula Used: Effective Discount % = (Total Discount ÷ Total MP) × 100
=> Scheme A: Net discount = 45 + 44 − (45 × 44)/100 = 89 − 19.8 = 69.2%
=> Scheme B: Final SP factor = 0.64 × 0.59 × 0.55 = 0.20768 → Discount = (1 − 0.20768) × 100 = 79.232%

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=> Scheme C: Discount on first 4 = 4 × 49 = Rs. 196; Discount on next 6 = 6 × 19 = Rs. 114. Total = Rs. 310. Discount % = (310/1000) × 100 = 31%

=> Scheme D: Discount % = [Free items ÷ Total items] × 100 = [7 ÷ 17] × 100 ≈ 41.18%

=> The least beneficial scheme for the customer is the one with the lowest discount percentage.

=> 31% < 41.18% < 69.2% < 79.23%

Therefore The correct answer is Scheme C.

Additional Information

Successive Discounts Formula

For two successive discounts of x% and y%, the single equivalent discount is [x + y − (xy/100)]%.

Buy X Get Y Free

In such schemes, the effective discount percentage is given by [Y ÷ (X + Y)] × 100.

Customer Benefit Rule

A scheme is most beneficial to a customer when the total discount is maximum and least beneficial when the total discount is minimum.

Q25. Answer: (c) 403.2 cm³

Shortcut Trick

When multiple identical cuboids are stacked, the total Volume is simply the sum of their individual volumes.

Volume of one cuboid = 10.5 × 6.4 × 2 = 134.4 cm³

Total Volume = 3 × 134.4 = 403.2 cm³

Therefore The correct answer is 403.2 cm³.

Alternate Method

Given:

Length of each cuboid (l) = 10.5 cm

Breadth of each cuboid (b) = 6.4 cm

Height of each cuboid (h) = 2 cm

Number of cuboids stacked = 3

Formula Used:

Volume of a cuboid = Length × Breadth × Height

When three cuboids are stacked one on top of the other:

=> New Length (L) = 10.5 cm

=> New Breadth (B) = 6.4 cm

=> New Height (H) = 2 + 2 + 2 = 6 cm

=> Volume of new cuboid = L × B × H

=> Volume = 10.5 × 6.4 × 6

=> Volume = 67.2 × 6

=> Volume = 403.2 cm³

Therefore The correct answer is 403.2 cm³.

Additional Information

Total Surface Area of Cuboid

The total area of all six faces is given by 2 × (lb + bh + hl).

Diagonal of a Cuboid

The longest rod that can be placed inside a cuboid is the diagonal, calculated as √(l² + b² + h²).

Lateral Surface Area

The area of the four side walls is given by 2 × h × (l + b).

Q26. Answer: (b) 34.8

Shortcut Trick

In an average calculation, the sum of deviations from the average must be zero.

Deviations from 18 are: (6.5 − 18) = −11.5, (10.8 − 18) = −7.2, and (19.9 − 18) = +1.9.

Sum of known deviations = −11.5 − 7.2 + 1.9 = −16.8.

To make the net deviation zero, the deviation of a must be +16.8.

Value of a = 18 + 16.8 = 34.8.

Therefore The correct answer is 34.8.

Alternate Method

Given:

Numbers: 6.5, 10.8, 19.9, and a

Total count (n) = 4

Average = 18

Formula Used:

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

Calculations:

=> (6.5 + 10.8 + 19.9 + a) ÷ 4 = 18

=> 6.5 + 10.8 + 19.9 + a = 18 × 4

=> 37.2 + a = 72

=> a = 72 − 37.2

=> a = 34.8

Therefore The correct answer is 34.8.

Additional Information

Arithmetic Mean

The Arithmetic Mean is the central value of a set of numbers, calculated by adding them together and dividing by the count.

Sum Property

The total sum of any dataset can be found using the formula: Sum = Average × Number of terms.

Deviation Rule

The sum of deviations of all observations from their arithmetic mean is always zero (Σ(x − Mean) = 0).

Q27. Answer: (b) Rs. 2,100

Shortcut Trick

Effective rate of Compound Interest for 2 years at 10% = x + y + (xy/100)

=> Effective Rate = 10 + 10 + (10 × 10)/100 = 21%

=> Compound Interest = 21% of Rs. 10,000

=> Interest = 0.21 × 10,000 = Rs. 2,100

Therefore The correct answer is Rs. 2,100.

Alternate Method

Given:

Principal (P) = Rs. 10,000

Rate (R) = 10% per annum

Time (n) = 2 years

Formula Used:

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

Compound Interest (CI) = A − P

Calculations:

=> $A = 10,000 \times (1 + 10/100)^2$

=> $A = 10,000 \times (11/10) \times (11/10)$

=> $A = 10,000 \times (121 / 100)$

=> A = 100 × 121 = Rs. 12,100

=> Compound Interest (CI) = 12,100 − 10,000

=> CI = Rs. 2,100

Therefore The correct answer is Rs. 2,100.

Additional Information

Simple Interest vs Compound Interest

Simple interest is calculated only on the Principal, while compound interest is calculated on the Principal plus the accumulated interest of previous periods.

Difference for 2 Years

The difference between CI and SI for 2 years is given by the formula: Difference = $P \times (R/100)^2$.

Rule of 72

To find the approximate time required to double your money at a given interest rate, divide 72 by the annual rate of return.

Q28. Answer: (d) 616 sq cm

Shortcut Trick

The Surface Area of a sphere is given by $4\pi r^2$.

Since π contains the factor 22 (2 × 11), the result must be a multiple of 11.

For r = 7 cm, Surface Area = 4 × (22/7) × 7 × 7 = 88 × 7.

88 × 7 = 616 sq cm.

Therefore The correct answer is 616 sq cm.

Alternate Method

Given:

Radius of the sphere (r) = 7 cm

Value of π = 22/7

Formula Used:

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

Calculations:

=> Surface Area = $4 \times (22/7) \times (7)^2$

=> Surface Area = 4 × (22/7) × 7 × 7

=> Surface Area = 4 × 22 × 7

=> Surface Area = 88 × 7

=> Surface Area = 616 sq cm

Therefore The correct answer is 616 sq cm.

Additional Information

Volume of a Sphere

The total space occupied by a sphere is given by the formula $V = (4/3)\pi r^3$.

Curved Surface Area of a Hemisphere

A hemisphere is half of a sphere; its curved surface area is half that of a sphere: $CSA = 2\pi r^2$.

Total Surface Area of a Hemisphere

For a solid hemisphere, the total surface area includes the curved part and the flat circular base: $TSA = 3\pi r^2$.

Q29. Answer: (c) Rs. 400

Shortcut Trick

Net difference in percentage = Gain% − (Loss%) = 5% − (−10%) = 15%

According to the question, 15% of Cost Price = Rs. 60

1% of Cost Price = 60 ÷ 15 = Rs. 4

100% (Cost Price) = 4 × 100 = Rs. 400

Therefore The correct answer is Rs. 400.

Alternate Method

Given:

Initial Loss = 10%

New Gain = 5%

Difference in Selling Price = Rs. 60

Formula Used:

Selling Price (SP) = Cost Price (CP) × (100 ± Profit/Loss%)/100

Let the Cost Price (CP) of the article be Rs. x.

=> Initial Selling Price (SP1) = x − 10% of x = 0.90x

=> New Selling Price (SP2) = x + 5% of x = 1.05x

=> Difference: SP2 − SP1 = 60

=> 1.05x − 0.90x = 60

=> 0.15x = 60

=> x = 60 ÷ 0.15

=> x = 400

Therefore The correct answer is Rs. 400.

Additional Information

Direct CP Formula

When there is a shift from loss to gain, Cost Price = [Difference in SP ÷ (Loss% + Gain%)] × 100.

Profit and Loss Percentage

Always calculate Profit% and Loss% on the Cost Price unless stated otherwise. Formula: (Profit/Loss ÷ CP) × 100.

Marked Price (MP)

The price at which a Discount is offered is the Marked Price. SP = MP × (100 − Discount%)/100.

Q30. Answer: (c) Rs. 2,240

Shortcut Trick

Simplified ratio X : Y : Z = 1/2 : 1/4 : 5/16 → Multiply by LCM (16) = 8 : 4 : 5.

Total parts = 8 + 4 + 5 = 17 units.

17 units = Rs. 9,520 => 1 unit = 9520 ÷ 17 = Rs. 560.

Share of Y = 4 units = 4 × 560 = Rs. 2,240.

This corresponds to Option 3.

Therefore The correct answer is Rs. 2,240.

Alternate Method

Given:

Total sum = Rs. 9,520

Ratio of X : Y : Z = 1/2 : 1/4 : 5/16

Formula Used:

Share of an individual = (Individual ratio part ÷ Sum of ratio parts) × Total Amount

Calculations:

=> To simplify the Ratio, find the LCM of denominators 2, 4, and 16, which is 16.

=> Ratio X : Y : Z = (1/2 × 16) : (1/4 × 16) : (5/16 × 16)

=> Ratio X : Y : Z = 8 : 4 : 5

=> Sum of ratios = 8 + 4 + 5 = 17 units

=> 17 units = Rs. 9,520

=> 1 unit = 9520 ÷ 17 = Rs. 560

=> Share of Y = 4 units = 4 × 560 = Rs. 2,240

=> Therefore, Option 3 is the correct result.

Therefore The correct answer is Rs. 2,240.

Additional Information

Ratio Simplification

To convert a fractional ratio into a whole number ratio, multiply each term by the Least Common Multiple (LCM) of all the denominators.

Unitary Method in Ratios

Divide the total quantity by the sum of the ratio parts to find the value of a single unit (1 part = Total ÷ Sum of Ratios).

Direct Proportion

The share of any individual is directly proportional to their respective ratio part when a fixed sum is divided among multiple entities.

Q31. Answer: (b) CCI may impose remedies and fix liability on office-bearers

The correct answer is CCI may impose remedies and fix liability on office-bearers.

Key Points

• In the landmark litigation involving the Competition Commission of India (CCI) and the Kerala Film Exhibitors Federation, the Supreme Court affirmed the regulatory power to hold individual leaders of trade bodies accountable for anti-competitive conduct.

• The core of this principle lies in Section 48 of the Competition Act, 2002, which deals with the liability of persons in charge of companies or associations found in contravention of the law.

• The Court clarified that an association of persons or a trade federation falls under the definition of a 'company' for the purposes of Section 48, allowing the CCI to look behind the corporate veil.

• This ensures that office-bearers, including Presidents, Secretaries, and Directors, cannot evade responsibility if they were

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responsible for the conduct of the association's business at the time of the violation.

• The affirmation allows the CCI to impose personal penalties (usually a percentage of their income) and behavioral remedies on these individuals to deter the practice of using federations to orchestrate boycotts or restrictive trade practices.

• By fixing individual liability, the ruling prevents trade associations from acting as a front for cartelization or market distortion, ensuring effective enforcement of competition law in fragmented industries like the film exhibition sector.

Additional Information

• Competition Act, 2002:

• Established the CCI to prevent practices having an adverse effect on competition (AAEC).

• Section 3: Prohibits anti-competitive agreements, including horizontal agreements like cartels.

• Section 4: Prohibits the abuse of dominant position by an enterprise or group.

• Section 27: Empowers the CCI to issue cease and desist orders and impose significant monetary penalties on both enterprises and individuals.

• The Act was amended via the Competition (Amendment) Act, 2023, which further expanded the scope of penalties to include global turnover for certain violations.

• Vicarious Liability:

• Under Section 48(2), if it is proved that the contravention took place with the consent, connivance, or neglect of any officer, such officer is deemed guilty.

• This legal mechanism is vital for maintaining market integrity by targeting the decision-makers within non-profit or trade-related organizations.

Q32. Answer: (d) Article 74

The correct answer is Article 74.

Key Points

• Article 74(1) of the Indian Constitution explicitly states that there shall be a Council of Ministers with the Prime Minister at the head to aid and advise the President.

• The President is constitutionally mandated to exercise his functions in accordance with the advice tendered by the Council, highlighting the Parliamentary form of government where the President is the titular head (De Jure) and the Council is the real executive (De Facto).

• The 42nd Amendment Act, 1976, made the advice of the Council of Ministers binding on the President.

• The 44th Amendment Act, 1978, introduced a proviso allowing the President to return the advice for reconsideration once; however, the President must act according to the advice tendered after such reconsideration.

• Article 74(2) provides a constitutional shield by stating that the question of whether any, and if so what, advice was tendered by Ministers to the President shall not be inquired into in any court of law.

Additional Information

• Article 64:

• Specifies that the Vice-President of India shall be the ex-officio Chairman of the Council of States (Rajya Sabha).

• It also mandates that the Vice-President shall not hold any other office of profit.

• Article 84:

• Outlines the qualifications for becoming a member of Parliament.

• Key requirements include being a citizen of India and meeting age criteria: 25 years for the Lok Sabha and 30 years for the Rajya Sabha.

• Article 94:

• Deals with the vacation, resignation, and removal from the offices of the Speaker and Deputy Speaker of the House of the People.

• It mentions that the Speaker may resign by writing to the Deputy Speaker and vice versa.

Therefore, the provision for the Council of Ministers to aid and advise the President is contained in Article 74, which is Option 4.

Q33. Answer: (d) Alluvial plains with perennial rivers

The correct answer is Alluvial plains with perennial rivers.

Key Points

• Canal irrigation is most extensively developed in the Northern Plains of India, particularly in states like Uttar Pradesh, Punjab, and Haryana.

• The Alluvial Plains are characterized by deep, soft soil layers deposited by rivers, which make the digging of canals and the construction of distributaries physically easier and more cost-effective compared to rocky terrains.

• The presence of Perennial Rivers, such as the Ganga, Yamuna, and the tributaries of the Indus, provides a guaranteed water

supply throughout the year, sustaining agricultural activities across different seasons.

• The flat topography of these plains allows for the distribution of water over large distances through the force of gravity, eliminating the high energy costs associated with lifting water.

• These regions have a high water table and fertile soil, making the massive capital investment in large-scale canal networks economically viable for maximizing food grain production.

Additional Information

• Types of Canals:

• Inundation Canals: These are drawn directly from rivers without the use of any barrage or dam and provide water only when the river is in flood.

• Perennial Canals: These are fed by dams or barrages built across perennial rivers to regulate and ensure a steady water flow year-round.

• Regional Constraints:

• In the Peninsular Plateau, the presence of hard crystalline rocks and an undulating landscape makes canal excavation difficult, leading to the dominance of Tank Irrigation.

• The Indira Gandhi Canal project is a notable exception where water is transported from the Sutlej River to the arid regions of Rajasthan, significantly altering the local Thar Desert ecosystem.

• Coastal regions often face issues with salinity and sandy soil textures that lead to high water seepage, making canal transport less efficient than in clay-rich alluvial zones.

Q34. Answer: (b) Repo rate kept at 5.50% with a neutral monetary policy stance

The correct answer is Repo rate kept at 5.50% with a neutral monetary policy stance.

Key Points

• The 57th meeting of the Monetary Policy Committee (MPC) was conducted from September 29 to October 1, 2025, under the chairmanship of RBI Governor Sanjay Malhotra.

• The committee voted unanimously to maintain the policy repo rate under the liquidity adjustment facility (LAF) at 5.50%.

• The MPC also decided to retain the monetary policy stance as neutral to remain flexible while ensuring that inflation aligns with the target while supporting economic growth.

• The Standing Deposit Facility (SDF) rate remained unchanged at 5.25%, while the Marginal Standing Facility (MSF) rate and the Bank Rate were kept steady at 5.75%.

• The decision to hold rates follows a period of monetary easing earlier in 2025, where the repo rate was reduced by 100 basis points from 6.50% to 5.50% across the February, April, and June meetings.

• During this meeting, the RBI revised the Real GDP growth projection for FY 2025-26 upwards to 6.8% from the previous estimate of 6.5%, driven by robust domestic demand and government capital expenditure.

• The Consumer Price Index (CPI) inflation forecast for FY 2025-26 was revised downwards to 2.6% (from 3.1%) due to softening food prices and the impact of GST rate rationalization.

Additional Information

• Monetary Policy Stance Definitions:

• Neutral Stance: Indicates that the central bank is comfortable with current interest rates and can move in either direction (hike or cut) based on incoming economic data and global uncertainty.

• Accommodative Stance: A posture where the central bank is prepared to expand the money supply and cut rates to stimulate economic activity.

• Hawkish Stance: A focus on controlling inflation as the top priority, often leading to higher interest rates to reduce liquidity.

• Calibrated Tightening: A stance indicating that rate hikes are on the table, but rate cuts are ruled out for the immediate future.

• MPC Composition: The Monetary Policy Committee consists of six members: three from the Reserve Bank of India and three external members appointed by the Government of India. Decisions are made by a majority vote, with the Governor having a casting vote in case of a tie.

• Policy Corridor: The SDF and MSF rates represent the floor and ceiling of the interest rate corridor, which is positioned 25 basis points below and above the repo rate, respectively.

Q35. Answer: (b) 25 basis points

The correct answer is 25 basis points.

Key Points

• During the 54th meeting of the Monetary Policy Committee (MPC) held from April 7 to 9, 2025, the committee unanimously voted to reduce the policy repo rate by 25 basis points.

• With this 25 bps cut, the benchmark repo rate was brought down from 6.25% to 6.00% with immediate effect.

• The decision was taken under the chairmanship of the RBI Governor, Sanjay Malhotra, marking the first bi-monthly monetary

policy statement of the financial year 2025-26.

• Consequently, the Standing Deposit Facility (SDF) rate was adjusted to 5.75%, while the Marginal Standing Facility (MSF) rate and the Bank Rate were adjusted to 6.25%.

• The MPC also unanimously decided to shift its policy stance to accommodative to support domestic economic growth amidst escalating global trade challenges and protectionist tariff regimes.

Additional Information

• Repo Rate (Repurchasing Option):

• It is the key policy interest rate at which the Reserve Bank of India (RBI) lends short-term money to commercial banks, typically against collateral of government securities.

• A lower repo rate makes borrowing cheaper for banks, which in turn leads to lower lending rates (EMIs) for home, auto, and other consumer loans.

• Monetary Policy Committee (MPC):

• The MPC is a six-member statutory body constituted under Section 45ZB of the amended Reserve Bank of India Act, 1934.

• It is responsible for determining the policy interest rates required to achieve the inflation target of 4% within a band of plus/minus 2%.

• It consists of three internal members (including the RBI Governor as ex-officio Chairperson) and three external members appointed by the Government of India.

• Key Monetary Policy Instruments:

• Standing Deposit Facility (SDF): The rate at which the RBI absorbs liquidity from commercial banks without any collateral. It acts as the lower bound of the policy corridor.

• Marginal Standing Facility (MSF): A penal rate at which commercial banks can borrow emergency overnight funds from the RBI by dipping into their statutory liquidity ratio (SLR) portfolio.

• Basis Points (bps): A financial unit of measure equal to one-hundredth of a percentage point (0.01%). Thus, a 25 basis point change is equal to a 0.25% change.

Q36. Answer: (a) Kalidasa

The correct answer is Kalidasa.

Key Points

• Chandragupta II, popularly known as Vikramaditya, was a prominent ruler of the Gupta Empire who reigned from approximately 375 to 415 CE.

• His court was distinguished by the presence of the Navaratnas (Nine Gems), a circle of nine exceptionally talented individuals who specialized in diverse fields like literature, science, and linguistics.

• Kalidasa is celebrated as the foremost Sanskrit poet and playwright among these gems, often cited as the Shakespeare of India for his lyrical and dramatic prowess.

• He authored legendary works such as Abhijnanashakuntalam, Meghaduta, Raghuvamsha, and Kumarasambhava, which represent the zenith of Classical Sanskrit literature.

• The other members of the Navaratnas included Amarasimha (lexicographer), Dhanvantari (physician), Varahamihira (astronomer), Vararuchi (grammarian), Ghatakarpara (sculptor/poet), Kshapanaka (astrologer), Shanku (architect), and Vetala Bhatta (magician).

Additional Information

• Bhavabhuti:

• He was an 8th-century scholar and playwright associated with the court of King Yashovarman of Kannauj.

• He is famous for his three major plays: Mahaviracharita, Malatimadhava, and Uttararamacharita.

• Bana (or Banabhatta):

• He served as the Asthana Kavi (court poet) of King Harshavardhana during the 7th century CE.

• His notable literary contributions include the Harshacharita (the first historical biography in Sanskrit) and the novel Kadambari.

• Bhasa:

• One of the earliest and most celebrated Indian playwrights, believed to have flourished between the 2nd and 3rd century CE, long before Chandragupta II.

• He is credited with 13 plays, the most famous being Svapnavasavadattam, and was even praised by Kalidasa in his own works.

Q37. Answer: (b) Keshavananda Bharati case

The correct answer is Keshavananda Bharati case.

Key Points

• The Keshavananda Bharati v. State of Kerala (1973) case is a landmark judgment in Indian constitutional law where a 13-judge

bench, the largest ever constituted, delivered a verdict with a 7:6 majority.

• This case propounded the Basic Structure Doctrine, ruling that while Parliament has the power to amend the Constitution under Article 368, it cannot alter its essential features or fundamental framework.

• The judgment established that the Supremacy of the Constitution and the Separation of Powers are core elements; since Judicial Review is the mechanism used by the judiciary to interpret these laws, it is inherently part of the basic structure.

• The court held that the power of amendment is not the power to abrogate the Constitution, thereby ensuring that the Judicial Review power of the Supreme Court and High Courts remains intact to check legislative overreach.

• By limiting the amending power of Parliament, the case ensured that the Judiciary remains the final arbiter of constitutional validity, effectively recognizing Judicial Review as an indestructible pillar of the Indian Democracy.

Additional Information

• Minerva Mills case (1980):

• This case further clarified the Basic Structure Doctrine by striking down portions of the 42nd Amendment Act.

• The court explicitly held that Judicial Review and a limited amending power are fundamental features that cannot be taken away.

• Menaka Gandhi case (1978):

• Significantly expanded the scope of Article 21 (Right to Life and Personal Liberty).

• Established the principle that any law depriving a person of their liberty must satisfy the triple test of being prescribed by law, having a legitimate aim, and being just, fair, and reasonable.

• Indra Sawhney case (1992):

• Commonly known as the Mandal Commission case, it examined the scope of Article 16(4) regarding reservations.

• The court upheld 27% reservation for Other Backward Classes (OBCs) but introduced the creamy layer concept and a 50% ceiling on total reservations.

Q38. Answer: (b) Man-in-loop retargeting via infrared seeker

The correct answer is Man-in-loop retargeting via infrared seeker.

Key Points

• The Naval Anti-Ship Missile-Short Range (NASM-SR) is the first indigenous air-launched anti-ship missile system developed by the Defence Research and Development Organisation (DRDO) specifically for the Indian Navy.

• The missile is equipped with a highly advanced Imaging Infrared (IIR) seeker, which enables it to home in on the thermal signature of enemy vessels, providing high-resolution imagery for target discrimination.

• The Man-in-loop (MIL) feature is a critical technological highlight that provides a real-time data link between the missile and the operator, allowing for retargeting or the selection of a specific impact point on the ship after launch.

• The flight test conducted in February 2025 successfully demonstrated the seamless integration of this seeker-link technology, confirming the missile's high precision and lethality in complex maritime environments.

• Designed for launch from maritime helicopters like the Sikorsky MH-60R and Sea King, the missile effectively bridges the gap in the Navy's short-range offensive capabilities against corvette-class vessels and patrol boats.

Additional Information

• Guidance and Stealth:

• Unlike radar-guided missiles, the IIR seeker is a passive guidance system, meaning it does not emit signals that can be detected by the target ship's Electronic Support Measures (ESM), making the missile stealthier.

• The missile utilizes a combination of Inertial Navigation System (INS) and satellite navigation (GPS/NavIC) for mid-course guidance before the seeker takes over for the terminal phase.

• Operational Performance:

• The NASM-SR has an operational range of approximately 55 kilometers and travels at subsonic speeds, optimized for sea-skimming flight to evade enemy defenses.

• It is powered by a solid-propellant rocket motor and carries a specialized semi-armor-piercing warhead designed to penetrate the thick hulls of naval targets.

Q39. Answer: (c) Cameroon

The correct answer is Cameroon.

Key Points

• Paul Biya, born on February 13, 1933, is the second president of the Republic of Cameroon.

• He originally assumed office on November 6, 1982, succeeding the country's first president, Ahmadou Ahidjo, after serving as Prime Minister from 1975 to 1982.

• At the age of 92, he secured his eighth presidential term during the elections held on October 12, 2025, which was officially declared by the Constitutional Council of Cameroon.

• With a tenure spanning over four decades, he is recognized as the world's oldest serving head of state and the longest consecutively ruling non-royal leader in the world.

Additional Information

• Nigeria:

• A major West African nation with its federal capital located in Abuja.

• The current President of Nigeria is Bola Tinubu, who assumed office in May 2023.

• Chad:

• A landlocked country in North-Central Africa, bordered by Cameroon to the southwest, with its capital at N'Djamena.

• The state is led by President Mahamat Déby.

• Sudan:

• A country in Northeast Africa with its capital in Khartoum.

• It has been governed under a transitional military council led by General Abdel Fattah al-Burhan.

Q40. Answer: (b) Solar Power

The correct answer is Solar Power.

Key Points

• According to the International Renewable Energy Agency (IRENA) Renewable Energy Statistics 2025, India has emerged as a global leader by securing the 3rd rank in total installed solar power capacity.

• This milestone indicates that India has effectively overtaken major industrial economies like Japan and Germany in the cumulative deployment of Solar Photovoltaic (PV) systems.

• The primary drivers for this growth include the National Solar Mission, which aims to establish India as a global leader in solar energy, and the Production Linked Incentive (PLI) scheme for high-efficiency solar modules.

• As per the report data, China continues to lead the global rankings at the 1st position, followed by the United States at the 2nd position, highlighting the competitive nature of the global energy transition.

• India’s progress is further supported by the development of massive Ultra Mega Solar Power Projects, such as the Bhadla Solar Park in Rajasthan, which is one of the largest single-location solar plants in the world.

• The government of India has set a target of achieving 500 GW of non-fossil fuel-based energy capacity by the year 2030, with solar power being the most significant contributor to this goal.

Additional Information

• Wind Power:

• India holds the 4th global rank in installed wind power capacity.

• The sector is dominated by states like Tamil Nadu, Gujarat, and Karnataka due to their high wind density and coastal geography.

• Hydropower:

• India ranks in the top 6 globally for total hydropower capacity (including pumped storage).

• It involves Large Hydro Projects (managed by the Ministry of Power) and Small Hydro Projects (SHP) which are categorized as renewable energy.

• Bio Power:

• This category encompasses Biomass Power, Bagasse Cogeneration, and Waste-to-Energy initiatives.

• While India has a huge potential of over 25-30 GW due to its agricultural surplus, it currently ranks lower than its solar and wind counterparts in total installed capacity.

Q41. Answer: (d) Negative Cultural Impact

The correct answer is Negative Cultural Impact.

Key Points

• Increased Consumer Choice: Globalization led to the entry of numerous Multinational Corporations (MNCs) into the Indian market, offering a vast array of products and services. This competition has significantly enhanced the quality and variety available to Indian consumers.

• Global Integration: The 1991 Economic Reforms aimed to integrate the Indian economy with the global market. This was achieved by reducing import duties, encouraging Foreign Direct Investment (FDI), and aligning domestic policies with World Trade Organization (WTO) standards.

• Technological Advancement: The influx of foreign companies brought high-end technology and modern management practices. This helped modernize sectors like Information Technology (IT), telecommunications, and the automobile industry, making India a global hub for outsourcing.

• Conclusion on Cultural Impact: While globalization introduces foreign influences, it often results in a Cultural Synthesis rather than a purely negative impact. In the context of economic development goals, Negative Cultural Impact is not considered an

intended or primary result of the globalization process.

Additional Information

• Globalization:

• It refers to the process of rapid integration or interconnection between countries through trade, migration, and capital flow.

• In India, it was initiated under the New Economic Policy of 1991 by the government of P.V. Narasimha Rao and Finance Minister Dr. Manmohan Singh.

• The core pillars were Liberalization, Privatization, and Globalization (LPG).

• Impact on the Indian Economy:

• Significant increase in the Gross Domestic Product (GDP) growth rate.

• Growth of the Service Sector, contributing to over 50% of India's GDP.

• Expansion of Foreign Exchange Reserves and better access to international capital markets.

Q42. Answer: (c) Sleep uses more power than Hibernate.

The correct answer is Sleep uses more power than Hibernate..

Key Points

• Sleep mode is a low-power state that keeps your open programs and data in the Random Access Memory (RAM). Because RAM is volatile memory, it requires a constant, albeit small, supply of electricity to maintain the stored information.

• In Windows 11, entering Sleep allows the system to resume full-power operation almost instantly, but the device continues to draw power to prevent data loss from the memory modules.

• Hibernate mode operates by taking all the information currently in the RAM and writing it to the Hard Disk Drive (HDD) or Solid State Drive (SSD) into a specialized file known as hiberfil.sys.

• Once the session data is stored on non-volatile storage, the computer effectively shuts down and stops consuming electricity entirely. This makes Hibernate significantly more energy-efficient than Sleep for long-term inactivity.

• According to the ACPI (Advanced Configuration and Power Interface) standards, Sleep typically corresponds to the S3 state, while Hibernate corresponds to the S4 state, which is the final stage before a complete mechanical off state (S5).

Additional Information

• Technical Comparison:

• Power Consumption: Sleep maintains a trickle charge to RAM; Hibernate uses zero power once the disk-writing process is complete.

• Resumption Speed: Sleep is much faster as it does not need to reload data from the disk; Hibernate requires a Cold Boot process to move data back into RAM.

• Data Security: If a laptop battery dies while in Sleep mode, unsaved data is lost. In Hibernate, data is safe on the disk even without power.

• Hybrid Sleep:

• Mainly used on Desktop PCs, this mode saves the session to both RAM and the Hard Disk. This provides the speed of Sleep with the data safety of Hibernate in case of a sudden power outage.

Q43. Answer: (c) They adopted constitutional methods such as petitions and discussions to seek political reforms.

The correct answer is They adopted constitutional methods such as petitions and discussions to seek political reforms.

Key Points

• The period from 1885 to 1905 in the history of the Indian National Congress (INC) is known as the Moderate Phase, led by prominent figures such as Dadabhai Naoroji, Pherozeshah Mehta, Surendranath Banerjee, and Gopal Krishna Gokhale.

• The Moderates were so named because they believed in patience and constitutionalism, maintaining a firm faith in the British sense of justice and fair play. They believed that the British were essentially good but unaware of the actual hardships faced by Indians.

• Their political strategy followed the 3Ps formula: Prayers, Petitions, and Protests. They focused on submitting formal memoranda and resolutions to the colonial authorities to express their demands for administrative and economic changes.

• Instead of demanding immediate independence or Swaraj, they sought gradual reforms such as the Indianization of Civil Services, the expansion of Legislative Councils, and the reduction of high land revenue and military expenditure.

• Their major achievement during this era was the enactment of the Indian Councils Act of 1892, which increased the number of non-official members in the central and provincial councils.

Additional Information

• Extremist Phase (1905–1919):

• Unlike the Moderates, the Extremist leaders like Bal Gangadhar Tilak, Bipin Chandra Pal, and Lala Lajpat Rai (Lal-Bal-Pal) rejected constitutional petitions.

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• They advocated for Atma-shakti (self-reliance), Boycott of foreign goods, and Swadeshi to achieve Swaraj.

• Drain of Wealth Theory:

• The Moderates made a significant contribution by exposing the economic exploitation of India. Dadabhai Naoroji, the Grand Old Man of India, detailed this in his book 'Poverty and Un-British Rule in India'.

• This intellectual critique helped create a sense of economic nationalism among the Indian masses.

• Revolutionary Movements:

• While Moderates focused on discussions, other groups turned to armed resistance and secret societies like Anushilan Samiti to challenge British rule through force.

Q44. Answer: (d) John von Neumann

The correct answer is John von Neumann.

Key Points

• John von Neumann was a Hungarian-American mathematician who formalized the concept of the stored-program computer in his influential 1945 document, First Draft of a Report on the EDVAC.

• The von Neumann architecture, also known as the Princeton architecture, is based on the principle that program instructions and data are stored in the same read-write, random-access memory (RAM).

• This design allows the Central Processing Unit (CPU) to fetch instructions and data using the same bus system, fundamentally simplifying the hardware required to switch between different computational tasks.

• Before this innovation, machines like the ENIAC had to be manually re-plugged and rewired to execute different programs, making them fixed-program computers rather than general-purpose machines.

• The architecture consists of four main sub-systems: the Arithmetic Logic Unit (ALU), the Control Unit, the Memory, and Input/Output (I/O) devices.

Additional Information

• Alan Turing:

• Commonly recognized as the Father of Modern Computer Science, he developed the theoretical model of the Turing Machine and the Universal Turing Machine.

• While he worked on early stored-program designs like the Automatic Computing Engine (ACE), the specific architecture defining modern hardware is traditionally attributed to von Neumann.

• Charles Babbage:

• An 18th-century inventor known as the Father of the Computer for designing the Difference Engine and the Analytical Engine.

• His designs were mechanical and utilized punched cards for input, laying the conceptual groundwork for programmable machines.

• Blaise Pascal:

• A French mathematician who invented the Pascaline in 1642, one of the first mechanical calculators.

• His contribution focused on automated arithmetic rather than the complex logical architecture of modern stored-program systems.

Q45. Answer: (d) 4.7%

The correct answer is 4.7%.

Key Points

• The Ministry of Statistics and Programme Implementation (MoSPI) reported that the Unemployment Rate (UR) for individuals aged 15 years and above stood at 4.7% in November 2025.

• The Unemployment Rate is a critical economic metric defined as the percentage of persons unemployed among the total persons in the Labour Force (those who are either working or actively seeking work).

• This data is derived from the Periodic Labour Force Survey (PLFS), which was launched by the National Sample Survey Office (NSSO) to provide frequent updates on employment and unemployment indicators.

• The survey covers both Rural and Urban areas, although high-frequency indicators often focus on urban trends using the Current Weekly Status (CWS) approach to capture recent labour market dynamics.

• A decline to 4.7% signifies an improvement in the labour market, suggesting that economic activities in the service, manufacturing, and agricultural sectors have expanded to absorb more workers from the 15+ age group.

• The Current Weekly Status (CWS) methodology used for these estimates determines an individual's activity status based on a reference period of the last 7 days preceding the survey date.

Additional Information

• Institutional Framework:

• MoSPI: Formed in 1999 through the merger of the Department of Statistics and the Department of Programme Implementation, it ensures the coverage of national statistical standards.

• National Statistical Office (NSO): Acts as the focal agency for the planned development of the statistical system in India and includes the NSSO and the Central Statistical Office (CSO).

• Key Labour Indicators:

• Labour Force Participation Rate (LFPR): This is the percentage of the population that is either working or seeking work; it measures the size of the available workforce.

• Worker Population Ratio (WPR): Defined as the percentage of employed persons in the total population, indicating the economy's capacity to generate jobs.

• Usual Status: Unlike CWS, the Usual Status approach considers a longer reference period of 365 days to determine employment status, capturing more stable employment trends.

• PLFS Objectives:

• To estimate key employment and unemployment indicators in the short time interval of three months for the urban areas only in the CWS.

• To estimate employment and unemployment indicators in both Usual Status and CWS in both rural and urban areas annually.

Q46. Answer: (d) Painted Grey Ware and Northern Black Polished Ware

The correct answer is Painted Grey Ware and Northern Black Polished Ware.

Key Points

• Painted Grey Ware (PGW) is the diagnostic pottery culture of the Early Iron Age in the Indo-Gangetic divide and the Upper Ganga Valley, generally dated between 1200 BCE and 600 BCE.

• This culture is characterized by a fine, grey fabric made of well-levigated clay, decorated with geometric patterns such as dots, lines, and concentric circles in black pigment.

• Archaeological excavations at sites like Atranjikhera, Hastinapur, Ahichchhatra, and Noh have confirmed the association of PGW with the early systematic use of iron technology for weapons and agricultural tools.

• Northern Black Polished Ware (NBPW) represents the succeeding phase, dating from approximately 600 BCE to 200 BCE, which marks the peak of the Iron Age and the Second Urbanization in India.

• NBPW is a luxury ware known for its unique metallic finish and highly lustrous, mirror-like surface, achieved through advanced firing techniques in specialized kilns.

• The transition from PGW to NBPW mirrors the socio-political evolution of North India from the Later Vedic period to the rise of the Mahajanapadas and the Mauryan Empire.

Additional Information

• Ochre Coloured Pottery (OCP)

• Commonly associated with the Late Copper Age or Chalcolithic period (c. 2000−1500 BCE) in the Ganga-Yamuna Doab.

• Characterized by a fragile, orange-to-red wash that rubs off easily, often found in association with Copper Hoards.

• Black-and-Red Ware (BRW)

• Produced using inverted firing techniques, resulting in a black interior and a red exterior.

• While it persists into the Iron Age, it is also a hallmark of various pre-Harappan and Chalcolithic cultures across India.

• Technological Significance

• The Iron Age in North India facilitated the clearing of dense forests in the Middle Ganga Plain, leading to surplus agricultural production and the formation of early states.

Q47. Answer: (b) 1934

The correct answer is 1934.

Key Points

• The Congress Socialist Party (CSP) was established as a socialist caucus within the Indian National Congress in 1934.

• The primary impetus for its formation was the dissatisfaction among younger leaders with the suspension of the Civil Disobedience Movement and the perceived conservative drift of the Congress leadership.

• A preliminary meeting was held in Patna in May 1934, followed by the formal foundational conference in Bombay in October 1934.

• The party was founded by revolutionary leaders including Jayaprakash Narayan, Acharya Narendra Deva, Ram Manohar Lohia, Minoo Masani, and Achyut Patwardhan.

• Acharya Narendra Deva presided over the first conference as President, while Jayaprakash Narayan served as the General Secretary.

• The CSP aimed to give the Indian National Congress a more radical and socialist orientation, advocating for the interests of peasants and laborers.

• Members of the CSP believed in Marxism-Leninism but remained within the National Congress to ensure that the struggle for socialism remained intertwined with the struggle for national independence.

Additional Information

• Key Leaders and Ideologies:

• Jayaprakash Narayan: Known as Lok Nayak, he was a central figure who later led the Total Revolution in the 1970s.

• Ram Manohar Lohia: An influential socialist thinker who championed the cause of backward castes and non-Congressism.

• Acharya Narendra Deva: Considered the father of Democratic Socialism in India, he emphasized that socialism must be adapted to Indian conditions.

• Historical Context of Other Options:

• 1942: This year is synonymous with the Quit India Movement, during which CSP leaders like Aruna Asaf Ali and Jayaprakash Narayan operated underground to mobilize the masses.

• 1947: India gained Independence from British rule on 15 August 1947. Following this, ideological differences led the socialists to leave the Congress in 1948.

• 1952: This year marked the first General Elections of independent India and the subsequent merger of the Socialist Party with the Kisan Mazdoor Praja Party (KMPP) to form the Praja Socialist Party.

Q48. Answer: (a) 4.4% of GDP

The correct answer is 4.4% of GDP.

Key Points

• The Fiscal Deficit represents the difference between the total expenditure of the government and its total non-debt receipts (revenue receipts plus non-debt capital receipts), essentially indicating the total borrowings required by the government.

• During the presentation of the Union Budget 2024-25 on July 23, 2024, Finance Minister Nirmala Sitharaman announced a revised fiscal consolidation path aimed at reducing the deficit significantly.

• The government narrowed the fiscal deficit target for FY 2024-25 to 4.9% of GDP, which was a further reduction from the 5.1% target mentioned in the Interim Budget earlier in the year.

• For the following financial year, FY 2025-26, the government has proposed a target to bring the fiscal deficit to below 4.5% of GDP, specifically aiming for 4.4% to ensure long-term macro-economic stability.

• This aggressive Fiscal Consolidation is supported by robust tax collections and a substantial dividend transfer from the Reserve Bank of India (RBI), which helps in cushioning the expenditure on infrastructure and social welfare.

Additional Information

• Economic Terminologies:

• Gross Domestic Product (GDP): The total monetary value of all final goods and services produced within a country's geographical boundaries during a specific financial year.

• Fiscal Responsibility and Budget Management (FRBM) Act: Enacted in 2003, this legislation provides a legal framework for fiscal discipline, aiming to limit the fiscal deficit to a sustainable level.

• Revenue Deficit: This occurs when the government's revenue expenditure (routine expenses) exceeds its revenue receipts (taxes and other non-investment income).

• Primary Deficit: This is the fiscal deficit minus interest payments on previous borrowings, showing the government's current fiscal health without the burden of past debts.

• Capital Expenditure (Capex): Funds used by the government to acquire, upgrade, and maintain physical assets such as roads, railways, and power plants, which helps in boosting long-term economic growth.

Q49. Answer: (a) Walrus

The correct answer is Walrus.

Key Points

• The Tundra is a treeless biome located primarily in the Arctic and on high mountain peaks, characterized by extremely low temperatures, poor nutrient quality, and short growing seasons.

• The Walrus (Odobenus rosmarus) is a large marine mammal specifically associated with the Arctic Ocean and subarctic seas, which are the primary geographical zones of the Tundra climate.

• These animals are adapted to the freezing environment with a thick layer of blubber for insulation and are frequently found on sea ice or rocky coasts near the northern reaches of Russia, Alaska, and Canada.

• The vegetation in this region is limited to mosses, lichens, and small shrubs because the ground remains frozen year-round as permafrost, preventing deep-rooted plants from growing.

• Other typical fauna of the tundra ecosystem includes the Arctic fox, Polar bear, Snowy owl, Musk ox, and Reindeer (Caribou).

Additional Information

• Iberian Lynx:

• This species is native to the Iberian Peninsula in southwestern Europe.

• It is associated with the Mediterranean forest and scrubland biome, rather than the cold tundra.

• Jackal:

• Jackals are found in Africa, Asia, and southeastern Europe.

• Their natural habitats include savannas, open grasslands, and arid deserts.

• Desert horned viper:

• This venomous snake is indigenous to the Sahara Desert and the Middle East.

• It is highly adapted to extreme heat and sandy terrain, making it the ecological opposite of tundra-dwelling animals.

Q50. Answer: (d) Compact Disk

The correct answer is Compact Disk.

Key Points

• The acronym CD stands for Compact Disk (alternatively spelled as Compact Disc), which is a digital optical disc data storage format.

• It was co-developed by Philips and Sony and was first commercially released in 1982, primarily intended for digital audio recordings.

• The technology utilizes a polycarbonate plastic substrate coated with a thin layer of aluminum to reflect laser light; data is stored as a series of microscopic indentations known as pits and flat areas called lands.

• A standard Compact Disk has a diameter of 120 millimeters and can store up to 700 MB of data or approximately 80 minutes of uncompressed high-fidelity audio.

• The reading process involves a semiconductor laser with a wavelength of 780 nm that detects the changes in reflectivity between pits and lands as the disc spins.

• Therefore, Option (4) is the correct answer as it accurately represents the technical name for this storage medium.

Additional Information

• Computer Drive: While a CD drive is a type of computer drive, the acronym CD itself specifically refers to the storage medium (the disk) rather than the mechanical drive assembly.

• Variations of Compact Disks:

• CD-ROM: Standing for Read-Only Memory, these are pre-pressed discs used for distributing software and games.

• CD-R: A Recordable format that allows a user to write data once using a laser to burn a dye layer, after which the data cannot be erased.

• CD-RW: A Re-Writable format that uses a phase-change metallic alloy, allowing the data to be erased and rewritten approximately 1,000 times.

• Technological Succession: The Compact Disk laid the foundation for subsequent optical formats like the DVD (Digital Versatile Disc) and Blu-ray Disc, which use shorter wavelength lasers to achieve much higher storage densities.

Q51. Answer: (c) Bharatmala Pariyojana

The correct answer is Bharatmala Pariyojana.

Key Points

• Bharatmala Pariyojana is a centrally-sponsored and funded umbrella program for the highways sector, launched by the Ministry of Road Transport and Highways (MoRTH) in October 2017.

• The project is designed to improve the efficiency of freight and passenger movement across India by bridging critical infrastructure gaps through effective interventions like Economic Corridors, Inter-corridors, and Feeder Routes.

• It identifies and develops Economic Corridors spanning approximately 9,000 km and Inter-corridors and Feeder Routes covering about 6,000 km to enhance nationwide logistics.

• A central component of the initiative is the construction of Greenfield Expressways, such as the Delhi-Mumbai Expressway, which are high-speed access-controlled roads aimed at reducing travel time and improving fuel efficiency.

• The project also focuses on National Corridor Efficiency Improvement (5,000 km), Border and International connectivity roads (2,000 km), and Coastal and Port connectivity roads (2,000 km).

• Phase I of the Bharatmala Pariyojana entails the development of a total of 34,800 km of road highways, requiring a massive financial outlay to overhaul the nation's surface transport infrastructure.

Additional Information

• PM Gati Shakti:

• Launched in October 2021, it is a National Master Plan for Multi-modal Connectivity that provides a digital platform to 16 Ministries for integrated planning and synchronized implementation of infrastructure projects.

• It incorporates existing flagship schemes like Bharatmala, Sagarmala, and UDAN to ensure the seamless movement of goods and people across the country.

• Smart Cities Mission:

• Launched in June 2015 by the Ministry of Housing and Urban Affairs, it aims to develop 100 cities across India that provide core infrastructure and a decent quality of life to their citizens.

• Key features include sustainable urban development, efficient energy usage, IT connectivity, and digitalization of public services.

• Sagarmala Programme:

• This initiative focuses on port-led development and modernization of India's 7,500 km coastline to reduce logistics costs for domestic and Export-Import (EXIM) cargo.

• The four pillars of the project include Port Modernization, Port Connectivity, Port-linked Industrialization, and Coastal Community Development.

Q52. Answer: (d) Articles 14, 15, 16, 17 and 18

The correct answer is Articles 14, 15, 16, 17 and 18.

Key Points

• The Right to Equality is one of the six fundamental rights provided by the Constitution of India, spanning five consecutive articles from Article 14 to Article 18.

• Article 14 establishes Equality before Law and Equal Protection of Laws, ensuring that the State treats all individuals equally within the territory of India.

• Article 15 prohibits the State from discriminating against any citizen on grounds only of religion, race, caste, sex, or place of birth, particularly regarding access to public places.

• Article 16 guarantees Equality of Opportunity in matters of public employment, preventing discrimination in government jobs while allowing for reservations for backward classes.

• Article 17 deals with the Abolition of Untouchability, making the practice of untouchability a punishable offense under the Untouchability (Offences) Act, 1955 (renamed as the Protection of Civil Rights Act).

• Article 18 mandates the Abolition of Titles, prohibiting the State from conferring any titles except military or academic ones, ensuring social equality.

Additional Information

• Fundamental Rights:

• These are enshrined in Part III of the Constitution, specifically from Articles 12 to 35.

• Right to Freedom: This group covers Articles 19, 20, 21, and 22, protecting individual liberties such as speech and personal liberty.

• Right against Exploitation: Enshrined in Articles 23 and 24, focusing on the prohibition of traffic in human beings and forced labor.

• Right to Freedom of Religion: Covered under Articles 25 to 28, ensuring secularism and the freedom to manage religious affairs.

• Articles 12 and 13: These provide the definition of the State and the doctrine of Judicial Review respectively, rather than specific group rights.

Therefore, Option 4 is the correct answer.

Q53. Answer: (a) RFID-driven supply chain systems

The correct answer is RFID-driven supply chain systems.

Key Points

• RFID (Radio Frequency Identification) is a computer-driven technology that uses electromagnetic fields to automatically identify and track tags attached to objects, making it the primary tool for real-time inventory tracking.

• Unlike traditional barcoding, RFID does not require a direct line-of-sight to read information, allowing for the simultaneous scanning of hundreds of items as they move through a warehouse or distribution center.

• This application falls under the category of AIDC (Automatic Identification and Data Capture), which minimizes human intervention and significantly reduces errors in supply chain management and logistics.

• The system provides high-speed data transmission to a central database, enabling businesses to maintain accurate stock levels, prevent out-of-stock scenarios, and monitor the transit of goods across global networks.

Additional Information

• System Components:

• RFID Tags: These can be Passive (powered by the reader signal) or Active (battery-powered for longer range and higher data storage).

• RFID Readers: Devices that emit radio waves and receive signals back from the tags to identify individual assets.

• Middleware: Software that filters the raw data from readers and integrates it with ERP (Enterprise Resource Planning) systems.

• Alternative Technologies:

• OCR (Optical Character Recognition): A technology used to convert different types of documents, such as scanned paper or PDFs, into editable and searchable data; it is not designed for physical asset tracking.

• Presentation Software: Applications like Microsoft PowerPoint used for visual information delivery, which lack the sensor-based data capture required for inventory control.

• Email-based Notifications: A communication protocol used to send messages; while it may report inventory status, it cannot perform the automated identification itself.

Q54. Answer: (c) Total Internal Reflection

The correct answer is Total Internal Reflection.

Key Points

• Total Internal Reflection (TIR) is the fundamental principle that allows optical fibres to guide light over long distances with minimal signal loss.

• An optical fibre consists of a central Core surrounded by a layer called Cladding. For TIR to occur, the refractive index of the core (n1) must be higher than the refractive index of the cladding (n2).

• When a light signal (representing data) is launched into the fibre, it strikes the interface between the core and the cladding at an angle of incidence that is greater than the critical angle.

• Because the angle exceeds the critical threshold, the light does not exit the core through refraction but is entirely reflected back into the denser medium of the core.

• This process repeats thousands of times per meter, effectively trapping the light pulse inside the fibre and allowing it to travel at high speeds through curved or straight paths.

• The efficiency of Total Internal Reflection ensures that nearly 100 percent of the light energy remains confined, which is crucial for maintaining signal integrity in modern telecommunication systems.

Additional Information

• Dispersion of light

• This refers to the splitting of light into its constituent spectral colors.

• In fibre optics, chromatic dispersion can lead to pulse broadening, which actually acts as a limitation to bandwidth rather than a means of transmission.

• Refraction of light

• Refraction involves the bending of light as it passes from one medium to another.

• While refraction is used to initially couple light into the fibre, the goal of the fibre design is to avoid refraction at the core-cladding boundary to prevent light leakage.

• Interference of light

• Interference is the phenomenon where two waves superpose to form a resultant wave of greater, lower, or the same amplitude.

• It is utilized in interferometers and specific sensors but is not the primary mechanism for guiding light through a standard telecommunication fibre.

Q55. Answer: (a) Precipitation reaction forming insoluble barium sulphate

The correct answer is Precipitation reaction forming insoluble barium sulphate.

Key Points

• When aqueous solutions of Barium chloride and Sodium sulphate are mixed, a chemical reaction occurs where the Barium ions (Ba^(2+)) from the barium chloride react with the Sulphate ions (SO4^(2−)) from the sodium sulphate.

• The balanced chemical equation for this process is: BaCl2(aq) + Na2SO4(aq) → BaSO4(s) + 2NaCl(aq).

• This reaction is specifically classified as a double displacement reaction because the positive and negative ions of the two ionic compounds exchange partners to form two new compounds.

• The Barium sulphate (BaSO4) produced is an insoluble salt that does not dissolve in water and settles out of the solution as a white, curd-like solid.

• In chemistry, any reaction that produces an insoluble solid (precipitate) upon mixing two aqueous solutions is defined as a precipitation reaction.

• The other product, Sodium chloride (NaCl), remains dissolved in the aqueous solution as it is highly soluble.

Additional Information

• Redox Reaction

• Involves a change in oxidation states of atoms through the transfer of electrons.

• In the reaction between barium chloride and sodium sulphate, the oxidation states of all elements remain constant; therefore, it is not a redox process.

• Decomposition Reaction

• A process where a single reactant breaks down into two or more simpler products, often requiring thermal energy, light, or electricity.

• This scenario involves two distinct reactants forming two new products, which contradicts the definition of decomposition.

• Evolution of Gas

• Certain reactions result in the release of gaseous products like SO2 or CO2.

• The mixing of these specific salt solutions does not involve any effervescence or the formation of Sulphur dioxide gas; the only visible change is the formation of a solid precipitate.

Q56. Answer: (d) Ball and Socket Joint

The correct answer is Ball and Socket Joint.

Key Points

• A Ball and Socket Joint is a specialized type of synovial joint where the rounded, ball-like surface of one bone fits into the cup-like depression (socket) of another bone.

• It is classified as a multiaxial joint (or triaxial), which means it allows movement in three primary planes: anterior-posterior, medial-lateral, and rotational.

• This joint structure provides the widest range of movement of all joint types in the human body, facilitating flexion, extension, abduction, adduction, and circumduction.

• Specifically, it enables both medial rotation (inward) and lateral rotation (outward), which are critical for the functionality of the limbs.

• The most prominent examples are the Shoulder Joint (glenohumeral joint), where the head of the humerus meets the glenoid cavity, and the Hip Joint (acetabulofemoral joint), where the femur head meets the acetabulum.

Additional Information

• Hinge Joint:

• Characterized as a uniaxial joint that functions like a door hinge, allowing movement in only one plane.

• Primary actions are flexion and extension; found in the Elbow, Knee, and Interphalangeal joints of the fingers.

• Pivot Joint:

• A uniaxial joint that allows only rotation around a single longitudinal axis.

• Examples include the Atlanto-axial joint (between the first two vertebrae) and the Proximal radioulnar joint.

• Gliding Joint:

• Also known as a Plane Joint, where the articulating surfaces are flat or slightly curved.

• Allows bones to slide over each other with minimal rotation; found between the Carpal bones of the wrist and Tarsal bones of the foot.

Q57. Answer: (d) Leading the Bardoli Satyagraha that established him as the “Sardar”

The correct answer is Leading the Bardoli Satyagraha that established him as the 'Sardar'.

Key Points

• The Bardoli Satyagraha was a major non-violent tax resistance movement launched in 1928 in the Bardoli Taluka of Gujarat against the British Raj.

• The movement was a response to the Bombay Presidency government's decision to increase the land revenue by 30 percent, despite the region suffering from severe floods and crop failure.

• Vallabhbhai Patel was invited by local leaders like Kalyanji Mehta and Kunverji Mehta to lead the struggle after the peasants resolved not to pay the enhanced tax.

• Patel organized the taluka into 13 chovisis (circles), each under a leader, and utilized a network of volunteers to keep the farmers united against the seizure of their property and cattle.

• The success of the movement forced the government to appoint the Broomfield-Maxwell Committee, which ultimately reduced the tax increase to 6.03 percent and restored confiscated lands.

• Following the triumph, the women of Bardoli conferred the title 'Sardar' (meaning chief or leader) upon him, a title that became synonymous with his name throughout the Indian Independence Movement.

Additional Information

• Anti-Rowlatt Agitations:

• These protests in 1919 were primarily aimed at the Anarchical and Revolutionary Crimes Act.

• In Punjab, the movement was led by local leaders Dr. Saifuddin Kitchlew and Dr. Satyapal, which eventually led to the Jallianwala Bagh massacre.

• Lucknow Pact:

• Signed in 1916, it was an agreement between the Indian National Congress and the Muslim League.

• It was largely the work of Bal Gangadhar Tilak and Mohammad Ali Jinnah to provide a joint platform for constitutional reforms.

• INA forces (Indian National Army):

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• The INA was revitalized by Subhash Chandra Bose (Netaji) in 1943.

• He led the forces during the Burma campaign and the Imphal-Kohima offensive against the British Indian Army.

Q58. Answer: (d) Iron is more reactive

The correct answer is Iron is more reactive.

Key Points

• The reaction between an iron nail and copper sulphate solution is a single displacement reaction, a process where a more chemically active element displaces a less active element from its compound.

• The fundamental cause of this reaction is the relative position of the metals in the reactivity series; Iron (Fe) is more reactive than Copper (Cu).

• Because iron is more electropositive, it has a stronger tendency to lose electrons and form Fe^(2+) ions compared to copper ions.

• The chemical transformation can be represented by the balanced equation: Fe + CuSO4 → FeSO4 + Cu.

• During the process, Iron atoms from the nail dissolve into the solution as Ferrous Sulphate, while Copper ions from the solution are reduced to solid copper metal.

• Visually, the intense blue color of the copper sulphate solution gradually fades and turns pale green due to the accumulation of iron(II) sulphate in the water.

Additional Information

• Reactivity Series of Metals:

• It is an analytical ranking of metals in descending order of their reactivity or standard electrode potentials.

• Metals at the top, such as Potassium (K) and Sodium (Na), are extremely reactive, while those at the bottom, like Silver (Ag) and Gold (Au), are noble and relatively unreactive.

• Iron is placed higher than Copper in this series, allowing it to displace copper, but iron cannot displace metals like Zinc or Magnesium from their respective salts.

• Observations and Characteristics:

• The reddish-brown coating that appears on the iron nail is the precipitated metallic copper.

• This is also a Redox reaction (Reduction-Oxidation), where Iron acts as the reducing agent and is oxidized, while Copper ions act as the oxidizing agent and are reduced.

• Contrary to some misconceptions, Copper Sulphate is highly soluble in water, forming an aqueous solution of Cu^(2+) and SO4^(2−) ions.

Q59. Answer: (c) Term "one-fourth" was replaced with "one-third"

The correct answer is Term 'one-fourth' was replaced with 'one-third'.

Key Points

• Article 171 of the Constitution of India deals with the composition of the Legislative Councils (Vidhan Parishad) in the states.

• Prior to the 1956 amendment, Article 171(1) stipulated that the total number of members in the Legislative Council of a State should not exceed one-fourth of the total number of members in the Legislative Assembly of that State.

• The Constitution (Seventh Amendment) Act, 1956, was enacted primarily to implement the States Reorganisation Act, which restructured state boundaries on a linguistic basis.

• Section 10 of this amendment specifically modified Article 171(1) by substituting the word one-fourth with one-third.

• This change allowed for a larger Legislative Council in proportion to the Legislative Assembly, providing broader representation while ensuring the Council remained the smaller, revisory chamber.

• Despite the increase in the maximum limit, the constitutional minimum strength of a Legislative Council remained fixed at 40 members.

Additional Information

• Composition Details of Legislative Council:

• Elected by Local Bodies: Approximately one-third of the members are elected by members of local authorities like Municipalities and District Boards.

• Elected by Legislative Assembly: Another one-third are elected by the members of the Legislative Assembly from among persons who are not members of the Assembly.

• Elected by Graduates: About one-twelfth are elected by persons residing in the state who have been graduates for at least three years.

• Elected by Teachers: About one-twelfth are elected by persons engaged in teaching in educational institutions (not lower than secondary schools) for at least three years.

• Nominated by Governor: The remainder (about one-sixth) are nominated by the Governor from individuals with special knowledge in Literature, Science, Art, Co-operative Movement, and Social Service.

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• Legislative Status:

• Unlike the Legislative Assembly, the Legislative Council is a permanent body and is not subject to dissolution; however, one-third of its members retire every second year.

Q60. Answer: (d) 29

The correct answer is 29.

Key Points

• The Eleventh Schedule was added to the Constitution of India through the 73rd Constitutional Amendment Act of 1992, which provided a formal framework for Panchayati Raj Institutions (PRIs).

• This schedule specifies the powers, authority, and responsibilities of Panchayats and contains exactly 29 functional items or subjects over which these local bodies have jurisdiction.

• The inclusion of these 29 functions is mandated under Article 243G, which empowers the State Legislatures to devolve necessary powers to the Panchayats to enable them to function as institutions of self-government.

• These functions are intended to ensure economic development and social justice at the grassroots level by allowing local representatives to manage essential community services and resources.

Additional Information

• Core Subjects of the Eleventh Schedule:

• Agriculture and Land: Includes agricultural extension, land improvement, implementation of land reforms, and soil conservation.

• Water and Resources: Covers minor irrigation, water management, watershed development, and providing safe drinking water.

• Social Infrastructure: Encompasses rural housing, roads, culverts, bridges, and rural electrification including distribution of electricity.

• Social Welfare: Includes poverty alleviation programs, education (primary and secondary), adult and non-formal education, and libraries.

• Health and Community: Manages health and sanitation (including hospitals and PHCs), family welfare, women and child development, and the Public Distribution System (PDS).

• Economic Activities: Focuses on fisheries, animal husbandry, social forestry, and small-scale industries like Khadi and village industries.

• Constitutional Framework:

• The 73rd Amendment Act introduced Part IX to the Constitution, titled The Panchayats, spanning from Article 243 to Article 243O.

• In contrast, the Twelfth Schedule, introduced by the 74th Constitutional Amendment Act, lists 18 functional items specifically for Municipalities in urban areas.

Q61. Answer: (c) China

The correct answer is China.

Key Points

• Shi Yuqi is a prominent professional badminton player who represents China in international competitions. Hence, the statement regarding his nationality is correct.

• The 2025 BWF World Championships were held in Paris, France, in August 2025. This event is one of the most prestigious tournaments in the badminton calendar, sanctioned by the Badminton World Federation (BWF). Hence, the tournament details provided are correct.

• Shi Yuqi secured the Men's Singles title at this championship, reinforcing China's historical dominance in the sport. He has consistently been ranked among the top players globally, reaching the World No. 1 ranking in the BWF World Rankings. Hence, the outcome of the final is correct.

• His victory in Paris followed his consistent performance in major team events like the Thomas Cup and Sudirman Cup, where he serves as a lead singles player for the Chinese National Badminton Team. Hence, his association with the Chinese team is correct.

Additional Information

• The BWF World Championships (formerly known as the IBF World Championships) offer the highest ranking points, along with the Summer Olympic Games. Winners are crowned as World Champions and awarded gold medals.

• Badminton Powerhouses:

• Indonesia: Known for legendary players like Taufik Hidayat and a strong tradition in Men's Doubles.

• Japan: Emerged as a major force in the last decade, led by stars like Kento Momota and Akane Yamaguchi.

• Malaysia: Famous for producing world-class talent such as Lee Chong Wei and having a massive following for the sport.

• The 2025 Championships in Paris served as a significant post-Olympic milestone, utilizing the same venues that hosted the badminton events during the 2024 Paris Olympics.

Q62. Answer: (c) Article 38

The correct answer is Article 38.

Key Points

• Article 38 of the Indian Constitution is the primary article that directs the State to secure a social order for the promotion of the welfare of the people.

• It serves as the foundational basis for the concept of a Welfare State, mandating that justice—social, economic, and political—must inform all institutions of national life.

• The article specifically instructs the State to minimize inequalities in income and strive to eliminate disparities in status, facilities, and opportunities among individuals and groups of people.

• The 44th Constitutional Amendment Act of 1978 expanded the scope of Article 38 by adding clause (2), which emphasizes the reduction of economic inequalities to ensure social welfare.

• Under this article, the State is empowered to implement policies that redistribute resources to ensure that the material resources of the community are subserved for the common good.

Additional Information

• Article 40:

• Directs the State to organize village panchayats and provide them with the necessary powers to function as units of self-government.

• This article reflects the Gandhian principles of decentralized governance in the Directive Principles of State Policy (DPSP).

• Article 41:

• Concerns the right to work, to education, and to public assistance in specific cases such as unemployment, old age, sickness, and disablement.

• It establishes the duty of the State to provide social security measures within its economic capacity.

• Article 42:

• Mandates the State to make provisions for securing just and humane conditions of work.

• It also specifically mentions the provision of maternity relief for women employees.

• Directive Principles of State Policy (DPSP):

• Enumerated in Part IV of the Constitution (Articles 36 to 51), these principles are non-justiciable but fundamental in the governance of the country.

• The concept was borrowed from the Irish Constitution, which had in turn taken it from the Spanish Constitution.

Q63. Answer: (a) Thiruvalluvar

The correct answer is Thiruvalluvar.

Key Points

• Thiruvalluvar is the revered poet-philosopher traditionally credited with authoring the Tirukkural, a masterpiece of Tamil literature that provides a comprehensive code of ethics for humanity.

• The Tirukkural consists of 1,330 couplets or Kurals, which are structured into 133 chapters, each containing exactly ten couplets.

• The work is systematically divided into three main books or Paals: Arathuppal (Virtue), Porutpal (Wealth/Polity), and Kamathuppal (Love), representing the three of the four goals of human life in Indian philosophy.

• The text is a part of the Pathinenkilkanakku (Eighteen Lesser Texts) collection, dating back to the post-Sangam period, generally estimated between the 3rd and 5th century CE, though the Tamil Nadu government officially recognizes 31 BCE as the Thiruvalluvar Era.

• Often referred to as the Tamil Veda or the Universal Code of Conduct, the Tirukkural is celebrated for its secular nature and its focus on universal values such as truth, non-violence, and social justice.

Additional Information

• Avvaiyar

• She was a title given to various female poets throughout different periods of Tamil history, most notably known for didactic works like Aathichoodi and Konrai Venthan.

• Her writings emphasize moral conduct and wisdom for children and common folk.

• Ilango Adigal

• He was a Chera prince and a Jain monk who authored the Silappatikaram, which is the earliest and one of the Five Great Epics of Tamil literature.

• The epic revolves around the tragic life of Kannagi and her husband Kovalan in the cities of Poompuhar and Madurai.

• Kambar

• A famous medieval poet from the 12th century who wrote the Kamba Ramayanam (Ramavataram), a landmark adaptation of the Ramayana in Tamil.

• He is often hailed as Kavi Chakravarti due to his exceptional use of the Viruttham poetic meter.

Q64. Answer: (b) South-West Monsoon Arabian Sea branch

The correct answer is South-West Monsoon Arabian Sea branch.

Key Points

• The South-West Monsoon is the primary rainy season in India, typically active from June to September. It originates due to the intense low-pressure system over the Thar Desert and the Tibetan Plateau, which draws moisture-laden winds from the high-pressure area over the Indian Ocean.

• As the monsoon winds approach the Indian Peninsula, they are divided into two main branches: the Arabian Sea branch and the Bay of Bengal branch.

• The Arabian Sea branch strikes the Western Coast of India first, typically hitting the coast of Kerala around June 1st. This branch is significantly more powerful than the Bay of Bengal branch, carrying approximately three times more moisture.

• Rainfall on the Western Coast is primarily orographic in nature. When the moisture-laden winds encounter the Western Ghats (Sahyadri), they are forced to rise. As the air rises, it cools adiabatically, leading to heavy precipitation on the windward side (the coastal plains).

• Regions such as the Konkan Coast, Malabar Coast, and the states of Maharashtra, Goa, Karnataka, and Kerala receive torrential rainfall, often exceeding 250 cm annually, due to this specific branch.

Additional Information

• South-West Monsoon Bay of Bengal branch:

• This branch moves towards Northeast India and the Ganges Valley.

• It is responsible for the highest rainfall in the world at Mawsynram and Cherrapunji on the Khasi Hills.

• North-East Monsoon:

• Also known as the Retreating Monsoon, it occurs during October and November.

• The winds blow from the land to the sea, picking up moisture from the Bay of Bengal and providing crucial rainfall to the Coromandel Coast (Tamil Nadu).

• Western Disturbances:

• These are extra-tropical cyclones originating in the Mediterranean Sea.

• They bring winter rainfall to Northwest India (Punjab, Haryana), which is vital for the Rabi crops, specifically wheat.

Q65. Answer: (a) Thankamani Kutty

The correct answer is Thankamani Kutty.

Key Points

• Thankamani Kutty is a pre-eminent dancer and teacher who has made significant contributions to the Indian classical dance landscape, particularly in West Bengal.

• She is widely recognized for her mastery and proficiency in two distinct classical dance forms: Bharatanatyam and Mohiniyattam.

• The Government of West Bengal honored her with the West Bengal State Academy of Dance Drama Music and Visual Arts Award (commonly referred to in the regional context as the Nritya Natak Sangeet Drishya Kala Akademy Award) for her excellence in the performing arts.

• She moved from Kerala to Kolkata in the late 1950s and, along with her husband Govindan Kutty, played a pivotal role in popularizing South Indian classical dances in Eastern India.

• In 1968, she founded Kalamandalam Calcutta, a premier institution dedicated to training students in Bharatanatyam, Mohiniyattam, and Kathakali.

Additional Information

• Elam Endira Devi

• She is a distinguished exponent of Manipuri classical dance.

• She was awarded the Padma Shri in 2014 for her contributions to the field of Art.

• Aruna Mohanty

• She is a leading Odissi dancer, choreographer, and guru.

• She currently serves as the Secretary of the Orissa Dance Academy and is a recipient of the Sangeet Natak Akademi Award.

• Radha Reddy

• She is a legendary Kuchipudi dancer who performs alongside her husband, Raja Reddy.

• The duo is credited with taking Kuchipudi to the global stage and they are recipients of the Padma Bhushan.

Q66. Answer: (c) River erosion

The correct answer is River erosion.

Key Points

• A V-shaped valley is a narrow valley with a cross-section resembling the letter 'V', formed primarily through the action of River erosion in high-altitude mountainous regions.

• In the youthful stage of a river, the flow is extremely rapid due to a steep topographic gradient, leading to a process known as vertical erosion or downcutting.

• The river bed is eroded downward much faster than the valley walls can be eroded laterally, which creates a deep, narrow channel.

• As the river deepens, the exposed valley sides are subjected to mechanical weathering and mass wasting (such as soil creep and landslides), which gradually widen the top of the valley while the base remains narrow.

• The combination of constant downward incision by the water and the outward collapse of the slopes results in the characteristic V-shaped profile.

Additional Information

• Wind erosion:

• Primarily occurs in arid and semi-arid environments where vegetation is sparse.

• It creates landforms such as Mushroom rocks, Inselbergs, and Yardangs through processes like abrasion and deflation.

• Wave action:

• Focuses on coastal geomorphology where the energy of the ocean waves erodes shorelines.

• Key landforms include Sea cliffs, Stacks, Sea caves, and Natural arches.

• Glacier movement:

• Responsible for the formation of U-shaped valleys or glacial troughs.

• Unlike rivers, glaciers are massive ice bodies that erode both the valley floor and the valley walls simultaneously through plucking and abrasion, resulting in a wide, flat bottom and steep, straight sides.

Q67. Answer: (a) Qawwali

The correct answer is Qawwali.

Key Points

• Qawwali is the most prominent form of Sufi devotional music in South Asia, primarily associated with the Chishti Sufi order.

• The genre was established in the 13th century by the legendary poet and musician Amir Khusrau, who is often referred to as the Father of Qawwali.

• The primary goal of Qawwali is to lead both the performers and the listeners to a state of spiritual ecstasy known as Wajad or Hal.

• A typical performance starts with the Hamd (praise of Allah), followed by the Naat (praise of Prophet Muhammad), and Manqabat (praise of Ali or Sufi saints).

• Musically, it involves a lead singer supported by a chorus, rhythmic hand clapping, and instruments like the Harmonium and Tabla or Dholak to create a powerful, repetitive rhythmic cycle.

Additional Information

• Tarana:

• A fast-paced vocal composition in Hindustani classical music that uses rhythmic syllables like odani, tanedere, and yalali.

• While invented by Amir Khusrau with Persian influences, it is now primarily a secular concert piece focused on Layakari (rhythmic play).

• Dhrupad:

• The oldest surviving genre of Hindustani music, known for its meditative and austere nature, originally performed in Hindu temples and later the Mughal court.

• It features a four-part structure: Sthayi, Antara, Sanchari, and Abhog, typically accompanied by the Pakhawaj.

• Tappa:

• Developed from the folk songs of Punjabi camel riders, it was refined into a classical style by Shory Mian.

• It is characterized by extremely rapid, complex, and ornamental melodic phrases or taans.

Q68. Answer: (a) Assam

The correct answer is Assam.

Key Points

• The Ambubachi Mela is a prominent Hindu festival held annually at the Kamakhya Temple in Guwahati, Assam, and is considered the most important event of the temple's calendar.

• This festival is celebrated during the monsoon season, specifically in the middle of June, coinciding with the Assamese month of Ahaar.

• It celebrates the annual menstrual cycle of the goddess Kamakhya; during this three-day period, the temple remains closed to the public as it is believed the Mother Earth is undergoing menstruation.

• On the fourth day, the temple doors are opened with great fanfare, and devotees are allowed to enter to receive Prasad and seek blessings from the goddess.

• The festival is popularly known as the Mahakumbh of the East because it attracts millions of pilgrims, Sadhus, Tantriks, and Bauls from across India and neighboring countries.

Additional Information

• Kamakhya Temple:

• Situated atop the Nilachal Hills, this temple is one of the 51 Shakti Peethas and represents the yoni (genitals) of Goddess Sati.

• The temple follows the Nilachal style of architecture, featuring a unique hemispherical dome resting on a cruciform base.

• It is a primary center for Tantric Shaktism, where the deity is worshipped in the form of a natural stone fissure kept moist by a natural spring.

• Cultural Significance:

• The Ambubachi Mela promotes the idea of fertility and challenges social taboos by openly celebrating the biological process of menstruation.

• The devotees are often given small pieces of red cloth called Angodak as Prasad, which is highly sought after for its spiritual significance.

• While Bihar, Jharkhand, and Chhattisgarh host significant regional festivals like Chhath Puja, Sarhul, and Bastar Dussehra respectively, they do not observe the Ambubachi Mela.

Q69. Answer: (a) Human Rights Watch

The correct answer is Human Rights Watch.

Key Points

• Human Rights Watch (HRW) is an international non-governmental organization headquartered in New York City that investigates and reports on abuses happening in all corners of the world.

• The World Report is the flagship annual publication of Human Rights Watch. It serves as a comprehensive review of human rights practices and trends globally.

• The World Report 2025 represents the 35th edition of this series, summarizing research findings on human rights conditions in approximately 100 countries and territories.

• The report typically evaluates events from the preceding year (2024) to provide a global perspective on humanitarian crises, democratic integrity, and international law.

Additional Information

• Amnesty International:

• This organization publishes a similar flagship document titled The State of the Worlds Human Rights, which covers the human rights situation in 155 countries.

• United Nations Human Rights Council (UNHRC):

• An inter-governmental body within the United Nations system, based in Geneva, which oversees the Universal Periodic Review (UPR) of all member states.

• International Criminal Court (ICC):

• Governed by the Rome Statute, the ICC is a judicial institution located in The Hague that prosecutes individuals for genocide, war crimes, and crimes against humanity.

Q70. Answer: (a) Wheat

The correct answer is Wheat.

Key Points

• Rabi crops are agricultural crops that are sown during the winter season, typically starting from October to December, and are harvested in the spring season between April and June.

• Wheat is the premier rabi crop in India and is extensively grown in the Northern and Northwestern regions, including states like Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir, Uttarakhand, and Uttar Pradesh.

• The growth of Wheat is significantly aided by the Western Temperate Cyclones, which bring vital precipitation during the winter months, ensuring a healthy yield for the rabi season.

• Other prominent examples of rabi crops include Barley, Peas, Gram, and Mustard, all of which require a cool growing season followed by bright sunshine during the ripening phase.

Additional Information

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• Kharif Crops: These are monsoon-dependent crops sown at the beginning of the rainy season (June to July) and harvested in September to October.

• Rice: It is a staple kharif crop requiring high temperatures (above 25°C), high humidity, and heavy annual rainfall exceeding 100 cm.

• Cotton: This is a major commercial kharif crop that thrives in black cotton soil and requires at least 210 frost-free days for optimal growth.

• Bajra: Also known as pearl millet, it is a kharif crop that grows well in dry climates, sandy soils, and shallow black soils, predominantly in states like Rajasthan.

• Zaid Crops: These are short-duration crops grown during the summer months between the rabi and kharif seasons (March to June), such as Watermelon, Muskmelon, and Cucumber.

Q71. Answer: (c) 8 km to the east

Given:

• Kiran starts from Point A and drives 23 km towards the north.

• She then takes a right turn, drives 9 km, turns right and drives 31 km.

• She then takes a right turn and drives 17 km.

• She takes a final right turn, drives 8 km and stops at Point P.

• The Final Diagram,

Therefore, she should drive 8 km to the east in order to reach Point A again.

Hence, the correct answer is " Option 3"

Q72. Answer: (c) EP -9

The logic follows here,

For JS 12 is related to MO -3,

For LW 9 is related to OS -6,

Applying same logic, for BT 6:

BT 6 is related to EP −9.

Hence, the correct answer is 'Option 3'.

Q73. Answer: (d) Four

Given : Seven people, N, H, C, D, E, R and G, are sitting in a row, facing north.

1. Only one person sits to the left of R.

2. G sits fourth from the right end.

3. Only two people sit between R and E.

4. D sits to the immediate left of N.

5. H does not sit to the left of C.

The Final Arrangement is,

The people sitting between C and D are R, H, G, and E is 4.

Hence, the correct answer is "Option 4"

Q74. Answer: (c) Only conclusion (I) follows

The least possible Venn diagram for the given statements is:

Conclusion

(I) No Spinaches are Corns - Follows (All corns are cauliflowers and no spinach is cauliflowers. Hence, it is false)

(II) Some Spinaches are Corns - Does not follows

(Their is no direct relation between spinaches and corns amy be it is possible but not definite. Hence, it is false)

Only conclusion (I) follows.

Hence, the correct answer is "Option 3".

Q75. Answer: (d) V

Given:Seven boxes, U, V, W, X, A, B and C, are kept one over the other, but not necessarily in the same order.

1. Box B is kept at the top-most position.

2. Only U is kept below W.

3. Only C is kept between B and X.

4. Only A is kept between V and X.

Final Arrangement:

7	B
6	C
5	X
4	A
3	V
2	W
1	U

Thus, the box at the third position from the bottom is V.

Hence, the correct answer is 'Option 4'.

Q76. Answer: (c) 217

The logic follows here,

Logic:+20, +24, +28, +32, +36, +40 .(Each difference increases by 4.)

• 37 + 20 = 57

• 57 + 24 = 81

• 81 + 28 = 109

• 109 + 32 = 141

• 141 + 36 = 177

• 177 + 40 = 217

Thus, the missing term in the series is 217.

Hence, the correct answer is 'Option 3';

Q77. Answer: (b) IC −1

The logic follows here,

For HI 26 is related to FF 11,

For MG 22 is related to KD 7,

For KF 14 related to,

Hence, the correct answer is 'Option 2'.

Q78. 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 G is kept above A.

2. Only two boxes are kept between A and C.

3. Only D is kept below E.

4. F is not kept immediately above C.

The Final Arrangement is,

7	G
6	A
5	F
4	B
3	C
2	E
1	D

Two boxes are kept between E and F

Hence, the correct answer is "Option 3"

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Q79. Answer: (b) UT - WX

The logic follows here,

Logic: First letter of the second cluster = First letter of the first cluster + 2; Second letter of the second cluster = Second letter of the first cluster + 2.

For ON - QP,

For UT - WX,

For LK - NM,

For SR - UT,

Therefore, the letter-cluster pair that is different from the others is UT - WX.

Hence, the correct answer is "Option 2"

Q80. Answer: (b) 10

Given number: 3164857

When the digits of the number are arranged in ascending order from left to right, the new arrangement is:

Left 1 3 4 5 6 7 8 Right

• The third digit from the left is: 4

• The third digit from the right is: 6

• Sum of the digit third from the left and the digit third from the right is: 4 + 6 = 10.

Hence, the correct answer is 'Option 2'.

Q81. Answer: (c) None

Given original number: 9342156

When we arrange the digits of the number in ascending order from left to right, we obtain a new sequence of digits. Let's compare the original sequence with the new sequence position-wise:

Original number: 9 3 4 2 1 5 6

Ascending Order: 1 2 3 4 5 6 9

As observed, every digit has moved from its original position. There are no digits whose position remains unchanged after the rearrangement.

Hence, the correct answer is "Option 3"

Q82. Answer: (a) T

Given: Seven boxes X, Y, Z, W, V, U and T are kept one over the other but not necessarily in the same order.

1. Y is placed at the bottommost position (Position 1).

2. Box V is kept immediately above W.

3. Box X is kept immediately below W.

4. Exactly three boxes are kept between T and W.

5. W is kept on one of the positions above T.

Position	Box
7	V
6	W
5	X
4	
3	
2	T
1	Y

1. Box U is kept immediately above Z.

Final Arrangement:

7	**V**
6	W

5	X
4	U
3	Z
2	T
1	Y

Looking at the final arrangement, the box kept second from the bottom is T.

Hence, the correct answer is 'Option 1'.

Q83. Answer: (d) 125

The logic follows here,

• 17 + 23 = 40

• 40 + 21 = 61

• 61 + 19 = 80

• 80 + 17 = 97

• 97 + 15 = 112

• 112 + 13 = 125

Thus, the missing term in the series is 125.

Hence, the correct answer is 'Option 4';

Q84. Answer: (b) VZC

The logic follows here,

Logic: The difference between the alphabetical positions of the consecutive letters in each cluster is +3 and +4.

For BEI,

For VZC,

For HKO,

For ZCG,

Therefore, the letter cluster that is different from the others is VZC.

Hence, the correct answer is 'Option 2'.

Q85. Answer: (a) 24

The logic follows here,

The shaded part in the diagram shows engineers are there who are also athletes but not teachers

Total number of engineers are there who are also athletes but not teachers is 24.

Hence, the correct answer is "option 1"

Q86. Answer: (c) (208, 212, 220)

The logic followed here is:

Logic: 2^(nd) Number = 1^(st) Number + 4; 3^(rd) Number = 2^(nd) Number + 8

For the first set (99, 103, 111)

=> 99 + 4 = 103.

=> 103 + 8 = 111.

Applying the same logic to the second set (157, 161, 169)

=> 157 + 4 = 161.

=> 161 + 8 = 169.

Applying the same logic to the set in Option 3

(208, 212, 220)

=> 208 + 4 = 212.

=> 212 + 8 = 220.

Hence, the correct answer is 'Option 3'.

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Q87. Answer: (a) Two

Given: R, E, A, D, I, N and G are sitting around a circular table, facing the centre of the table.

1. D sits third to the left of R.
2. A sits second to the left of G.
3. Only R sits between I and A.
4. E is not an immediate neighbor of D.

The Final Diagram,

Two people sit between N and A when counted from the right of N.

Hence, the correct answer is 'Option 1'.

Q88. Answer: (d) 9

Given number: 7213546

As per the given conditions, 2 is added to each odd digit and 2 is subtracted from each even digit:

The number formed after these operations is: 9035724

• The highest digit is: 9

• The lowest digit is: 0

So, the difference between the highest and lowest digits is: 9 - 0 = 9.

Hence, the correct answer is 'Option 4'.

Q89. Answer: (b) 55

The logic follows here,

Logic:The pattern observed is: (Sum of reverse positional values of letters) + 14.

For VINP is coded as 61,

• Sum of reverse positional values = 5 + 18 + 13 + 11 = 47

• Code = 47 + 14 = 61

For FSKA is coded as 85,

• Sum of reverse positional values = 21 + 8 + 16 + 26 = 71

• Code = 71 + 14 = 85

Applying the same logic for TOYG,

• Sum of reverse positional values = 7 + 12 + 2 + 20 = 41

• Code = 41 + 14 = 55

Hence, the correct answer is "option 2"

Q90. Answer: (d) PGV 55

The logic follows here,

The missing cluster in the series is PGV 55.

Hence, the correct answer is "Option 4"

Q91. Answer: (b) Three

Given : X P S A D U G L O E J F K I M C R T Q

Vowels are there in the English alphabetical series between the letter which is third from the right end and fifth from the left end of the series is: O,E and I.

Left X P S A D U G L O E J F K I M C R T Q Right

Hence, the correct answer is 'Option 2'.

Q92. Answer: (d) BWH 83

The logic follows here,

Therefore, the cluster that replaces the question mark is BWH 83.

Hence, the correct answer is "Option 4."

Q93. Answer: (a) 2

Given: E S I C X Z O W G U K A Q D F T B Y M R H

Required Conditions: Vowel − Consonant − Vowel

(Left) E S I C X Z O W G U K A Q D F T B Y M R H (Right)

ESI and UKA.

Hence ,the correct answer is "option 1"

Q94. Answer: (a) QNJ

The logic followed here is based on the positions of the letters in the English alphabetical order.

Logic: First letter + 4 = Second letter; Second letter + 3 = Third letter.

For QNJ,

For GKN,

For BFI,

For PTW,

Therefore, the letter-cluster that is different from the others is QNJ.

Hence, the correct answer is 'Option 1'.

Q95. Answer: (a) Mother's mother

Family Chart:

The Family tree Diagram is,

Therefore, Anita is the mother of Kunal, and Chetna is the mother of Anita. This makes Chetna the Mother's mother (maternal grandmother) of Kunal.

Hence, the correct answer is "Option 1".

Q96. Answer: (d) Mother's father's brother's wife

Family Chart:

Let us first decode the given symbols and then draw a family tree.

Symbol	@	×	•	**div**
Meaning	Mother	Wife	Brother	Father

Given: 'S × D + R ÷ Y @ H'

From the family tree, it is evident that Y is the mother of H, and R is the father of Y (making R the maternal grandfather). D is the brother of R, and S is the wife of D. Therefore, S is the Mother's father's brother's wife of H.

Hence, the correct answer is 'Option 4'.

Q97. Answer: (b) UJ69

The logic follows here,

Combining the results, the next cluster in the series is UJ69.

Hence, the correct answer is "option 2"

Q98. Answer: (d) PM −3

The logic follows here,

For RS 4 is related to UR −11,

For IJ 8 is related to LI −7,

Applying the same logic to MN 12:

Following this logic, MN 12 is related to PM −3.

Hence, the correct answer is 'Option 4'.

Q99. Answer: (b) 1

Given: O K I Y C R L U K V I E H L Y V O N Q O S Z

Required Conditions: Vowel - Consonant - Vowel

The vowels are: A, E, I, O, U.

For the given series:

(Left) O K I Y C R L U K V I E H L Y V O N Q O S Z (Right)

• There is only one consonant that is immediately preceded and followed by a O-K-I.

• The total number of such consonants is 1.

Hence, the correct answer is "Option 2"

Q100. Answer: (a) 9

The logic follows here,

Therefore, the letter S is coded as 9.

Hence, the correct answer is "option 1"

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