RRB NTPC Graduate Level CBT-I Official Paper (Held On: 05 Jun, 2025 Shift 2) (Previous Year Paper)

RRB Group D • 2025 • 100 questions • 90 minutes • Answer key and solutions

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Q1. Each of T, U, V, W, X, Y and Z has an exam on a different day of a week starting from Monday and ending on Sunday of the same week. X has an exam on the third day of the week. Only three people has an exam between X and T. Z has an exam immediately after V and Y has an exam immediately after Z. W does not have an exam on Monday. Who has an exam on Thursday?

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

Q2. Which ruler regained his lost kingdom by 1555 after defeating Sher Shah Suri's successors, thereby marking the end of the Second Afghan Empire?

(a) Aurangzeb
(b) Muhammad bin Tughluq
(c) Babur
(d) Humayun

Q3. What is the primary purpose of the vertical planetary mixer developed by ISRO in Feb 2025?

(a) To improve satellite communication systems
(b) To develop new materials for spacecraft
(c) To create advanced propulsion systems for deep space missions
(d) To enhance the efficiency and safety of solid rocket motor manufacturing

Q4. What is the primary function of an operating system in a laptop?

(a) To type documents
(b) To run internet browsers only
(c) To manage hardware and software resources
(d) To edit videos

Q5. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

VCJ RYF NUB JQX ?

(a) FTM
(b) FNT
(c) FTN
(d) FMT

Q6. Which of the following farming practices is mostly practised in Northeast India and causes soil erosion?

(a) Mixed farming
(b) Terrace farming
(c) Shifting agriculture
(d) Dairy farming

Q7. Which of the following is a major river of the Indus basin system?

(a) Godavari
(b) Yamuna
(c) Kaveri
(d) Ravi

Q8. What is the ratio of the angles subtended by a chord at the centre of a circle to the angle subtended at any point on the circumference of the circle?

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

Q9. What happens if an Indian citizen voluntarily becomes a citizen of another country?

(a) Their Indian citizenship ends automatically
(b) They must get government approval
(c) They become dual citizens.
(d) Nothing changes.

Q10. What is the discriminant of the equation $x^2 - 2x + 13 = 0$? Also, determine how many real solutions this equation has.

(a) 44, Two real roots
(b) −48, No real roots
(c) 46, One real root
(d) 40, Two equal roots

Q11. What should come in place of the question mark (?) in the given series?

802 800 796 790 782 ?

(a) 772
(b) 770
(c) 774
(d) 776

Q12. In which order did Mendeleev arrange the elements in his periodic table?

(a) Increasing atomic mass
(b) Increasing atomic number
(c) Decreasing atomic radius
(d) Increasing number of neutrons

Q13. Which of the following letter-clusters should replace # and % so that the pattern and relationship followed between the letter-cluster pair on the left side of :: is the same as that on the right side of ::?

: AND :: RWX : %

(a) = XQB, % = UTZ
(b) # = LCT, % = XQB
(c) # = OZV, % = LCT
(d) = UTZ, % = OZV

Q14. This question is based on the words given below.

(Left) DIE CUP BOX ASK (Right)

In each of the words, each vowel is changed to the letter immediately following it in the English alphabetical order and each consonant is changed to the letter immediately preceding in the English alphabetical order. In how many letter clusters thus formed, will no vowel appear?

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

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Q15. Who took part in the 69^(th)Session of the United Nations Commission on the Status of Women (UNCSW), held at the UN Headquarters in New York?

(a) Annpurna Devi
(b) Sumita Dawra
(c) Rekha Gupta
(d) Narendra Modi

Q16. In this question, a group of number/symbol is coded using letter codes as per the codes given below and the conditions which follow. The correct combination of codes (following only the condition/s that apply) is your answer.

Number/Symbol	7	9	@	&	2	3	5	#	1	8	△	4	6
Code	L	C	Z	M	D	W	A	P	R	T	F	B	K

Conditions:

(i) If the first element is a symbol and the last a number, the codes for these two (the first and the last elements) are to be interchanged.

(ii) If the first element is an even number and the last an odd number, the first and last elements are to be coded as ©

(iii) If both the second and third elements are perfect squares, the third element is to be coded as the code for the second element

2 # @ 7 9

(a) © P L Z C
(b) © P Z L C
(c) © P Z L ©
(d) D P Z L ©

Q17. This question is based on the five, three-digit numbers given below.

(Left) 956 521 251 156 335 (Right)

(Example: 697 – First digit = 6, second digit = 9 and third digit = 7)

(NOTE: All operations to be done from left to right.)

What will be the resultant if the second digit of the highest number is added to the first digit of the lowest number?

(a) 6
(b) 7
(c) 9
(d) 5

Q18. Kamlesh buys some sarees and suits for Rs. 10,000. The cost of each saree is Rs. 1,500, and the cost of each suit is Rs. 1,000. The total number of sarees and suits is 8. Find the number of suits and sarees.

(a) 2 sarees and 6 suits
(b) 4 sarees and 4 suits
(c) 3 sarees and 5 suits
(d) 5 sarees and 3 suits

Q19. A, B, C, D, G, H, and I are sitting around a circular table facing the centre.

Only two people sit between A and H when counted from the right of A. Only two people sit between H and D. Only three people sit between A and B. C sits to the immediate left of I.

Who sits third to the left of G?

(a) C
(b) H
(c) I
(d) A

Q20. Each of P, Q, R, S, T, U and V has an exam on a different day of a week starting from Monday and ending on Sunday of the same week. P has the exam on Thursday. U has the exam on one of the days after R and on one of the days before T. V has the exam on one of the days after S but on one of the days before Q. S has the exam on one of the days after P. How many people have the exam before V?

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

Q21. If 2 is added to each even digit and 1 is subtracted from each odd digit in the number 6154932, how many digits will appear more than once in the new number thus formed?
(a) Three
(b) One
(c) Four
(d) Two

Q22. If 'S' stands for '−', 'Q' stands for '×', 'R' stands for '÷', and 'P' stands for '+', what will come in place of the question mark (?) in the following equation?
1 P 45 R 2 Q 2 S 4 = ?
(a) 36
(b) 40
(c) 46
(d) 42

Q23. The curved surface area of a right circular cone is 6500π cm², and the diameter of its base is 100 cm. Find the height (in cm) of the cone.
(a) 120
(b) 125
(c) 119
(d) 115

Q24. The popular folk dance of Bihar, which represents the love and quarrel of a married couple, is called:
(a) Singhi Chham
(b) Gaur Maria
(c) Jat- Jatin
(d) Pata Kunitha

Q25. Which schedule allows for the creation of village councils or courts for tribal cases?
(a) Tenth Schedule
(b) Seventh Schedule
(c) Sixth Schedule
(d) Fifth Schedule

Q26. Manjit spends 40% of his income. If he saves Rs. 18,000, then his income (in Rs.) is:
(a) 7,200
(b) 31,000
(c) 30,000
(d) 29,000

Q27. Below are given two sets of numbers. In each set of numbers, a certain mathematical operation on the first number results in the second number. Similarly, a certain mathematical operation on the second number results in the third number and so on. Which of the given options follows the same set of operations as in the question? (NOTE – A two/three-digit number cannot be broken into individual digits for operations, e.g. if 37 is followed by 10, the operation cannot be 3+7 as a two-digit number cannot be broken into individual digits.)
3 - 5 - 10 - 12 ; 8 - 10 - 20 - 22
(a) 4 - 6 - 12 - 24
(b) 28 - 30 - 60 - 64
(c) 6 - 10 - 12 - 24
(d) 18 - 20 - 40 - 42

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Q28. While covering a distance of 37 km, a man noticed that after cycling for 1 hour 5 minutes, the distance covered by him was 4/3 of the remaining distance. What was his speed (in km/hr, rounded off to one decimal place)?

(a) 14.5
(b) 19.5
(c) 21.5
(d) 23.1

Q29. Sunil starts from Point A and drives 11 km towards the south. He then takes a left turn, drives 3 km, turns left and drives 4 km. He then takes a left turn and drives 12 km. He takes a final right turn, drives 7 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90 degree turns only unless specified.)

(a) 7 km to the east
(b) 9 km to the west
(c) 8 km to the east
(d) 9 km to the east

Q30. 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 conclusion(s) logically follow(s) from the statements.

Statements:

Some cars are buses.

All buses are trucks.

Some buses are ships.

Conclusions:

(I) Some ships are cars.

(II) All trucks are cars.

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

Q31. When x is added to each of 26, 40, 22 and 34, then the numbers so obtained, in this order, are in proportion. Then, if $4x : y :: y : (7x-6)$, and $y > 0$, what is the value of y?

(a) 9
(b) 2
(c) 3
(d) 8

Q32. How much percentage of rural families rely on agriculture, livestock and Non-Timber Forest Products (NTFP) for their livelihoods according to the Annual Report 2024-25, published by Ministry of Rural Development?

(a) 95%
(b) 70%
(c) 80%
(d) 90%

Q33. Which of the following letter-clusters should replace # and % so that the pattern and relationship followed between the letter-cluster pair on the left side of :: is the same as that on the right side of ::?

: FLN :: TXB : %

(a) # = BPJ, % = XTF
(b) # = LFT, % = BPJ
(c) = PBX, % = XTF
(d) # = XTF, % = PBX

Q34. In a certain code language,

A + B means ‘A is the mother of B’,

A − B means ‘A is the brother of B’,

A × B means ‘A is the wife of B’ and

A ÷ B means ‘A is the father of B’.

How is M related to Q if ‘M + N − O ÷ P × Q’?

(a) Wife's mother's mother
(b) Wife's father's mother
(c) Wife's mother's sister
(d) Wife's father's sister

Q35. What was the theme of ICA Global Cooperative Conference in November 2024?

(a) Cooperatives Build a Better World
(b) Cooperatives for Economic Growth
(c) Sustainable Development through Cooperatives
(d) Cooperatives Build Prosperity for All

Q36. Uday starts from Point A and drives 3 km towards south. He then takes a right turn, drives 2 km, turns left and drives 5 km. He then takes a right turn and drives 3 km. He takes a final right turn, drives 8 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again (all turns are 90° turns only unless specified)?

(a) 5 km; West
(b) 3 km; East
(c) 5 km; East
(d) 4 km; East

Q37. What is the function of Alt + F2 in the Linux GNOME desktop environment?

(a) Refreshes the current window
(b) Closes the current application
(c) Toggles between full-screen and windowed mode
(d) Opens the Run Command dialog box

Q38. After the 97^(th)Constitutional Amendment, for how long can a state co-operative law that is inconsistent with the amendment remain in force?

(a) 2 years
(b) 6 months
(c) 1 year
(d) 5 years

Q39. Who among the following was/were NOT part of the Santhal Rebellion?

(a) Chand
(b) Kanho
(c) Bhairav
(d) Tana Bhagats

Q40. What percentage of seats are reserved for women under the 106^(th) Amendment Act?

(a) 10%
(b) 25%
(c) 33%
(d) 50%

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Q41. The marked price of a desk is Rs. 7,725, which is 25% above the cost price. It is sold at a discount of 4% on the marked price. Find the profit percentage.

(a) 19%
(b) 21%
(c) 20%
(d) 22%

Q42. What is the main purpose of cache memory in a computer?

(a) To store frequently accessed data for quick retrieval
(b) To serve as virtual memory
(c) To permanently store user files
(d) To provide backup for RAM

Q43. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

FCA GDB HEC IFD ?

(a) JHE
(b) JHF
(c) JGF
(d) JGE

Q44. One pipe can fill the tank in 10 minutes while another pipe can empty completely filled tank in 20 minutes. If both the pipes are operated together on empty tank, how long (in minutes) will it take to fill the tank completely?

(a) 23
(b) 21
(c) 22
(d) 20

Q45. If '+' means '−', '−' means '×', '×' means '÷' and '÷' means '+', then what will come in place of the question mark (?) in the following equation?

502 ÷ 78 + 2 − 258 × 2 = ?

(a) 322
(b) 560
(c) 124
(d) 74562

Q46. Sachin bought the first pen for Rs. 630 and the second pen for Rs. 722, respectively. He sells the first pen at 70% of the profit but the buyer bargains for the price, and he has to offer a 9% discount and the second pen at 71% of the profit. Find the total profit he had in this transaction (correct to two decimal places).

(a) Rs. 854.79
(b) Rs. 857.23
(c) Rs. 855.49
(d) Rs. 856.32

Q47. Which princely ruler patronised the Sikh community and institutions?

(a) Maharaja of Jaipur
(b) Raja of Travancore
(c) Bhupinder Singh of Patiala
(d) Gaikwad of Baroda

Q48. The arithmetic mean of 25 real numbers is 110. If 10 numbers are increased by 121/2 each, another 10 numbers are increased by 15 each and the remaining 5 numbers are unaltered, then the new value of the arithmetic mean is:

(a) 120
(b) 112
(c) 125
(d) 121

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Q49. In a certain code language, ‘GIVE’ is coded as ‘4628’ and ‘VOLT’ is coded as ‘3567’. What is the code for ‘V’ in the given code language?

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

Q50. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group? (Note: The odd one out is not based on the number of consonants/vowels or their position in the letter cluster)

(a) KL - FG
(b) XY - ST
(c) HK - LP
(d) OP - JK

Q51. Which author wrote the popular novel 'Held', shortlisted for Booker 2024?

(a) J K Rowling
(b) Sarah J Maas
(c) Rick Riordan
(d) Anne Michaels

Q52. A group of people consists of men, women and children. Among them, 20% are men, 50% are women and the rest are children, and their average weights are 45 kg, 60 kg and 20 kg, respectively. The average weight (in kg) of the group is:

(a) 45
(b) 44
(c) 42
(d) 43

Q53. AB is parallel to CD. A transversal PQ intersects AB and CD at E and F, respectively, and angle PEB = 56°. G is a point between AB and CD such that angle BEG = 32° and angle GFE = 47°. What is the measure of angle EGF?

(a) 29°
(b) 46°
(c) 41°
(d) 37°

Q54. The curved surface area of a right circular cone is 5400π cm², and the diameter of its base is 144 cm. Find the height (in cm) of the cone.

(a) 16
(b) 21
(c) 22
(d) 20

Q55. What is the percentage change in allocation for the Smart Cities Mission in India from the Revised Estimates of 2023-24 to the Budget Estimates of 2024-25?

(a) -50%
(b) -70%
(c) -80%
(d) -60%

Q56. This question is based on the words given below.

(Left) ACT BUS CAR DAD (Right)

In each of the words, each vowel is changed to the letter immediately following it in the English alphabetical order and each consonant is changed to the letter immediately preceding in the English alphabetical order. In how many letter clusters thus formed, will no vowel appear?

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

Q57. What was the Infant Mortality Rate (IMR) in India according to the Sample Registration System (SRS), 2019?
(a) 28 per 1000 live births
(b) 32 per 1000 live births
(c) 30 per 1000 live births
(d) 34 per 1000 live births

Q58. In April 2025, Chief Justice Sanjiv Khanna named ___ as his successor, who will be the ___ upon appointment
(a) Justice B R Gavai; 53^(rd) Chief Justice of India
(b) Justice B R Gavai; 52^(nd) Chief Justice of India
(c) Justice Hima Kohli; 53^(rd) Chief Justice of India
(d) Justice Surya Kant; 51^(st) Chief Justice of India

Q59. Solve : 70 + 72/6 +29 -30
(a) 52
(b) 81
(c) 91
(d) 101

Q60. According to the Jal Jeevan Mission, what is the percentage target for rural households to receive tap water by 2024?
(a) 50%
(b) 100%
(c) 85%
(d) 70%

Q61. What was the major impact of penicillin's discovery?
(a) First antiviral drug for Human Immunodeficiency Virus (HIV)
(b) First vaccine for prevention of smallpox
(c) First effective antibiotic against bacterial infections
(d) First drug for Rabies prevention and cure

Q62. Each of C, D, E, F, S, T and U has an exam on a different day of a week starting from Monday and ending on Sunday of the same week. Only two people have the exam before T. Only one person has the exam after D. Only three people have the exam between T and F. Only one person has the exam between E and C. U has the exam immediately before E. Who among the following has the exam on Friday?
(a) U
(b) T
(c) E
(d) S

Q63. Suppose x : y = 2 : 5; y : z = 4 : 7. If Rs. 15,120 is distributed among x, y and z, then the amounts received by x, y and z, respectively, are (in Rs.):
(a) 2,500, 5,200 and 7,420
(b) 1,920, 4,800 and 8,400
(c) 2,820, 4,500 and 7,800
(d) 2,700, 6,000 and 6,420

Q64. What is the primary function of the CPU in a computer system ?
(a) Store data permanently
(b) Connect input and output devices
(c) Manage the power supply

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(d) Execute instructions and process data

Q65. If the mode of the following data is 140, then what is the value of x?

Class	125-130	130-135	135-140	140-145	145-150
Frequency	30	30	33	x	31

(a) 33
(b) 46
(c) 47
(d) 34

Q66. The angle of elevation of the top of a tower from a point on the ground, which is 48m away from the foot of the tower is 30°. Find the height of the tower.

(a) 15√3 m
(b) 12√3 m
(c) 16√3 m
(d) 18√3 m

Q67. What is the major constraint in dry land farming?

(a) Too much rainfall
(b) Use of hybrid seeds
(c) Low water availability
(d) Lack of fertilisers

Q68. Where did the two-day Chintan Shivir, held on 7-8 March 2025 to discuss preparations for the 2028 and 2036 Olympics, take place?

(a) Mumbai
(b) New Delhi
(c) Hyderabad
(d) Bengaluru

Q69. A vendor sold 5 chocolates for Rs. 1, thereby gaining 40%. How many chocolates did he buy for Rs. 1?

(a) 13
(b) 7
(c) 9
(d) 11

Q70. As of February 2025, how many youth were trained in vocational skills under the Nehru Yuva Kendra Sangathan initiatives?

(a) 28,275
(b) 18,041
(c) 12,571
(d) 35,677

Q71. Rajesh has 156 litres of Oil A and 256 litres of Oil B. He fills a number of identical containers with the two types of oil in a manner that each container has only one type of oil, and all containers are completely filled. What can be the maximum volume (in litres) of each container that Rajesh uses, so that all the oil that Rajesh has, of both the types, can be poured into these containers?

(a) 6
(b) 10
(c) 13
(d) 4

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Q72. In April 2025, India and China initiated discussions to resume direct passenger flights that had been suspended since which year?

(a) 2021
(b) 2022
(c) 2020
(d) 2019

Q73. Which of the following best encapsulates the role of an operating system's kernel?

(a) Managing user accounts and access permissions
(b) Providing the graphical user interface for user interaction
(c) Offering a suite of utility programs for file management and system configuration
(d) Acting as the core interface between applications and the system hardware

Q74. If 3.5 : 17.4 :: 14 : x, find the value of x.

(a) 72.9
(b) 65.9
(c) 69.6
(d) 67.9

Q75. What will come in place of the question mark (?) in the following equation, if '+' and '−' are interchanged and '×' and '÷' are interchanged?

63 ÷ 12 − 98 × 7 + 35 = ?

(a) 745
(b) 742
(c) 735
(d) 736

Q76. Simplify the following.

$(2x+3)^2 - (x+1)^2$.

(a) $4x^2 + 12x + 8$
(b) $4x^2 + 10x + 6$
(c) $3x^2 + 7x + 6$
(d) $3x^2 + 10x + 8$

Q77. The difference between the compound interest, compounded annually and the simple interest if Rs. 47,100 is deposited at 9% rate of interest per annum for 2 years is:

(a) Rs. 391.21
(b) Rs. 381.51
(c) Rs. 382.71
(d) Rs. 391.81

Q78. What is the total length of the Mahanadi river?

(a) 200 km
(b) 351 km
(c) 567 km
(d) 851 km

Q79. 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 letter-cluster 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) KGE
(b) DAX
(c) WSQ
(d) SOM

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Q80. Atul's salary is Rs. 10,000 per month. He spends Rs. 6,000 on house rent and Rs. 2,500 on bills, and the rest of the amount is his monthly savings. Find his savings (in Rs.) in a year, if in the month of his birthday, he spent all his monthly savings on birthday celebrations.

(a) 18,000
(b) 16,500
(c) 15,000
(d) 13,500

Q81. Simplify: 194 + [6 x (1 - 6 + 5)] ÷ 12

(a) 193
(b) 184
(c) 191
(d) 194

Q82. Which of the following acts authorised the Governor General to override his council in matters affecting the interest of British empire in India?

(a) Charter Act of 1793
(b) Charter Act of 1813
(c) Pitt's India Act 1784
(d) Regulating Act 1773

Q83. Which ruler, upon his death in 1530, left behind a newly established empire that stretched across northern India—from the Indus River in the west to Bihar in the east, and from the Himalayas in the north to Gwalior in the south?

(a) Babur
(b) Alauddin Khalji
(c) Aurangzeb
(d) Qutb ud-Din Aibak

Q84. Select the triad that follows the same pattern as that followed by the two triads given below. Both triads follow the same pattern.

EL-GN-IK

GN-IP-KM

(a) IP-KR-MO
(b) JP-KR-MQ
(c) JP-KS-MQ
(d) IP-KR-MQ

Q85. At what rate of interest (rounded off to two decimal places) per year will a sum of money double itself in 12 years on simple interest?

(a) 16.67%
(b) 8.33%
(c) 6.33%
(d) 10.33%

Q86. From a taxi stand, two cabs start at a speed of 74 km/hr at an interval of 28 minutes, both cabs travelling in the same direction. A man coming in the opposite direction towards the taxi stand meets the cabs at an interval of 10 minutes. Find the speed (in km/hr) of the man.

(a) 125.5
(b) 143.1
(c) 133.2
(d) 128.8

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Q87. Marks in statistics of 12 students are x, 28, 35, 56, 78, 63, 65, 81, 79, 83, 80, y, where x and y are the lowest and highest marks, respectively. If the range and average of the marks are 70 and 64, respectively, then the ordered pair (x, y) is:

(a) (35, 105)
(b) (23, 93)
(c) (25, 95)
(d) (30, 100)

Q88. Select the number from among the given options that can replace the question mark (?) in the following series.

37 55 66 84 95 113 ?

(a) 145
(b) 124
(c) 166
(d) 131

Q89. Which of the following rivers is NOT a tributary of the Ganga but flows directly into the Bay of Bengal?

(a) Ghaghara
(b) Kosi
(c) Gomti
(d) Mahanadi

Q90. How many medals did India win in total at the World Para Athletics Grand Prix 2025?

(a) 120
(b) 180
(c) 134
(d) 150

Q91. In holozoic nutrition, the first essential step for complex organisms is _____

(a) egestion
(b) absorption
(c) ingestion
(d) assimilation

Q92. Where was the 13^(th) Governing Council Meeting of the Bay of Bengal Inter-Governmental Organization (BOBP-IGO) held?

(a) Colombo, Sri Lanka
(b) Chennai, India
(c) Male, Maldives
(d) Dhaka, Bangladesh

Q93. In a certain code language, ‘pizza base queen’ is coded as ‘du su qw’ and ‘pig queen wave’ is coded as ‘ic fv su’. How is ‘queen’ coded in the given language?

(a) du
(b) ic
(c) su
(d) qw

Q94. Saura painting, a tribal art form, is traditionally practiced by communities in which Indian state?

(a) Gujarat
(b) Madhya Pradesh
(c) Odisha
(d) Rajasthan

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Q95. Find the value of m that satisfies $(29/4)^3 \times (4/29)^2 \times (29/4)^{11} = (4/29)^{(9m + 7)}$

(a) -18/9
(b) -10/9
(c) -23/9
(d) -19/9

Q96. What role did the Indian People's Theatre Association (IPTA) play during the British rule?

(a) Encouraged the British education policy
(b) Expressed dissent through art
(c) Promoted classical dance
(d) Supported the British war efforts

Q97. P, Q, R, S, T, U and V are sitting around a circular table facing the centre. Only one person sits between R and T when counted from the left of T. Q sits third to the right of P. U sits third to the left of V. Q sits to the immediate right of U. S is not an immediate neighbour of U. How many people sit between S and T when counted from the right of S?

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

Q98. Which of the following letter-clusters should replace # and % so that the pattern and relationship followed between the letter-cluster pair on the left side of :: is the same as that on the right side of :: ?

: LPR :: PSV : %

(a) # = HMR, % = TVW
(b) = FMP, % = RUY
(c) = HNT, % = TUT
(d) = FNR, % = RVM

Q99. Two pipes, A and B, can fill a tank of 3700 litres in 9 hours and 6 hours, respectively. If they are opened together, how many hours will they take to fill an empty tank of 6400 litres?

(a) 1159/185 hours
(b) 1152/185 hours
(c) 1149/185 hours
(d) 1153/185 hours

Q100. In 2025, which state launched a groundbreaking initiative aimed at eradicating mother to-child transmission of HIV, syphilis, and Hepatitis B by 2026?

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

ANSWER KEY

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

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81	d	82	a	83	a	84	a	85	b	86	c	87	c	88	b	89	d	90	c
91	c	92	c	93	c	94	c	95	d	96	b	97	c	98	c	99	b	100	c

SOLUTIONS

Q1. Answer: (d) V

Given: Each of T, U, V, W, X, Y and Z has an exam on a different day of a week,

Starting from Monday and ending on Sunday of the same week.

1) X has an exam on the third day of the week.

2) Only three people have an exam between X and T.

3) Z has an exam immediately after V, and Y has an exam immediately after Z.

4) W does not have an exam on Monday.

Day	Person
Monday	U
Tuesday	W
Wednesday	X
Thursday	V
Friday	Z
Saturday	Y
Sunday	T

Thus, the V has an exam on "Thursday."

The correct answer is "Option 4".

Q2. Answer: (d) Humayun

The correct answer is Humayun.

Key Points

• Humayun, the second Mughal emperor, regained his lost kingdom after defeating the successors of Sher Shah Suri in 1555.

• He recaptured Delhi and Agra from the Afghan rulers, marking the end of the Second Afghan Empire.

• Humayun's return to power was aided by strategic alliances, including support from the Persian ruler Shah Tahmasp.

• His victory restored the Mughal Empire's presence in India, laying the foundation for the reign of his son, Akbar the Great.

• Humayun's return to the throne was short-lived, as he passed away in 1556, shortly after regaining power.

Additional Information

• Second Afghan Empire:

• It was established by Sher Shah Suri, who overthrew Humayun in 1540 and ruled until his death in 1545.

• Sher Shah's successors were unable to maintain control, leading to Humayun's return.

• Shah Tahmasp's Support:

• Humayun sought refuge in Persia after losing his kingdom and received military assistance from Shah Tahmasp.

• This alliance was pivotal in Humayun's successful campaign against the Afghan rulers.

• Mughal Empire:

• The Mughal Empire was one of the largest and most influential empires in Indian history, known for its cultural and architectural contributions.

• Humayun's restoration strengthened the Mughal dynasty, which reached its zenith under Akbar.

• Humayun's Tomb:

• Built by Humayun's widow, Bega Begum, it is one of the first examples of Mughal architecture in India.

• Located in Delhi, it is a UNESCO World Heritage Site and inspired later architectural marvels like the Taj Mahal.

Q3. Answer: (d) To enhance the efficiency and safety of solid rocket motor manufacturing

The correct answer is To enhance the efficiency and safety of solid rocket motor manufacturing.

Key Points

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• The vertical planetary mixer developed by ISRO in February 2025 is designed to enhance the efficiency and safety in the production of solid rocket motors.

• This technology supports precise mixing of propellant ingredients, ensuring consistent quality and composition for better performance of rockets.

• Solid rocket motors are critical components in many launch vehicles, including those used for satellite deployment and interplanetary missions.

• The mixer integrates advanced mechanical design and automation features to reduce human intervention, minimizing risks associated with hazardous materials.

• ISRO has been focusing on innovations to streamline the manufacturing process of solid propulsion systems, which are vital for India's space missions.

Additional Information

• Solid Rocket Motors:

• Solid rocket motors use a solid propellant mixture that is ignited to produce thrust.

• They are simpler and more reliable compared to liquid propulsion systems but require meticulous manufacturing processes for consistent results.

• Propellant mixtures generally include oxidizers, fuel, and binders.

• Planetary Mixers:

• Planetary mixers are specialized machines designed for mixing viscous materials uniformly.

• They are widely used in industries like food, chemical, and aerospace manufacturing.

• The "vertical" design enhances efficiency by reducing material settling and ensuring thorough mixing.

• ISRO's Advancements in Propulsion:

• ISRO has developed several propulsion technologies, including cryogenic engines and solid rocket boosters.

• Solid propulsion systems are used in the PSLV and GSLV series for launching satellites into orbit.

• Continuous advancements aim to improve reliability, safety, and cost-effectiveness.

• Safety Considerations in Propellant Manufacturing:

• Propellant manufacturing involves handling hazardous chemicals and explosive materials.

• Automation and specialized equipment like vertical planetary mixers reduce the risks associated with human errors.

• Safety protocols and advanced designs are integral to ensuring worker safety and environmental protection.

Q4. Answer: (c) To manage hardware and software resources

The correct answer is To manage hardware and software resources.

Key Points

• An operating system acts as an intermediary between hardware and software, enabling them to function together seamlessly.

• Its primary role is to manage system resources, such as CPU, memory, storage, and input/output devices.

• The operating system provides a user interface (e.g., command line or graphical user interface) to interact with the system.

• It oversees tasks like process scheduling, ensuring efficient execution of multiple programs.

• Popular operating systems include Windows, macOS, Linux, and Chrome OS, each designed to optimize resource utilization and user experience.

Additional Information

• Kernel:

• The kernel is the core component of an operating system, responsible for managing system resources and facilitating communication between hardware and software.

• It handles essential functions like memory management, process management, and device control.

• File System:

• The operating system organizes and stores data using a file system, enabling efficient retrieval and management.

• Popular file systems include NTFS, FAT32, ext4, and APFS.

• Multitasking:

• Modern operating systems support multitasking, allowing multiple processes to run simultaneously.

• This is achieved through process scheduling techniques like time-sharing and priority-based execution.

• Security:

• Operating systems implement security measures like user authentication, access control, and firewalls to protect data and resources.

• Regular updates are provided to address vulnerabilities and enhance security.

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• Virtualization:

• Operating systems can support virtualization, allowing multiple virtual environments to run on a single physical machine.

• It is widely used in cloud computing and server management for resource optimization.

Q5. Answer: (d) FMT

The logic followed here is:

Hence, the correct answer is "Option 4".

Q6. Answer: (c) Shifting agriculture

The correct answer is Shifting agriculture.

Key Points

• Shifting agriculture, also known as Jhum cultivation, is a traditional farming method practiced in Northeast India, particularly in states like Assam, Nagaland, and Mizoram.

• Farmers clear forested land by cutting and burning vegetation (slash-and-burn method) and use the ash as fertilizer for crops.

• This practice leads to severe soil erosion due to the removal of vegetation cover, exposing the soil to heavy rainfall and wind.

• Shifting agriculture results in the loss of soil nutrients over time, leading to the degradation of land and reduced agricultural productivity.

• After a few years, the land is abandoned, and farmers move to another area, repeating the cycle, which further contributes to deforestation and environmental concerns.

Additional Information

• Soil Erosion:

• It refers to the removal of the topsoil layer due to natural forces like wind and water or human activities such as deforestation and farming.

• Soil erosion reduces fertility, destroys agricultural land, and affects water quality in nearby rivers and streams.

• Terrace Farming:

• This is a sustainable agricultural practice where crops are grown on stepped terraces built into hillsides to prevent soil erosion and water runoff.

• It is widely practiced in hilly regions, such as in Himachal Pradesh and Uttarakhand, but is not the main method used in Northeast India.

• Mixed Farming:

• Involves growing crops and raising livestock simultaneously on the same farm.

• It does not involve practices that lead to significant soil erosion.

• Deforestation:

• Shifting agriculture contributes to deforestation as large areas of forests are cleared for farming.

• Deforestation leads to loss of biodiversity, disruption of ecosystems, and increased carbon emissions.

Q7. Answer: (d) Ravi

The correct answer is Ravi.

Key Points

• Ravi is one of the major rivers of the Indus basin system, flowing through India and Pakistan.

• The river originates in the Kullu hills of Himachal Pradesh, India, and flows westward before entering Pakistan.

• It is an important tributary of the Indus River and plays a significant role in the irrigation systems in both countries.

• The Ravi River is historically significant, being mentioned in ancient texts like the Rigveda and associated with the region of Punjab.

• Under the Indus Waters Treaty (1960), the Ravi is allocated to India for utilization of its waters.

Additional Information

• Indus River System

• The Indus River System consists of six main rivers: Indus, Jhelum, Chenab, Ravi, Beas, and Sutlej.

• These rivers originate in the Himalayas and serve as lifelines for agriculture in northern India and Pakistan.

• The system is governed by the Indus Waters Treaty (1960), signed between India and Pakistan.

• Indus Waters Treaty (1960)

• The treaty was brokered by the World Bank to resolve water-sharing disputes between India and Pakistan.

• Under the treaty, India has control over the eastern rivers (Ravi, Beas, and Sutlej), while Pakistan controls the western rivers (Indus, Jhelum, and Chenab).

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• Punjab Region

• The name "Punjab" translates to "Land of Five Rivers," referring to Ravi, Beas, Sutlej, Chenab, and Jhelum.

• The region is agriculturally rich, largely due to the extensive irrigation supported by the Indus River System.

• Ravi River's Historical Significance

• The Ravi River was central to the ancient Indus Valley Civilization.

• It flows near the historic city of Lahore, Pakistan, and has cultural importance in the region.

Q8. Answer: (d) 2 : 1

Shortcut Trick

By the standard degree measure theorem of circles, the angle subtended by an arc or chord at the centre is always twice the angle subtended by it at any point on the remaining part of the circumference.

Let the angle subtended at the circumference be θ.

Then, the angle subtended at the centre is 2θ.

Required Ratio = Angle at Centre : Angle at Circumference = $2\theta : \theta = 2 : 1$.

Therefore The correct answer is 2 : 1.

Alternate Method

Given:

=> A circle with centre O.

=> A chord AB subtending an angle angle AOB at the centre O.

=> The same chord subtends an angle angle ACB at point C on the circumference.

Theorem Used:

The angle subtended by an arc at the centre of a circle is twice the angle subtended by it at any point on the circumference.

Calculations:

=> Let the angle subtended at the circumference be angle ACB = θ

=> According to the theorem, the angle subtended at the centre is angle AOB = 2 × angle ACB

=> angle AOB = 2θ

=> Required Ratio = angle AOB : angle ACB

=> Ratio = $2\theta : \theta$

=> Ratio = 2 : 1

Explanation of Incorrect Options:

=> Option (1) 3 : 1 is incorrect because the central angle is exactly double, not triple, the inscribed angle.

=> Option (2) 1 : 3 is incorrect because the central angle must be larger than the inscribed angle, making a ratio less than 1 impossible.

=> Option (3) 1 : 2 is incorrect because this represents the ratio of the angle at the circumference to the angle at the centre, which is the reverse of the requested order.

Therefore The correct answer is 2 : 1.

Additional Information

Angle in a Semicircle

An angle subtended by a diameter at any point on the circumference is always a right angle (90°), which is half of the 180° straight angle at the centre.

Angles in the Same Segment

Angles subtended by the same chord or arc at different points on the same segment of the circumference are always equal.

Cyclic Quadrilateral Property

The opposite angles of a cyclic quadrilateral always sum up to 180° (they are supplementary).

Q9. Answer: (a) Their Indian citizenship ends automatically

The correct answer is Their Indian citizenship ends automatically.

Key Points

• As per the Indian Citizenship Act, 1955, Indian citizenship is automatically terminated when an Indian citizen voluntarily acquires the citizenship of another country.

• India follows the principle of single citizenship, meaning that dual citizenship is not allowed under Indian law.

• An individual acquiring foreign citizenship must surrender their Indian passport as it becomes invalid after acquiring foreign nationality.

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• The government of India issues an Overseas Citizen of India (OCI) card to eligible individuals of Indian origin, which provides certain privileges but is not equivalent to dual citizenship.

• Section 9(1) of the Indian Citizenship Act explicitly states that Indian citizenship ceases automatically upon acquiring foreign citizenship voluntarily.

Additional Information

• Indian Citizenship Act, 1955

• This act governs the acquisition, termination, and supplementary provisions of Indian citizenship.

• It provides five modes of acquiring citizenship: by birth, descent, registration, naturalization, and incorporation of territory.

• It also lays down the grounds for the termination and deprivation of citizenship under specific conditions.

• Overseas Citizen of India (OCI) Card

• The OCI card is issued to foreign nationals of Indian origin, allowing them to visit, live, or work in India indefinitely.

• It is not equivalent to Indian citizenship, and OCI cardholders cannot vote, hold government office, or purchase agricultural land in India.

• The scheme was introduced in 2005 to strengthen the bond between India and its diaspora.

• Dual Citizenship

• Dual citizenship refers to a situation where an individual is a legal citizen of two countries simultaneously.

• India does not allow dual citizenship; instead, it provides the OCI card as an alternative for individuals of Indian origin.

• Surrender Certificate

• Indian citizens who acquire foreign nationality must obtain a surrender certificate for their Indian passport.

• This certificate is required for availing of consular services and applying for an OCI card.

Q10. Answer: (b) −48, No real roots

Shortcut Trick

Identify the coefficients: a = 1, b = −2, and c = 13.

Apply the Discriminant formula: $D = b^2 − 4ac$.

$D = (−2)^2 − 4 × 1 × 13 = 4 − 52 = −48$.

Since D < 0, the equation has no real roots.

Therefore The correct answer is −48, No real roots.

Alternate Method

Given quadratic equation: $x^2 − 2x + 13 = 0$

Comparing with the standard form $ax^2 + bx + c = 0$, we get:

=> a = 1

=> b = −2

=> c = 13

The Discriminant (D) is calculated as:

=> $D = b^2 − 4ac$

=> $D = (−2)^2 − 4 × (1) × (13)$

=> D = 4 − 52

=> D = −48

Nature of roots based on Discriminant value:

=> As D = −48, which is less than zero (D < 0), the roots are imaginary/non-real.

Therefore The correct answer is −48, No real roots.

Additional Information

Nature of Roots

If D > 0, roots are real and distinct; if D = 0, roots are real and equal; if D < 0, roots are imaginary.

Quadratic Formula

The roots of $ax^2+bx+c=0$ are given by $x = (−b ± \sqrt{D}) / 2a$.

Sum and Product of Roots

For a quadratic equation, Sum of roots = −b/a and Product of roots = c/a.

Q11. Answer: (a) 772

The logic followed here is:

Hence, the correct answer is "Option 1".

Q12. Answer: (a) Increasing atomic mass

The correct answer is Increasing atomic mass.

Key Points

• Dmitri Mendeleev arranged the elements in his periodic table based on their increasing atomic mass.

• He grouped elements with similar chemical properties into vertical columns called groups.

• Mendeleev left gaps in his periodic table to predict the existence of undiscovered elements and their properties.

• The periodic table was published in 1869, marking a significant advancement in the study of chemistry.

• Although atomic mass was the primary criterion, Mendeleev occasionally altered the arrangement to ensure elements with similar properties were aligned correctly.

Additional Information

• Periodic Table:

• A tabular arrangement of chemical elements organized by their atomic number, electron configuration, and recurring chemical properties.

• The modern periodic table is based on the Moseley's concept of increasing atomic number, rather than atomic mass.

• Atomic Mass:

• The total mass of protons and neutrons in an atom's nucleus.

• Mendeleev used atomic mass as a criterion because atomic numbers were unknown at the time.

• Predictions Made by Mendeleev:

• Mendeleev successfully predicted the properties of elements like gallium (eka-aluminum) and germanium (eka-silicon).

• These predictions were later confirmed with the discovery of these elements.

• Limitations of Mendeleev's Table:

• Some elements were placed out of order based on atomic mass to align with chemical properties.

• The periodic table did not account for the existence of isotopes, which have the same atomic number but different atomic masses.

Q13. Answer: (a) = XQB, % = UTZ

The logic followed here is:

Given: # : AND :: RWX : %

Option 1) # = XQB, % = UTZ

Here, it does follow the pattern.

Option 2) # = LCT, % = XQB

Option 3) # = OZV, % = LCT

Option 4) # = UTZ, % = OZV

Hence, the correct answer is "Option 1".

Q14. Answer: (a) Two

Given: DIE CUP BOX ASK

According to the question:

In each of the words, each vowel is changed to the letter immediately following it in the English alphabetical order and each consonant is changed to the letter immediately preceding in the English alphabetical order.

Now, changing each letter in the words:

DIE: D → C, I → J, E → F

CUP: C → B, U → V, P → O

BOX: B → A, O → P, X → W

ASK: A → B, S → R, K → J

Thus, the new clusters formed are:

DIE → CJF

CUP → BVO

BOX → APW

ASK → BRJ

In these clusters, the ones without any vowel (A, E, I, O, U) are:

CJF, BVO, APW, BRJ

Thus, 2 cluster of letter without any vowel CJF, BRJ

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Hence, the correct answer is "Option 1".

Q15. Answer: (a) Annpurna Devi

The correct answer is Annpurna Devi.

Key Points

• Annpurna Devi, Union Minister of State for Education, represented India at the 69th Session of the United Nations Commission on the Status of Women (UNCSW).

• The session was held at the United Nations Headquarters in New York in March 2023.

• The theme for the 69th Session of UNCSW was "Innovation and technological change, and education in the digital age for achieving gender equality and the empowerment of all women and girls."

• Annpurna Devi emphasized India's commitment to gender equality and empowerment through technology and innovation.

• The session focused on global discussions regarding the role of technology in bridging gender gaps and promoting inclusivity in education and innovation.

Additional Information

• United Nations Commission on the Status of Women (UNCSW):

• UNCSW is a functional commission of the United Nations Economic and Social Council (ECOSOC).

• Its primary focus is on advancing gender equality and the empowerment of women globally.

• It convenes annually at the UN Headquarters in New York to discuss progress, challenges, and strategies related to women's rights.

• India's Efforts in Digital Education:

• India has launched several initiatives like PM eVIDYA, DIKSHA (Digital Infrastructure for Knowledge Sharing), and SWAYAM to enhance digital education.

• These programs aim to provide inclusive and equitable access to education, especially for marginalized groups.

• Role of Technology in Gender Equality:

• Technology and innovation play a crucial role in bridging the digital divide and promoting women's participation in education and workforce.

• Global discussions focus on ensuring equal access to digital resources and addressing challenges such as online safety and digital literacy.

• India's Global Representation:

• India actively participates in global forums like UNCSW to showcase its efforts in gender equality and sustainable development.

• Such participation reflects India's commitment to achieving the Sustainable Development Goals (SDGs), particularly SDG 5 (Gender Equality).

Q16. Answer: (c) © P Z L ©

Given:

Number/Symbol	2	#	@	7	9
Code	M	Y	T	P	V

Conditions	Coded As
If the first element is a symbol and the last a number, the codes for these two (the first and the last elements) are to be interchanged.	Codes for first and last elements are interchanged
If the first element is an even number and the last an odd number, the first and last elements are to be coded as ©	First and last elements are coded as ©
If both the second and third elements are perfect squares, the third element is to be coded as the code for the second element	Third element takes the code for the second element

Now, the group of numbers and symbols is: 2 # @ 7 9

Here, 2nd condition applies (If the first element is an even number and the last an odd number, the first and last elements are to be coded as ©

Hence, the code for 2 # @ 7 9 is → © P Z L ©

Therefore, the correct answer is "Option 3".

Q17. Answer: (a) 6

Given: (Left) 956 521 251 156 335 (Right)

The second digit of the highest number is: 5 (956)

And,

The first digit of the lowest number is: 1 (156)

So, the addition of the second digit of the highest number and the first digit of the lowest number is:

→ 5 + 1 = 6.

The correct answer is "Option 1".

Q18. Answer: (b) 4 sarees and 4 suits

Shortcut Trick

Total items = 8. Let all 8 be suits: Total cost = 8 × 1,000 = Rs. 8,000.

Difference from actual cost = 10,000 − 8,000 = Rs. 2,000.

Price difference per saree = 1,500 − 1,000 = Rs. 500.

Number of sarees = 2,000 ÷ 500 = 4.

Number of suits = 8 − 4 = 4.

Therefore The correct answer is 4 sarees and 4 suits.

Alternate Method

Given → Total Cost = Rs. 10,000, Total Quantity = 8, Saree Price = Rs. 1,500, Suit Price = Rs. 1,000.

Formulas: Total Cost = (Price_(Saree) × Qty_(Saree)) + (Price_(Suit) × Qty_(Suit))

=> Let the number of sarees be x and suits be (8 − x).

=> Equation: 1,500x + 1,000(8 − x) = 10,000.

=> 1,500x + 8,000 − 1,000x = 10,000.

=> 500x = 2,000.

=> x = 4 (Sarees).

=> Suits = 8 − 4 = 4.

Therefore The correct answer is 4 sarees and 4 suits.

Additional Information

Linear Equations in Two Variables

Problems involving two types of items can be solved using x and y where x + y = Total Quantity.

Alligation Method

The ratio of quantities can be found by (Average Price − Price 1) : (Price 2 − Average Price).

Q19. Answer: (c) I

Given: A, B, C, D, G, H, and I are sitting around a circular table facing the centre.

Only two people sit between A and H when counted from the right of A. Only two people sit between H and D.

Only two people sit between H and D. Only three people sit between A and B. C sits to the immediate left of I.

Thus, I sits third to the left of G.

Hence, the correct answer is "Option 3".

Q20. Answer: (b) 5

Given: Each of P, Q, R, S, T, U and V has an exam on a different day of a week,

Starting from Monday and ending on Sunday of the same week.

1) P has the exam on Thursday.

2) U has the exam on one of the days after R and on one of the days before T.

3) V has the exam on one of the days after S but on one of the days before Q.

4) S has the exam on one of the days after P.

Day	Person
Monday	R
Tuesday	U
Wednesday	T

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Thursday	P
Friday	S
Saturday	V
Sunday	Q

Thus, the number of the person before V is 5.

Hence, the correct answer is "Option 2".

Q21. Answer: (d) Two

Given: 6154932

By adding 2 in the even digits and subtracting 1 from the odd digits, we will get,

Number	**6**	**1**	**5**	**4**	**9**	**3**	**2**
operation	+2	-1	-1	+2	-1	-1	+2
New Number	8	0	4	6	8	2	4

The new number formed is: 8046842

Here, the digits that appear more than once are 4 and 8.

So, the number of digits that appear more than once is: 2

Hence, the correct answer is "Option 4".

Q22. Answer: (d) 42

Given symbol mappings:

• 'S' stands for '–'

• 'Q' stands for '×'

• 'R' stands for '÷'

• 'P' stands for '+'

The given equation is:

1 P 45 R 2 Q 2 S 4 = ?

=> 1 + 45 ÷ 2 × 2 - 4 = ?

=> 1 + 45 - 4 = ?

=> 46 - 4 = 42.

Hence, the correct answer is "Option 4".

Q23. Answer: (a) 120

Shortcut Trick

Base radius (r) = 100 ÷ 2 = 50 cm.

Slant height (l) = CSA ÷ (πr) = 6500π ÷ (50π) = 130 cm.

Using Pythagorean triplet (5, 12, 13) scaled by 10 → (50, 120, 130).

Height (h) = 120 cm.

Therefore The correct answer is 120 cm.

Alternate Method

Given:

Curved Surface Area (CSA) = 6500π cm^2

Diameter (d) = 100 cm => Radius (r) = 50 cm

Formula Used:

Curved Surface Area of cone = πrl

Relationship between height (h), radius (r), and slant height (l): $l^2 = r^2 + h^2$

Calculations:

=> π × 50 × l = 6500π

=> 50 × l = 6500

=> l = 6500 ÷ 50

=> l = 130 cm

=> $h^2 = l^2 - r^2$

=> $h^2 = 130^2 - 50^2$

=> $h^2 = 16900 - 2500$

=> $h^2 = 14400$

=> $h = \sqrt{14400} = 120$ cm

Therefore The correct answer is 120 cm.

Additional Information

Total Surface Area (TSA) of a Cone

It is the sum of the curved surface area and the base area: TSA = $\pi r(l + r)$.

Volume of a Cone

The amount of space occupied by a cone: V = $(1/3)\pi r^2 h$.

Pythagorean Triplets

Standard sets like (3, 4, 5), (5, 12, 13), and (8, 15, 17) help solve right-triangle geometry problems quickly by scaling.

Q24. Answer: (c) Jat- Jatin

The correct answer is Jat-Jatin.

Key Points

• Jat-Jatin is a popular folk dance of Bihar, often performed during the monsoon season.

• The dance is a symbolic representation of the love and quarrels of a married couple, portraying their emotional dynamics.

• It is widely performed in the Mithila region of Bihar and adjoining areas, showcasing the cultural richness of the state.

• The dance is accompanied by traditional folk songs that narrate the stories of Jat (husband) and Jatin (wife).

• Jat-Jatin serves as a form of entertainment and a medium for expressing the daily lives and struggles of rural communities.

Additional Information

• Folk Dances of Bihar:

• Some other famous folk dances of Bihar include Sohar-Khilouna, Bidesia, Jhijhiya, and Kajari.

• These dances are deeply rooted in the traditions and practices of rural Bihar, celebrating various aspects of life.

• Mithila Region:

• The Mithila region is known for its unique cultural heritage, including folk art, music, and dance.

• It is also famous for the world-renowned Madhubani paintings.

• Music in Jat-Jatin:

• The music accompanying the Jat-Jatin dance typically uses traditional instruments such as dholak, harmonium, and manjira.

• The lyrics focus on themes of rural life, love, and hardships faced by couples.

• Cultural Significance:

• Jat-Jatin reflects the social and emotional aspects of relationships in rural Bihar.

• It provides insights into the challenges faced by couples due to migration, poverty, and societal norms.

Q25. Answer: (c) Sixth Schedule

The correct answer is Sixth Schedule.

Key Points

• The Sixth Schedule of the Indian Constitution provides for the administration of tribal areas in the states of Assam, Meghalaya, Tripura, and Mizoram.

• It allows for the establishment of Autonomous District Councils (ADCs), which are empowered to make laws and govern certain aspects of administration in tribal areas.

• The ADCs are authorized to create village councils or courts for handling disputes and cases involving tribal individuals, ensuring their customary laws and practices are preserved.

• This schedule provides a legal framework to protect the rights and culture of tribal communities while granting them self-governance.

• The Sixth Schedule seeks to empower tribal regions by granting them autonomy in areas such as land use, resource management, and administration of justice.

Additional Information

• Autonomous District Councils (ADCs):

• ADCs are created under the Sixth Schedule to administer tribal areas and protect tribal rights.

• They have the authority to legislate on matters such as land, forests, water, customs, and inheritance.

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• ADCs are composed of members both elected and nominated by the Governor of the respective state.

• Tribal Courts:

• Village councils or courts established under ADCs are empowered to handle cases involving tribal individuals in accordance with customary laws.

• These courts aim to ensure quick and culturally sensitive resolution of disputes within tribal communities.

• Other Schedules Related to Tribals:

• The Fifth Schedule of the Indian Constitution deals with the administration and control of Scheduled Areas and Scheduled Tribes in other states (excluding the Sixth Schedule states).

• The Sixth Schedule, however, provides a more autonomous framework for certain northeastern states.

• Importance of the Sixth Schedule:

• It preserves the unique cultural identity and traditions of tribal communities.

• It ensures self-governance and participatory democracy within tribal areas.

Q26. Answer: (c) 30,000

Shortcut Trick

Spending = 40% => Savings = 100% − 40% = 60%.

Given Savings = Rs. 18,000.

60% → Rs. 18,000

1% → Rs. 18,000 ÷ 60 = Rs. 300

100% → 300 × 100 = Rs. 30,000

Therefore The correct answer is Rs. 30,000.

Alternate Method

Given:

Expenditure percentage = 40%

Total Savings amount = Rs. 18,000

Formula Used:

Income = Expenditure + Savings

Income = (Savings ÷ Savings %) × 100

Calculations:

=> Let Total Income be 'I'.

=> Savings % = 100% − 40% = 60%

=> 60% of I = 18,000

=> (60 ÷ 100) × I = 18,000

=> I = (18,000 × 100) ÷ 60

=> I = 300 × 100

=> I = 30,000

Therefore The correct answer is Rs. 30,000.

Additional Information

Percentage Change

Increase or decrease in income is calculated as: (Change ÷ Original Value) × 100.

Ratio Method

If Expenditure : Savings = 40 : 60 = 2 : 3, then Income corresponds to 5 units. If 3 units = 18,000, then 1 unit = 6,000 and 5 units = 30,000.

Successive Changes

If Income increases by x% and then y%, the net effective change is (x + y + xy/100)%.

Q27. Answer: (d) 18 - 20 - 40 - 42

The logic followed here is:

Logic: 1st number + 2 = 2nd number × 2 = 3rd number + 2 - 4th number.

For, 3 - 5 - 10 - 12

=> 3 + 2 = 5 × 2 = 10 + 2 = 12.

For, 8 - 10 - 20 - 22

=> 8 + 2 = 10 × 2 = 20 + 2 = 22.

Option 1) 4 - 6 - 12 - 24
=> 4 + 2 = 6 × 2 = 12 + 2 = 14 ≠ 24.
Option 2) 28 - 30 - 60 - 64
=> 28 + 2 = 30 × 2 = 60 + 2 = 62 ≠ 64.
Option 3) 6 - 10 - 12 - 24
=> 6 + 2 = 8 × 2 = 16 + 2 = 18 ≠ 24.
Option 4) 18 - 20 - 40 - 42
=> 18 + 2 = 20 × 2 = 40 + 2 = 42.
Hence, the correct answer is "Option 4".

Q28. Answer: (b) 19.5

Shortcut Trick
Distance Ratio: Covered : Remaining = 4 : 3
Total units = 7 units → 37 km Therefore 1 unit = 37/7 km
Distance Covered = 4 units = 4 × (37/7) = 148/7 km
Time = 1 hr 5 min = 13/12 hr
Speed = (148/7) ÷ (13/12) = 1776/91 ≈ 19.5 km/hr
Therefore The correct answer is 19.5 km/hr.
Alternate Method
Given:
Total Distance = 37 km
Time = 1 hour 5 minutes
Relationship: Distance covered = 4/3 × Remaining distance
Calculations:
=> Let the remaining distance be x km.
=> Distance covered = 4/3 x km.
=> Total Distance = x + 4/3 x = 7/3 x = 37 km
=> x = (37 × 3) / 7 = 111/7 km
=> Distance covered = 4/3 × (111/7) = 148/7 km
=> Time = 1 + 5/60 = 1 + 1/12 = 13/12 hours
=> Speed = Distance ÷ Time = (148/7) ÷ (13/12)
=> Speed = (148 × 12) / (7 × 13) = 1776 / 91
=> Speed ≈ 19.516 km/hr
Therefore The correct answer is 19.5 km/hr.
Additional Information
Speed, Distance, and Time Relation
The basic formula is Speed = Distance ÷ Time. Ensure all units are consistent (e.g., km and hours) before calculation.
Unit Conversion
To convert km/hr to m/s, multiply by 5/18. To convert m/s to km/hr, multiply by 18/5.
Average Speed
If a journey is divided into parts, Average Speed = Total Distance ÷ Total Time. Do not simply average the speeds.

Q29. Answer: (d) 9 km to the east

Given:
Sunil starts from Point A and drives 11 km towards the south.
He then takes a left turn, drives 3 km, turns left and drives 4 km.
He then takes a left turn and drives 12 km.
He takes a final right turn, drives 7 km and stops at Point P.
Thus, 9 km to the east he should drive in order to reach Point A.
Hence, the correct answer is "Option 4".

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Q30. Answer: (d) Neither conclusion (I) nor (II) follows.

Statements:

Some cars are buses.

All buses are trucks.

Some buses are ships.

The least possible venn diagram is:

Conclusions:

(I) Some ships are cars - False(because, there is no direct relation id given so, it can be possible only).

(II) All trucks are cars - False(because, All bus are truck and some care are bus, it implies thar some truck are car, so it can be possible only).

Thus, Neither conclusion (I) nor (II) follows.

Hence, the correct answer is "Option 4".

Q31. Answer: (d) 8

Shortcut Trick

For numbers a, b, c, d to be in proportion after adding x: x = (ad − bc) ÷ ((a + d) − (b + c)).

Here a = 26, b = 40, c = 22, d = 34.

x = (26 × 34 − 40 × 22) ÷ ((26 + 34) − (40 + 22)) = (884 − 880) ÷ (60 − 62) = 4 ÷ (−2) = −2.

Mean proportional $y^2 = 4x \times (7x - 6)$ => $y^2 = 4(-2) \times (7(-2) - 6) = -8 \times (-20) = 160$. (Check values: 26−2=24, 40−2=38, 22−2=20, 34−2=32. 24/38 ≠ 20/32).

Correcting calculation: x = (bc − ad) ÷ ((a+d) − (b+c)) = (880 − 884) ÷ (60 − 62) = −4 ÷ −2 = 2. x = 2. Then $y^2 = 4(2) \times (7(2) - 6) = 8 \times 8 = 64$ => y = 8.

Therefore The correct answer is 8.

Alternate Method

Given: Numbers 26, 40, 22, 34. Added value is x. Resulting numbers are in proportion.

Formula: (a+x)/(b+x) = (c+x)/(d+x)

=> (26 + x) × (34 + x) = (22 + x) × (40 + x)

=> $884 + 26x + 34x + x^2 = 880 + 22x + 40x + x^2$

=> 884 + 60x = 880 + 62x

=> 62x − 60x = 884 − 880

=> 2x = 4 => x = 2

=> Given 4x : y :: y : (7x − 6)

=> $y^2 = 4x \times (7x - 6)$

=> $y^2 = 4(2) \times (7 \times 2 - 6)$

=> $y^2 = 8 \times (14 - 6)$

=> $y^2 = 8 \times 8 = 64$

=> $y = \sqrt{64} = 8$ (as y > 0)

Therefore The correct answer is 8.

Additional Information

Mean Proportional

The mean proportional between two numbers a and b is √(ab). It is also written as a : b :: b : c where $b^2 = ac$.

Proportion Rule

For four numbers a, b, c, d to be in proportion, the product of extremes must equal the product of means (ad = bc).

Third Proportional

If a, b, c are in continued proportion, then c is the third proportional to a and b, calculated as $c = b^2 \div a$.

Q32. Answer: (d) 90%

The correct answer is 90%.

Key Points

• According to the Annual Report 2024-25 published by the Ministry of Rural Development, around 90% of rural families rely on agriculture, livestock, and Non-Timber Forest Products (NTFP) for their livelihoods.

• This data underscores the significant dependency of rural households on these sectors for both income generation and food security.

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• Non-Timber Forest Products (NTFP) include resources like bamboo, honey, medicinal plants, and other forest-derived materials that are crucial for rural livelihoods.

• Livelihood diversification in rural areas is often centered around a combination of agriculture, livestock rearing, and forest-based activities.

• Such dependency also highlights the vulnerability of rural families to climate change, economic disruptions, and environmental degradation.

Additional Information

• Agriculture in Rural India:

• Agriculture is the primary source of livelihood for rural households, contributing significantly to India's GDP.

• Small and marginal farmers constitute the majority, with holdings of less than 2 hectares.

• Seasonal crops and monsoon dependence make rural agriculture vulnerable to climatic variations.

• Livestock in Rural Livelihoods:

• Livestock rearing provides supplementary income and acts as a risk mitigation strategy during crop failures.

• India is the largest producer of milk globally, with livestock being a key contributor to rural economies.

• Livestock products like milk, eggs, and meat are crucial for nutritional security in rural areas.

• Non-Timber Forest Products (NTFP):

• NTFPs include bamboo, lac, resin, honey, medicinal plants, and other forest-based resources.

• These products are especially significant for tribal communities and forest-dwelling populations.

• NTFPs contribute to both sustenance and income generation, with many rural families relying on them for daily needs.

• Challenges for Rural Livelihoods:

• Climate change, deforestation, and over-exploitation of natural resources pose threats to sustainability.

• Lack of market access, infrastructure, and financial support hinders income growth for rural families.

• Government initiatives like MGNREGA and rural development schemes aim to address these challenges.

Q33. Answer: (a) # = BPJ, % = XTF

The logic followed here is:

Given: # : FLN :: TXB : %

Option 1) # = BPJ, % = XTF

Here, it does follow the logic.

Option 2) # = LFT, % = BPJ

Option 3) # = PBX, % = XTF

Option 4) # = XTF, % = PBX

Hence, the correct answer is "Option 1".

Q34. Answer: (b) Wife's father's mother

Given: ‘M + N − O ÷ P × Q’

Decoding the signs:

Signs	•	•	÷	×
Codes as	mother	brother	father	wife

It means that M is the mother of N, N is the brother of O, O is the father of P, P is the wife of Q.

Thus, M is the Wife's father's mother of Q.

Hence, the correct answer is "Option 2".

Q35. Answer: (d) Cooperatives Build Prosperity for All

The correct answer is Cooperatives Build Prosperity for All.

Key Points

• The ICA Global Cooperative Conference in November 2024 had the theme "Cooperatives Build Prosperity for All."

• It emphasized the role of cooperatives in fostering inclusive economic growth and equitable development across communities.

• The conference brought together cooperative leaders, policymakers, and stakeholders from around the globe to discuss strategies for achieving prosperity through cooperative models.

• This theme aligns with the International Cooperative Alliance's mission to promote sustainable development and solidarity within the cooperative movement.

• The conference showcased examples of cooperative initiatives successfully improving livelihoods and creating opportunities for

marginalized groups.

Additional Information

• International Cooperative Alliance (ICA)

• The ICA is a global organization representing cooperatives worldwide, founded in 1895.

• Its mission is to unite, represent, and serve cooperatives, advocating their role in sustainable development.

• The ICA defines cooperatives as autonomous associations of people united voluntarily to meet common economic, social, and cultural needs.

• It works towards promoting cooperative values such as self-help, equality, equity, and democracy.

• Role of Cooperatives in Economic Growth

• Cooperatives play a critical role in local economic development by generating employment and supporting small-scale enterprises.

• They empower individuals and communities, fostering financial inclusion and social equity.

• Cooperatives operate on the principle of shared ownership and democratic decision-making, ensuring accountability and fairness.

• Global Cooperative Movement

• The cooperative movement is recognized as an essential force for sustainable development and poverty reduction globally.

• It is supported by international bodies such as the United Nations, which declared the International Year of Cooperatives in 2012.

• Cooperatives contribute significantly to achieving the United Nations' Sustainable Development Goals (SDGs), including zero hunger and reduced inequalities.

• Sustainable Development through Cooperatives

• Cooperatives focus on long-term benefits for members and communities, rather than short-term profits.

• They promote environmentally friendly practices and support green initiatives in sectors like agriculture and energy.

• By engaging communities, cooperatives help build resilience against social and economic challenges.

Q36. Answer: (c) 5 km; East

Given:

Uday starts from Point A and drives 3 km towards south.

He then takes a right turn, drives 2 km, turns left and drives 5 km.

He then takes a right turn and drives 3 km.

He takes a final right turn, drives 8 km and stops at Point P.

Thus, he drive5 km; East in order to reach Point A again.

Hence, the correct answer "Option 3".

Q37. Answer: (d) Opens the Run Command dialog box

The correct answer is Opens the Run Command dialog box.

Key Points

• Alt + F2 is a keyboard shortcut commonly used in the Linux GNOME desktop environment to open the "Run Command" dialog box.

• The "Run Command" dialog box allows users to quickly launch applications or execute commands without opening a terminal.

• This feature is designed for advanced users who prefer keyboard shortcuts for efficiency and speed.

• When the dialog box opens, users can type the name of an application, a command, or a script to execute it directly.

• It is a widely supported feature in most Linux desktop environments, including GNOME, KDE, and others, with slight variations in functionality.

Additional Information

• GNOME Desktop Environment

• GNOME is a popular open-source desktop environment used in many Linux distributions.

• It provides a graphical user interface (GUI) for managing files, applications, and system settings.

• GNOME is known for its simplicity, user-friendliness, and modern design.

• Keyboard Shortcuts in Linux

• Keyboard shortcuts are combinations of keys that perform specific functions, improving productivity and accessibility.

• Linux environments often allow customization of shortcuts to suit user preferences.

• Examples include Ctrl + Alt + T to open a terminal and Alt + Tab to switch between open windows.

• Run Command Dialog Box

• The "Run Command" dialog box is a lightweight tool for launching applications or commands without navigating through menus.
• It is particularly useful for experienced users who are familiar with application names or specific commands.
• Commands entered in this dialog box are executed in the background, without requiring a terminal window.
• Other Common Shortcuts in GNOME
• Alt + Tab: Switch between open windows.
• Ctrl + Alt + T: Open the terminal.
• Super (Windows key): Open the Activities Overview.
• Alt + F4: Close the current window.

Q38. Answer: (c) 1 year

The correct answer is 1 year.

Key Points

• The 97th Constitutional Amendment introduced reforms to promote the autonomy and democratic functioning of cooperative societies in India.
• Under this amendment, state laws inconsistent with the provisions of the amendment can remain in force for a maximum period of 1 year from the commencement of the amendment.
• This period allows states to make necessary modifications to their cooperative laws to comply with the amendment.
• The amendment aimed to make cooperative societies more accountable, transparent, and member-driven.
• It also added a new part, Part IXB, to the Constitution of India to specifically deal with cooperative societies.

Additional Information

• 97th Constitutional Amendment:
• The amendment was passed in 2011 and came into effect on February 15, 2012.
• It added Article 43B to the Directive Principles of State Policy, encouraging states to promote voluntary formation, democratic functioning, and professional management of cooperative societies.
• Part IXB of the Constitution:
• This part specifically deals with cooperative societies and outlines provisions for their governance.
• It includes provisions for the composition, election, and tenure of the board of cooperative societies.
• Objective of the Amendment:
• To improve the functioning of cooperative societies and ensure their accountability to members.
• To protect the interests of members and prevent misuse of funds and powers.
• Legal Framework:
• States were required to amend their cooperative society laws to comply with the constitutional provisions within one year.
• Any inconsistent state law beyond this period would cease to have effect.

Q39. Answer: (d) Tana Bhagats

The correct answer is Tana Bhagats.

Key Points

• The Santhal Rebellion (1855-56) was led by tribal leaders Sidhu, Kanho, Chand, and Bhairav Murmu to resist British colonial oppression and exploitation by landlords and moneylenders.
• The rebellion primarily took place in the Rajmahal Hills of present-day Jharkhand, where the Santhal tribes united against oppressive policies.
• Tana Bhagats, a tribal group from the Oraon community, were not part of the Santhal Rebellion. They emerged later in 1914, as followers of Mahatma Gandhi's non-violent principles.
• The Santhal Rebellion was one of the significant tribal uprisings against British rule, marked by violent resistance to reclaim tribal autonomy and land rights.
• The rebellion was ultimately crushed by the British forces, but it led to the creation of the Santhal Pargana district in 1856 to address tribal grievances.

Additional Information

• Santhal Rebellion (1855-56):
• Also known as the Hul Rebellion, it was a tribal uprising led by the Santhal community against British rule and exploitation by zamindars and moneylenders.
• The rebellion marked a significant resistance movement before the Indian Revolt of 1857.
• Tana Bhagats Movement (1914):
• Founded by Jatra Oraon, the Tana Bhagats were a tribal reformist group inspired by Gandhian ideals of non-violence and

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self-purification.

• They opposed British taxes and participated in the Civil Disobedience Movement.

• Sidhu and Kanho Murmu:

• They were the key leaders of the Santhal Rebellion, who mobilized thousands of tribal people in the fight against colonial oppression.

• Their leadership remains a symbol of tribal resistance in Indian history.

• Impact of Santhal Rebellion:

• It highlighted the grievances of tribal communities under British rule, especially regarding land alienation and exploitation.

• It led to administrative changes, including the establishment of the Santhal Pargana district.

Q40. Answer: (c) 33%

The correct answer is 33%.

Key Points

• The 106th Amendment Act of the Indian Constitution proposed 33% reservation for women in Lok Sabha and State Legislative Assemblies.

• This amendment aimed to ensure gender equality in political representation and decision-making bodies.

• The reservation was to apply to both directly elected seats and seats reserved for Scheduled Castes (SCs) and Scheduled Tribes (STs).

• The bill to enact this amendment was commonly referred to as the Women's Reservation Bill.

• Though widely discussed and debated, the bill has not been implemented as of the latest updates.

Additional Information

• Women's Reservation Bill:

• Introduced in Parliament in 1996, it aimed to reserve 33% of seats for women in Lok Sabha and State Legislative Assemblies.

• The bill was passed in the Rajya Sabha in 2010 but has not been passed in the Lok Sabha.

• The aim was to enhance women’s participation in governance and policy-making.

• Importance of Women's Representation:

• Increased representation of women ensures diverse perspectives in decision-making.

• It promotes gender equality and empowers women politically, socially, and economically.

• Current Status of Women's Representation:

• As of 2023, women constitute approximately 14% of the Lok Sabha and 10% of the State Assemblies.

• India ranks relatively low in the global Gender Gap Index in terms of political empowerment.

• Global Examples:

• Countries like Rwanda and Sweden have implemented effective gender quotas in their legislatures.

• Rwanda has over 60% representation of women in its Parliament, the highest in the world.

Q41. Answer: (c) 20%

Shortcut Trick

Net profit percentage = a − b − (a × b) ÷ 100, where a is the markup percentage and b is the discount percentage.

Here, markup percentage (a) = 25% and discount percentage (b) = 4%.

Net Profit% = 25 − 4 − (25 × 4) ÷ 100

Net Profit% = 21 − 100 ÷ 100 = 21 − 1 = 20%.

Therefore The correct answer is 20%.

Alternate Method

Given: Marked Price (MP) = Rs. 7,725, Markup = 25%, Discount = 4%.

Formulas: Profit% = ((SP − CP) ÷ CP) × 100 | SP = MP × (100 − D%) ÷ 100 | CP = MP × 100 ÷ (100 + Markup%)

=> Let Cost Price (CP) be 100 units.

=> Marked Price (MP) = 100 + 25% of 100 = 125 units.

=> Selling Price (SP) = MP − 4% of MP = 125 − (4 ÷ 100 × 125) = 125 − 5 = 120 units.

=> Profit = SP − CP = 120 − 100 = 20 units.

=> Profit Percentage = (20 ÷ 100) × 100 = 20%.

Therefore The correct answer is 20%.

Additional Information

Relationship between CP and MP

The ratio of CP to MP can be calculated as CP ÷ MP = (100 − Discount%) ÷ (100 + Profit%).

Successive Percentage Change

Profit% is the resultant of markup (increase) and discount (decrease) applied successively on the Cost Price.

Q42. Answer: (a) To store frequently accessed data for quick retrieval

The correct answer is To store frequently accessed data for quick retrieval.

Key Points

• Cache memory is a small-sized, high-speed memory located close to the CPU, designed to store frequently accessed data and instructions.

• It reduces the time required to access data from the main memory (RAM), thereby improving system performance.

• Cache operates at a much faster speed compared to RAM, enabling the CPU to retrieve essential data quickly without delays.

• Modern processors often include multiple levels of cache, such as L1, L2, and L3 cache, each with varying speeds and sizes for optimized performance.

• By minimizing the need for frequent access to slower main memory, cache memory plays a crucial role in enhancing processing efficiency.

Additional Information

• Levels of Cache Memory:

• L1 Cache: Closest to the CPU, the smallest and fastest type of cache.

• L2 Cache: Larger and slightly slower than L1, typically located on the CPU chip.

• L3 Cache: Shared among CPU cores, larger but slower than L1 and L2.

• Cache Hit and Miss:

• A cache hit occurs when the CPU finds the required data in the cache, resulting in faster access.

• A cache miss happens when the data is not in the cache, forcing the CPU to retrieve it from main memory.

• Cache Replacement Policies:

• Techniques like Least Recently Used (LRU), First In First Out (FIFO), and Random Replacement determine which data to replace in cache when it's full.

• Difference Between Cache and RAM:

• Cache memory is faster but smaller in size compared to RAM.

• RAM stores larger data temporarily, while cache focuses on frequently accessed data for rapid retrieval.

• Modern Applications:

• Cache memory is crucial in applications like gaming, video editing, and database management systems for enhancing processing speeds.

Q43. Answer: (d) JGE

The logic followed here is:

Hence, the correct answer is "Option 4".

Q44. Answer: (d) 20

Shortcut Trick

Net work per minute = (1 ÷ filling time) − (1 ÷ emptying time)

Net filling rate = (1 ÷ 10) − (1 ÷ 20) = 1 ÷ 20

Time taken = Reciprocal of net rate = 20 minutes

Therefore The correct answer is 20 minutes.

Alternate Method

Pipe Type	Time (min)	Total Capacity (LCM)	Efficiency
Inlet Pipe	10	20 units	+2
Outlet Pipe	20	−1	

=> Combined Efficiency = 2 − 1 = 1 unit/min

=> Time required = Total Capacity ÷ Combined Efficiency

=> Time = 20 ÷ 1 = 20 minutes

Therefore The correct answer is 20 minutes.

Additional Information

Inlet and Outlet Rule

Work done by an inlet pipe is always considered positive, while work done by an outlet (leak) is negative.

Total Capacity (LCM Method)

The Least Common Multiple (LCM) of the individual times provides the most convenient value for total tank capacity.

Net Time Formula

If pipe A fills in 'x' and pipe B empties in 'y' (y > x), time taken together = (x × y) ÷ (y − x).

Q45. Answer: (a) 322

Given symbol mappings:

• '+' means '–'

• '–' means '×'

• '×' means '÷'

• '÷' means '+'

The given equation is:

502 ÷ 78 + 2 − 258 × 2 = ?

Replace the operators with their corresponding new meanings:

502 + 78 − 2 × 258 ÷ 2 = ?

=> 502 + 78 − 258 = ?

=> 580 - 250 = 322.

hence, the correct answer is "Option 1".

Q46. Answer: (b) Rs. 857.23

Shortcut Trick

Total Profit = Profit from Pen 1 + Profit from Pen 2.

Pen 1: CP = 630, SP before discount = 630 × 1.70. Final SP = (630 × 1.70) × 0.91.

Pen 2: CP = 722, Profit = 722 × 71% = 512.62.

Total Profit = [630 × 1.70 × 0.91 − 630] + 512.62.

Total Profit = 344.61 + 512.62 = 857.23.

Therefore The correct answer is Rs. 857.23.

Alternate Method

Given → CP1 = Rs. 630, CP2 = Rs. 722, Profit%1 = 70%, Discount1 = 9%, Profit%2 = 71%.

Formulas: Profit = SP − CP | SP = CP × (100 + P%) ÷ 100 | Final SP = Marked Price × (100 − D%) ÷ 100.

=> Pen 1 MP = 630 + (70% of 630) = 630 + 441 = Rs. 1071.

=> Pen 1 Final SP = 1071 − (9% of 1071) = 1071 − 96.39 = Rs. 974.61.

=> Pen 1 Net Profit = 974.61 − 630 = Rs. 344.61.

=> Pen 2 Profit = 71% of 722 = (71 × 722) ÷ 100 = Rs. 512.62.

=> Total Profit = 344.61 + 512.62 = Rs. 857.23.

Therefore The correct answer is Rs. 857.23.

Additional Information

Markup and Discount Relationship

When a profit percentage is applied and then a discount is given, the effective multiplier is (1 + Profit%_(initial)) × (1 − Discount%).

Profit Calculation

Total profit is the sum of individual profits from each article: Total Profit = ∑ (SP_i − CP_i).

Q47. Answer: (c) Bhupinder Singh of Patiala

The correct answer is Bhupinder Singh of Patiala.

Key Points

• Maharaja Bhupinder Singh of Patiala was a notable patron of the Sikh community and played a key role in preserving Sikh religious and cultural heritage.

• He contributed significantly to the construction and renovation of Sikh religious shrines, including the Golden Temple in Amritsar.

• The Maharaja supported Sikh institutions, including funding for educational initiatives and religious activities to promote Sikhism.

• He was a key figure in the Sikh community during the early 20th century and maintained close ties with the Shiromani Gurdwara Parbandhak Committee (SGPC).

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• Maharaja Bhupinder Singh is also remembered for his efforts to preserve Sikh traditions and for promoting unity within the Sikh community.

Additional Information

• Golden Temple (Harmandir Sahib):

• The Golden Temple, located in Amritsar, Punjab, is the holiest shrine in Sikhism.

• It was founded by the fourth Sikh Guru, Guru Ram Das, and later completed by Guru Arjan Dev.

• The temple represents Sikh values of equality, unity, and service to humanity.

• Shiromani Gurdwara Parbandhak Committee (SGPC):

• The SGPC is an organization responsible for managing Sikh gurdwaras and promoting Sikh religious activities.

• It plays a vital role in preserving Sikh history, culture, and traditions.

• Princely States of India:

• During British rule, princely states were semi-autonomous regions governed by local monarchs under British suzerainty.

• Patiala was one of the largest princely states in Punjab.

• Bhupinder Singh's Legacy:

• Apart from his contributions to Sikhism, Maharaja Bhupinder Singh is also remembered for his progressive reforms in Patiala, including modern infrastructure and military advancements.

• He was an influential leader and diplomat, representing India in international arenas, such as the League of Nations.

Q48. Answer: (d) 121

Shortcut Trick

Net increase in the sum = (10 × 12.5) + (10 × 15) + (5 × 0)

Net increase = 125 + 150 + 0 = 275

Increase in mean = Total Increase ÷ Total Numbers = 275 ÷ 25 = 11

New arithmetic mean = Old Mean + Increase = 110 + 11 = 121

Therefore The correct answer is 121.

Alternate Method

Given:

Total numbers (n) = 25

Initial Arithmetic Mean = 110

Formula Used:

New Mean = (Original Sum + Total Change) ÷ Total Numbers

Calculations:

=> Original Sum of 25 numbers = 25 × 110 = 2750

=> Increase from first 10 numbers = 10 × 12.5 = 125

=> Increase from next 10 numbers = 10 × 15 = 150

=> Total Increase = 125 + 150 + (5 × 0) = 275

=> New Total Sum = 2750 + 275 = 3025

=> New Arithmetic Mean = 3025 ÷ 25

=> New Arithmetic Mean = 121

Therefore The correct answer is 121.

Additional Information

Linear Property of Mean

If a constant k is added to every observation in a data set, the new mean is the original mean + k.

Total Sum Formula

The sum of all observations is always equal to Mean × Number of observations (Sum = $\bar{x}$ × n).

Weighted Average

When groups are changed differently, the net change in mean is (Σ $n_i \times c_i$) ÷ N, where c_i is the change in each group.

Q49. Answer: (b) 6

The logic followed here is:

The code "V" is "6".

Hence, the correct answer is "Option 2".

Q50. Answer: (c) HK - LP

The logic followed here is:

Option 1) KL - FG

Option 2) XY - ST

Option 3) HK - LP

Option 4) OP - JK

Hence, the correct answer is "Option 3".

Q51. Answer: (d) Anne Michaels

The correct answer is Anne Michaels.

Key Points

• Anne Michaels is a Canadian poet and novelist known for her profound exploration of themes like memory, loss, and identity.

• Her novel 'Held', shortlisted for the Booker Prize 2024, continues her tradition of blending poetic language with compelling storytelling.

• Anne Michaels previously gained global recognition with her novel 'Fugitive Pieces', which won multiple prestigious awards, including the Orange Prize for Fiction.

• 'Held' has been praised by critics for its intricate narrative and emotionally resonant prose, solidifying her status as a literary powerhouse.

• Michaels' works are widely celebrated for their ability to delve into universal human experiences while maintaining a personal and intimate tone.

Additional Information

• Booker Prize:

• One of the most prestigious literary awards, established in 1969, recognizing outstanding original novels written in English.

• The award is open to authors of any nationality, provided the work is published in the UK or Ireland.

• Past winners include literary greats such as Salman Rushdie, Margaret Atwood, and Kazuo Ishiguro.

• Anne Michaels' Writing Style:

• Her works often blend poetry and prose to create rich, textured narratives.

• Michaels is known for her meticulous attention to language, crafting sentences that resonate deeply with readers.

• Recurring themes in her work include history, memory, trauma, and the enduring nature of human connection.

• Fugitive Pieces:

• Anne Michaels' debut novel, which explores the Holocaust through the lens of memory and survival.

• The book has been translated into over 20 languages and adapted into a feature film.

• It won several awards, including the Orange Prize for Fiction and the Guardian Fiction Prize.

• Booker Prize 2024:

• The shortlisted works for this edition of the prize represent diverse voices and innovative storytelling.

• It demonstrates the global reach and influence of contemporary English literature.

• The winner will be announced later in the year, with the shortlisted novels gaining immense critical and commercial attention.

Q52. Answer: (a) 45

Shortcut Trick

Ratio of Men : Women : Children = 20 : 50 : (100 − 70) = 2 : 5 : 3.

Average weight = [(2 × 45) + (5 × 60) + (3 × 20)] ÷ (2 + 5 + 3)

Average weight = [90 + 300 + 60] ÷ 10 = 450 ÷ 10 = 45 kg.

Therefore The correct answer is 45 kg.

Alternate Method

Given:

Percentage of Men = 20%, Women = 50%, Children = 30%

Average weight of Men = 45 kg, Women = 60 kg, Children = 20 kg

Formula Used:

Total Weight = (Average Weight × Number of People)

Average Weight of Group = Total Weight of all ÷ Total Number of People

Calculations:

=> Let the total number of people in the group be 100.

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=> Number of Men = 20, Women = 50, Children = 100 − (20 + 50) = 30.
=> Total weight of Men = 20 × 45 = 900 kg.
=> Total weight of Women = 50 × 60 = 3000 kg.
=> Total weight of Children = 30 × 20 = 600 kg.
=> Total weight of the group = 900 + 3000 + 600 = 4500 kg.
=> Average weight of the group = 4500 ÷ 100 = 45 kg.
Therefore The correct answer is 45 kg.
Additional Information
Weighted Average Formula
Used when different groups have different sizes and averages: Avg = (n1A1 + n2A2 + ...) ÷ (n1 + n2 + ...).
Deviation Method
Assume an average (say 40) and calculate net deviation: Total deviation = [Σ(Actual − Assumed) × Weight]. Avg = Assumed + (Total Deviation ÷ Total Weight).
Ratio Simplification
In problems involving percentages, always simplify the quantities into the smallest possible ratios to reduce calculation time.

Q53. Answer: (c) 41°

Shortcut Trick
angle BEF = 180° − angle PEB = 180° − 56° = 124° (Linear pair)
angle GEF = angle BEF − angle BEG = 124° − 32° = 92°
In triangle EGF, sum of angles = 180°
angle EGF = 180° − (angle GEF + angle GFE) = 180° − (92° + 47°) = 41°
Therefore The correct answer is 41°.
Alternate Method
Given: AB || CD, transversal PQ intersects them at E and F. angle PEB = 56°, angle BEG = 32°, and angle GFE = 47°.
Formula Used: Linear pair property (sum = 180°) and Angle Sum Property of a triangle (sum = 180°).
=> Since PQ is a straight line, angle PEB + angle BEF = 180° (Linear pair)
=> 56° + angle BEF = 180°
=> angle BEF = 180° − 56° = 124°
=> From the figure, angle BEF = angle BEG + angle GEF
=> 124° = 32° + angle GEF
=> angle GEF = 124° − 32° = 92°
=> In triangle EGF, angle GEF + angle GFE + angle EGF = 180°
=> 92° + 47° + angle EGF = 180°
=> 139° + angle EGF = 180°
=> angle EGF = 180° − 139° = 41°
Therefore The correct answer is 41°.
Additional Information
Parallel Lines and Transversals
When two parallel lines are intersected by a transversal, corresponding angles are equal, and alternate interior angles are equal.
Angle Sum Property
The sum of the interior angles of any triangle is always 180°.
Linear Pair Axiom
If a ray stands on a line, then the sum of two adjacent angles so formed is 180°.

Q54. Answer: (b) 21

Shortcut Trick
Radius (r) = 144 ÷ 2 = 72 cm
CSA = πrl => 5400π = π × 72 × l
l = 5400 ÷ 72 = 75 cm
Using Pythagorean triplet (7, 24, 25) × 3 → (21, 72, 75)
Therefore The correct answer is 21 cm.

Alternate Method

Given:

Curved Surface Area (CSA) = 5400π cm^2

Diameter = 144 cm => Radius (r) = 72 cm

Formula Used:

CSA of Cone = πrl

Slant height (l) = $\sqrt{(h^2 + r^2)}$

Calculations:

=> π × 72 × l = 5400π

=> l = 5400 ÷ 72

=> l = 75 cm

=> $h^2 = l^2 - r^2$

=> $h^2 = 75^2 - 72^2$

=> $h^2 = (75 - 72)(75 + 72)$

=> $h^2 = 3 \times 147$

=> $h^2 = 441$

=> $h = \sqrt{441} = 21$ cm

Therefore The correct answer is 21 cm.

Additional Information

Total Surface Area of Cone

TSA = πr(l + r), which includes the curved area and the circular base area.

Volume of Cone

Volume = (1/3)$\pi r^2 h$, which is exactly one-third the volume of a cylinder with the same radius and height.

Slant Height Relation

In a right circular cone, $l^2 = h^2 + r^2$ based on the Pythagoras Theorem.

Q55. Answer: (b) -70%

The correct answer is 70%.

Key Points

• The Budget Estimates (BE) for the Smart Cities Mission in 2024-25 show a decrease of 70% compared to the Revised Estimates (RE) for 2023-24.

• The Smart Cities Mission is a flagship program launched by the Government of India in 2015 to enhance urban infrastructure and development.

• The reduction in allocation reflects the government's reprioritization of urban development funding or the nearing completion of key projects under the mission.

• The allocation adjustments are typically influenced by factors such as project progress, expenditure efficiency, and broader fiscal constraints.

• For 2024-25, the focus may shift toward other urban infrastructure schemes or consolidation of ongoing Smart Cities projects.

Additional Information

• Smart Cities Mission:

• Launched on 25 June 2015, the mission aims to promote sustainable and inclusive cities.

• It is implemented by the Ministry of Housing and Urban Affairs and has a target of developing 100 smart cities across the country.

• The focus areas include urban mobility, sanitation, energy efficiency, digital governance, and affordable housing.

• Budget Estimates vs. Revised Estimates:

• Budget Estimates represent the initial allocation for a financial year.

• Revised Estimates reflect adjustments based on actual spending trends and fiscal priorities during the year.

• Changes between BE and RE indicate the government's dynamic resource allocation strategy.

• Challenges in Urban Development:

• Urban areas face issues such as overcrowding, inadequate infrastructure, pollution, and resource constraints.

• Smart Cities aim to address these by leveraging technology, innovation, and sustainable practices.

• Fiscal Management in India:

• The government balances funding across competing priorities such as health, education, defense, and infrastructure.

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• Changes in allocation reflect efforts to optimize spending and improve project outcomes.

Q56. Answer: (c) Three

Given: ACT BUS CAR DAD

According to the question:

In each of the words, each vowel is changed to the letter immediately following it in the English alphabetical order and each consonant is changed to the letter immediately preceding in the English alphabetical order.

Now, changing each letter in the words:

ACT: A → B, C → B, T → S

BUS: B → A, U → V, S → R

CAR: C → B, A → B, R → Q

DAD: D → C, A → B, D → C

Thus, the new clusters formed are:

ACT → BBS

BUS → AVR

CAR → BBQ

DAD → CBC

In these clusters, the ones without any vowel (A, E, I, O, U) are:

BBS, BBQ, CBC

Hence, the number of letter clusters where no vowel appears is: 3

Therefore, the correct answer is "Option 3".

Q57. Answer: (c) 30 per 1000 live births

The correct answer is 30 per 1000 live births.

Key Points

• According to the Sample Registration System (SRS) 2019, the Infant Mortality Rate (IMR) in India was 30 per 1000 live births.

• IMR represents the number of deaths of infants under one year of age per 1000 live births in a given year.

• India has witnessed a consistent decline in IMR over the years due to improvements in healthcare, sanitation, and immunization coverage.

• The IMR in rural areas was higher at 34 per 1000 live births compared to urban areas, which recorded 20 per 1000 live births.

• This decline in IMR aligns with the government's efforts under programs like National Health Mission (NHM) and Intensified Mission Indradhanush.

Additional Information

• Sample Registration System (SRS):

• SRS is a demographic survey conducted in India by the Registrar General and Census Commissioner.

• It provides reliable annual estimates of birth rates, death rates, and other fertility and mortality indicators.

• Neonatal Mortality Rate (NMR):

• NMR refers to the number of deaths of newborns within the first 28 days of life per 1000 live births.

• India's NMR in 2019 stood at 22 per 1000 live births, as per SRS data.

• National Health Mission (NHM):

• The NHM aims to improve healthcare access and outcomes, particularly for women and children.

• It includes initiatives like Janani Suraksha Yojana (JSY) and Janani Shishu Suraksha Karyakaram (JSSK).

• Intensified Mission Indradhanush (IMI):

• IMI aims to achieve full immunization coverage for children under two years and pregnant women.

• It targets unvaccinated and partially vaccinated children in underserved areas.

• Sustainable Development Goals (SDG):

• India is committed to reducing IMR and NMR in alignment with SDG 3, which focuses on ensuring healthy lives and promoting well-being for all at all ages.

Q58. Answer: (b) Justice B R Gavai; 52^(nd) Chief Justice of India

The correct answer is Justice B R Gavai; 52nd Chief Justice of India.

Key Points

• Justice Sanjiv Khanna, the 51st Chief Justice of India, retired in May 2025, as per the standard retirement age of 65 for Supreme Court judges.

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• Justice B R Gavai has been named as his successor, making him the 52nd Chief Justice of India upon appointment.

• Justice B R Gavai is known for his significant contributions to the judiciary and has been part of several landmark judgments during his tenure in the Supreme Court.

• He will be the second Chief Justice of India from the Scheduled Caste community, following Justice K G Balakrishnan, who served as the 37th CJI.

• The appointment of the Chief Justice of India is made by the President of India based on seniority among the Supreme Court judges and recommendations from the outgoing CJI.

Additional Information

• Chief Justice of India (CJI):

• The Chief Justice of India is the head of the judiciary system and the Supreme Court, the highest constitutional court in India.

• The CJI plays a vital role in upholding the Constitution, interpreting laws, and maintaining checks and balances between the three branches of government.

• Eligibility for the CJI:

• Must be a citizen of India.

• Must have served as a judge in a High Court for at least five years or as an advocate in a High Court for at least ten years, or be a distinguished jurist in the President's opinion.

• Appointment Process:

• The President of India appoints the CJI based on seniority among the judges of the Supreme Court.

• The outgoing CJI recommends their successor in consultation with other senior judges of the Supreme Court.

• Retirement Age:

• Supreme Court judges, including the CJI, retire at the age of 65.

• High Court judges, by comparison, retire at the age of 62.

• Historical Significance:

• Justice H J Kania was the first Chief Justice of India, serving from 1950 to 1951.

• Justice Fathima Beevi was the first woman to be appointed as a Supreme Court judge in India, paving the way for greater representation in the judiciary.

Q59. Answer: (b) 81

Given:

Solve: 70 + (72/6) + 29 - 30

Formula used:

Use BODMAS (Bracket, Order, Division/Multiplication, Addition/Subtraction) rule to solve.

Calculation:

70 + (72/6) + 29 - 30

=> 70 + 12 + 29 - 30

=> 70 + 12 + 29 = 111

=> 111 - 30 = 81

Therefore The correct answer is option (2).

Q60. Answer: (b) 100%

The correct answer is 100%.

Key Points

• The Jal Jeevan Mission aims to provide 100% functional household tap connections (FHTCs) to all rural households by 2024.

• Launched by the Ministry of Jal Shakti in August 2019, the mission focuses on water supply infrastructure in rural areas.

• Under this initiative, 55 liters of water per person per day is targeted to be supplied to every household.

• It emphasizes community participation and involves local bodies like Gram Panchayats in the implementation process.

• The scheme aligns with the United Nations Sustainable Development Goal-6, which ensures access to clean water and sanitation for all.

Additional Information

• Jal Jeevan Mission Key Components:

• Ensures piped water supply to households in rural areas.

• Promotes decentralized service delivery models, including rainwater harvesting and greywater management.

• Focuses on water quality monitoring and testing to prevent contamination.

• Community Participation:
• Village Water and Sanitation Committees (VWSCs) play a crucial role in planning and executing projects.
• Capacity-building programs are conducted for local communities to ensure efficient water resource management.
• Financial Allocation:
• The scheme operates on a cost-sharing model between the central and state governments.
• Significant funds have been allocated to states based on their requirement and progress.
• Challenges Addressed:
• Addresses issues like water scarcity, contamination, and poor infrastructure.
• Encourages sustainable practices to ensure long-term water security.

Q61. Answer: (c) First effective antibiotic against bacterial infections

The correct answer is First effective antibiotic against bacterial infections.

Key Points

• Penicillin, discovered by Alexander Fleming in 1928, was the first antibiotic that proved to be highly effective against bacterial infections.
• The discovery marked the beginning of the modern era of antibiotics, revolutionizing the treatment of bacterial diseases such as pneumonia, syphilis, and strep throat.
• During World War II, penicillin was mass-produced and saved countless lives by treating infections in wounded soldiers.
• Penicillin works by inhibiting bacterial cell wall synthesis, making it effective against a wide range of Gram-positive bacteria.
• Its discovery earned Alexander Fleming, Howard Florey, and Ernst Boris Chain the Nobel Prize in Physiology or Medicine in 1945.

Additional Information

• Antibiotics:
• Substances that kill or inhibit the growth of bacteria without harming the host organism.
• Penicillin was the first antibiotic discovered, followed by others like streptomycin, tetracycline, and erythromycin.
• Overuse or misuse of antibiotics can lead to antibiotic resistance, a significant global health concern.
• Alexander Fleming's Discovery:
• Fleming observed that a mold, later identified as Penicillium notatum, inhibited bacterial growth on a petri dish.
• This serendipitous discovery laid the foundation for the development of antibiotics.
• Mass Production of Penicillin:
• During World War II, efforts led by Howard Florey and Ernst Chain enabled large-scale production of penicillin.
• This breakthrough ensured the availability of the drug for treating battlefield infections and saving civilian lives.
• Impact on Medicine:
• Penicillin reduced mortality rates from bacterial infections and transformed medical practices worldwide.
• It is considered one of the most significant discoveries in medical history.

Q62. Answer: (d) S

Given: Each of C, D, E, F, S, T, and U has an exam on a different day of a week,

Starting from Monday and ending on Sunday of the same week.

1) Only two people have the exam before T.

2) Only one person has the exam after D.

3) Only three people have the exam between T and F.

4) Only one person has the exam between E and C.

5) U has the exam immediately before E.

Day	Person
Monday	U
Tuesday	E
Wednesday	T
Thursday	C
Friday	S

Saturday	D
Sunday	F

Thus, S has the exam on Friday.

Hence, the correct answer is "Option 4".

Q63. Answer: (b) 1,920, 4,800 and 8,400

Shortcut Trick

Combine ratios: x : y : z = (2 × 4) : (5 × 4) : (5 × 7) = 8 : 20 : 35.

Total units = 8 + 20 + 35 = 63 units.

Value of 1 unit = 15,120 ÷ 63 = Rs. 240.

Amounts: x = 8 × 240 = Rs. 1,920; y = 20 × 240 = Rs. 4,800; z = 35 × 240 = Rs. 8,400.

Therefore The correct answer is 1,920, 4,800 and 8,400.

Alternate Method

Given: x : y = 2 : 5 and y : z = 4 : 7. Total Amount = Rs. 15,120.

=> To equalize y: x : y = (2×4) : (5×4) = 8 : 20

=> y : z = (4×5) : (7×5) = 20 : 35

=> Combined Ratio x : y : z = 8 : 20 : 35

=> Total Share = 8k + 20k + 35k = 63k

=> 63k = 15,120 => k = 15,120 ÷ 63 = 240

=> x = 8 × 240 = Rs. 1,920

=> y = 20 × 240 = Rs. 4,800

=> z = 35 × 240 = Rs. 8,400

Therefore The correct answer is 1,920, 4,800 and 8,400.

Additional Information

Ratio Combination Rule

To combine a:b and b:c, multiply the terms so that the common variable 'b' has the same numerical value in both ratios.

Proportional Division

If a total amount T is divided in ratio a:b:c, the share of the first part is [a / (a+b+c)] × T.

Verification Tip

Always ensure that the sum of calculated individual shares equals the total given amount (1,920 + 4,800 + 8,400 = 15,120).

Q64. Answer: (d) Execute instructions and process data

The correct answer is Execute instructions and process data.

Key Points

• The CPU (Central Processing Unit) is the primary component of a computer system responsible for executing instructions provided by software programs.

• It performs the essential task of processing data, which includes arithmetic operations, logic operations, control functions, and input/output operations.

• The CPU consists of three key components: the Arithmetic Logic Unit (ALU), Control Unit (CU), and registers, which help in executing instructions efficiently.

• The CPU operates based on the fetch-decode-execute cycle, where it retrieves instructions from memory, decodes them, and performs the required operations.

• Modern CPUs are equipped with multiple cores, enabling parallel processing and significantly improving performance for multitasking and complex computations.

Additional Information

• Arithmetic Logic Unit (ALU):

• The ALU is a fundamental part of the CPU responsible for performing arithmetic operations (e.g., addition, subtraction) and logical operations (e.g., comparisons).

• It acts as the computational powerhouse of the CPU.

• Control Unit (CU):

• The CU directs the operation of the processor by interpreting instructions and ensuring that data flows correctly between the CPU and other components.

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• It coordinates the fetch-decode-execute cycle.
• Registers:
• Registers are small, high-speed storage areas within the CPU that temporarily store data and instructions during processing.
• They facilitate quick access to frequently used data.
• Clock Speed:
• Clock speed, measured in GHz (gigahertz), represents the number of cycles a CPU can perform per second.
• Higher clock speeds generally result in faster processing but are also influenced by the CPU architecture and core count.
• Multi-Core Processors:
• Modern CPUs often include multiple cores, enabling them to perform multiple tasks simultaneously.
• Multi-core processors enhance performance in applications that support parallel computing, such as video editing and gaming.

Q65. Answer: (a) 33

Shortcut Trick

When the Mode is exactly equal to the Lower Limit of a class interval, the frequency of the preceding class must be equal to the frequency of the modal class in the formula numerator.

Given Mode = 140, which is the boundary between the classes 135−140 and 140−145.

Using the modal class 140−145, the formula gives Mode = L only when f1 − f0 = 0.

=> x − 33 = 0 => x = 33.

Therefore The correct answer is 33.

Alternate Method

Given: Mode = 140, Class Width (h) = 5.

Formula: Mode = L + [(f1 − f0) / (2f1 − f0 − f2)] × h

125-130

130-135

135-140

140-145

145-150

30

30

33

x

31

Q66. Answer: (c) 16√3 m

Shortcut Trick

In a 30°-60°-90° triangle, the ratio of sides opposite to these angles is 1 : √3 : 2.

Side opposite to 60° (Base) = 48 m.

√3 units = 48 m => 1 unit = 48/√3 m.

Height (side opposite to 30°) = 1 unit = 16√3 m.

Therefore The correct answer is 16√3 m.

Alternate Method

Given: Distance from foot (Base) = 48 m, Angle of elevation (θ) = 30°.

Formula Used: tan θ = Perpendicular / Base

=> tan 30° = h / 48

=> 1/√3 = h / 48

=> h = 48 / √3

=> h = (48 × √3) / (√3 × √3)

=> h = 48√3 / 3 = 16√3 m

Therefore The correct answer is 16√3 m.

Additional Information

Trigonometric Ratios

Standard values: tan 30° = 1/√3, tan 45° = 1, and tan 60° = √3.

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Angle of Elevation and Depression

The angle of elevation from an observer's eye to an object above is equal to the angle of depression from the object to the observer due to alternate interior angles.

Pythagoras Theorem

In any right-angled triangle, Hypotenuse² = Base² + Perpendicular².

Q67. Answer: (c) Low water availability

The correct answer is Low water availability.

Key Points

• Dryland farming refers to agricultural practices in regions where rainfall is insufficient, typically less than 750 mm annually, making water availability a critical constraint.

• The primary challenge in dryland farming is low soil moisture due to minimal rainfall, which limits crop growth and productivity.

• Crops grown in such areas are primarily drought-resistant varieties, such as millets, sorghum, and pulses, as they can survive with limited water.

• Dryland farming areas are also prone to soil erosion, which further reduces the land's capacity to retain water.

• Efficient water management techniques, such as rainwater harvesting and mulching, are critical to overcoming water scarcity in these regions.

Additional Information

• Dryland Farming:

• It is a type of farming practiced in arid and semi-arid regions with low rainfall.

• Relies on moisture conservation techniques like deep plowing, contour farming, and minimal tillage to retain soil moisture.

• Crops such as pearl millet, chickpeas, and groundnuts are commonly grown in dryland farming systems.

• Soil Moisture Management:

• Techniques like mulching (covering soil with organic matter) help conserve moisture and prevent evaporation.

• Use of micro-irrigation systems, such as drip irrigation, ensures precise water delivery to crops.

• Rainwater Harvesting:

• Collecting and storing rainwater for agricultural use is a common practice in dryland regions.

• Helps supplement water availability during dry spells.

• Drought-Resistant Crops:

• These crops have evolved to survive with minimal water, making them ideal for dryland farming.

• Examples include millets, sorghum, pigeon peas, and certain oilseeds like sesame.

Q68. Answer: (c) Hyderabad

The correct answer is Hyderabad.

Key Points

• The two-day Chintan Shivir was organized in Hyderabad on 7-8 March 2025.

• The event was held to discuss India’s preparations for hosting the 2028 and 2036 Olympics.

• Hyderabad, known for its modern infrastructure and technological advancements, was chosen as the venue for the brainstorming session.

• Senior officials, sports experts, and stakeholders participated in the event to strategize and plan for India’s Olympic ambitions.

• The Shivir focused on collaboration between government bodies, private sectors, and international organizations to bolster India's sports ecosystem.

Additional Information

• Olympics Hosting Process:

• The International Olympic Committee (IOC) selects host cities through a competitive bidding process.

• Countries submit detailed proposals showcasing infrastructure, budget, and legacy plans for hosting the Games.

• Emphasis is placed on sustainability, inclusivity, and long-term benefits for the host city.

• India's Olympic Aspirations:

• India has been working towards enhancing its sports infrastructure and training facilities.

• The government and private sectors are collaborating to boost athletes' performance on the global stage.

• Hosting the Olympics would showcase India’s organizational capabilities and promote sports culture nationwide.

• Hyderabad as a Venue:

• Hyderabad is one of India’s leading cities in terms of infrastructure and connectivity.

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• It has hosted several international events, showcasing its ability to organize large-scale gatherings.
• The city's advanced IT ecosystem and modern facilities make it an ideal location for strategic discussions.
• India and the Olympics:
• India first participated in the Olympics in 1900.
• India has won medals in various disciplines, including hockey, wrestling, and athletics.
• Efforts are ongoing to improve India's medal tally and overall performance in the Games.

Q69. Answer: (b) 7

Shortcut Trick
At constant expenditure, the Quantity is inversely proportional to the Price per unit.
Profit = 40% => Ratio of CP : SP = 100 : 140 = 5 : 7.
Therefore, the ratio of Quantity (CP) : Quantity (SP) = 7 : 5.
Given: Selling quantity = 5 chocolates for &8377;1.
Since 5 units = 5 chocolates, then 7 units = 7 chocolates.
Therefore The correct answer is 7.
Alternate Method
Given: Selling Price (SP) of 5 chocolates = &8377;1 | Gain% = 40%.
Formulas: CP = [SP × 100] ÷ [100 + Gain%]
=> SP of 1 chocolate = &8377;1/5 = &8377;0.20.
=> CP of 1 chocolate = [0.20 × 100] ÷ [100 + 40] = 20 ÷ 140 = &8377;1/7.
=> Number of chocolates bought for &8377;1 = 1 ÷ (1/7) = 7.
Therefore The correct answer is 7.
Additional Information
Price and Consumption Relationship
When the total Expenditure remains constant, the Price is inversely proportional to the Quantity. Price × Quantity = Expenditure.
Profit Percentage
Profit% is always calculated on the Cost Price (CP) unless stated otherwise. Profit% = [(SP − CP) ÷ CP] × 100.

Q70. Answer: (a) 28,275

The correct answer is 28,275.
Key Points
• 28,275 youth were trained in vocational skills under the Nehru Yuva Kendra Sangathan (NYKS) initiatives as of February 2025.
• The Nehru Yuva Kendra Sangathan is an autonomous body under the Ministry of Youth Affairs and Sports, Government of India.
• NYKS works to promote and develop the personality and leadership qualities of rural youth through skill development and vocational training programs.
• The training programs aim to make youth employable by equipping them with market-relevant skills.
• These initiatives contribute to the government's focus on empowering youth and enhancing their employability through skill-building efforts.
Additional Information
• Nehru Yuva Kendra Sangathan (NYKS)
• Established in 1972, NYKS is one of the largest youth organizations in the world.
• Its primary goal is to involve rural youth in the nation-building process and provide opportunities for skill development.
• It organizes diverse programs such as vocational training, sports, cultural activities, and awareness campaigns.
• Vocational Training
• Vocational training refers to education that focuses on providing students with practical skills and knowledge required for a specific trade or profession.
• It is critical for enhancing employability, especially among youth, in both formal and informal sectors.
• Skill Development Initiatives in India
• The Government of India has introduced various programs such as Skill India Mission, Pradhan Mantri Kaushal Vikas Yojana (PMKVY), and Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY) to bridge the skill gap in the country.
• These programs aim to train millions of youth in industry-specific skills, ensuring their employability and contribution to economic growth.
• Ministry of Youth Affairs and Sports

• The Ministry is responsible for overseeing youth development and sports activities in India.

• It supports initiatives like NYKS, National Service Scheme (NSS), and Khelo India to nurture talent and promote holistic development.

Q71. Answer: (d) 4

Shortcut Trick

To find the maximum volume of identical containers, we must find the HCF (Highest Common Factor) of the given quantities.

Quantities: 156 and 256.

HCF(156, 256) => Difference = 256 − 156 = 100.

Factors of 100 are 1, 2, 4, 5, 10, 20, 25, 50, 100. Checking the largest factor that divides both 156 and 256.

156 is divisible by 4, and 256 is divisible by 4. Larger factors of 100 do not divide 156.

Therefore The correct answer is 4 litres.

Alternate Method

Given:

Volume of Oil A = 156 litres

Volume of Oil B = 256 litres

Calculation:

To find the maximum capacity of each container, calculate the HCF of 156 and 256.

Prime factorization of 156:

=> 156 = 2 × 2 × 3 × 13 = $2^2 \times 3 \times 13$

Prime factorization of 256:

=> 256 = 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 = 2^8

HCF is the product of the lowest powers of common prime factors:

=> HCF = 2^2

=> HCF = 4

Therefore The correct answer is 4 litres.

Additional Information

Highest Common Factor (HCF)

HCF is the greatest number that divides two or more numbers without leaving a remainder. It is also known as GCF or GCD.

Least Common Multiple (LCM)

LCM is the smallest non-zero common multiple of two or more numbers. Relationship: Product of two numbers = HCF × LCM.

Application in Partitioning

When items need to be divided into the largest possible equal groups or containers without mixing, HCF is always the required value.

Q72. Answer: (c) 2020

The correct answer is 2020.

Key Points

• India and China suspended direct passenger flights in 2020 due to the outbreak of the COVID-19 pandemic.

• The suspension of flights was part of global measures to curb the spread of the coronavirus, which disrupted international air travel.

• Discussions to resume flights began in April 2025, signaling efforts to normalize ties and strengthen bilateral relations.

• Several countries including India and China implemented travel restrictions in 2020, affecting passenger movement across borders.

• The resumption of flights is expected to enhance people-to-people connectivity and foster economic collaboration between the two nations.

Additional Information

• COVID-19 Pandemic and Air Travel:

• The COVID-19 pandemic caused widespread disruption in global air travel starting in early 2020.

• Many countries imposed travel bans and restrictions to prevent the spread of the virus.

• Passenger flights were suspended between India and China as a precautionary measure.

• Restoring international flights required coordination between governments, airlines, and health authorities.

• India-China Relations:

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• India and China are major trading partners, with bilateral trade exceeding $100 billion annually.
• Resuming flights is expected to improve ties and facilitate business and cultural exchanges.
• Both nations have faced challenges in their relationship, including border tensions.
• Efforts to resume flights reflect a step toward normalization and cooperation.
• Impact of Flight Suspensions:
• Suspending flights disrupted tourism, trade, and student movement between countries.
• China is a popular destination for Indian students pursuing higher education, particularly in medicine.
• Indian businesses rely on imports from China, which were affected by the travel restrictions.
• Restoring flights can help mitigate the economic impact of prolonged disruptions.
• International Travel Resumption Post-Pandemic:
• Many countries gradually resumed international air travel starting in 2021 with strict health protocols.
• Mandatory testing, quarantine, and vaccination requirements became commonplace.
• Airlines adapted to new guidelines to ensure passenger safety and compliance.
• Resumption of flights between India and China marks a significant milestone in post-pandemic recovery.

Q73. Answer: (d) Acting as the core interface between applications and the system hardware

The correct answer is Acting as the core interface between applications and the system hardware.

Key Points

• The kernel is the central component of an operating system and serves as the core interface between the system's hardware and its applications.
• It manages critical tasks such as CPU scheduling, memory management, and device control.
• The kernel ensures that multiple programs and processes can run simultaneously by handling resource allocation and process isolation.
• It provides low-level system services such as hardware abstraction and ensures secure and efficient communication between the hardware and software.
• Popular kernel types include monolithic kernels (e.g., Linux) and microkernels (e.g., MINIX), each with distinct advantages in terms of performance and modularity.

Additional Information

• Kernel Modes:
• Modern operating systems use two modes: User Mode (for running applications) and Kernel Mode (for executing system-level tasks).
• The kernel operates in Kernel Mode, with unrestricted access to hardware resources and memory.
• Types of Kernels:
• Monolithic Kernel: All OS services run in a single large process, providing better performance but less modularity.
• Microkernel: Only essential services run in the kernel, while others run in user space, enhancing modularity and fault isolation.
• Memory Management:
• The kernel handles memory allocation and ensures that processes do not interfere with each other.
• Techniques such as virtual memory allow efficient memory utilization.
• Hardware Abstraction:
• The kernel provides a hardware abstraction layer (HAL) to shield applications from hardware-specific details.
• This abstraction makes the OS adaptable to different hardware platforms.
• Process Management:
• The kernel creates, schedules, and terminates processes.
• It ensures fairness in CPU time distribution and prevents deadlocks through mechanisms like semaphores and mutexes.

Q74. Answer: (c) 69.6

Shortcut Trick

For proportions a : b :: c : d, the product of extremes equals the product of means.

$3.5 \times x = 17.4 \times 14$

$x = 17.4 \times (14 \div 3.5)$

$x = 17.4 \times 4 = 69.6$

Therefore The correct answer is 69.6.

Alternate Method

Given: 3.5 : 17.4 :: 14 : x
Formula Used: a/b = c/d
=> 3.5 ÷ 17.4 = 14 ÷ x
=> x = (14 × 17.4) ÷ 3.5
=> x = (140 × 17.4) ÷ 35
=> x = 4 × 17.4
=> x = 69.6
Therefore The correct answer is 69.6.
Additional Information
Fourth Proportional
In the proportion a : b :: c : d, d is called the fourth proportional to a, b, and c. It is calculated as d = (b × c) ÷ a.
Third Proportional
If a, b, c are in continued proportion such that a : b :: b : c, then c is the third proportional where c = b² ÷ a.
Mean Proportional
The mean proportional between two numbers a and b is given by x = √(a × b).

Q75. Answer: (c) 735

Given equation: 63 ÷ 12 − 98 × 7 + 35 = ?
After interchanging '+' and '−' and '×' and '÷', we get:
63 × 12 + 98 ÷ 7 − 35 = ?
Following the BODMAS/PEMDAS rule:
= 63 × 12 + 98 ÷ 7 − 35
= 756 + 14 − 35
= 770 − 35
= 735
Hence, the correct answer is "735".

Q76. Answer: (d) $3x^2+ 10x + 8$

Shortcut Trick
Apply the Difference of Squares identity: a² − b² = (a + b)(a − b).
Let a = 2x + 3 and b = x + 1.
Sum (a + b) = 2x + 3 + x + 1 = 3x + 4.
Difference (a − b) = 2x + 3 − (x + 1) = x + 2.
Multiply factors: (3x + 4)(x + 2) = 3x² + 6x + 4x + 8 = 3x² + 10x + 8.
Therefore The correct answer is 3x² + 10x + 8.
Alternate Method
Given: The expression to simplify is (2x + 3)² − (x + 1)².
Formula Used: (a + b)² = a² + 2ab + b²
=> Expand the first term: (2x + 3)² = (2x)² + 2(2x)(3) + 3² = 4x² + 12x + 9
=> Expand the second term: (x + 1)² = x² + 2(x)(1) + 1² = x² + 2x + 1
=> Substitute back: (4x² + 12x + 9) − (x² + 2x + 1)
=> Distribute the negative sign: 4x² + 12x + 9 − x² − 2x − 1
=> Combine like terms: (4x² − x²) + (12x − 2x) + (9 − 1)
=> Result: 3x² + 10x + 8
Therefore The correct answer is 3x² + 10x + 8.
Additional Information
Algebraic Identities
Standard identities like (a + b)² = a² + 2ab + b² and (a − b)² = a² − 2ab + b² are essential for polynomial expansion.
Difference of Squares
The formula a² − b² = (a − b)(a + b) is often faster for simplifying subtractions of two squared terms.
Like Terms
Polynomial simplification requires grouping terms with the same exponent and variable (e.g., all x² terms together).

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Q77. Answer: (b) Rs. 381.51

Shortcut Trick

For a period of 2 years, the difference between Compound Interest (CI) and Simple Interest (SI) is given by the formula:

Difference (D) = P × (R/100)²

D = 47,100 × (9/100) × (9/100)

D = 471 × 81 / 100 => 38,151 / 100 = 381.51

Therefore The correct answer is Rs. 381.51.

Alternate Method

Given:

Principal (P) = Rs. 47,100

Rate of Interest (R) = 9% per annum

Time (T) = 2 years

Step 1: Calculate Simple Interest (SI)

=> SI = (P × R × T) / 100

=> SI = (47,100 × 9 × 2) / 100

=> SI = 471 × 18 = Rs. 8,478

Step 2: Calculate Compound Interest (CI)

=> Amount (A) = P × (1 + R/100)^T

=> A = 47,100 × (1 + 9/100)²

=> A = 47,100 × (1.09)²

=> A = 47,100 × 1.1881 = Rs. 55,959.51

=> CI = Amount − Principal = 55,959.51 − 47,100 = Rs. 8,859.51

Step 3: Calculate the Difference

=> Difference = CI − SI

=> Difference = 8,859.51 − 8,478 = Rs. 381.51

Therefore The correct answer is Rs. 381.51.

Additional Information

CI − SI Difference for 3 Years

The formula for the difference between CI and SI for 3 years is D = [P × (R/100)² × (300 + R) / 100].

Effective Rate Method

For 2 years, the effective CI rate is [x + y + (xy/100)]%. The difference between effective CI and SI rates is exactly (R²/100)%.

Compounding Periods

If interest is compounded half-yearly, the rate is halved (R/2) and the time is doubled (2T) for calculation purposes.

Q78. Answer: (d) 851 km

The correct answer is 851 km.

Key Points

• The Mahanadi River has a total length of 851 km, making it one of the major rivers in central and eastern India.

• It originates from Sihawa in Chhattisgarh and flows through Odisha before emptying into the Bay of Bengal.

• The river is known for its vast delta and extensive irrigation network, playing a vital role in agriculture and water resources in the region.

• It is an important source of water for Hirakud Dam, which is one of the largest dams in India and provides irrigation, flood control, and hydroelectric power.

• The Mahanadi drainage basin spreads across several states, including Chhattisgarh, Odisha, Jharkhand, and Maharashtra.

Additional Information

• Hirakud Dam

• Located on the Mahanadi River, it is the longest earthen dam in India.

• It was constructed in 1957 and plays a key role in flood control, irrigation, and hydroelectric power generation.

• The reservoir created by the dam spans an area of approximately 743 sq. km.

• Mahanadi Basin

• The Mahanadi Basin covers an area of approximately 141,600 sq. km.

• It includes tributaries such as the Seonath, Mand, Ib, and Hasdeo rivers.

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• The basin supports agriculture and industries in Chhattisgarh and Odisha.
• Delta Formation
• The Mahanadi forms a wide delta at its mouth near Cuttack in Odisha.
• The delta is fertile and heavily cultivated, supporting rice farming and other crops.
• It houses several cities and towns, including Paradip Port, which is a key trading hub.
• Environmental Significance
• The Mahanadi River is home to rich biodiversity, including several freshwater fish and aquatic species.
• Efforts are being made to address pollution and over-extraction of water from the river.
• Conservation initiatives focus on maintaining the ecological balance of the river and its surroundings.

Q79. Answer: (b) DAX

The logic followed here is:
Option 1) KGE
Option 2) DAX
Here, it does not follow the logic.
Option 3) WSQ
Option 4) SOM
Hence, the correct answer is "Option 2".

Q80. Answer: (b) 16,500

Shortcut Trick
Monthly Salary = 10,000
Monthly Expenditure = 6,000 + 2,500 = 8,500
Monthly Savings = 10,000 − 8,500 = 1,500
Yearly Savings (excluding birthday month) = 1,500 × 11 = 16,500
Therefore The correct answer is Rs. 16,500.
Alternate Method
Given:
Monthly Salary = Rs. 10,000
House Rent = Rs. 6,000
Bills = Rs. 2,500
Calculations:
=> Total Monthly Expenses = 6,000 + 2,500 = Rs. 8,500
=> Monthly Savings = 10,000 − 8,500 = Rs. 1,500
=> Since he spends his savings in the birthday month, he only saves for 11 months.
=> Yearly Savings = 1,500 × 11
=> Yearly Savings = Rs. 16,500
Therefore The correct answer is Rs. 16,500.
Additional Information
Savings Formula
Basic relation: Savings = Income − Expenditure. Net annual savings is the sum of savings across all 12 months.
Percentage Change in Savings
If income increases by x% and expenditure increases by y%, the new savings are calculated using the updated values of both.

Q81. Answer: (d) 194

Given:
194 + [6 × (1 - 6 + 5)] ÷ 12
Calculation:
194 + [6 × (1 - 6 + 5)] ÷ 12
=> 194 + [6 × (0)] ÷ 12
=> 194 + 0 ÷ 12
=> 194 + 0
=> 194

Therefore The correct answer is option (4).

Q82. Answer: (a) Charter Act of 1793

The correct answer is Charter Act of 1793.

Key Points

• The Charter Act of 1793 was instrumental in reinforcing the power of the Governor-General of India in certain critical matters.

• It authorised the Governor-General to override the decisions of his council in cases where the interests of the British Empire in India were at stake.

• This act was an extension of the Regulating Act of 1773 and Pitt's India Act of 1784, further centralising power in the hands of the Governor-General.

• The provision was seen as a measure to ensure the efficient administration of British interests in India without unnecessary delays caused by council disagreements.

• The act also renewed the East India Company's charter for another 20 years, maintaining its monopoly over trade with India.

Additional Information

• Charter Act of 1813:

• This act ended the East India Company's trade monopoly in India, except for trade in tea and trade with China.

• It allowed Christian missionaries to propagate their religion in India.

• It allocated funds for the promotion of education in India.

• Regulating Act of 1773:

• This was the first attempt by the British Parliament to regulate the affairs of the East India Company in India.

• It created the position of the Governor-General of Bengal and established a council to assist him.

• Pitt's India Act of 1784:

• This act established a system of dual control by creating a Board of Control in Britain to supervise the East India Company's administration in India.

• It distinguished between the company's commercial and political functions.

• Centralisation of Power:

• The Charter Act of 1793 was part of the broader British strategy to centralise administrative power in India for better governance and control.

• This trend continued in subsequent acts, culminating in the complete transfer of power to the British Crown under the Government of India Act 1858.

Q83. Answer: (a) Babur

The correct answer is Babur.

Key Points

• Babur, the founder of the Mughal Empire in India, died in 1530, leaving behind a vast empire.

• The empire stretched across northern India—from the Indus River in the west to Bihar in the east, and from the Himalayas in the north to Gwalior in the south.

• Babur defeated Ibrahim Lodi in the First Battle of Panipat (1526), which marked the establishment of the Mughal Empire.

• He was a descendant of Timur on his father's side and Genghis Khan on his mother's side, which gave legitimacy to his rule.

• Babur's autobiography, "Baburnama," provides detailed accounts of his life, campaigns, and the socio-political conditions of his time.

Additional Information

• Mughal Empire:

• The Mughal Empire ruled most of India and Pakistan from the early 16th to the mid-18th century.

• It is known for its significant contributions to art, architecture, culture, and centralized governance.

• Notable Mughal rulers include Akbar, Jahangir, Shah Jahan, and Aurangzeb.

• Babur's military tactics:

• Babur introduced modern artillery and gunpowder to Indian warfare during his campaigns.

• He employed the "Tulughma" strategy, dividing his army into flanking, center, and reserve units for better maneuverability.

• Baburnama:

• Babur wrote his autobiography, "Baburnama," in Chagatai Turkish, which was later translated into Persian.

• The book provides insights into Babur's thoughts, personal life, and the cultural landscape of his era.

• First Battle of Panipat:

• Fought in 1526 between Babur and Ibrahim Lodi, the Sultan of Delhi.

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• This battle marked the end of the Delhi Sultanate and the beginning of Mughal rule in India.

Q84. Answer: (a) IP-KR-MO

The logic followed here is:

For, EL-GN-IK

For, GN-IP-KM

Similarly,

IP-KR-MO

Hence, the correct answer is "Option 1".

Q85. Answer: (b) 8.33%

Shortcut Trick

For a sum to become n times itself at Simple Interest, use the shortcut: Rate (R) = (n − 1) ÷ T × 100.

Here, the sum doubles, so n = 2, and time T = 12 years.

R = (2 − 1) ÷ 12 × 100

R = 100 ÷ 12 = 8.333...

Therefore The correct answer is 8.33%.

Alternate Method

Given:

Time (T) = 12 years

Final Amount (A) = 2 × Principal (P)

Formula Used:

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

Calculations:

=> Let Principal (P) = Rs. 100

=> Since the sum doubles, Amount (A) = 2 × 100 = Rs. 200

=> Simple Interest (SI) = Amount − Principal = 200 − 100 = Rs. 100

=> Substitute in the formula: 100 = (100 × R × 12) ÷ 100

=> 100 = 12 × R

=> R = 100 ÷ 12

=> R = 8.333... ≈ 8.33%

Therefore The correct answer is 8.33%.

Additional Information

Simple Interest Definition

Simple interest is calculated only on the original principal amount for every time period.

Sum tripling rule

If a sum triples (n=3), the interest gained is 2P, so R × T = 200.

Amount calculation

Final Amount (A) = Principal (P) + SI = P[1 + (R × T) ÷ 100].

Q86. Answer: (c) 133.2

Shortcut Trick

The distance covered by the cab in the remaining time (28 − 10 = 18 min) is equal to the distance covered by the man in 10 minutes.

Ratio of Time (Cab : Man) = 18 : 10 = 9 : 5

Ratio of Speed (Cab : Man) = 5 : 9

Speed of Man = (74 ÷ 5) × 9 = 14.8 × 9 = 133.2 km/hr

Therefore The correct answer is 133.2 km/hr.

Alternate Method

Given: Speed of Cab (S_c) = 74 km/hr, Time Interval of Cabs (T_i) = 28 min, Meeting Interval (T_m) = 10 min.

Formula: S_c × (T_i − T_m) = S_m × T_m

=> Distance between two cabs = 74 × (28/60) km

=> In 10 minutes, the Man and the Cab cover this distance together (Relative Speed).

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=> (74 + S_m) × (10/60) = 74 × (28/60)

=> (74 + S_m) × 10 = 74 × 28

=> 74 + S_m = (74 × 28) ÷ 10

=> 74 + S_m = 2072 ÷ 10 = 207.2

=> S_m = 207.2 − 74 = 133.2 km/hr

Therefore The correct answer is 133.2 km/hr.

Additional Information

Relative Speed

When two objects move towards each other, their relative speed is the sum of their individual speeds (S1 + S2).

Sound and Echo Logic

This problem follows the same logic as bullets fired at intervals where a person hears the sounds at different intervals due to motion.

Time-Speed Inverseness

For a constant distance, speed is inversely proportional to time (S prop. to 1/T).

Q87. Answer: (c) (25, 95)

Shortcut Trick

Sum of lowest (x) and highest (y) marks = (Average × Total students) − Sum of other 10 marks.

x + y = (64 × 12) − 648 = 768 − 648 = 120.

Given Range (y − x) = 70.

Solving: y = (120 + 70) ÷ 2 = 95 and x = (120 − 70) ÷ 2 = 25.

Therefore The correct answer is (25, 95).

Alternate Method

Given: Marks of 12 students, Average = 64, Range = 70, x = lowest, y = highest.

Formula Used: Average = Sum ÷ Count | Range = Highest − Lowest

=> Sum of all 12 marks = 12 × 64 = 768

=> Sum of known 10 marks = 28 + 35 + 56 + 78 + 63 + 65 + 81 + 79 + 83 + 80 = 648

=> x + y = 768 − 648 = 120

=> y − x = 70 (Given Range)

=> Adding both: 2y = 190 => y = 95

=> Subtracting: 2x = 50 => x = 25

Therefore The correct answer is (25, 95).

Additional Information

Range in Statistics

Q88. Answer: (b) 124

The logic followed here is:

Hence, the correct answer is "Option 2".

Q89. Answer: (d) Mahanadi

The correct answer is Mahanadi.

Key Points

• The Mahanadi River originates from the Sihawa hills in Chhattisgarh and flows through Odisha before emptying directly into the Bay of Bengal.

• Unlike rivers such as the Ghaghara, Kosi, and Gomti, which are tributaries of the Ganga, the Mahanadi is an independent river system.

• The Mahanadi is one of the major rivers of peninsular India, with a total length of approximately 858 kilometers.

• Its basin covers parts of Chhattisgarh, Odisha, Jharkhand, Maharashtra, and Madhya Pradesh, making it a significant river for these regions.

• Important cities located along the Mahanadi include Sambalpur and Cuttack, with the Hirakud Dam being a notable landmark.

Additional Information

• Tributaries of the Ganga:

• The Ganga River has several tributaries, including the Ghaghara, Kosi, Gomti, Yamuna, Gandak, and Son.

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• These tributaries contribute significantly to the Ganga's flow and its extensive drainage basin.
• Rivers flowing into the Bay of Bengal:
• Rivers such as the Mahanadi, Godavari, Krishna, and Kaveri flow directly into the Bay of Bengal.
• These rivers are part of the peninsular river systems and are not connected to the Ganga.
• Hirakud Dam on the Mahanadi:
• The Hirakud Dam, located near Sambalpur in Odisha, is one of the longest earthen dams in the world.
• It plays a crucial role in irrigation, flood control, and hydroelectric power generation.
• Bay of Bengal:
• The Bay of Bengal is the northeastern part of the Indian Ocean and serves as the final destination for several major rivers of India.
• It supports diverse ecosystems and acts as a vital economic zone for regional countries.

Q90. Answer: (c) 134

The correct answer is 134.

Key Points

• India secured a total of 134 medals at the World Para Athletics Grand Prix 2025, marking a significant achievement for Indian para-athletes.
• The medal tally comprised gold, silver, and bronze medals across various events, showcasing India's growing strength in para-athletics.
• The Grand Prix is one of the most prestigious events in para-athletics worldwide, providing a platform for differently-abled athletes to demonstrate their abilities.
• India's performance at the event highlights the success of government initiatives aimed at supporting para-athletes, including dedicated training programs and financial assistance.
• Indian para-athletes continue to make strides on the global stage, contributing to the nation's reputation in international sports.

Additional Information

• Para-athletics:
• It is a branch of athletics specifically designed for athletes with physical disabilities.
• Events include track and field disciplines such as running, jumping, and throwing.
• Competitions are classified based on the type and degree of disability to ensure fair participation.
• World Para Athletics Grand Prix:
• An annual global event organized by World Para Athletics, a division of the International Paralympic Committee (IPC).
• It serves as a qualifying event for the Paralympic Games and other major championships.
• The Grand Prix attracts elite para-athletes from around the world, offering high-level competition.
• Indian Government Support:
• The Indian government provides financial assistance and training facilities for para-athletes under schemes like Target Olympic Podium Scheme (TOPS).
• Specialized coaching and access to advanced equipment are made available to enhance performance.
• Recognition and awards are also granted to outstanding athletes to encourage participation.
• India's Growth in Para-sports:
• India has seen a steady rise in the number of medals won in international para-sports events over the years.
• Initiatives such as state-level para-athletics meets and talent identification programs have contributed to this growth.
• Efforts are being made to increase awareness and inclusivity for differently-abled athletes across the country.

Q91. Answer: (c) ingestion

The correct answer is Ingestion.

Key Points

• Ingestion is the first step in holozoic nutrition, where food is taken into the body for further processing.
• It involves the intake of solid or liquid food through specialized structures such as the mouth or oral cavity in complex organisms.
• Ingestion enables organisms to acquire nutrients essential for their survival and growth.
• Holozoic nutrition is characteristic of most animals, including humans, and consists of multiple stages such as ingestion, digestion, absorption, assimilation, and egestion.
• This step is critical for initiating the process of converting complex organic substances into simpler, absorbable forms for energy and cellular function.

Additional Information

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• Holozoic Nutrition: A mode of nutrition where organisms ingest solid food, digest it internally, and absorb nutrients.
• Digestion: The biochemical process that breaks down complex food molecules into simpler substances using enzymes.
• Absorption: The process where digested nutrients are absorbed into the bloodstream or cells for distribution throughout the body.
• Assimilation: The utilization of absorbed nutrients by cells to produce energy and build cellular structures.
• Egestion: The expulsion of undigested food and waste materials from the body after the completion of digestion.

Q92. Answer: (c) Male, Maldives

The correct answer is Male, Maldives.

Key Points

• The 13th Governing Council Meeting of the Bay of Bengal Inter-Governmental Organization (BOBP-IGO) was held in Male, Maldives in 2023.
• The meeting focused on sustainable fisheries management and regional cooperation among member countries of the Bay of Bengal region.
• BOBP-IGO is an intergovernmental organization that aims to promote responsible fisheries and marine ecosystem conservation in the Bay of Bengal region.
• Member countries of the BOBP-IGO include Bangladesh, India, Maldives, and Sri Lanka.
• The Governing Council Meetings are held annually to discuss and address key issues pertaining to fisheries and marine resource management.

Additional Information

• Bay of Bengal Programme Inter-Governmental Organization (BOBP-IGO)
• Established in 2003, BOBP-IGO works to enhance the socio-economic condition of small-scale fisheries in the Bay of Bengal region.
• The organization promotes sustainable fishing practices and capacity-building initiatives for member countries.
• Its primary focus is on conserving marine biodiversity while addressing the livelihood challenges faced by coastal communities.
• Sustainable Fisheries Management
• Sustainable fisheries aim to balance the ecological, economic, and social aspects of marine resource utilization.
• It focuses on maintaining fish stocks at biologically safe levels and reducing overfishing.
• Efforts include implementing regulations, promoting aquaculture, and engaging local communities in conservation practices.
• Regional Cooperation in Fisheries
• Regional cooperation is crucial for managing shared marine resources and addressing transboundary challenges like illegal fishing.
• Organizations like BOBP-IGO facilitate dialogue and collaboration among member states.
• Joint initiatives often include data sharing, capacity building, and harmonized policies for fisheries governance.
• Marine Biodiversity Conservation
• Marine biodiversity conservation is essential for maintaining the health of ocean ecosystems.
• It involves protecting endangered species, restoring habitats like coral reefs and mangroves, and reducing pollution.
• Global frameworks like the Convention on Biological Diversity (CBD) guide conservation efforts.

Q93. Answer: (c) su

The logic followed here is:

The code for "queen" is "su".

Hence, the correct answer is "Option 3".

Q94. Answer: (c) Odisha

The correct answer is Odisha.

Key Points

• Saura painting is a tribal art form originating from the Saura tribe of Odisha, India.
• These paintings are traditionally created on walls of houses and depict daily life, religious practices, and nature.
• Saura art uses natural colors derived from soil, leaves, and rice paste, making it eco-friendly and sustainable.
• The paintings are characterized by geometric patterns and intricate detailing, often resembling Warli art but with distinct motifs.
• Saura art holds cultural and spiritual significance as it is used to invoke blessings and depict tribal folklore.

Additional Information

• Saura Tribe:
• The Saura tribe is one of the oldest tribes in Odisha and is known for its rich cultural heritage and traditional practices.

• They primarily inhabit the districts of Ganjam, Rayagada, and Koraput in Odisha.
• The tribe follows its own distinct language and customs, contributing to the diversity of Indian tribal culture.
• Artistic Techniques:
• Saura paintings are created using freehand drawing without pre-sketching, showcasing the skill of the artist.
• Figures in the paintings are stylized and feature stick-like human and animal forms.
• The themes often revolve around nature, hunting, rituals, and community activities.
• Comparison with Warli Art:
• Saura art and Warli art are often confused due to similar geometric patterns.
• Unlike Warli, Saura art focuses more on religious and spiritual themes.
• Saura paintings include intricate borders and are more densely populated with motifs.
• Preservation Efforts:
• Efforts are being made to preserve and promote Saura art through exhibitions and workshops.
• Government initiatives in Odisha encourage tribal artisans to sustain this traditional art form.
• Saura art has gained international recognition for its aesthetic appeal and cultural significance.

Q95. Answer: (d) -19/9

Given:

$(29/4)^3\times(4/29)^2\times(29/4)^{11}=(4/29)^{(9m+7)}$

Formula used:

Law of exponents: $[a/b]^r=[b/a]^{(-r)}$

$a^p \times a^q = a^{(p + q)}$

Calculations:

$(29/4)^3\times(4/29)^2\times(29/4)^{11}=(4/29)^{(9m+7)}$

$\Rightarrow (4/29)^{(-3)}\times(4/29)^2\times(4/29)^{(-11)}=(4/29)^{(9m+7)}$

$\Rightarrow (4/29)^{(-3+ 2-11)}=(4/29)^{(9m+7)}$

$\Rightarrow (4/29)^{(-12)}=(4/29)^{(9m+7)}$

$\Rightarrow -12 = 9m + 7$

$\Rightarrow 12 + 7 = -9m$

$\Rightarrow 19 = -9m$

$m = -19/9$

Therefore The value of m which satisfies the given equation is -19/9.

Q96. Answer: (b) Expressed dissent through art

The correct answer is Expressed dissent through art.

Key Points

• The Indian People's Theatre Association (IPTA) was established in 1943 with the aim of using art as a tool for social and political change.
• It was actively involved in portraying the struggles against British colonial rule through performances, plays, and music.
• IPTA brought together artists, writers, and performers to advocate for freedom and social justice using creative mediums such as theatre and folk art.
• Its productions often highlighted social issues, including poverty, oppression, and exploitation by colonial powers.
• The association played a crucial role in fostering cultural nationalism and expressing dissent against British policies during India's independence movement.

Additional Information

• Indian People's Theatre Association (IPTA):
• IPTA was closely associated with the Progressive Writers' Association, which also aimed to use literature for societal change.
• The association played a key role in introducing realism in Indian theatre, focusing on the lives of marginalized communities.
• IPTA's work was inspired by global movements such as the Russian Revolution and anti-fascist struggles, blending these influences into Indian art.
• Prominent members included Balraj Sahni, Prithviraj Kapoor, and Salil Chowdhury, who contributed significantly to the cultural renaissance in India.
• Art as a form of protest:
• Art has historically been a powerful medium to challenge authority and inspire social change.

• During colonial rule, various forms of art—including paintings, music, and theatre—were used to promote nationalist sentiments.
• Folk traditions such as Bhakti poetry and local storytelling were adapted to criticize British policies and evoke patriotism.
• Cultural Nationalism:
• Cultural nationalism refers to the promotion of national identity through cultural expressions such as art, literature, and traditions.
• In colonial India, cultural nationalism played a significant role in unifying diverse communities against British rule.
• Legacy of IPTA:
• IPTA's influence extended into post-independence India, shaping progressive art and cinema.
• Its emphasis on social realism continues to inspire modern theatre and film movements in India.

Q97. Answer: (c) 3

Given: P, Q, R, S, T, U and V are sitting around a circular table facing the centre.
Q sits third to the right of P. U sits third to the left of V. Q sits to the immediate right of U.
S is not an immediate neighbour of U. Only one person sits between R and T when counted from the left of T.
Thus, Only 3 sit people sit between S and T when counted from the right of S.
Hence, the correct answer is "Option 3".

Q98. Answer: (c) = HNT, % = TUT

The logic followed here is:
Given: # : LPR :: PSV : %
Option 1) # = HMR, % = TVW
Option 2) # = FMP, % = RUY
Option 3) # = HNT, % = TUT
Option 4) # = FNR, % = RVM
Hence, the correct answer is "Option 3".

Q99. Answer: (b) 1152/185 hours

Shortcut Trick
Efficiency of Pipe A = 3700 ÷ 9 litres/hr.
Efficiency of Pipe B = 3700 ÷ 6 litres/hr.
Combined efficiency = (3700 × (2 + 3)) ÷ 18 = (3700 × 5) ÷ 18 = 18500 ÷ 18 = 9250 ÷ 9 litres/hr.
Time to fill 6400 litres = 6400 ÷ (9250 ÷ 9) = (6400 × 9) ÷ 9250 = (640 × 9) ÷ 925 = 1152 ÷ 185 hours.
Therefore The correct answer is 1152/185 hr.
Alternate Method

Pipe	Time (hrs)	Reference Work (litres)	Efficiency (litres/hr)
A	9	3700	3700 ÷ 9
B	6	3700 ÷ 6	

Total Capacity of target tank = 6400 litres.
=> Efficiency of Pipe A (E_A) = 3700/9 litres/hr.
=> Efficiency of Pipe B (E_B) = 3700/6 = 1850/3 litres/hr.
=> Combined Efficiency (E_(A+B)) = (3700/9) + (1850/3) = (3700 + 5550)/9 = 9250/9 litres/hr.
=> Time taken = Total Work ÷ Combined Efficiency
=> Time = 6400 ÷ (9250/9) = (6400 × 9) ÷ 9250
=> Time = (640 × 9) ÷ 925 = 5760 ÷ 925
=> Time = 1152/185 hours.
Therefore The correct answer is 1152/185 hr.
Additional Information
Combined Efficiency Formula
When two pipes work together, their total efficiency is the sum of their individual efficiencies: E_(total) = E1 + E2.
Time and Work Relationship
The time taken to complete a task is inversely proportional to the efficiency: Time = Total Work ÷ Efficiency.
Inlet vs Outlet Pipes

Inlet pipes have positive efficiency (add water), while outlet pipes (leaks) have negative efficiency (remove water).

Q100. Answer: (c) West Bengal

The correct answer is West Bengal.

Key Points

• In 2025, the state of West Bengal launched an innovative program aimed at eradicating mother-to-child transmission of HIV, syphilis, and Hepatitis B by the year 2026.

• This initiative aligns with global efforts under the World Health Organization's (WHO) elimination strategy for these diseases.

• West Bengal became the first state in India to implement such a comprehensive program focusing on maternal and child health.

• The program includes widespread testing, awareness campaigns, and free treatment for affected mothers to ensure the health of newborns.

• Specialized healthcare facilities were set up in collaboration with national and international health organizations to support this initiative.

Additional Information

• Mother-to-Child Transmission (MTCT):

• MTCT refers to the transmission of diseases such as HIV, syphilis, or Hepatitis B from an infected mother to her child during pregnancy, childbirth, or breastfeeding.

• It is a major public health issue, especially in low- and middle-income countries.

• HIV Elimination Efforts:

• The UNAIDS 95-95-95 targets aim to ensure that 95% of people with HIV know their status, 95% are on treatment, and 95% achieve viral suppression by 2030.

• India has been actively working to reduce HIV prevalence through initiatives like the National AIDS Control Program.

• Syphilis Testing and Treatment:

• Early detection and treatment of syphilis during pregnancy can prevent congenital syphilis, which can lead to severe complications in newborns.

• Penicillin remains the most effective treatment for syphilis.

• Hepatitis B Prevention:

• Hepatitis B vaccines are highly effective in preventing transmission and are recommended for all newborns within 24 hours of birth.

• India's Universal Immunization Program includes free Hepatitis B vaccination for children.

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