# RRB NTPC (Graduate) CBT-I Official Paper (Held On: 17 Mar, 2026 Shift 1) (Previous Year Paper)

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

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**Q1.** Which dynasty ruled over Kannauj during the Tripartite Struggle?

**(a)** Rashtrakutas
**(b)** Chalukyas
**(c)** Gurjara-Pratiharas
**(d)** Palas - Cholas

**Q2.** A is the wife of B. B is the father of C. D is the brother of C. E is the son of D. How is A related to E?

**(a)** Mother's mother
**(b)** Mother
**(c)** Father's mother
**(d)** Husband's wife

**Q3.** Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some ants are lizards.

All lizards are spiders.

No spider is a rat.

Conclusions:

(I) Some rats are lizards.

(II) Some spiders are ants.

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

**Q4.** Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

All oranges are apples. No apple is a banana. No banana is a kiwi.

Conclusions:

(I) No orange is a banana.

(II) No apple is a kiwi.

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

**Q5.** The product of two numbers, X and Y, is 6760, and the HCF of X and Y is 13. Find the number of possible pairs (X,Y), given that X > Y.

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

**Q6.** As per Article _____ of the Indian Constitution, from the date of commencement of the Constitution (Sixty-ninth Amendment) Act, 1991, the Union territory of Delhi shall be called the National Capital Territory of Delhi.

**(a)** 239AA
**(b)** 239AC
**(c)** 239AB
**(d)** 239AD

**Q7.** A and B start running on a circular track of length 900 m. A runs at 225 m/min and B at 180 m/min. Every time A overtakes B, both reduce their speeds by 5% of their then speeds before continuing. After how many minutes (correct to two decimal places) does A overtake B for the 3^(rd) time?

**(a)** 62.11 min
**(b)** 63.21 min
**(c)** 64.41 min
**(d)** 64.21 min

**Q8.** Under the Citizenship Act, 1955, which section governs the grant of citizenship when a new territory becomes part of India?

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

**Q9.** Which substance is the primary component of the reddish-brown coating formed on iron articles exposed to moist air?

**(a)** Iron Sulfate (FeSO4)
**(b)** Hydrated Iron (III) Oxide (Fe2O3·xH2O)
**(c)** Iron (II) Oxide (FeO)
**(d)** Iron (III) Hydroxide (Fe(OH)3)

**Q10.** In a certain code language,

A @ B means ‘A is the son of B’,
A # B means ‘A is the sister of B’,
A + B means ‘A is the wife of B’ and
A % B means ‘A is the father of B’.
Based on the above, how is E related to B if ‘E % R # D + N @ B’?

**(a)** Son's wife's father
**(b)** Wife's father
**(c)** Son's wife's brother
**(d)** Wife's brother

**Q11.** Simplify : (525 × 525 × 525) + (321 × 321 × 321)/(525 × 525) - (525 × 321) + (321 × 321) × 1/(96 - 36)

**(a)** 12.5
**(b)** 13.1
**(c)** 14.1
**(d)** 15.9

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**Q12.** The waves which can propagate in gases are:

**(a)** Transverse Waves
**(b)** Stationary Waves
**(c)** Longitudinal Waves
**(d)** Gravity Waves

**Q13.** 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.

Only two people have exams before Q. Only three people have exams after V. Only three people have exams between S and Q. P has the exam immediately before T but not on Monday. R does not have the exam on Tuesday.

How many people have exams between R and T?

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

**Q14.** By November 2025, non-fossil power accounted for what percentage of the total installed electricity capacity in India?

**(a)** 40.2%
**(b)** 60.0%
**(c)** 45.8%
**(d)** 51.5%

**Q15.** What is the average of all the natural numbers from 1 to 63?

**(a)** 33
**(b)** 31.5
**(c)** 32
**(d)** 32.5

**Q16.** Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

EGE 85 DFD 90 CEC 95 BDB 100 ?

**(a)** ABD 104
**(b)** ABZ 104
**(c)** ADZ 105
**(d)** ACA 105

**Q17.** Select the set in which the numbers are related in the same way as are the numbers of the following sets.

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits.)

(336, 216, 156)

(379, 259, 199)

**(a)** (412, 292, 232)
**(b)** (394, 264, 204)
**(c)** (432, 332, 252)
**(d)** (449, 329, 249)

**Q18.** Which constitutional amendment to the Indian Constitution added the term 'Socialist' to the Preamble?

**(a)** 1st Amendment, 1951
**(b)** 44th Amendment, 1978
**(c)** 26th Amendment, 1971
**(d)** 42nd Amendment, 1976

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**Q19.** If the mean of the following data is 35, find the value of X.

| Class | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
|---|---|---|---|---|---|
| Frequency | 42 | 26 | 45 | 46 | X |

**(a)** 32
**(b)** 26
**(c)** 28
**(d)** 34

**Q20.** A cube has a lateral surface area of 324 $cm^2$. It is fully submerged in a rectangular container of height 18 cm, having a square base and a lateral surface area of 864 $cm^2$. If the container was partially filled with water before the cube was submerged, find the rise in the water level after the cube is submerged.

(Round your answer to the nearest integer.)

**(a)** 6 cm
**(b)** 4 cm
**(c)** 7 cm
**(d)** 5 cm

**Q21.** How do Centre-State financial relations impact the governance in India?

**(a)** By providing states with unlimited financial resources
**(b)** By centralizing all tax revenues at the Centre
**(c)** Through mechanisms like the Finance Commission that allocate resources
**(d)** By eliminating the need for state budgets

**Q22.** As of February 1, 2025, what percentage of rural households in India had been provided tap water connections under the Jal Jeevan Mission?

**(a)** 92.67%
**(b)** 84.15%
**(c)** 69.34%
**(d)** 79.74%

**Q23.** In an election between two candidates, 84% of the registered voters cast their votes and 20% of the votes polled were found invalid. Winning candidate got 58% of the valid votes and won the election by a margin of 336 votes. How many voters were registered?

**(a)** 3123
**(b)** 3124
**(c)** 3120
**(d)** 3125

**Q24.** Manan starts from Point A and drives 42 km towards South. He then takes a left turn, drives 40 km, turns left and drives 54 km. He then takes a left turn and drives 48 km. He takes a final left turn, drives 12 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again?

**(a)** 5 km to the west
**(b)** 6 km to the west
**(c)** 7 km to the east
**(d)** 8 km to the east

**Q25.** 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 :: ?

: NMH :: VUP : %

**(a)** = SRO % = ZPK
**(b)** = SVC % = OIK
**(c)** = SRM % = QPK
**(d)** = IBM % = QKL

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**Q26.** Which core component of Windows OS is responsible for handling low-level operations such as memory management and process scheduling?

**(a)** Windows Kernel
**(b)** Service Control Manager
**(c)** Windows Explorer
**(d)** Task Scheduler

**Q27.** If a : b : c = 3 : 4 : 5 and 2a - 3b + 4c = 56, then the value of c is:

**(a)** 22
**(b)** 24
**(c)** 20
**(d)** 21

**Q28.** Evaluate: (-9) - (-60) ÷ (-6) + (-2) × 8

**(a)** -37
**(b)** -38
**(c)** -35
**(d)** -34

**Q29.** The population of a village was 2,90,000. It increased by 10% in the first year and increased by 20% in the second year. Its population after two years is _____.

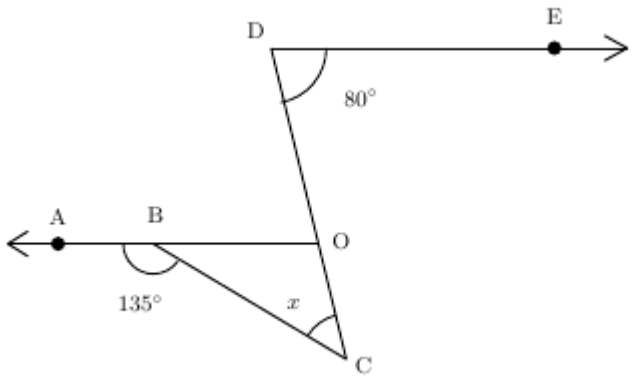
**(a)** 3,77,000
**(b)** 3,48,000
**(c)** 3,19,000
**(d)** 3,82,800

**Q30.** 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 :: ?

: NQW :: LOU : %

**(a)** = HKQ, % = RUO
**(b)** = KKQ, % = RUA
**(c)** = HKQ, % = RUA
**(d)** = HKQ, % = RUL

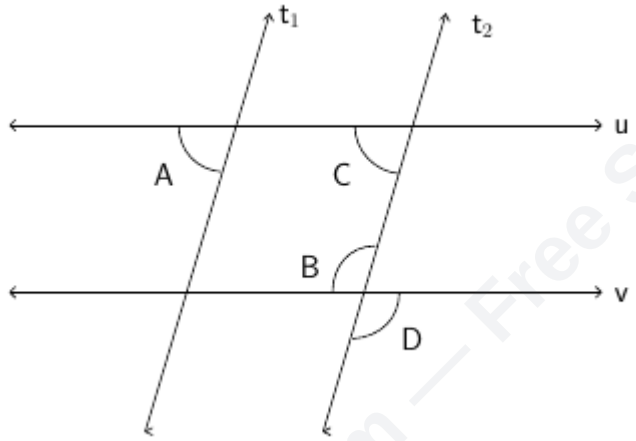
**Q31.** In the given figure, lines AO and DE are parallel. What is the value of x?




**(a)** 100º
**(b)** 145º
**(c)** 45º
**(d)** 35º

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**Q32.** In the given figure, if u || v, t1 || t2 and angle A = 92º ,find angle D.




**(a)** 78^o
**(b)** 92^o
**(c)** 82^o
**(d)** 88^o

**Q33.** According to Census 2011, which of the following states showed a negative decadal population growth rate between 2001 and 2011?

**(a)** Gujrat
**(b)** Kerela
**(c)** Punjab
**(d)** Nagaland

**Q34.** Seven boxes A, C, G, H, J, N and R are kept one over the other but not necessarily in the same order. Only three boxes are kept below N. Only two boxes are kept between N and J. Only G is kept immediately above H. C is kept at some place below R and at some place above A. How many boxes are kept above C?

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

**Q35.** Which 2025 event by the United Nations highlights that member states continue to ratify a variety of multilateral treaties across human rights, the environment, penal law, and the law of the sea, among others?

**(a)** UN Ocean Conference
**(b)** 2025 Treaty Event
**(c)** UN Biodiversity Summit
**(d)** Paris Climate Summit

**Q36.** Which of the following statements is true about the role of Cabinet Ministers in India?

**(a)** They are not involved in policy decisions.
**(b)** They only assist other ministers in their duties.
**(c)** They head important ministries like Home, Defence, and Finance.
**(d)** They do not attend Cabinet meetings.

**Q37.** Two taps can fill a cistern in 4 hours and 27 hours respectively. A third tap can empty it in 27 hours. How long (in hours) will it take to fill one-fourth of the empty cistern, if all of them are opened together?

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

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**Q38.** In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements is sufficient to answer the question. Read both the statements and decide the appropriate answer.

A, B, C, D, E and F are sitting around a circular table, facing the centre. Who sits to the immediate right of C?

(I) D sits to the immediate left of F. C is the immediate neighbour of A and E.

(II) B sits second to the left of F. C sits second to the right of F.

**(a)** Data in Statement II alone is sufficient to answer the question while data in statement I is not.
**(b)** Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question.
**(c)** Data in Statement I alone is sufficient to answer the question while data in statement II is not.
**(d)** Both statements I and II together are not sufficient to answer the question.

**Q39.** Under which of the following categories do headphones fall?

**(a)** Output Device
**(b)** Calculator Device
**(c)** Storage Device
**(d)** Input Device

**Q40.** P sells an item to Q at 70% profit. Q sells the same item to R at 67% loss. If R paid Rs. 3927 for the item, then at what price (in Rs. ) is the item purchased by P?

**(a)** 7003
**(b)** 6998
**(c)** 7000
**(d)** 6997

**Q41.** A shopkeeper professes to sell his goods at a 25% loss but uses a false balance and gains 70%. The actual weight (rounded off to one decimal place) that he uses instead of 1 kg is:

**(a)** 436.4 gm
**(b)** 441.2 gm
**(c)** 443.3 gm
**(d)** 438.1 gm

**Q42.** Which of the following States/Union Territories shares a border with Afghanistan?

**(a)** Rajasthan
**(b)** Ladakh
**(c)** Jammu and Kashmir
**(d)** Punjab

**Q43.** Based on the English alphabetical order, three of the following four letter cluster pairs are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

**(a)** PR-SU
**(b)** MO-PR
**(c)** HJ-KM
**(d)** DF-GJ

**Q44.** As of December 2025, under the Pradhan Mantri Jan-Dhan Yojana (PMJDY), eligible account holders can access an overdraft facility of up to:

**(a)** Rs. 8,000
**(b)** Rs. 15,000
**(c)** Rs. 10,000
**(d)** Rs. 5,000

**Q45.** Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only two boxes are kept below A. Only two boxes are kept between E and A. F is kept immediately above B. D is kept above G but below A.

How many boxes are kept below C but above B?

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**(a)** Three
**(b)** Two
**(c)** Four
**(d)** Five

**Q46.** Free fall corresponds to which type of motion?

**(a)** Uniformly accelerated motion
**(b)** Uniform motion
**(c)** Non-uniform motion
**(d)** Periodic motion

**Q47.** Mahesh has Rs. 1407 with him. He divides this amount between his two sons, Vijay and Ajay, and asks them to invest their respective shares at a compound interest rate of 10% per annum, compounded annually. It is observed that Vijay's investment amounts to the same value after 17 years as Ajay's investment does after 18 years. How much (in Rs. ) did Mahesh give to Ajay?

**(a)** 837
**(b)** 737
**(c)** 670
**(d)** 520

**Q48.** Which of the following objectives is mentioned in Article 39 of the Indian Constitution?

**(a)** To ensure equal justice and provide free legal aid
**(b)** To organise agriculture and animal husbandry
**(c)** To organise village panchayats
**(d)** To promote equal pay for equal work for both men and women

**Q49.** According to early Buddhist literature, how many gāmas (villages) were said to exist in the kingdom of Magadha during the reign of King Bimbisāra?

**(a)** 80,000
**(b)** 40,000
**(c)** 60,000
**(d)** 1,00,000

**Q50.** What should come in place of '?' in the given series?

19 20 28 55 119 ?

**(a)** 245
**(b)** 142
**(c)** 144
**(d)** 244

**Q51.** Based on the English alphabetical order, three of the following four letter cluster pairs are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

**(a)** BD-EH
**(b)** LN-OQ
**(c)** JL-MO
**(d)** NP-QS

**Q52.** What should come in place of '?' in the given series?

64 62 59 54 47 ?

**(a)** 36
**(b)** 32
**(c)** 34
**(d)** 38

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**Q53.** Barren Island, which witnessed two eruptions in 2025, is situated in which Union Territory of India?

**(a)** Dadra & Nagar Haveli and Daman & Diu
**(b)** Lakshadweep
**(c)** Puducherry
**(d)** Andaman & Nicobar Islands

**Q54.** In a certain code language, 'ROAD' is coded as '9416' and 'DORM' is coded as '3691'. What is the code for 'M' in the given code language?

**(a)** 1
**(b)** 9
**(c)** 3
**(d)** 6

**Q55.** The median for the following frequency distribution is:

| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| f | 8 | 10 | 11 | 16 | 20 | 25 | 15 | 9 | 6 |

**(a)** 4
**(b)** 8
**(c)** 5
**(d)** 6

**Q56.** Refer to the following letter and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left) T O @ $ J $ S € M L I * N G © Y & T P £ Y T (Right)

How many such symbols are there each of which is immediately preceded by a letter and also immediately followed by a symbol?

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

**Q57.** Which law of Mendel explains the separation of alleles during gamete formation?

**(a)** Law of Segregation
**(b)** Law of Assortment
**(c)** Law of Dominance
**(d)** Law of Variation

**Q58.** Rs. 7770 is divided among A, B, C, and D in such a way that the shares of A and B, B and C, and C and D are in the ratios of 2 : 3, 4 : 5, and 6 : 7, respectively. The share of A (in Rs. ) is:

**(a)** 1154
**(b)** 1224
**(c)** 1184
**(d)** 1124

**Q59.** Which of the following methods was characteristically adopted by the Moderates during the early phase of the Indian national movement?

**(a)** Constitutional reforms
**(b)** Swadeshi Movement
**(c)** Promotion of Vedic education
**(d)** Boycott of foreign goods and institutions

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**Q60.** In a certain code language, 'WAND' is coded as '1846' and 'GNAW' is coded as '4165'. What is the code for 'G' in that language?

**(a)** 6
**(b)** 4
**(c)** 5
**(d)** 1

**Q61.** Which of the following is a significant component of the Harappan citadel?

**(a)** Huge temples
**(b)** Grand palaces
**(c)** Dwelling houses
**(d)** The Great Bath

**Q62.** This question is based on the five, three-digit numbers given below.

(Left) 194 582 419 149 825 (Right)

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

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

**(a)** 12
**(b)** 6
**(c)** 8
**(d)** 9

**Q63.** A, B, C, D, E, f and G are sitting around a circular table facing the centre. D sits to the immediate right of A. Only three people sit between D and G when counted from the left of D. Only three people sit between A and F when counted from the right of F. E sits to the immediate right of B. How many people sit between D and E when counted from the right of D?

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

**Q64.** Which of the following factors causes Ooty to have cooler summers than Coimbatore, even though both are located at nearly the same latitude?

**(a)** Ooty is influenced by cold desert winds from the north
**(b)** Ooty is situated at a higher altitude, leading to lower temperatures
**(c)** Coimbatore receives less solar radiation during the year
**(d)** Ooty is located closer to the sea, while Coimbatore is inland

**Q65.** A man sold an article for Rs. 132 by first giving a d% discount on its marked price, and then another discount having the same nominal value (in Rs. ). If the marked price of the article is Rs. 880, then what is the value of d?

**(a)** 39.5
**(b)** 42.5
**(c)** 37.3
**(d)** 46

**Q66.** Evaluate: (-9) - (-56) ÷ (-14) + (-3) × 8

**(a)** 40
**(b)** 36
**(c)** -37
**(d)** 39

**Q67.** If cot A = 3/4, and A is an acute angle, then find the value of sin2A - cos3A.

**(a)** 141/125
**(b)** 3/125
**(c)** 237/125

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**(d)** 273/125

**Q68.** TN 13 is related to WR 16 in a certain way. In the same way, KE 18 is related to NI 21. To which of the following is VP 26 related, following the same logic?

**(a)** XY 28
**(b)** YV 29
**(c)** XU 28
**(d)** YT 29

**Q69.** The revised methodology from 2025 for calculating Green Credit for tree plantation requires certain thresholds before a claim can be submitted. Which is the correct eligibility pair?

**(a)** 3 years of restoration + 30% canopy density
**(b)** 5 years of restoration + 40% canopy density
**(c)** 7 years of restoration + 40% canopy density
**(d)** 5 years of restoration + 60% canopy density

**Q70.** Refer to the following letter, symbol series and answer the question. Counting to be done from left to right only.

(Left) O N & # K € S * P # £ * G I & * @ I A * @ © (Right)

How many such letters are there each of which is immediately preceded by a letter and also immediately followed by a symbol?

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

**Q71.** At what rate (in percentage, rounded off to two decimal place) per year will a sum of money 5 times itself in 15 years on simple interest?

**(a)** 28.67
**(b)** 26.67
**(c)** 53.34
**(d)** 24.67

**Q72.** 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?

157 – 162 – 172 – 86

93 – 98 – 108 – 54

**(a)** 98 – 103 – 113 – 133
**(b)** 112 – 116 – 126 – 63
**(c)** 65 – 70 – 80 – 160
**(d)** 185 – 190 – 200 – 100

**Q73.** A and B, when each is working alone, can complete a piece of work in. respectively, 20 days and 25 days. Each work on alternate days, with A and B starting to work on Day 1 and Day 2, respectively. How long will it take them to complete the work?

**(a)** 221/5 days
**(b)** 23 days
**(c)** 22 days
**(d)** 11 days

**Q74.** Which of the following is an example of Customized Software?

**(a)** School Management Software
**(b)** LibreOffice Calc
**(c)** Mozilla Firefox Application
**(d)** Adobe Photoshop Software

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**Q75.** A woman travelled at a speed of 20 m/min for 90 min, and at a speed of 72 m/min for 66 min. Her average speed (in m/min) for the entire journey is:

**(a)** 42
**(b)** 46
**(c)** 35
**(d)** 48

**Q76.** If a is a root of the equation $2x(2x + 1) = 1$, then the other root is:

**(a)** 3a(a+1)
**(b)** -a(a+1)
**(c)** -1/4a
**(d)** 2a(a-1)

**Q77.** A file is selected on the desktop. Pressing the Delete key will mainly:

**(a)** Open the file
**(b)** Rename the file
**(c)** Remove the file
**(d)** Copy the file

**Q78.** With reference to the 93rd anniversary celebrations of the Indian Air Force (IAF) in 2025, where was the main ceremonial parade held?

**(a)** Delhi Cantonment
**(b)** Air Force Station Hindan, Ghaziabad
**(c)** Bengaluru (HAL Complex)
**(d)** Guwahati

**Q79.** If 1 is added to each odd digit and 1 is subtracted from each even digit in the number 21673458, what will be the product of the greatest and smallest digit in the new number thus formed?

**(a)** 16
**(b)** 8
**(c)** 0
**(d)** 9

**Q80.** Which of the following athletes clinched the women's 100m hurdles gold at the World Athletics Championships Tokyo 2025 on 15 September?

**(a)** Masai Russell
**(b)** Grace Stark
**(c)** Ditaji Kambundji
**(d)** Tobi Amusan

**Q81.** Which of the following principle was most emphasized by Bal Gangadhar Tilak during the Extremist Phase?

**(a)** Complete armed revolution against the British
**(b)** Support for communal representation
**(c)** Exclusive focus on economic reforms
**(d)** Swaraj as the birthright of every Indian

**Q82.** Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

PMO 51 SPR 46 VSU 41 YVX 36 ?

**(a)** BZZ 31
**(b)** BYA 31
**(c)** BJS 30
**(d)** BXZ 30

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**Q83.** Which name is given to the southern stretch of the western coastal plain of India?

**(a)** Konkan Coast
**(b)** Kannad Coast
**(c)** Coromandel Coast
**(d)** Malabar coast

**Q84.** If 1 is added to each odd digit and 2 is subtracted from each even digit in the number 4813576, what will be the difference between the highest and the lowest digits in the number thus formed?

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

**Q85.** During recession, which type of Fiscal Policy should be used?

**(a)** Contractionary Fiscal Policy
**(b)** Neutral Fiscal Policy
**(c)** Expansionary Fiscal Policy
**(d)** Stable Fiscal Policy

**Q86.** The ratio of three numbers is 3 : 5 : 7. If the sum of the largest and smallest numbers is 60, what is the sum of all the three numbers?

**(a)** 120
**(b)** 70
**(c)** 90
**(d)** 100

**Q87.** Who was exiled to Rangoon after the First War of Independence in India?

**(a)** Bahadur Shah Zafar
**(b)** Rani Lakshmibai
**(c)** Nana Sahib
**(d)** Ahmadullah Shah

**Q88.** Which of the following regions was one of the major sources for copper for the Harappan civilisation?

**(a)** Rajasthan
**(b)** Bihar
**(c)** Afghanistan
**(d)** Maharashtra

**Q89.** Who is the author of the historical work 'Rajatarangini', which records the history of Kashmir?

**(a)** Bilhana
**(b)** Kalhana
**(c)** Bana
**(d)** Kalidasa

**Q90.** If a 7-digit number 54468A0 is completely divisible by 4, what is the minimum value of A?

**(a)** 2
**(b)** 0
**(c)** 3
**(d)** 5

**Q91.** Seven people B, C, D, O, P, Q and R are sitting around a circular table facing the center of the table. P sits third to the left of Q. Only one person sits between Q and B when counted from the right of Q. Only two people sit between O and C when counted from the left of O. D is an immediate neighbor of O. Who sits third to the right of R?

**(a)** D
**(b)** P

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**(c)** C
**(d)** O

**Q92.** Which U.S. state experiences a Mediterranean climate that supports the cultivation of fruits, vegetables, and vineyards?
**(a)** Alaska
**(b)** Texas
**(c)** Florida
**(d)** California

**Q93.** There are 12 members in group A, 73 members in group B and 80 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are Rs. 184, Rs. 234 and Rs. 390, respectively. The overall average amount (in Rs. ) spent per member is:
**(a)** 311
**(b)** 305
**(c)** 306
**(d)** 308

**Q94.** Which mission, announced in August 2025, aims to provide India with a multi-layered indigenous air and missile defence system?
**(a)** Integrated Air Defence Mission
**(b)** Mission Shakti
**(c)** Mission Sudarshan Chakra
**(d)** Agni Defence Initiative

**Q95.** Which North Indian fair, held every 12 years, is a major Hindu pilgrimage event at Prayagraj?
**(a)** Hemis Festival
**(b)** Kumbh Mela
**(c)** Pushkar Mela
**(d)** Surajkund Mela

**Q96.** A copper sphere of diameter 24 cm is melted and drawn into a wire of diameter 4 mm. What is the length (in metres) of the wire?
**(a)** 580
**(b)** 576
**(c)** 456
**(d)** 480

**Q97.** 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?

15 – 225 – 235 – 195

9 – 81 – 91 – 51

**(a)** 16 – 256 – 276 – 246
**(b)** 18 – 324 – 334 – 294
**(c)** 10 – 100 – 110 – 90
**(d)** 8 – 64 – 74 – 104

**Q98.** Why did the share of workers in the rural agriculture sector increase during July–September 2025?
**(a)** Due to Kharif agricultural operations
**(b)** Due to urban migration
**(c)** Because of new government schemes
**(d)** Because of a decline in manufacturing jobs

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**Q99.** Tejasvi, Trishana and Meena are three sisters. Tejasvi and Trishana are twins. The sum of the ages of Tejasvi and Trishana is the same as that of Meena. Four years earlier, the ratio of the ages of Tejasvi and Meena was 1: 3. What will be the age of Trishana 4 years from now?

**(a)** 16 years
**(b)** 14 years
**(c)** 18 years
**(d)** 12 years

**Q100.** Which three countries formed the ACITI Partnership announced in November 2025?

**(a)** India, Australia, Canada
**(b)** Australia, Japan, Canada
**(c)** Canada, USA, India
**(d)** India, UK, Australia

## ANSWER KEY

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

## SOLUTIONS

**Q1. Answer: (c) Gurjara-Pratiharas**

The correct answer is Gurjara-Pratiharas.

Key Points

• The Tripartite Struggle was a significant historical conflict that took place in North India between the 8th century and the 10th century.

• The struggle was centered around the control of the city of Kannauj, which was considered a symbol of prestige and sovereign power after the death of Harshavardhana.

• Three major dynasties were involved in this long-standing conflict: the Gurjara-Pratiharas of Western India, the Palas of Bengal, and the Rashtrakutas of the Deccan.

• The Gurjara-Pratiharas ultimately managed to establish long-term control over Kannauj. During the reign of Nagabhata II (around 816 AD), the dynasty successfully conquered Kannauj and made it their capital city. Hence, the Gurjara-Pratiharas are the correct answer as they ruled over Kannauj as their primary seat of power during this era.

• The conflict initially began when the Pratihara king Vatsaraja defeated the Pala ruler Dharmapala and the Rashtrakuta king Dhruva Dharavarsha intervened, defeating both.

Additional Information

• Significance of Kannauj:

• Located in the Ganga valley in present-day Uttar Pradesh, Kannauj was strategically important for trade and agriculture.

• Possession of Kannauj signified lordship over the Indo-Gangetic plains, leading to its nickname as the "Mahodaya Nagar".

• The Palas:

• Founded by Gopala in 750 AD, this dynasty ruled over Bengal and Bihar.

• Dharmapala and Devapala were the most powerful rulers who briefly installed their nominees on the throne of Kannauj during the struggle.

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• The Rashtrakutas:

• Founded by Dantidurga in 753 AD with their capital at Manyakheta in the Deccan region (modern-day Karnataka).

• Rulers like Dhruva, Govinda III, and Indra III frequently invaded North India and defeated the Pratiharas and Palas, but they often returned south, allowing the Pratiharas to regain control.

• The Chalukyas and Cholas:

• The Chalukyas of Badami had declined by the mid-8th century, and the Chalukyas of Kalyani rose later; they were not primary participants in the Tripartite Struggle.

• The Cholas were a powerful maritime empire in South India that reached its peak under Rajaraja I and Rajendra I in the 11th century, well after the core period of the Tripartite Struggle.

Important Points

• Consequences of the Struggle:

• The constant warfare for over two centuries exhausted the resources of all three dynasties, leading to their eventual fragmentation and decline.

• The weakness of these empires paved the way for the rise of small Rajput principalities and later facilitated the Ghaznavid and Ghurid invasions of India.

• Mihira Bhoja:

• The Gurjara-Pratihara ruler Mihira Bhoja (836–885 AD) was one of the most formidable monarchs of this period. He consolidated Kannauj and successfully defended his territory against both the Palas and the Rashtrakutas.

• The Arab traveler Al-Masudi referred to the Gurjara-Pratihara kingdom as Al-Juzr and praised their powerful cavalry.

**Q2. Answer: (c) Father's mother**

Family Chart:

Given:

A is the wife of B,

B is the father of C,

D is the brother of C,

E is the son of D.

Here, A is related to E as Father’s mother

Hence, the correct answer is Option 3.

**Q3. Answer: (c) Only conclusion (II) follows**

Given Statements:

Some ants are lizards.

All lizards are spiders.

No spider is a rat.

The least possible Venn diagram for the given statement is:

Conclusions:

I. Some rats are lizards - False (Because no spider is a rat and all lizards are spiders, so lizards cannot be rats).

II. Some spiders are ants - True (Since some ants are lizards and all lizards are spiders, those ants are also spiders).

So, only conclusion II follows.

Hence, the correct answer is Option 3.

**Q4. Answer: (a) Only conclusion (I) follows**

Given Statements:

All oranges are apples.

No apple is a banana.

No banana is a kiwi.

The least possible Venn diagram for the given statement is:

Conclusions:

I. No orange is a banana - True (Since all oranges are apples and no apple is a banana, oranges cannot be bananas).

II. No apple is a kiwi - False (There is no direct relation given between apples and kiwi; both can overlap).

So, only conclusion I follows.

Hence, the correct answer is Option 1.

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**Q5. Answer: (c) 2**

Shortcut Trick

=> X = 13a, Y = 13b and HCF(a,b) = 1

=> XY = 6760 => 169ab = 6760 => ab = 40

=> Prime factor: 40 = $2^3 \times 5$

=> Coprime pairs => assign full powers: (1,40), (5,8)

=> With X > Y => (40,1), (8,5) => total 2 pairs

Therefore Answer = 2

Alternate Method

Given: XY = 6760, HCF = 13

Formula: X = 13a, Y = 13b, where HCF(a,b) = 1

=> XY = 169ab = 6760

=> ab = 6760 / 169 = 40

=> Factors of 40: (1,40), (2,20), (4,10), (5,8)

=> Coprime pairs:

=> (1,40), (5,8)

=> Since X > Y:

=> (a,b) = (40,1), (8,5)

=> Total possible pairs = 2

Therefore Final Answer = 2

Additional Information

HCF Form: X = HCF × a, Y = HCF × b

Product Rule: XY = $HCF^2 \times ab$

Coprime Condition: HCF(a,b) = 1

Counting Trick: Distribute prime powers fully to keep coprime

**Q6. Answer: (a) 239AA**

The correct answer is 239AA.

Key Points

• Article 239AA of the Indian Constitution was inserted by the Constitution (Sixty-ninth Amendment) Act, 1991. It conferred a special status on the Union Territory of Delhi, designating it as the National Capital Territory (NCT) of Delhi.

• As per this article, the Administrator of the National Capital Territory of Delhi, appointed under Article 239, shall be designated as the Lieutenant Governor.

• The article provided for the creation of a Legislative Assembly for the NCT of Delhi, the members of which are chosen by direct election from territorial constituencies in the Union Territory.

• The Legislative Assembly has the power to make laws for the whole or any part of the NCT of Delhi with respect to any of the matters enumerated in the State List or Concurrent List, except for three specific subjects: Public Order, Police, and Land.

• These provisions officially came into force on February 1, 1992, marking a significant shift in the administrative and political structure of the capital city of India.

Additional Information

• Article 239AB: This article deals with the failure of constitutional machinery in the NCT of Delhi. It allows the President, on receiving a report from the Lieutenant Governor, to suspend the operation of any provision of Article 239AA if the administration of the territory cannot be carried on in accordance with the law.

• Article 239: This is the general provision for the administration of Union Territories. It states that every Union Territory shall be administered by the President acting, to such extent as he thinks fit, through an administrator appointed by him with such designation as he may specify.

• Article 239A: This article was inserted by the Constitution (Fourteenth Amendment) Act, 1962, to create local Legislatures or Council of Ministers or both for certain Union Territories like Puducherry.

• Article 239B: Grants the Administrator of certain Union Territories the power to promulgate ordinances during the recess of the Legislature.

• The 69th Amendment Act was based on the recommendations of the S. Balakrishnan Committee, which was set up in 1987 to look into the demands for statehood for Delhi and suggested a compromise of a Legislative Assembly with limited powers.

Important Points

• Composition of the Assembly: The Legislative Assembly of Delhi consists of 70 members. The total number of seats is

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determined by Parliament by law.

• Council of Ministers: Article 239AA(4) provides for a Council of Ministers consisting of not more than 10% of the total number of members in the Legislative Assembly (which equals 7 ministers, including the Chief Minister), to aid and advise the Lieutenant Governor in the exercise of his functions.

• Difference of Opinion: In case of a difference of opinion between the Lieutenant Governor and his Ministers on any matter, the Lieutenant Governor shall refer it to the President for decision and act according to the decision given by the President.

• Government of NCT of Delhi (Amendment) Act, 2021: This recent amendment further clarified that the expression "Government" referred to in any law to be made by the Legislative Assembly shall mean the Lieutenant Governor, thereby increasing the discretionary powers of the LG.

• The NCT of Delhi is unique because, unlike other Union Territories (except Puducherry and Jammu and Kashmir), it has its own elected Government while remaining under the ultimate control of the Union Government through the Ministry of Home Affairs.

**Q7. Answer: (b) 63.21 min**

Shortcut Trick

=> Relative speed initially = 225 − 180 = 45 m/min

=> Time for 1st overtake = 900 / 45 = 20 min

=> Speeds reduce by 5% each time => relative speed also × 0.95

=> Times form GP: 20, 20/0.95, 20/(0.95)²

=> Total time = 20 + 21.05 + 22.16 = 63.21 min

Therefore Answer = 63.21

Alternate Method

Given: Track = 900 m

=> Speeds: A = 225, B = 180

Formula: Time = Distance / Relative Speed

=> 1st overtake:

=> Relative speed = 225 − 180 = 45

=> t1 = 900 / 45 = 20 min

=> After 1st overtake speeds reduce:

=> A = 225 × 0.95 = 213.75

=> B = 180 × 0.95 = 171

=> Relative speed = 42.75

=> t2 = 900 / 42.75 = 21.05 min

=> After 2nd overtake speeds reduce again:

=> A = 213.75 × 0.95 = 203.06

=> B = 171 × 0.95 = 162.45

=> Relative speed = 40.61

=> t3 = 900 / 40.61 = 22.16 min

=> Total time = 20 + 21.05 + 22.16 = 63.21 min

Therefore Final Answer = 63.21

Additional Information

Relative Speed: Difference of speeds for same direction

Circular Track: Overtake when relative distance = track length

Successive Reduction: New speed = old speed × factor

GP Insight: Time increases as speed decreases proportionally

**Q8. Answer: (a) Section 7**

The correct answer is Section 7.

Key Points

• Section 7 of the Citizenship Act, 1955, specifically addresses the "Incorporation of Territory." It stipulates that if any foreign territory becomes a part of India, the Central Government has the authority to specify which persons from that territory shall be recognized as citizens of India.

• Under this provision, the notification of citizenship is issued by the government through an order published in the Official Gazette. This ensures a legal transition for the inhabitants of the newly annexed or merged land.

• A primary historical example of the application of Section 7 occurred when Pondicherry (now Puducherry) became part of the

Indian Union. The Government issued the Citizenship (Pondicherry) Order, 1962, to grant Indian citizenship to the residents of that territory.

• The power granted under this section is absolute for the Central Government, allowing it to determine the date from which such persons shall become citizens based on their connection with the incorporated territory.

• This section is distinct from other modes of acquisition because it does not require individual applications or specific residency periods like naturalization or registration; it is a collective grant of citizenship based on sovereign territorial change.

Additional Information

• Section 5 (Citizenship by Registration): This section allows the Central Government to register any person (not being an illegal migrant) as a citizen of India if they belong to certain categories. For instance, a person of Indian origin who is ordinarily resident in India for 7 years before making an application can apply under this section.

• Section 6 (Citizenship by Naturalization): This pertains to foreigners who have resided in India for a specific duration. The applicant must have resided in India or been in Government Service for at least 12 months immediately preceding the date of application, and for 11 years out of the preceding 14 years.

• Section 9 (Termination of Citizenship): This section mandates the automatic termination of Indian citizenship if a citizen of India voluntarily acquires the citizenship of another country. India does not permit dual citizenship, except for the Overseas Citizen of India (OCI) scheme which provides limited rights.

• The Citizenship Act, 1955: This is the comprehensive Act passed by the Parliament to provide for the acquisition and determination of Indian citizenship. It has been amended several times, most notably in 1986, 1992, 2003, 2005, 2015, and 2019.

• Constitutional Framework: While Articles 5 to 11 of the Constitution of India deal with citizenship at the commencement of the Constitution (26 January 1950), Article 11 specifically empowers Parliament to make any provision regarding the acquisition and termination of citizenship.

Important Points

• Modes of Acquisition: The 1955 Act prescribes five ways to acquire citizenship: Birth (Section 3), Descent (Section 4), Registration (Section 5), Naturalization (Section 6), and Incorporation of Territory (Section 7).

• Loss of Citizenship: The Act mentions three ways an individual can lose their citizenship: Renunciation (voluntary giving up), Termination (by operation of law upon acquiring another nationality), and Deprivation (compulsory termination by the Central Government on grounds of fraud, disloyalty to the Constitution, or illegal conduct).

• Citizenship Amendment Act (CAA) 2019: This amendment sought to provide a faster path to citizenship for persecuted minorities (Hindus, Sikhs, Buddhists, Jains, Parsis, and Christians) from Afghanistan, Bangladesh, and Pakistan who entered India on or before 31 December 2014.

• Nodal Ministry: The Ministry of Home Affairs is the primary organisation responsible for matters related to citizenship and the implementation of the Citizenship Act in India.

**Q9. Answer: (b) Hydrated Iron (III) Oxide ($Fe_2O_3 \cdot xH_2O$)**

The correct answer is Hydrated Iron (III) Oxide ($Fe_2O_3 \cdot xH_2O$).

Key Points

• Rusting is a specific type of corrosion that occurs when iron or iron-based alloys are exposed to oxygen and moisture (water) for a prolonged period.

• The reddish-brown coating formed during this process is chemically known as Hydrated Iron (III) Oxide, represented by the chemical formula $Fe_2O_3 \cdot xH_2O$.

• The process of rusting is an oxidation reaction where iron metal loses electrons to oxygen in the presence of water. The overall chemical equation can be simplified as: $4Fe + 3O_2 + 6H_2O \rightarrow 4Fe(OH)_3$, which then dehydrates to form $Fe_2O_3 \cdot nH_2O$.

• Unlike the protective oxide layers formed on metals like aluminum, rust is porous and flaky. It does not stick firmly to the surface, allowing the oxidation process to continue deep into the metal until the object is completely eaten away.

• For rusting to occur, both air (oxygen) and moisture (water) are essential requirements. If either is absent, the reddish-brown coating will not form on the iron article.

Additional Information

• Methods of Prevention:

• Galvanization: This is the process of applying a protective zinc coating to iron or steel to prevent rusting. Zinc is more reactive than iron and acts as a sacrificial anode.

• Alloying: Mixing iron with other elements like chromium, nickel, and manganese produces stainless steel, which is highly resistant to corrosion.

• Painting and Greasing: Applying a layer of paint, oil, or grease creates a physical barrier that prevents oxygen and moisture from coming into contact with the metal surface.

• Other Iron Oxides:

• Iron (II) Oxide (FeO): Also known as ferrous oxide, it is a black-colored powder that is not the primary component of common rust.

• Iron (II, III) Oxide ($Fe_3O_4$): Naturally occurring as the mineral magnetite, it is often found as a black scale on iron heated to high temperatures.

• Factors Accelerating Rusting:

• Saltwater: The presence of electrolytes (salts) in water increases the speed of the electrochemical reaction involved in rusting, which is why ships and coastal structures corrode faster.

• Acidity: Lower pH levels (acidic environments) increase the rate of corrosion by providing more hydrogen ions for the reaction.

Important Points

• Rusting is considered a chemical change because it results in the formation of a new substance, Hydrated Iron (III) Oxide, which has different properties than the original iron.

• In the Periodic Table, iron (Fe) is a transition metal with the atomic number 26. It is one of the most widely used metals in construction, machinery, and infrastructure due to its strength.

• The economic impact of corrosion is significant; it is estimated that countries spend approximately 3% to 4% of their Gross Domestic Product (GDP) annually on replacing corroded parts and prevention measures.

• Hydrated Iron (III) Oxide is also used as a pigment in various industries, known as Pigment Brown 6 or Pigment Red 101, due to its distinct color and stability.

**Q10. Answer: (a) Son's wife's father**

Family Chart:

Decoding the Symbols:

| **Symbol** | @ | # | • | % |
|---|---|---|---|---|
| Meaning | Son | Sister | Wife | Father |

Given: E % R # D + N @ B

It means: E is the father of R, R is the sister of D, D is the wife of N, N is the son of B.

So, E is related to B as Son’s wife’s father.

Hence, the correct answer is Option 1.

**Q11. Answer: (c) 14.1**

Shortcut Trick

=> Use identity: $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

=> Numerator / denominator cancels => = (525 + 321)

=> = 846

=> Expression = $846 \times 1/(96 - 36) = 846/60$

=> = 14.1

Therefore Answer = 14.1

Alternate Method

Given: Expression with cubes and squares

Formula: $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

=> Let a = 525, b = 321

=> Numerator = $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

=> Denominator = $(a^2 - ab + b^2)$

=> Cancel common term:

=> = a + b = 525 + 321 = 846

=> Remaining expression:

=> $846 \times 1/(96 - 36)$

=> = 846/60 = 14.1

Therefore Final Answer = 14.1

Additional Information

Cube Identity: $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

Cancellation: Common terms simplify large expressions

Difference: 96 − 36 = 60

Speed Trick: Always check identities before expanding

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**Q12. Answer: (c) Longitudinal Waves**

The correct answer is Longitudinal Waves.

Key Points

• Longitudinal Waves: These are mechanical waves in which the displacement of the medium is in the same direction as, or the opposite direction to, the direction of propagation of the wave. In gases, waves propagate through compressions (high pressure) and rarefactions (low pressure). Because gases possess volume elasticity (or Bulk Modulus), they can support the transmission of these pressure variations. Hence, statement 3 is correct.

• Transverse Waves: In these waves, the particles of the medium move perpendicular to the direction of the wave's propagation. These waves require a medium with shear strength or rigidity to propagate. Since gases (and liquids) do not have shear modulus and cannot sustain a shearing force, transverse mechanical waves cannot propagate through the bulk of a gas. Hence, statement 1 is incorrect.

• Stationary Waves: Also known as standing waves, these are formed by the superposition of two waves of the same frequency and amplitude traveling in opposite directions. While they can be observed in gas-filled cavities (like organ pipes), they do not "propagate" energy from one location to another in the traditional sense, as the wave profile remains stationary in space. Hence, statement 2 is incorrect.

• Gravity Waves: These are waves generated in a fluid medium or at the interface between two media (like the atmosphere and ocean) when the force of gravity or buoyancy tries to restore equilibrium. While they exist in the atmosphere, they are distinct from the standard acoustic waves that propagate through the bulk of the gas via molecular collisions. Hence, statement 4 is incorrect.

Additional Information

• Properties of Sound in Gases: Sound is the most common example of a longitudinal wave. The speed of sound in a gas depends on the temperature, density, and molecular structure of the gas. At 20 degrees Celsius, the speed of sound in dry air is approximately 343 meters per second.

• Elasticity and Density: The speed of a longitudinal wave in a medium is determined by the formula $v = \sqrt{(B/\rho)}$, where B is the Bulk Modulus and ρ is the density. Gases have a lower Bulk Modulus compared to solids and liquids, which is why sound generally travels slower in gases than in water or steel.

• Newton's Formula and Laplace Correction: In 1687, Sir Isaac Newton assumed sound propagation in gases was an isothermal process. However, this led to inaccurate results. In 1816, Pierre-Simon Laplace corrected this by treating the process as adiabatic, as heat does not have enough time to flow between compressions and rarefactions.

• Electromagnetic Waves vs. Mechanical Waves: It is important to note that light (an electromagnetic wave) is transverse in nature and can travel through a vacuum or gases. However, the question pertains to mechanical waves that require the gas molecules as a medium for propagation.

Important Points

• Fluid Dynamics: Since both liquids and gases are classified as fluids, they share the characteristic of being unable to support transverse mechanical waves in their interior. Only longitudinal waves can travel through the interior of any fluid.

• Seismic Waves: In Geophysics, P-waves (Primary waves) are longitudinal and can travel through the Earth's liquid outer core, whereas S-waves (Secondary waves) are transverse and cannot, which provides evidence for the liquid nature of the core.

• Molecular Collisions: In a gas, the mean free path (the average distance a molecule travels before colliding) affects the propagation of high-frequency ultrasonic waves. If the wavelength becomes comparable to the mean free path, the wave can no longer propagate effectively.

**Q13. Answer: (c) Four**

Given: P, Q, R, S, T, U and V have exams from Monday to Sunday.

Only two people have exams before Q.

Only three people have exams after V.

Only three people have exams between S and Q.

P has the exam immediately before T but not on Monday.

R does not have the exam on Tuesday.

| Day | Person |
|---|---|
| Monday | R |
| Tuesday | U |
| Wednesday | Q |
| Thursday | V |
| Friday | P |
| Saturday | T |

| | |
|---|---|
| Sunday | S |

People between R and T → U, Q, V, P → 4

Hence, the correct answer is Option 3.

**Q14. Answer: (d) 51.5%**

The correct answer is 51.5%.

Key Points

• By November 2025, non-fossil fuels accounted for 51.5% of India's total installed electricity capacity.

• India achieved the milestone of 50% non-fossil installed capacity in June 2025, five years ahead of its 2030 NDC target.

• The total installed power capacity stood at 509.64 GW.

• Non-fossil fuel capacity reached 262.74 GW, including 253.96 GW from renewable energy (including large hydro) and 8.78 GW from nuclear power.

• Fossil fuel capacity accounted for 246.90 GW, making up 48.45% of the total capacity.

• Solar energy emerged as the largest contributor, with installed capacity reaching 132.85 GW.

• Wind energy capacity stood at 53.99 GW.

• Large hydropower capacity was approximately 50.35 GW.

• India added a record 44.51 GW of renewable energy capacity between January and November 2025.

Additional Information

• Sources of Non-Fossil Power:

• Solar Power: This is the largest contributor to the renewable energy basket, with an installed capacity exceeding 73 GW as of late 2023.

• Wind Power: India ranks fourth globally in wind power capacity, with installations totaling over 44 GW located primarily in states like Tamil Nadu, Gujarat, and Karnataka.

• Large Hydro: Since 2019, Large Hydropower projects (above 25 MW) have been officially classified as renewable energy, significantly boosting the percentage of non-fossil fuel in the total mix.

• Nuclear Power: India currently operates 23 nuclear reactors with a total capacity of 7.48 GW, and aims to increase this to 22.48 GW by 2031.

• Commitments and Policies:

• Nationally Determined Contributions (NDCs): Under the updated NDC, India is committed to reducing the emissions intensity of its GDP by 45% by 2030 from 2005 levels.

• Energy Conservation (Amendment) Act, 2022: This Act empowers the government to mandate the use of non-fossil sources for energy and establishes a Carbon Credit Trading market in India.

• Green Hydrogen Mission: Launched in 2023 with an outlay of Rs. 19,744 crore, this mission aims to make India a global hub for the production and export of Green Hydrogen, further reducing dependence on fossil fuels.

Important Points

• Total Capacity Context: As of the financial year 2023-24, Coal remains the single largest source of electricity generation, but its share in "installed capacity" is gradually declining as Renewable Energy (RE) additions outpace thermal additions.

• Global Ranking: India currently stands 4th globally in Renewable Energy installed capacity, 4th in Wind Power, and 5th in Solar Power capacity.

• Institutional Support: Organizations like the Solar Energy Corporation of India (SECI) and the Indian Renewable Energy Development Agency (IREDA) play a pivotal role in financing and implementing these large-scale transitions.

• Data Fact: In the year 2023, Renewable Energy sources (including large hydro) accounted for about 30% of the actual electricity generation, while the installed capacity percentage is higher (around 45.8%) because fossil fuel plants usually operate at a higher Plant Load Factor (PLF).

**Q15. Answer: (c) 32**

Shortcut Trick

=> Average of 1 to n = (first + last) / 2

=> = (1 + 63) / 2 = 64 / 2

=> = 32

Therefore Answer = 32

Alternate Method

Given: Natural numbers from 1 to 63

Formula: Average = Sum / Number of terms

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=> Sum = n(n+1)/2 = 63×64/2 = 2016

=> Number of terms = 63

=> Average = 2016 / 63 = 32

Therefore Final Answer = 32

Additional Information

AP Average: (first + last)/2

Sum Formula: n(n+1)/2

Natural Numbers: Start from 1

Symmetry Trick: Pairs give constant sum

**Q16. Answer: (d) ACA 105**

The logic followed here is:

So, 'ACA 105' will replace the question mark in the given series.

Hence, the correct answer is "Option 4".

**Q17. Answer: (a) (412, 292, 232)**

The logic followed here is:

Logic:

First − Second = 120

Second − Third = 60

Now, checking all options:

Option 1: (412, 292, 232)

=> 412 − 292 = 120

=> 292 − 232 = 60

Option 2: (394, 264, 204)

=> 394 − 264 = 130

=> 264 − 204 = 60

Option 3: (432, 332, 252)

=> 432 − 332 = 100

=> 332 − 252 = 80

Option 4: (449, 329, 249)

=> 449 − 329 = 120

=> 329 − 249 = 80

Only (412, 292, 232) satisfies both conditions.

Hence, the correct answer is Option 1.

**Q18. Answer: (d) 42nd Amendment, 1976**

The correct answer is 42nd Amendment, 1976.

Key Points

• The 42nd Amendment Act, passed in 1976, is one of the most significant amendments in the history of the Constitution of India.

• It amended the Preamble of the Constitution to include three new terms: Socialist, Secular, and Integrity. Prior to this, India was described as a "Sovereign Democratic Republic." After the amendment, it became a "Sovereign Socialist Secular Democratic Republic."

• The addition of the word Socialist was intended to reflect the state's commitment to social and economic justice, aiming to reduce inequalities in income and status.

• This amendment was enacted during the National Emergency (1975–1977) under the government led by Prime Minister Indira Gandhi.

• The 42nd Amendment is frequently referred to as the "Mini-Constitution" because of the massive number of changes it introduced to various parts of the Indian Constitution.

Additional Information

• 44th Amendment Act, 1978:

• Enacted by the Janata Party government led by Morarji Desai to nullify several controversial changes brought by the 42nd Amendment.

• It removed the Right to Property from the list of Fundamental Rights and made it a Legal Right under Article 300A.

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• It also ensured that the Right to Life and Liberty (Article 21) cannot be suspended even during an Emergency.

• 1st Amendment Act, 1951:

• This was the first ever change to the Constitution, moved by Jawaharlal Nehru.

• It introduced the Ninth Schedule to protect land reform laws from being challenged in courts on the grounds of violating Fundamental Rights.

• It also placed "reasonable restrictions" on the Freedom of Speech and Expression.

• 26th Amendment Act, 1971:

• This amendment was crucial in the history of post-independence India as it abolished the Privy Purses.

• It ended the recognition of the titles and special privileges previously enjoyed by the rulers of former Princely States.

• Preamble of India:

• The Preamble is based on the "Objectives Resolution" drafted and moved by Pandit Jawaharlal Nehru on 13 December 1946 and adopted by the Constituent Assembly.

• It serves as an introduction to the Constitution and outlines its basic philosophy and objectives.

Important Points

• Legal Status of the Preamble: In the landmark Kesavananda Bharati case of 1973, the Supreme Court ruled that the Preamble is a part of the Constitution and can be amended under Article 368, provided the Basic Structure of the Constitution remains intact.

• Frequency of Amendments: To date, the Preamble of the Indian Constitution has been amended only once, which was through the 42nd Amendment Act of 1976.

• Swaran Singh Committee: Most of the provisions of the 42nd Amendment were based on the recommendations of the Swaran Singh Committee, which was appointed by the government to suggest changes to the Constitution.

• Fundamental Duties: Apart from changing the Preamble, the 42nd Amendment also added Part IV-A containing Article 51A, which listed 10 Fundamental Duties for Indian citizens.

• Directive Principles: It gave precedence to Directive Principles of State Policy over Fundamental Rights in certain cases and added new directives like Equal Justice and Free Legal Aid (Article 39A).

**Q19. Answer: (a) 32**

Shortcut Trick

=> Midpoints: 15, 25, 35, 45, 55

=> Take A = 35 => deviations: -20, -10, 0, 10, 20

=> Mean = A => Σfd = 0

=> (-20×42) + (-10×26) + (0×45) + (10×46) + (20×X) = 0

=> -840 - 260 + 0 + 460 + 20X = 0

=> -640 + 20X = 0 => X = 32

Therefore Answer = 32

Alternate Method

Given: Mean = 35

Formula: Mean = Σ(fx) / Σf

=> Midpoints (x): 15, 25, 35, 45, 55

=> Σfx = 42×15 + 26×25 + 45×35 + 46×45 + X×55

=> = 630 + 650 + 1575 + 2070 + 55X = 4925 + 55X

=> Σf = 42 + 26 + 45 + 46 + X = 159 + X

=> Mean = (4925 + 55X) / (159 + X) = 35

=> 4925 + 55X = 35(159 + X)

=> 4925 + 55X = 5565 + 35X

=> 20X = 640

=> X = 32

Therefore Final Answer = 32

Additional Information

Mean Formula: Mean = Σ(fx) / Σf

Assumed Mean: If mean = A => Σfd = 0

Midpoint: x = (lower + upper)/2

Shortcut Insight: Use deviations when mean equals midpoint

**Q20. Answer: (d) 5 cm**

Shortcut Trick

=> Cube LSA = $4a^2 = 324 \Rightarrow a^2 = 81 \Rightarrow a = 9$ cm

=> Volume of cube = $9^3 = 729$

=> Container: $4bh = 864$, $h = 18 \Rightarrow b = 12$ cm

=> Base area = $12^2 = 144$

=> Rise = Volume ÷ Base area = $729 \div 144 \approx 5.06$

Therefore Answer = 5 cm

Alternate Method

Given:

Cube LSA = 324 $cm^2$

Container height = 18 cm

Container LSA = 864 $cm^2$

Formula:

Cube LSA = $4a^2$

Container LSA = 4 × side × height

Volume = $side^3$

Rise in water = Volume displaced ÷ Base area

Container Cube

Calculations:

=> Cube: $4a^2 = 324 \Rightarrow a^2 = 81 \Rightarrow a = 9$ cm

=> Volume of cube = $9^3 = 729$ $cm^3$

=> Container: 4 × side × 18 = 864

=> 72 × side = 864 => side = 12 cm

=> Base area = $12^2 = 144$ $cm^2$

=> Rise = 729 ÷ 144 ≈ 5.06 cm

Final Answer: 5 cm

Additional Information

1. Displacement Principle: Submerged object displaces equal volume of water
2. Cube LSA: $4a^2$ (excluding top and bottom)
3. Container LSA: 4 × base side × height
4. Height Rise: Volume ÷ Base area

**Q21. Answer: (c) Through mechanisms like the Finance Commission that allocate resources**

The correct answer is Through mechanisms like the Finance Commission that allocate resources.

Key Points

• Article 280 of the Constitution of India mandates the establishment of a Finance Commission every five years by the President to define the financial relations between the central government and the state governments.

• The primary function of the Finance Commission is to recommend the distribution of net proceeds of taxes between the Union and the States (vertical devolution) and the allocation between the states themselves (horizontal devolution). For the 15th Finance Commission, the vertical devolution was set at 41% for the states.

• Centre-State financial relations are governed by the Seventh Schedule of the Constitution, which divides taxing powers. While the Centre collects major taxes like Income Tax and Corporation Tax, the States have the power to levy taxes on land revenue, state excise, and sales tax on petroleum and liquor.

• Governance is impacted by these relations because states rely on Central transfers to fund social sector schemes. This fiscal federalism ensures that states with lower revenue-generating capacity receive higher Grants-in-aid to maintain administrative standards.

• Statement 1 is incorrect because financial resources are limited by the FRBM Act, 2003, and the overall fiscal deficit targets. Statement 2 is incorrect as states retain independent taxing powers under the State List. Statement 4 is incorrect because Article 202 mandates every state to present its own Annual Financial Statement or Budget. Hence, the third option is the only correct mechanism described.

Additional Information

• Goods and Services Tax (GST): Introduced on July 1, 2017, through the 101st Constitutional Amendment Act, it revolutionized financial relations by subsuming various central and state indirect taxes. The GST Council, chaired by the Union Finance Minister,

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serves as a joint forum for the Centre and States to decide on tax rates and exemptions.

• Grants-in-Aid: Under Article 275, the Parliament can provide financial assistance to specific states in need of help, particularly for the welfare of Scheduled Tribes or to improve administration in Scheduled Areas.

• NITI Aayog: Replacing the Planning Commission in January 2015, it acts as a premier policy think tank providing directional and policy inputs. It fosters Cooperative Federalism through structured support initiatives with the states on a continuous basis.

• Borrowing Powers: Under Article 293, the State Executive has the power to borrow money within the territory of India upon the security of the Consolidated Fund of the State, subject to limits set by the State Legislature and consent from the Centre if previous loans are outstanding.

Important Points

• 15th Finance Commission: Chaired by Shri N.K. Singh, it used 2011 Census data for the first time, moving away from 1971 data, which significantly influenced the resource allocation based on demographic performance and tax effort.

• Centrally Sponsored Schemes (CSS): These are schemes where the funding is shared between the Centre and States, usually in a 60:40 ratio for general states and 90:10 for North-Eastern and Himalayan States.

• Article 268 to 293: These articles in Part XII of the Constitution deal with the distribution of revenues between the Union and the States, ensuring a balance of fiscal powers.

• Fiscal Responsibility and Budget Management (FRBM) Act: This 2003 act sets targets for the government to reduce fiscal deficits. States are generally required to keep their fiscal deficit within 3% of their GSDP (Gross State Domestic Product).

**Q22. Answer: (d) 79.74%**

The correct answer is 79.74%.

Key Points

• The Jal Jeevan Mission (JJM) is a flagship program of the Government of India, launched by Prime Minister Narendra Modi on August 15, 2019.

• As of February 1, 2025, the percentage of rural households in India provided with tap water connections reached 79.74%.

• This milestone signifies that over 15.42 crore rural households now have access to clean tap water, out of a total target of approximately 19.34 crore households.

• At the inception of the mission in August 2019, only about 3.23 crore households (representing 16.64%) had a Functional Household Tap Connection (FHTC).

• The mission aims to ensure the supply of 55 litres of water per person per day to every rural household through FHTCs by the target timeline.

Additional Information

• Ministry and Department: The mission is being implemented by the Department of Drinking Water and Sanitation under the Ministry of Jal Shakti.

• Funding Mechanism: The central government and states share the financial burden. The fund-sharing ratio is 90:10 for Himalayan and North-Eastern States, 50:50 for other States, and 100% for Union Territories.

• Implementation Strategy: The program follows a community-driven approach, involving Gram Panchayats and Village Water and Sanitation Committees (VWSC) to plan, implement, manage, operate, and maintain their own in-village water supply systems.

• Har Ghar Jal Certification: Goa became the first "Har Ghar Jal" certified State in India, followed by Dadra and Nagar Haveli and Daman and Diu as the first certified Union Territory. Other states like Haryana, Gujarat, and Telangana have also achieved 100% coverage.

• Technological Integration: A JJM Dashboard was developed to provide real-time data and transparency regarding the progress of the mission across every village and district in the country.

Important Points

• Water Quality: The mission focuses on water quality monitoring and surveillance. It empowers local communities by training at least 5 women in every village to use Field Test Kits (FTKs) for testing water samples.

• Sustainability Components: Beyond just providing taps, the mission includes source sustainability measures such as recharge and reuse through greywater management, water conservation, and rainwater harvesting.

• Empowerment and Health: The mission significantly reduces the drudgery of women and girls who previously traveled long distances to fetch water, while also reducing the incidence of water-borne diseases like cholera, typhoid, and dysentery.

• Scope: In addition to households, the mission prioritizes providing tap water to Schools, Anganwadi centres, and Public Institutions to ensure the health and hygiene of children.

**Q23. Answer: (d) 3125**

Shortcut Trick

=> Let valid votes = V

=> Winner gets 58%, loser gets 42% => Difference = 16% of V

=> 16% of V = 336 => V = 336 × 100 ÷ 16 = 2100
=> Valid = 80% of polled => Polled = 2100 ÷ 0.8 = 2625
=> Polled = 84% of registered => Registered = 2625 ÷ 0.84 = 3125
Therefore Answer = 3125
Alternate Method
Given:
84% voters cast votes
20% votes invalid => 80% valid
Winner = 58%, Loser = 42%
Margin = 336 votes
Formula:
Margin = Difference % × Valid votes
Calculations:
=> Difference = (58 − 42)% = 16%
=> 16% of valid votes = 336
=> Valid votes = 336 × 100 ÷ 16 = 2100
=> Valid = 80% of polled
=> Polled votes = 2100 × 100 ÷ 80 = 2625
=> Polled = 84% of registered
=> Registered voters = 2625 × 100 ÷ 84 = 3125
Final Answer: 3125
Additional Information
1. Election Margin: Margin = (Winner% − Loser%) × Valid votes
2. Valid Votes: Valid = Total polled × (1 − invalid%)
3. Reverse Percentage: Total = Part × 100 ÷ %
4. Step Flow: Margin → Valid → Polled → Registered

**Q24. Answer: (d) 8 km to the east**

The logic followed here is:
Given:
Manan starts from Point A and drives 42 km South.
He turns left → 40 km East.
He turns left → 54 km North.
He turns left → 48 km West.
He takes a final left → 12 km South.
So, Manan must travel 8 km East to reach Point A.
Hence, the correct answer is Option 4.

**Q25. Answer: (c) = SRM % = QPK**

The logic followed here is:
For, VUP → %
So, % = QPK
Now, apply the same pattern to NMH → #
So, # = SRM
Hence, the correct answer is Option 3.

**Q26. Answer: (a) Windows Kernel**

The correct answer is Windows Kernel.
Key Points
• The Windows Kernel is the central core of the Windows Operating System, serving as the bridge between software applications and the physical hardware of the computer. It is responsible for critical low-level operations like memory management and process scheduling. Hence, statement 1 is correct.
• In terms of memory management, the kernel tracks every memory location, managing the transition between Physical RAM and

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Virtual Memory to ensure that each process has enough resources to execute without interfering with others.

• The process scheduling function of the kernel determines which thread or process receives CPU time and for how long. It uses complex algorithms to prioritize tasks, ensuring system stability and responsiveness for the user.

• The Windows Kernel operates in Kernel Mode (also known as Ring 0), which grants it unrestricted access to the system hardware and CPU instructions, protecting the system from crashes caused by faulty user-level applications.

• It also handles Interrupt Management, where it responds to signals from hardware devices like keyboards, mice, and hard drives, ensuring that the processor handles these events immediately and accurately.

Additional Information

• Architecture Type: The Windows OS utilizes a Hybrid Kernel architecture, which combines the speed of a Monolithic Kernel with the modularity of a Microkernel. This design started with Windows NT and continues through modern versions like Windows 10 and Windows 11.

• Hardware Abstraction Layer (HAL): A vital sub-component of the Windows executive, the HAL is a software layer that hides hardware differences from the rest of the kernel, allowing the OS to run on different motherboards and chipsets without major code changes.

• I/O Management: The kernel includes an I/O Manager that facilitates communication between applications and device drivers. It translates read/write requests into I/O Request Packets (IRPs) that the hardware can understand.

• Security Reference Monitor (SRM): This component within the kernel enforces access control and security policies on the local system, ensuring that users can only access files and objects they are authorized to use.

• Registry Management: While the Registry is a database, the kernel manages the Configuration Manager, which handles the reading and writing of system settings and configuration data during boot time and runtime.

Important Points

• Service Control Manager (SCM): The Service Control Manager is a user-mode process that manages the starting, stopping, and interaction of system services; it does not handle low-level memory or CPU scheduling directly. Hence, statement 2 is incorrect.

• Windows Explorer (File Explorer): Now officially called File Explorer, this is the graphical user interface (GUI) that allows users to navigate folders and manage files. It is a user-mode application, not a core kernel component. Hence, statement 3 is incorrect.

• Task Scheduler: The Task Scheduler is a service that allows users to automate scripts or programs to run at specific times or dates. While it schedules tasks, it does not perform low-level thread scheduling at the CPU level. Hence, statement 4 is incorrect.

• User Mode vs. Kernel Mode: In Windows, applications run in User Mode to prevent them from accessing critical memory areas. If an application crashes, it only affects itself, whereas a crash in Kernel Mode usually results in a Blue Screen of Death (BSOD).

• Object Manager: The Windows Kernel uses an Object Manager to manage system resources such as files, ports, and semaphores as standardized objects, providing a uniform way to track and secure these resources.

**Q27. Answer: (c) 20**

Shortcut Trick

=> a : b : c = 3 : 4 : 5 => take a = 3k, b = 4k, c = 5k

=> Put directly: 2(3k) − 3(4k) + 4(5k) = 56

=> 6k − 12k + 20k = 56 => 14k = 56 => k = 4

=> c = 5k = 20

Therefore Answer = 20

Alternate Method

Given:

a : b : c = 3 : 4 : 5

2a − 3b + 4c = 56

Formula:

If a : b : c = x : y : z => a = xk, b = yk, c = zk

Calculations:

=> Let a = 3k, b = 4k, c = 5k

=> Substitute:

=> 2(3k) − 3(4k) + 4(5k) = 56

=> 6k − 12k + 20k = 56

=> 14k = 56

=> k = 4

=> c = 5k = 20

Final Answer: 20

Additional Information

1. Ratio Concept: Multiply ratio by common factor k
2. Substitution: Replace variables to simplify equation
3. Linear Equation: Solve for k using basic algebra
4. Final Step: Substitute k back to get required value

**Q28. Answer: (c) -35**

Shortcut Trick
=> (−60 ÷ −6) = 10 and (−2 × 8) = −16
=> Expression becomes: −9 − 10 − 16
=> −9 − 10 = −19
=> −19 − 16 = −35
Therefore Answer = −35
Alternate Method
Given:
Expression = (−9) − (−60) ÷ (−6) + (−2) × 8
Formula:
BODMAS Rule → Division and Multiplication first
Calculations:
=> Step 1: (−60) ÷ (−6) = 10
=> Step 2: (−2) × 8 = −16
=> Expression becomes: −9 − 10 − 16
=> Step 3: −9 − 10 = −19
=> Step 4: −19 − 16 = −35
Final Answer: −35
Additional Information
1. Sign Rule: (− ÷ − = +), (− × + = −)
2. BODMAS: Division & Multiplication before addition/subtraction
3. Negative Addition: Adding negative means subtracting
4. Simplification: Convert stepwise into linear expression

**Q29. Answer: (d) 3,82,800**

Shortcut Trick
=> Successive increase: 10% and 20%
=> Net increase = 10 + 20 + (10×20)/100 = 32%
=> Final population = 2,90,000 × 1.32
=> = 3,82,800
Therefore Answer = 3,82,800
Alternate Method
Given:
Initial population = 2,90,000
First year increase = 10%
Second year increase = 20%
Formula:
Final Value = Initial × (1 + r1/100) × (1 + r2/100)
Calculations:
=> After 1st year = 2,90,000 × 1.10 = 3,19,000
=> After 2nd year = 3,19,000 × 1.20 = 3,82,800
Final Answer: 3,82,800
Additional Information
1. Successive Percentage: a + b + (ab/100)
2. Growth Formula: Final = Initial × (1 + r/100)
3. Compound Growth: Applied year after year

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4. Shortcut Tip: Use net % to avoid stepwise multiplication

**Q30. Answer: (c) = HKQ, % = RUA**

Given:

: NQW :: LOU : %

Option 1) # = HKQ, % = RUO

For # (HKQ) to NQW

For LOU to % (RUO)

Since the pattern (+6, +6, +6) does not match (+6, +6, -6), Option 1 is incorrect.

Option 2) # = KKQ, % = RUA

For # (KKQ) to NQW

For LOU to % (RUA)

Since the pattern (+3, +6, +6) does not match (+6, +6, +6), Option 2 is incorrect.

Option 3) # = HKQ, % = RUA

For # (HKQ) to NQW

For LOU to % (RUA)

Since the pattern for HKQ to NQW (+6, +6, +6) is the same as the pattern for LOU to RUA (+6, +6, +6), Option 3 is correct.

Option 4) # = HKQ, % = RUL

For # (HKQ) to NQW

For LOU to % (RUL)

Since the pattern (+6, +6, +6) does not match (+6, +6, -9), Option 4 is incorrect.

Hence, the correct answer is "Option 3".

**Q31. Answer: (d) 35°**

Shortcut Trick

=> Angle at B = 180 − 135 = 45°

=> AO || DE => corresponding angle = 80°

=> Interior angle at O (triangle) = 180 − 80 = 100°

=> In triangle BOC: x + 45 + 100 = 180

=> x = 35°

Therefore Answer = 35°

Alternate Method

Given: AO || DE, angle at B = 135°, angle at D = 80°

Concept: Linear pair + corresponding angles + triangle sum

=> Angle at B in triangle = 180 − 135 = 45°

=> Corresponding angle at O = 80°

=> Interior angle at O in triangle = 180 − 80 = 100°

=> In triangle BOC:

=> x + 45 + 100 = 180

=> x = 35°

Therefore Final Answer = 35°

Additional Information

Linear Pair: Adjacent angles sum = 180°

Corresponding Angles: Equal when lines are parallel

Interior Angle: Straight line gives supplement

Triangle Rule: Sum = 180°

**Q32. Answer: (d) 88^o**

Shortcut Trick

=> Given angle A = 92°

=> t1 || t2 => angle A = angle C = 92°

=> u || v => C and B are co-interior => B = 180 − 92 = 88°

=> B and D are vertical opposite => angle D = 88°

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Therefore Answer = 88°

Alternate Method

Given: u || v, t1 || t2, angle A = 92°

Concepts Used: Corresponding angles, co-interior angles, vertical opposite

=> Since t1 || t2:

=> angle A = angle C = 92°

=> Since u || v:

=> angle C + angle B = 180° (co-interior)

=> 92 + B = 180

=> angle B = 88°

=> Vertical opposite angles:

=> angle D = angle B = 88°

Therefore Final Answer = 88°

Additional Information

Corresponding Angles: Equal for parallel lines

Co-interior Angles: Sum = 180°

Vertical Angles: Opposite angles equal

Key Tip: Identify correct angle relation carefully

**Q33. Answer: (d) Nagaland**

The correct answer is Nagaland.

Key Points

• According to the Census 2011, Nagaland was the only state in India to record a negative decadal population growth rate. Between the years 2001 and 2011, its growth rate was approximately -0.58% (often rounded to -0.6%).

• This negative growth was a significant shift from the 1991-2001 census period, where Nagaland had reported an exceptionally high growth rate of 64.53%. Experts suggest this anomaly was likely due to the correction of previous over-estimations and inflated figures in the 2001 Census.

• The Census 2011 was the 15th National Census of the country since 1872 and the 7th after Independence. It was conducted under the guidance of C. Chandramouli, the then Registrar General and Census Commissioner of India.

• In contrast to Nagaland, the state of Meghalaya recorded the highest decadal growth rate among all states at 27.9%, followed by Arunachal Pradesh at 26%.

• While Nagaland showed a decline, the state of Kerala recorded the lowest positive decadal growth rate among the states at 4.9%.

Additional Information

• Population Growth in Other States (2001-2011):

• Gujarat: This western state recorded a decadal growth rate of 19.3%. Gujarat has consistently shown industrial and urban growth, contributing to its population dynamics.

• Kerala: Known for its high literacy and advanced social indicators, Kerala had a growth rate of 4.9%. This was the lowest among the states (excluding Nagaland) and significantly lower than the national average.

• Punjab: The state of Punjab recorded a decadal growth rate of 13.9%. It is one of the states where the growth rate remained lower than the overall Indian average.

• National Average: The overall decadal population growth rate of India during 2001-2011 was 17.7%, a decrease from 21.5% in the previous decade (1991-2001).

• Significant Census 2011 Facts:

• The slogan of the 2011 Census was "Our Census, Our Future".

• The total population of India as per the 2011 Census was 1.21 billion (approximately 121.08 crore), making it the second most populous country at that time.

• Uttar Pradesh was identified as the most populous state, while Sikkim was the least populous state in India.

• Thane district in Maharashtra was the most populated district in the country.

Important Points

• Decadal Growth Rate: It refers to the percentage of total population growth in a particular area (state/country) over a period of 10 years. It is a vital indicator used by the government for resource allocation and policy planning.

• Demographic Transition: The decline in growth rates in states like Kerala and the negative growth in Nagaland indicate different stages of demographic transition. Lower growth rates are typically associated with higher literacy rates, better healthcare, and

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increased urbanization.

• Gender Statistics: In the 2011 Census, the child sex ratio (0-6 years) saw a decline to 919, which remains a critical concern for policymakers. The overall sex ratio in India was 943 females per 1000 males.

• Literacy Rate: The national literacy rate was recorded at 73%. Kerala topped the list with a 94% literacy rate, while Bihar was at the bottom with 61.8%.

• Administrative Units: During the 2011 Census, there were 28 states and 7 Union Territories (before the reorganization of Jammu and Kashmir and the merger of Dadra and Nagar Haveli and Daman and Diu).

**Q34. Answer: (b) 4**

Given:

Seven boxes A, C, G, H, J, N and R are kept one over the other but not necessarily in the same order.

Only three boxes are kept below N.

Only two boxes are kept between N and J.

Only G is kept immediately above H.

C is kept at some place below R and at some place above A.

| Position | Box |
|---|---|
| 7 (Top) | G |
| 6 | H |
| 5 | R |
| 4 | N |
| 3 | C |
| 2 | A |
| 1 (Bottom) | J |

Boxes above C → N, R, H, G

i.e. There are 4 boxes kept above C

Hence, the correct answer is Option (2).

**Q35. Answer: (b) 2025 Treaty Event**

The correct answer is 2025 Treaty Event.

Key Points

• The 2025 Treaty Event is a high-level United Nations event held annually, typically during the opening of the General Debate of the General Assembly in September 2025 in New York. It serves as a dedicated platform for member states to demonstrate their commitment to the international legal framework.

• The primary objective of the event is to encourage the universal participation of member states in multilateral treaties deposited with the Secretary-General. These treaties span a wide range of global issues, including human rights, disarmament, environmental protection, penal law, and the law of the sea.

• The tradition of the Treaty Event was established in the year 2000 during the Millennium Summit to promote the rule of law at the international level. Since its inception, it has resulted in thousands of treaty actions, including signatures, ratifications, and accessions.

• For the 2025 cycle, the United Nations highlights specific multilateral treaties that address contemporary global challenges, such as the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ Agreement).

• The event provides a unique opportunity for Heads of State and Heads of Government to deposit their instruments of ratification in a high-profile setting, signaling their country's adherence to international law and global standards.

Additional Information

• UN Ocean Conference 2025: This conference is scheduled to be held in Nice, France, in June 2025. It is co-hosted by France and Costa Rica and focuses specifically on Sustainable Development Goal 14 (Life Below Water) to support the conservation and sustainable use of the oceans, seas, and marine resources.

• Paris Climate Summit (COP30): The 30th session of the Conference of the Parties (COP30) to the UNFCCC is expected to take place in Belém, Brazil, in November 2025. This event is critical for the Paris Agreement as it will involve the submission of new Nationally Determined Contributions (NDCs) by member states to tackle climate change.

• UN Biodiversity Summit: While COP16 of the Convention on Biological Diversity (CBD) occurs in 2024, the year 2025 remains

significant for implementing the Kunming-Montreal Global Biodiversity Framework, which aims to protect 30% of the planet's land and oceans by 2030.

• Treaty Section of the OLA: The Office of Legal Affairs (OLA) of the United Nations, specifically the Treaty Section, is responsible for the technical and legal processing of all treaty actions during the event. They maintain the United Nations Treaty Series, which contains over 250,000 treaties and related actions.

Important Points

• Role of the Secretary-General: The United Nations Secretary-General acts as the depositary for more than 600 multilateral treaties. In this role, the Secretary-General ensures that all legal formalities regarding the entry into force and implementation of these treaties are strictly followed.

• Legal Terminologies: It is important to distinguish between Signature (a preliminary endorsement of a treaty), Ratification (the formal process by which a state confirms its consent to be bound, usually involving domestic legislative approval), and Accession (the act by which a state joins a treaty that has already been negotiated and signed by other states).

• Law of the Sea: The United Nations Convention on the Law of the Sea (UNCLOS), often described as the "constitution for the oceans," remains a central pillar of the Treaty Event, especially with the recent focus on the BBNJ Agreement, which was adopted in June 2023 and opened for signature in September 2023.

**Q36. Answer: (c) They head important ministries like Home, Defence, and Finance.**

The correct answer is They head important ministries like Home, Defence, and Finance.

Key Points

• Cabinet Ministers are senior members of the Council of Ministers and hold independent charge of specific ministries or departments of the Government of India.

• They head the most crucial and strategically important portfolios such as Home, Defence, Finance, External Affairs, and Railways. Hence, the statement "They head important ministries like Home, Defence, and Finance" is correct.

• They are the core policy-making body of the central government, responsible for deliberating and deciding upon major national policies, legislations, and administrative matters. Therefore, the statement "They are not involved in policy decisions" is incorrect.

• Cabinet Ministers are the only category of ministers who have a legal right to attend Cabinet meetings, which are presided over by the Prime Minister. Consequently, the statement "They do not attend Cabinet meetings" is incorrect.

• The role of assisting senior ministers is typically performed by Ministers of State or Deputy Ministers, not by the Cabinet Ministers themselves. This makes the statement "They only assist other ministers in their duties" incorrect.

Additional Information

• Structure of the Council of Ministers: The Union Council of Ministers consists of three ranks: Cabinet Ministers, Ministers of State, and Deputy Ministers. The total number of ministers cannot exceed 15% of the total strength of the Lok Sabha, as per the 91st Amendment Act, 2003.

• Constitutional Status: Article 74 of the Constitution of India provides for a Council of Ministers with the Prime Minister at the head to aid and advise the President. Article 75 deals with the appointment, tenure, responsibility, and salaries of the ministers.

• Collective Responsibility: Under Article 75(3), the Council of Ministers is collectively responsible to the Lok Sabha. This means that if a no-confidence motion is passed against one minister, the entire council must resign.

• Definition of Cabinet: While the word 'Cabinet' was not originally detailed in the Constitution, it was inserted into Article 352 via the 44th Amendment Act, 1978. It defines the Cabinet as the council consisting of the Prime Minister and other ministers of Cabinet rank.

• Selection and Appointment: Ministers are appointed by the President on the advice of the Prime Minister. A person who is not a member of either House of Parliament can also be appointed as a minister, but they must become a member of either Lok Sabha or Rajya Sabha within 6 months.

Important Points

• Cabinet Committees: These are specialized units like the Appointments Committee of the Cabinet (ACC) and the Cabinet Committee on Economic Affairs (CCEA) that handle specific issues. They are usually chaired by the Prime Minister and consist mainly of Cabinet Ministers.

• Role of the Prime Minister: The Prime Minister is the "primus inter pares" (first among equals) and determines the size of the Cabinet and the portfolios allocated to each minister.

• Cabinet Secretariat: This office provides secretarial assistance to the Cabinet and its committees. It is headed by the Cabinet Secretary, who is the topmost civil servant in India and acts as the chairman of the Senior Selection Board.

• Advisory Function: The advice tendered by the Council of Ministers to the President is binding after the 42nd Amendment Act, 1976 (subject to the President's power to ask for reconsideration once under the 44th Amendment).

**Q37. Answer: (a) 1**

Shortcut Trick

=> 27 hr fill and 27 hr empty cancel each other

=> Only 4 hr tap works

=> 1/4 tank filled in 1 hr

Therefore Answer = 1

Alternate Method

Given: Times = 4 hr, 27 hr, 27 hr

LCM Method:

=> LCM of 4 and 27 = 108 (total work)

| Tap | Time (hrs) | Work per hour |
|---|---|---|
| A (fill) | 4 | 108 ÷ 4 = 27 |
| B (fill) | 27 | 108 ÷ 27 = 4 |
| C (empty) | 27 | −4 |

=> Net work per hour = 27 + 4 − 4 = 27

=> Work needed = 1/4 of 108 = 27

=> Time = 27 / 27 = 1 hr

Therefore Final Answer = 1

Additional Information

LCM Method: Convert total work into common units

Efficiency: Work per unit time

Net Work: Add filling, subtract emptying

Partial Work: Required fraction of total work

**Q38. Answer: (d) Both statements I and II together are not sufficient to answer the question.**

Given Statements:

I. D sits to the immediate left of F. C is the immediate neighbour of A and E.

II. B sits second to the left of F. C sits second to the right of F.

Analysis:

I. From Statement I → We know D–F relation and that C is between A and E, but full arrangement cannot be fixed → Not sufficient.

II. From Statement II → Positions of B, F and C are known, but A, D, E are unknown → Not sufficient.

Using both I and II together → Even after combining, we can form arrangement but cannot uniquely decide whether A or E sits to the immediate right of C → Not sufficient.

Hence, the correct answer is Option 4.

**Q39. Answer: (a) Output Device**

The correct answer is Output Device.

Key Points

• An Output Device is a piece of computer hardware equipment used to communicate the results of data processing carried out by an information processing system (such as a computer) to the outside world. Headphones fall strictly into this category as they receive electronic signals and convert them into audible sound waves. Hence, the statement that headphones are an output device is correct.

• The primary function of headphones is to provide a private audio experience for the user. They act as transducers, converting electrical energy from a device like a smartphone, laptop, or MP3 player into acoustic energy.

• Unlike speakers, which are also output devices designed for multiple listeners, headphones are localized output devices intended for a single user. They allow for the consumption of multimedia content without disturbing others in the vicinity.

• In the context of the Human-Computer Interaction (HCI), headphones represent the auditory output channel. They are essential for tasks involving sound monitoring, video editing, and gaming, where directional audio and clarity are required.

Additional Information

• History and Origin: The first modern headphones were developed in 1910 by Nathaniel Baldwin, who manufactured them in his kitchen and sold them to the United States Navy. They were initially used for radio communication before becoming a consumer electronic staple.

• Types of Headphones:

• Over-ear (Circumaural): These have large earcups that surround the entire ear, offering excellent sound isolation.

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• On-ear (Supra-aural): These sit directly on the outer ear and are generally lighter and more portable.

• In-ear (Earbuds/IEMs): These are inserted into the ear canal, making them the most compact option, often used with mobile devices.

• Input vs. Output Devices: While an Output Device (like headphones or a monitor) displays or emits processed data, an Input Device (like a keyboard or mouse) sends data and control signals to the computer for processing.

• Hybrid Devices: Some devices, known as headsets, combine both output (headphones) and input (a microphone). These are widely used in telecommunications, customer service, and online gaming.

• Storage and Calculation Devices: A Storage Device (like a Hard Disk Drive or SSD) is used for permanent data retention, while a Calculator Device (like a microprocessor or ALU) is responsible for performing arithmetic and logic operations. Headphones perform neither of these functions.

Important Points

• Connectivity: Headphones can connect to devices via wired connections (using a 3.5mm jack, USB-C, or Lightning port) or wireless technologies such as Bluetooth (versions 5.0 and above are currently standard).

• Technical Specifications: Key metrics for headphones include Impedance (measured in Ohms), Frequency Response (typically 20Hz to 20kHz), and Sensitivity (measured in dB/mW). These factors determine the audio quality and the power required to drive the device.

• Applications: Beyond entertainment, headphones are used in specialized fields such as Aviation for pilot communication, in Medical Science for audiometry tests, and in Military operations for sonar monitoring.

• Features: Modern output devices in this category often feature Active Noise Cancellation (ANC), which uses microphones to pick up external noise and create anti-noise to cancel it out, providing a clearer output.

**Q40. Answer: (c) 7000**

Shortcut Trick

=> Successive change => ×1.7 × 0.33

=> Net factor = 1.7 × 0.33 = 0.561

=> Final price = 0.561 × P's CP

=> 3927 = 0.561 × CP

=> CP = 3927 / 0.561 = 7000

Therefore Answer = 7000

Alternate Method

Given: Profit = 70%, Loss = 67%, Final price = 3927

LCM Method:

=> Assume P's CP = 100

=> P sells to Q at 70% profit => SP = 170

=> Q sells at 67% loss => retains 33%

=> SP to R = 170 × 33/100 = 56.1

=> So 56.1 corresponds to 3927

=> 1 corresponds to 3927 / 56.1

=> 100 corresponds to (3927 / 56.1) × 100 = 7000

Therefore Final Answer = 7000

Additional Information

Successive Change: Multiply factors

Profit: SP = CP × (1 + profit%)

Loss: SP = CP × (1 − loss%)

Shortcut: Combine percentage effects

**Q41. Answer: (b) 441.2 gm**

Shortcut Trick

=> Assume CP of 1 kg = 100

=> SP at 25% loss = 75

=> Let actual weight = x => CP = 100x

=> Gain 70% => 75 = 1.7 × 100x

=> x = 75 / 170 = 0.4412 kg = 441.2 g

Therefore Answer = 441.2 g

Alternate Method

Given:

Loss percent = 25%

Gain percent = 70%

Formula Used:

Selling price at loss = Cost price × (1 − loss%)

Gain% = (Actual gain ÷ Cost price) × 100

Calculation:

=> Let cost price of 1 kg = 100

=> Selling price at 25% loss = 100 × 0.75 = 75

=> Let actual weight given = x kg

=> Cost of x kg = 100x

=> Gain% = [(75 − 100x) ÷ (100x)] × 100

=> 70 = [(75 − 100x) ÷ (100x)] × 100

=> 0.7 = (75 − 100x) ÷ (100x)

=> 70x = 75 − 100x

=> 170x = 75

=> x = 75 ÷ 170

=> x ≈ 0.4412 kg

=> In grams = 441.2 g

Therefore Final Answer = 441.2 g

Additional Information

False Weight Concept: Profit arises by giving less quantity

Loss Trick: SP reduced but quantity reduced more

Profit Formula: Based on actual cost (100x)

Conversion: 1 kg = 1000 g

**Q42. Answer: (b) Ladakh**

The correct answer is Ladakh.

Key Points

• Ladakh is the only Union Territory of India that shares a land border with Afghanistan. This border is located in the Wakhan Corridor region. Hence, statement 2 is correct.

• The length of the border between India and Afghanistan is approximately 106 km, which is the shortest international border India shares with any neighbor. This border is technically known as the Durand Line.

• Rajasthan shares its international border exclusively with Pakistan to its west. It does not have any geographical contact with Afghanistan. Hence, statement 1 is incorrect.

• Prior to the Jammu and Kashmir Reorganization Act, 2019, the undivided state of Jammu and Kashmir shared this border. However, after the reorganization on October 31, 2019, the area bordering Afghanistan (Gilgit-Baltistan) falls under the Union Territory of Ladakh. Hence, statement 3 is incorrect.

• Punjab shares a 547 km long international border with Pakistan (the Radcliffe Line). It is separated from Afghanistan by the territory of Pakistan. Hence, statement 4 is incorrect.

Additional Information

• India's Land Borders: India shares a total land frontier of 15,106.7 km with seven countries. These include Bangladesh (4,096.7 km), China (3,488 km), Pakistan (3,323 km), Nepal (1,751 km), Myanmar (1,643 km), Bhutan (699 km), and Afghanistan (106 km).

• The Durand Line: This line was established in 1893 following an agreement between Sir Mortimer Durand of British India and Amir Abdur Rahman Khan of Afghanistan. It currently serves as the international border between Pakistan and Afghanistan, and a small portion serves as the border between India and Afghanistan.

• Union Territory of Ladakh: Created in 2019, it is the largest Union Territory of India in terms of area. It is a high-altitude cold desert bounded by the Karakoram range in the north and the Himalayas in the south. It shares borders with Pakistan (Line of Control) and China (Line of Actual Control).

• Strategic Significance: The Wakhan Corridor is a narrow strip of territory in northeastern Afghanistan that extends to China and separates Tajikistan from Pakistan and the Gilgit-Baltistan region.

Important Points

• Territorial Claims: Although the border with Afghanistan is currently in Pakistan Occupied Kashmir (POK), the Government of

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India maintains its sovereign claim over the entire region of Gilgit-Baltistan, which makes Afghanistan a direct neighbor of India in official Indian maps.

• Bordering States/UTs with Pakistan: The states of Gujarat, Rajasthan, and Punjab, along with the Union Territories of Jammu and Kashmir and Ladakh, share borders with Pakistan.

• Longest Border: Bangladesh shares the longest border with India, touching five states: West Bengal, Assam, Meghalaya, Tripura, and Mizoram.

• Establishment of UTs: The Jammu and Kashmir Reorganization Act was passed by the Parliament of India in August 2019, leading to the formation of two separate Union Territories on 31 October 2019.

**Q43. Answer: (d) DF-GJ**

The logic followed here is based on the alphabetical difference between corresponding letters in each pair:

Option 1: PR – SU

Option 2: MO – PR

Option 3: HJ – KM

Option 4: DF – GJ

Thus, DF – GJ does not follow the same pattern.

Hence, the odd one out is Option 4.

**Q44. Answer: (c) Rs. 10,000**

The correct answer is Rs. 10,000.

Key Points

• The Pradhan Mantri Jan-Dhan Yojana (PMJDY), launched by Prime Minister Narendra Modi on 28th August 2014, is a National Mission on Financial Inclusion aimed at ensuring access to financial services in an affordable manner.

• One of the primary features of the scheme is the overdraft facility. Initially, the limit was set at Rs. 5,000, but the Government of India doubled this limit to Rs. 10,000 in September 2018 to provide better credit access to the underprivileged. Hence, the statement regarding the limit of Rs. 10,000 is correct.

• The upper age limit for availing of the overdraft facility was also revised from 60 years to 65 years, ensuring that more senior citizens could benefit from this short-term credit function.

• To facilitate ease of use, there are no conditions attached for overdraft amounts up to Rs. 2,000. For amounts above this, up to the numerical value of Rs. 10,000, certain eligibility criteria based on account conduct apply.

• The PMJDY accounts are Zero Balance accounts, meaning there is no requirement to maintain a minimum balance, which is a crucial application for low-income earners across the country.

Additional Information

• Insurance Benefits: Every PMJDY account holder is provided with a RuPay Debit Card. For accounts opened after 28th August 2018, the Accidental Insurance Cover has been increased from Rs. 1 lakh to Rs. 2 lakh.

• Direct Benefit Transfer (DBT): The scheme serves as a platform for Direct Benefit Transfer, ensuring that subsidies from various government laws and guidelines reach the beneficiaries directly without any leakages.

• The Six Pillars: The PMJDY is based on six pillars: Universal access to banking services, basic savings accounts with overdraft, Financial Literacy Program, Credit Guarantee Fund, Insurance, and Pension schemes for the unorganized sector.

• Life Cover: A life insurance cover of Rs. 30,000 is available to eligible beneficiaries who opened their accounts for the first time between August 2014 and January 2015.

• Impact and Data: According to official reports, as of August 2024, the total number of Jan Dhan accounts has crossed the 53 crore mark, with a total deposit balance exceeding Rs. 2.3 lakh crore, signifying a massive shift in the financial landscape of India.

Important Points

• Eligibility: Any Indian citizen above the age of 10 years can open a PMJDY account. The overdraft facility is generally available after six months of satisfactory operation of the account.

• Micro-Pension: The scheme also links account holders to the Atal Pension Yojana (APY), providing social security through a pension system for the unorganized sector.

• Banking Correspondents: To increase reach in rural locations, the government utilizes Bank Mitras or Banking Correspondents who provide banking services at the doorstep of villagers.

• Digital Transactions: The RuPay card promotes digital payments, aligning with the Digital India initiative and reducing the country's dependency on cash.

**Q45. Answer: (b) Two**

Given: Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order.

Only two boxes are kept below A.

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Only two boxes are kept between E and A.

F is kept immediately above B.

D is kept above G but below A.

| Position | Box |
|---|---|
| 7 (Top) | C |
| 6 | E |
| 5 | F |
| 4 | B |
| 3 | A |
| 2 | D |
| 1 (Bottom) | G |

Boxes below C but above B → E, F → 2

Hence, the correct answer is Option 2.

**Q46. Answer: (a) Uniformly accelerated motion**

The correct answer is Uniformly accelerated motion.

Key Points

• Uniformly accelerated motion occurs when an object's velocity changes by an equal amount in every equal time interval. In the case of free fall, an object is under the sole influence of gravity, which provides a constant acceleration. Hence, statement 1 is correct.

• Uniform motion refers to a type of motion where an object covers equal distances in equal intervals of time, implying a constant velocity and zero acceleration. Since a falling object speeds up due to gravity, its velocity is not constant. Hence, statement 2 is incorrect.

• Non-uniform motion is a broad category where the velocity of an object changes over time. While free fall involves changing velocity, it is more specifically classified as uniformly accelerated motion because the rate of change (acceleration) remains constant throughout the descent. Hence, statement 3 is incorrect.

• Periodic motion is a motion that repeats itself at regular intervals of time, such as a pendulum or the Earth's orbit around the Sun. Free fall is a unidirectional movement toward the center of a celestial body and does not repeat in cycles naturally. Hence, statement 4 is incorrect.

• The acceleration due to gravity on Earth is approximately 9.8 $m/s^2$. This means that for every second an object is in free fall, its downward velocity increases by exactly 9.8 meters per second, assuming air resistance is negligible.

Additional Information

• Concept of Free Fall:

• In Physics, free fall is defined as the motion of a body where gravity is the only force acting upon it. In a strict Newtonian sense, this only occurs in a vacuum where no air resistance or fluid friction exists to oppose the motion.

• Historical experiments by Galileo Galilei in the late 16th century demonstrated that all objects, regardless of their mass, fall with the same acceleration in the absence of air resistance. This challenged the Aristotelian view that heavier objects fall faster.

• Mathematical Equations:

• The motion of a free-falling object can be described by the three equations of motion. If an object starts from rest (initial velocity $u = 0$), the final velocity ($v$) after time ($t$) is given by $v = gt$.

• The distance ($h$) covered during free fall is calculated using the formula $h = \frac{1}{2}gt^2$. These numerical values help in engineering and ballistics to predict the impact and timing of falling bodies.

• Factors Influencing Motion:

• On Earth, the value of g varies slightly depending on location; it is higher at the poles (approx 9.83 $m/s^2$) and lower at the equator (approx 9.78 $m/s^2$) due to the Earth's rotation and oblate spheroid shape.

• In real-world applications, air resistance eventually balances the force of gravity, leading to terminal velocity, at which point the acceleration becomes zero and the motion becomes uniform.

Important Points

• Weightlessness: An object in free fall experiences a state of apparent weightlessness. This is the principle behind astronauts training in neutral buoyancy tanks or microgravity aircraft (often called the "Vomit Comet").

• Universal Gravitation: Sir Isaac Newton's Law of Universal Gravitation, published in 1687, explains that the force of gravity depends on the mass of the two objects and the distance between their centers. This law governs the free fall of planets in orbit

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just as it governs a falling apple.

• Vacuum Experiments: Modern NASA facilities, like the Space Power Facility in Ohio, have performed free fall tests using a feather and a bowling ball in a vacuum chamber, proving they fall at the exact same rate when air is removed.

**Q47. Answer: (c) 670**

Shortcut Trick

=> Let Vijay = V, Ajay = A

=> V(1.1)^(17) = A(1.1)^(18)

=> V = A × 1.1

=> Ratio V : A = 11 : 10

=> Total = 21 parts = 1407 => 1 part = 67

=> Ajay = 10 × 67 = 670

Therefore Answer = 670

Alternate Method

Given:

Total money = 1407

Rate = 10% p.a.

Vijay time = 17 years

Ajay time = 18 years

Formula:

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

Calculations:

=> Vijay's amount = V(1.1)^(17)

=> Ajay's amount = A(1.1)^(18)

=> Given equal:

=> V(1.1)^(17) = A(1.1)^(18)

=> V = A(1.1)

=> Ratio V : A = 1.1 : 1 = 11 : 10

=> Total ratio = 21 parts

=> 1 part = 1407 ÷ 21 = 67

=> Ajay's share = 10 × 67 = 670

Final Answer: 670

Additional Information

1. Compound Interest: $A = P(1 + r/100)^n$

2. Equal Amount Trick: Compare powers to form ratio

3. Ratio Conversion: Decimal ratio → integer ratio

4. Distribution Rule: Total ÷ sum of ratio parts

**Q48. Answer: (d) To promote equal pay for equal work for both men and women**

The correct answer is To promote equal pay for equal work for both men and women.

Key Points

• Article 39 of the Constitution of India contains certain principles of policy to be followed by the State. It is a part of the Directive Principles of State Policy (DPSP), which are mentioned in Part IV.

• Specifically, Article 39(d) mandates that the State shall direct its policy towards securing that there is equal pay for equal work for both men and women. Hence, the statement in the correct option is mentioned in Article 39.

• Other provisions under Article 39 include:

• Article 39(a): Citizens, men and women equally, have the right to an adequate means of livelihood.

• Article 39(b): Ownership and control of the material resources of the community are distributed to subserve the common good.

• Article 39(c): The operation of the economic system does not result in the concentration of wealth and means of production to the common detriment.

• Article 39(e): The health and strength of workers and the tender age of children are not abused.

• Article 39(f): Children are given opportunities and facilities to develop in a healthy manner. This clause was modified by the 42nd Amendment Act of 1976.

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• These principles are fundamental in the governance of the country, and it shall be the duty of the State to apply these principles in making laws.

Additional Information

• Directive Principles of State Policy (DPSP):

• The DPSP are enumerated in Articles 36 to 51 of the Indian Constitution.

• The concept was borrowed from the Irish Constitution of 1937, which had copied it from the Spanish Constitution.

• They are non-justiciable in nature, meaning they are not legally enforceable by the courts for their violation.

• Article 39A (Equal Justice and Free Legal Aid):

• The objective "To ensure equal justice and provide free legal aid" is mentioned in Article 39A, not Article 39. Hence, this statement is incorrect in the context of Article 39.

• This article was added by the 42nd Constitutional Amendment Act in 1976 to promote justice on the basis of equal opportunity.

• Article 40 (Organisation of Village Panchayats):

• The objective "To organise village panchayats" is mentioned in Article 40. Hence, this statement is incorrect in the context of Article 39.

• It directs the State to endow them with such powers and authority as may be necessary to enable them to function as units of self-government.

• Article 48 (Organisation of Agriculture and Animal Husbandry):

• The objective "To organise agriculture and animal husbandry" is mentioned in Article 48. Hence, this statement is incorrect in the context of Article 39.

• It directs the State to organize these sectors on modern and scientific lines and take steps for preserving and improving the breeds of cattle.

Important Points

• The Supreme Court of India has often relied on Article 39(d) to interpret labor laws and ensure that gender discrimination in wages is eliminated.

• The Equal Remuneration Act, 1976 was enacted by the Parliament to give effect to the constitutional provision of equal pay for equal work.

• The DPSP are classified into three broad categories: Socialistic Principles, Gandhian Principles, and Liberal-Intellectual Principles. Article 39 falls under the Socialistic Principles.

• The Minerva Mills Case (1980) emphasized that the Constitution is founded on the bedrock of the balance between Fundamental Rights and Directive Principles.

**Q49. Answer: (a) 80,000**

The correct answer is 80,000.

Key Points

• According to the Mahāvagga, which is a significant part of the Vinaya Pitaka (one of the three baskets of early Buddhist literature), it is mentioned that the kingdom of Magadha comprised 80,000 villages (gāmas) during the reign of King Bimbisāra.

• King Bimbisāra is recorded to have summoned an assembly of the gāmanis (village headmen) from each of these 80,000 villages to address administrative matters and to encourage them to seek the guidance of the Buddha.

• This large numerical value of 80,000 highlights the vast extent, dense population, and organized administrative structure of the Magadha empire in the 6th century BCE.

• The mention of such a specific number in Buddhist texts serves to emphasize Bimbisāra's status as a powerful monarch and his deep connection with the Buddhist sangha. Hence, the option stating 80,000 is correct.

Additional Information

• King Bimbisāra: He ruled Magadha from approximately 544 BCE to 492 BCE and was the founder of the Haryanka Dynasty. He was a contemporary of Gautama Buddha and was known for his policy of expansion through conquest and matrimonial alliances.

• Matrimonial Alliances: To strengthen Magadha, Bimbisāra married princesses from powerful neighboring states, including Kosala Devi (sister of King Prasenajit of Kosala), Chellana (a Lichchhavi princess from Vaishali), and Khema (princess of Madra in Punjab).

• The Title 'Seniya': He was the first Indian king to maintain a standing army, which earned him the title of Seniya (one who has an army). This military strength was crucial for his annexation of the kingdom of Anga.

• Capital City: His capital was Girivraja, later known as Rajagriha (modern-day Rajgir in Bihar). The city was strategically fortified by five hills, making it a secure center for the growing Magadhan power.

• Religious Patronage: While Bimbisāra was a great devotee of the Buddha and donated the Veluvana bamboo grove to the Sangha, historical accounts also suggest he showed respect toward Jainism and other contemporary sects.

Important Points

• Rise of Magadha: The kingdom of Magadha became the most powerful Mahajanapada due to its geographical location near iron ore mines and fertile land in the Gangetic plains, which provided agricultural surplus and advanced weaponry.

• Administrative Setup: The Magadhan administration under Bimbisāra was highly efficient. He appointed various officials known as Mahamattas to oversee different functions like executive, judicial, and military affairs.

• Succession: Bimbisāra was eventually succeeded by his son, Ajatashatru, who according to Buddhist and Jain traditions, imprisoned his father to seize the throne. Ajatashatru continued the expansionist policies of his father, further consolidating Magadha's dominance.

• Early Buddhist Texts: The Vinaya Pitaka, from which this data is derived, primarily deals with the rules of conduct for monks but provides invaluable historical data regarding the socio-political conditions of ancient India.

**Q50. Answer: (d) 244**

The logic followed here is:

thus, "244" will replace the question mark in the given series.

Hence, the correct option is "Option 4".

**Q51. Answer: (a) BD-EH**

The logic followed here is based on the alphabetical difference between corresponding letters in each pair:

Option 1: BD – EH

Option 2: LN – OQ

Option 3: JL – MO

Option 4: NP – QS

Thus, BD – EH does not follow the same pattern.

Hence, the odd one out is Option 1.

**Q52. Answer: (a) 36**

The logic followed here is:

thus, "36" will replace the question mark in the given series.

Hence, the correct option is "Option 1".

**Q53. Answer: (d) Andaman & Nicobar Islands**

The correct answer is Andaman & Nicobar Islands.

Key Points

• Barren Island is located in the Andaman Sea and is politically part of the Andaman and Nicobar Islands, a Union Territory of India.

• It is famously known as the only active volcano along a chain of volcanoes from Sumatra to Myanmar and is the only active one in the Indian subcontinent and South Asia.

• The island is situated approximately 138 kilometers (86 miles) northeast of the territory's capital, Port Blair.

• As mentioned in the question context, the volcano witnessed two eruptions in the year 2025, continuing its history of frequent activity since the 1991 eruption, which ended a 150-year period of dormancy.

• The island is currently uninhabited by humans, though it supports a small population of feral goats, birds, and crabs that have adapted to the harsh volcanic environment.

Additional Information

• Andaman & Nicobar Islands: This Union Territory consists of 572 islands, of which only about 38 are inhabited. It is divided into three districts: North and Middle Andaman, South Andaman, and Nicobar.

• Geological Setting: The Barren Island volcano is part of the Neogene-Quaternary volcanic arc. It lies near the boundary of the Indian Plate and the Burmese Microplate, a subduction zone that creates significant seismic and volcanic activity.

• Narcondam Island: Another volcanic island in the Andaman Sea, located about 150 km north of Barren Island. Unlike Barren Island, Narcondam is classified as a dormant volcano and is a UNESCO World Heritage site due to its unique biodiversity, including the Narcondam Hornbill.

• Lakshadweep: For contrast, this Union Territory on the western coast of India consists of coral atolls rather than volcanic islands. It is the smallest Union Territory of India by area.

• Other Options: Puducherry and Dadra & Nagar Haveli and Daman & Diu are coastal or land-locked territories on the mainland and do not contain any volcanic formations.

Important Points

• Eruption History: The first recorded eruption of Barren Island occurred in 1787. After several eruptions in the 18th and 19th centuries, it remained quiet until 1991. Major recent activities were also recorded in 2005, 2017, and notably in 2025.

• Topography: The volcano reaches an elevation of 354 meters above sea level, but it is actually the summit of a much larger submarine volcano rising from the ocean floor at a depth of nearly 2,250 meters.

• Tourism and Accessibility: Landing on Barren Island is strictly prohibited for security and safety reasons. However, tourists can view the island from chartered boats or seaplanes operated from Port Blair under specific government guidelines.

• Scientific Monitoring: The Geological Survey of India (GSI) and the National Institute of Oceanography (NIO) closely monitor the island's activities to study plate tectonics and volcanology in the Bay of Bengal region.

**Q54. Answer: (c) 3**

Given:

ROAD → 9416

DORM → 3691

=> M corresponds to 3

Hence, the correct answer is Option 3.

**Q55. Answer: (c) 5**

Shortcut Trick

=> Total frequency = 120 => Median position = 120 ÷ 2 = 60th item

=> Cumulative check: till 4 = 45, till 5 = 65

=> 60th item lies in x = 5

Therefore Answer = 5

Alternate Method

Given:

| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| f | 8 | 10 | 11 | 16 | 20 | 25 | 15 | 9 | 6 |

Formula:

Median position = N ÷ 2

Calculations:

=> Total frequency N = 8 + 10 + 11 + 16 + 20 + 25 + 15 + 9 + 6 = 120

=> Median position = 120 ÷ 2 = 60

| x | f | cf |
|---|---|---|
| 1 | 8 | 8 |
| 2 | 10 | 18 |
| 3 | 11 | 29 |
| 4 | 16 | 45 |
| 5 | 20 | 65 |
| 6 | 25 | 90 |
| 7 | 15 | 105 |
| 8 | 9 | 114 |
| 9 | 6 | 120 |

=> 60th item lies where cf just exceeds 60 => at x = 5

Final Answer: 5

Additional Information

1. Median: Middle value of ordered data
2. Cumulative Frequency: Running total of frequencies
3. Odd vs Even: For even N, take N/2 position
4. Key Rule: First cf ≥ N/2 gives median value

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**Q56. Answer: (d) 1**

Given: (Left) T O @ $ J $ S € M L I * N G © Y & T P £ Y T (Right)

Now, Symbols which are immediately preceded by a letter and also immediately followed by a symbol.

So, Needed pattern is: Letter - Symbol - Symbol.

(Left) T O @ $ J $ S € M L I * N G © Y & T P £ Y T (Right)

So, Only one symbol satisfies the condition.

Hence, the correct answer is Option 4.

**Q57. Answer: (a) Law of Segregation**

The correct answer is Law of Segregation.

Key Points

• The Law of Segregation, also known as Mendel's First Law, states that during the production of gametes, the two copies of each hereditary factor (alleles) segregate so that offspring acquire one factor from each parent.

• This law explains that in a diploid organism, the two alleles for a specific trait separate during the process of meiosis (specifically Anaphase I), ensuring that each gamete (egg or sperm) carries only one allele for each gene.

• Gregor Mendel formulated this principle after performing monohybrid cross experiments with Pisum sativum (garden pea) plants in the mid-19th century, specifically around 1865.

• The law is based on the observation that recessive traits, which might be "hidden" in the F1 generation, reappear in the F2 generation in a specific 3:1 phenotypic ratio. Hence, the statement regarding the separation of alleles is explained by the Law of Segregation.

• This principle is fundamental to understanding how genetic diversity is maintained and how traits are passed from one generation to the next without blending.

Additional Information

• Law of Dominance:

• This law states that in a heterozygote, one allele will conceal the presence of another allele for the same characteristic. Rather than both alleles contributing to a phenotype, the dominant allele will be expressed exclusively.

• The recessive allele will remain "latent" but will be transmitted to offspring in the same manner as the dominant allele. The recessive trait will only be expressed by offspring that have two copies of this allele (homozygous recessive).

• Law of Independent Assortment:

• Known as Mendel's Second Law, it states that the alleles of two (or more) different genes get sorted into gametes independently of one another.

• In other words, the allele a gamete receives for one gene does not influence the allele received for another gene. This is typically observed in dihybrid crosses and applies to genes located on different chromosomes.

• This law results in a typical 9:3:3:1 phenotypic ratio in the F2 generation.

• Gregor Mendel:

• Known as the "Father of Genetics", he was an Austrian monk who conducted his famous experiments in the Brno monastery (now in the Czech Republic) between 1856 and 1863.

• He tracked 7 distinct characteristics of pea plants, including seed shape, seed color, flower color, and stem height.

Important Points

• Exceptions to Mendel's Laws:

• Incomplete Dominance: Where the phenotype of the offspring is a blend of the parents (e.g., pink flowers in Mirabilis jalapa from red and white parents).

• Codominance: Where both alleles are expressed equally in the phenotype, such as the ABO blood group system in humans.

• Linkage: Genes that are located very close to each other on the same chromosome tend to be inherited together, which violates the Law of Independent Assortment.

• Genotype vs. Phenotype:

• Genotype refers to the genetic makeup (e.g., Tt), while Phenotype refers to the physical appearance (e.g., Tall).

• A Punnett Square is a common tool used to predict the genotypes and phenotypes of offspring based on the Law of Segregation.

**Q58. Answer: (c) 1184**

Shortcut Trick

=> A:B = 2:3, B:C = 4:5, C:D = 6:7

=> Equalize B: LCM(3,4) = 12 => A:B = 8:12, B:C = 12:15

=> Equalize C: LCM(15,6) = 30 => B:C = 24:30, C:D = 30:35

=> Final ratio A:B:C:D = 16:24:30:35

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=> Total parts = 105 => 1 part = 7770 ÷ 105 = 74

=> A = 16 × 74 = 1184

Therefore Answer = 1184

Alternate Method

Given:

A : B = 2 : 3

B : C = 4 : 5

C : D = 6 : 7

Total = 7770

Formula:

Convert chained ratios into a common ratio

Calculations:

=> A : B = 2 : 3 => multiply by 4 => 8 : 12

=> B : C = 4 : 5 => multiply by 3 => 12 : 15

=> Now A : B : C = 8 : 12 : 15

=> C : D = 6 : 7 => match C = 15 => multiply by 2 => 12 : 14

=> Adjust all:

=> A : B : C = 16 : 24 : 30

=> C : D = 30 : 35

=> Final ratio A : B : C : D = 16 : 24 : 30 : 35

=> Total parts = 16 + 24 + 30 + 35 = 105

=> 1 part = 7770 ÷ 105 = 74

=> A's share = 16 × 74 = 1184

Final Answer: 1184

Additional Information

1. Chain Ratio: Match common terms stepwise

2. LCM Trick: Use LCM to equalize middle terms

3. Total Parts: Sum of final ratio

4. Share Formula: (Part ÷ Total parts) × Total amount

**Q59. Answer: (a) Constitutional reforms**

The correct answer is Constitutional reforms.

Key Points

• The Moderates (Early Nationalists) dominated the Indian National Congress from its inception in 1885 until 1905. Their primary method was Constitutional reforms, which involved working within the legal framework provided by the British Government to seek gradual changes. Hence, statement 1 is correct.

• The Swadeshi Movement was characteristically adopted by the Extremists (Radicals) following the Partition of Bengal in 1905. It involved the use of indigenous goods and was a shift toward more radical mass mobilization. Hence, statement 2 is incorrect.

• The Promotion of Vedic education was a feature of socio-religious reform movements, most notably the Arya Samaj founded by Dayanand Saraswati in 1875. While it influenced national pride, it was not the characteristic political method of the Moderates. Hence, statement 3 is incorrect.

• The Boycott of foreign goods and institutions became a major political tool during the Anti-Partition Agitation (1905-1908) and was championed by Extremist leaders like Lala Lajpat Rai and Bal Gangadhar Tilak. Hence, statement 4 is incorrect.

• Moderates believed in the British sense of justice and fair play. They utilized the policy of the Three Ps: Petition, Prayer, and Protest to convey their demands to the United Kingdom government.

Additional Information

• Prominent Moderate Leaders:

• Dadabhai Naoroji: Known as the Grand Old Man of India, he was a three-time president of the Indian National Congress and the first Indian to be elected to the British House of Commons in 1892.

• Gopal Krishna Gokhale: He founded the Servants of India Society in 1905 and was considered the political guru of Mahatma Gandhi.

• Womesh Chandra Bonnerjee: He served as the first president of the Indian National Congress during the Bombay session in 1885.

• Surendranath Banerjea: Often called the Indian Burke, he founded the Indian National Association in 1876.

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• Economic Critique of Colonialism:

• One of the greatest contributions of the Moderates was the Drain of Wealth theory, primarily formulated by Dadabhai Naoroji in his book "Poverty and Un-British Rule in India".

• They argued that India's poverty was not natural but was a result of the British policy of exporting Indian resources to England without any equivalent return.

• Political Demands:

• They demanded the Indianization of higher grades of administrative services through simultaneous Civil Services Examinations in India and England.

• They sought the expansion and reform of Legislative Councils, leading to the enactment of the Indian Councils Act of 1892.

Important Points

• The Safety Valve Theory: It was suggested by some historians that the Indian National Congress was formed by A.O. Hume in 1885 under Lord Dufferin to provide a "safety valve" for the release of Indian discontent to prevent another revolt like 1857.

• The Shift in 1905: The Moderates' failure to achieve significant concessions from the British and the reactionary policies of Lord Curzon led to the rise of the Extremist faction within the Congress, eventually leading to the Surat Split in 1907.

• Methods of Agitation: While the Moderates used memorandums and resolutions, they avoided mass strikes or passive resistance, fearing that the British would suppress the nascent movement with force.

• Administrative Reforms: They campaigned for the separation of the Judiciary from the Executive and the repeal of the Arms Act of 1878 and the Vernacular Press Act.

**Q60. Answer: (c) 5**

Given:

WAND → 1846

GNAW → 4165

=> G corresponds to 5

Hence, the correct answer is Option 3.

**Q61. Answer: (d) The Great Bath**

The correct answer is The Great Bath.

Key Points

• The Harappan cities were generally divided into two or more parts. The part to the West was smaller but higher, known as the Citadel, while the part to the East was larger but lower, called the Lower Town.

• The Great Bath is one of the most remarkable structures found within the Citadel area of Mohenjo-daro, a major city of the Indus Valley Civilization located in present-day Pakistan.

• It was a large rectangular tank in a courtyard surrounded by a corridor on all four sides. The tank was made watertight by using a layer of natural tar (bitumen) and lined with burnt bricks and plaster.

• There were two flights of steps, one on the North and the other on the South, leading into the tank. There were rooms on three sides, in one of which was a large well used to supply water to the bath.

• Scholars suggest that The Great Bath was used for special ritual bathing or religious ceremonies, reflecting the administrative and spiritual importance of the Citadel. Hence, the correct answer is Option 4.

Additional Information

• Absence of Huge Temples: Unlike the contemporary civilizations of Mesopotamia or Egypt, the Harappans did not build huge temples or monumental religious structures. Their religious life is inferred from seals, terracotta figurines (such as the Mother Goddess), and amulets.

• Grand Palaces: While the Citadel likely housed the ruling elite or priest-kings, there is no definitive archaeological evidence of grand palaces similar to those found in later historical periods. The structures in the Citadel were primarily functional and administrative.

• Dwelling Houses: Most of the dwelling houses were located in the Lower Town. These houses were built of baked bricks and usually had a central courtyard with rooms around it. Most houses had a separate bathing area and were connected to the sophisticated drainage system.

• Geographic Extent: The Harappan Civilization flourished during the Bronze Age, roughly between 2600 BCE and 1900 BCE. It spanned across parts of modern-day India (Gujarat, Rajasthan, Haryana, Punjab), Pakistan, and Afghanistan.

Important Points

• Mohenjo-daro: Meaning "Mound of the Dead," it was discovered by R.D. Banerji in 1922. Apart from The Great Bath, it is famous for the Granary (the largest building), the Bronze Dancing Girl statue, and numerous steatite seals.

• Harappa: The first site to be discovered (in 1921 by Daya Ram Sahni), which gave the civilization its name. Notable finds include six granaries in a row and working floors.

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• Urban Planning: The civilization is renowned for its grid system of street planning, where roads cut each other at right angles. The use of standardized burnt bricks (ratio 4:2:1) across all sites indicates a high level of centralized authority or cultural uniformity.

• Economic Features: The Harappans practiced advanced agriculture (wheat, barley, cotton) and engaged in overseas trade with Mesopotamia through the port city of Lothal in Gujarat, which featured a man-made brick dockyard.

**Q62. Answer: (d) 9**

Given numbers: 194, 582, 419, 149, 825

Here, Third digit of the highest number

Second digit of the lowest number

Original numbers: 194 582 419 149 825

| Number | Type |
|---|---|
| 194 | |
| 582 | |
| 419 | |
| 149 | Lowest |
| 825 | Highest |

Now,

| Number | Digit Position | Digit |
|---|---|---|
| 825 | Third digit | 5 |
| 149 | Second digit | 4 |

Resultant: 5 + 4 = 9

Hence, the correct answer is Option 4.

**Q63. Answer: (a) 4**

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

D sits to the immediate right of A.

Only three people sit between D and G when counted from the left of D.

Only three people sit between A and F when counted from the right of F.

E sits to the immediate right of B.

So, the people between D and E when counted from the right of D are F, C, G and B = 4 people

Hence, the correct answer is "Option 1".

**Q64. Answer: (b) Ooty is situated at a higher altitude, leading to lower temperatures**

The correct answer is Ooty is situated at a higher altitude, leading to lower temperatures.

Key Points

• The primary reason for the temperature difference between Ooty and Coimbatore is the Altitude (elevation above sea level). In the troposphere, temperature generally decreases with increasing height, a phenomenon known as the Normal Lapse Rate.

• Ooty, also known as Udhagamandalam, is situated at a high altitude of approximately 2,240 meters (7,350 feet) above sea level in the Nilgiri Hills.

• Coimbatore is located on the plains at an elevation of about 411 meters (1,348 feet). Because it is at a much lower elevation, it experiences higher temperatures than the hill station.

• The Normal Lapse Rate states that for every 1,000 meters of ascent, the temperature drops by about 6.5 degrees Celsius (or 1 degree Celsius for every 165 meters). This vertical temperature gradient explains why Ooty remains cool even during summer. Hence, the statement regarding higher altitude is correct.

Additional Information

• Location and Geography: Both cities are located in the state of Tamil Nadu, India. They are situated at nearly the same latitude (around 11° North), which means they receive a similar amount of solar radiation. However, the mountainous terrain of the Western Ghats creates distinct microclimates.

• The Nilgiri Biosphere Reserve: Ooty is the headquarters of the Nilgiris district. It is a part of the Nilgiri Biosphere Reserve, which was the first biosphere reserve in India established in 1986. The high elevation attracts heavy rainfall during the Southwest

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Monsoon and Northeast Monsoon.

• Coimbatore's Climate: Coimbatore is often called the Manchester of South India. It is located on the leeward side of the Western Ghats near the Palghat Gap. While the gap allows cool winds to pass through, the low altitude prevents it from having a temperate climate like Ooty.

• Factors Affecting Climate: The climate of a place is determined by Latitude, Altitude, Pressure and Wind system, Distance from the sea (continentality), Ocean currents, and Relief features. In this specific case, Relief (Altitude) is the dominant factor.

Important Points

• Cold Desert Winds: The statement regarding cold desert winds from the north is incorrect. India is protected from the frigid Siberian winds by the Himalayan mountain range. Moreover, South India is too far south to be influenced by northern desert winds.

• Solar Radiation: Since both locations are at the same latitude, the difference in solar radiation is negligible. Therefore, lower solar radiation is not the cause of Ooty's coolness.

• Distance from the Sea: Both Ooty and Coimbatore are inland cities. Ooty is actually further into the mountain ranges than the coastal plains, but its "coolness" is not a result of being "closer to the sea." In fact, proximity to the sea usually moderates temperature (smaller range), whereas high altitude significantly lowers the absolute temperature.

• Environmental Data: During May (peak summer), the average high temperature in Coimbatore can reach 35 degrees Celsius, while in Ooty, it typically stays around 20 to 25 degrees Celsius.

**Q65. Answer: (b) 42.5**

Shortcut Trick

=> Let discount = d% of 880 => = 8.8d

=> Same Rs. discount again => total reduction = 2 × 8.8d = 17.6d

=> Final price = 880 − 17.6d = 132

=> 17.6d = 748 => d = 748 ÷ 17.6 = 42.5

Therefore Answer = 42.5%

Alternate Method

Given:

Marked price = 880

Selling price = 132

Two discounts of same value (in Rs. )

Formula:

Discount amount = (d/100) × Marked Price

Calculations:

=> First discount = (d/100) × 880 = 8.8d

=> Second discount = same = 8.8d

=> Total discount = 17.6d

=> Selling price = 880 − 17.6d

=> 880 − 17.6d = 132

=> 17.6d = 880 − 132 = 748

=> d = 748 ÷ 17.6 = 42.5

Final Answer: 42.5%

Additional Information

1. Discount Formula: Discount = (d/100) × MP

2. Same Rs. Discount: Both discounts are equal in absolute value

3. Selling Price: SP = MP − total discount

4. Key Trick: Convert % into actual value for quick solving

**Q66. Answer: (c) -37**

Shortcut Trick

=> (−56 ÷ −14) = 4 and (−3 × 8) = −24

=> Expression becomes: −9 − 4 − 24

=> −9 − 4 = −13

=> −13 − 24 = −37

Therefore Answer = −37

Alternate Method
Given:
Expression = (−9) − (−56) ÷ (−14) + (−3) × 8
Formula:
BODMAS Rule → Division and Multiplication first
Calculations:
=> Step 1: (−56) ÷ (−14) = 4
=> Step 2: (−3) × 8 = −24
=> Expression becomes: −9 − 4 − 24
=> Step 3: −9 − 4 = −13
=> Step 4: −13 − 24 = −37
Final Answer: −37
Additional Information
1. Sign Rule: (− ÷ − = +), (− × + = −)
2. BODMAS: Division & Multiplication before addition/subtraction
3. Negative Handling: Subtracting positive reduces value further
4. Simplification Tip: Solve stepwise to avoid sign errors

**Q67. Answer: (c) 237/125**

Shortcut Trick
=> cot A = 3/4 => tan A = 4/3 => sin A = 4/5, cos A = 3/5
=> sin2A = 2 × (4/5) × (3/5) = 24/25
=> cos3A = 4cos³A − 3cosA = 4(3/5)³ − 3(3/5) = 108/125 − 9/5
=> = 108/125 − 225/125 = −117/125
=> sin2A − cos3A = 24/25 − (−117/125)
=> = 120/125 + 117/125 = 237/125
Therefore Answer = 237/125
Alternate Method
Given:
cot A = 3/4, A acute
Formula:
sin2A = 2sinA cosA
cos3A = 4cos³A − 3cosA
Calculations:
=> cot A = 3/4 => tan A = 4/3
=> Take triangle: opposite = 4, adjacent = 3, hypotenuse = 5
=> sin A = 4/5, cos A = 3/5
=> sin2A = 2 × (4/5) × (3/5) = 24/25
=> cos3A = 4(3/5)³ − 3(3/5)
=> = 4 × 27/125 − 9/5
=> = 108/125 − 225/125 = −117/125
=> sin2A − cos3A = 24/25 + 117/125
=> = 120/125 + 117/125 = 237/125
Final Answer: 237/125
Additional Information
1. Identity: sin2A = 2sinA cosA
2. Triple Angle: cos3A = 4cos³A − 3cosA
3. Triangle Trick: Use Pythagorean triplet (3,4,5)
4. Acute Angle: All trigonometric values positive

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**Q68. Answer: (d) YT 29**

The logic followed here is:

For, TN 13 → WR 16

For, KE 18 → NI 21

Now, apply the same to VP 26:

So, result = YT 29

Hence, the correct answer is Option 4.

**Q69. Answer: (b) 5 years of restoration + 40% canopy density**

The correct answer is 5 years of restoration + 40% canopy density.

Key Points

• The Ministry of Environment, Forest and Climate Change (MoEFCC) updated the methodology in 2024-2025 to streamline the Green Credit Program (GCP), focusing on the quality and survival of tree plantations.

• As per the revised guidelines, a plantation activity must demonstrate a minimum of 5 years of successful restoration and maintenance to be eligible for the issuance of credits. Hence, the first part of the statement is correct.

• In addition to the time duration, the plantation must achieve a Tree Canopy Density (TCD) of at least 40%. This ensures that the plantation has matured into a functional ecological unit rather than just being a collection of scattered saplings. Hence, the second part of the statement is correct.

• The calculation of credits is now more scientific, shifting from a simple count of trees to assessing biomass, biodiversity, and ecosystem services generated over the 5-year period.

• The Indian Council of Forestry Research and Education (ICFRE), based in Dehradun, serves as the administrator and is responsible for verifying these thresholds before any green credits are generated in the Green Credit Registry.

Additional Information

• Green Credit Program (GCP): Launched in October 2023 under the LiFE (Lifestyle for Environment) movement, this program is an innovative market-based mechanism designed to incentivize voluntary environmental actions. Unlike traditional carbon credits which focus solely on emissions, Green Credits cover multiple sectors like water conservation, waste management, and sustainable agriculture.

• LiFE Movement: This global initiative was introduced by the Prime Minister of India at COP26 in Glasgow in 2021, promoting mindful and deliberate utilization of resources instead of mindless and destructive consumption.

• Administrative Body: The ICFRE acts as the primary technical and administrative body. It develops the methodologies, manages the registration process, and oversees the third-party verification of ecological outcomes to maintain the integrity of the market.

• Implementation Sites: The program initially prioritized degraded forest lands and wastelands across various states in India, including Madhya Pradesh, Rajasthan, and Chhattisgarh, to maximize the impact of restoration efforts.

• Digital Infrastructure: A dedicated web portal and registry have been established to ensure transparency and prevent double-counting of environmental benefits, allowing for easy trading of credits between stakeholders.

Important Points

• Verification Mechanism: To claim credits, the project proponent must submit a report after the 5-year mark. The ICFRE uses remote sensing, drones, and ground-level inspections to verify that the 40% canopy density has been met.

• Trading Value: Once issued, Green Credits can be traded on a dedicated exchange. Entities such as private companies can purchase these credits to meet their Environmental, Social, and Governance (ESG) goals or Corporate Social Responsibility (CSR) mandates.

• Calculation Metrics: Under the 2025 methodology, the credits are not just awarded per tree; the density and age of the trees are crucial. High-density plantations (above 40%) that support indigenous species are valued higher than monoculture plantations.

• Global Context: India's Green Credit Rules, 2023 are considered a pioneering effort, as few countries have a national-level market that quantifies environmental gains beyond carbon sequestration.

**Q70. Answer: (c) 3**

Given: (Left) O N & # K € S * P # £ * G I & * @ I A * @ © (Right)

Now, Letters which are immediately preceded by a letter and also immediately followed by a symbol.

So, Needed pattern is: Letter - Letter - Symbol.

(Left) O N & # K € S * P # £ * G I & * @ I A * @ © (Right)

So, Only three letters satisfy the condition.

Hence, the correct answer is Option 3.

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**Q71. Answer: (b) 26.67**

Shortcut Trick

=> Amount = 5P => Interest = 4P

=> SI = (P × R × T) / 100

=> 4P = (P × R × 15) / 100

=> 4 = (R × 15) / 100

=> R = (4 × 100) ÷ 15 = 26.67%

Therefore Answer = 26.67%

Alternate Method

Given:

Time = 15 years

Amount = 5 × Principal

Formula:

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

Amount = P + SI

Calculations:

=> Amount = 5P => SI = 5P − P = 4P

=> SI = (P × R × 15) / 100

=> 4P = (P × R × 15) / 100

=> 4 = (R × 15) / 100

=> R = (4 × 100) ÷ 15 = 400 ÷ 15 = 26.67%

Final Answer: 26.67%

Additional Information

1. Simple Interest: SI = (P × R × T) / 100
2. Amount Relation: A = P + SI
3. Multiple Growth: If amount = nP => SI = (n−1)P
4. Shortcut: Directly equate interest without full expansion

**Q72. Answer: (d) 185 – 190 – 200 – 100**

Given sets:

157 – 162 – 172 – 86

157 + 5 = 162

162 + 10 = 172

172 ÷ 2 = 86

93 – 98 – 108 – 54

93 + 5 = 98

98 + 10 = 108

108 ÷ 2 = 54

Logic:

First number + 5 gives second number

Second number + 10 gives third number

Third number ÷ 2 gives fourth number

Now, check options:

Option 1:98 – 103 – 113 – 133

98 + 5 = 103

103 + 10 = 113

113 ÷ 2 = 56.5

Option 2:112 – 116 – 126 – 63

112 + 5 = 117

Option 3:65 – 70 – 80 – 160

65 + 5 = 70

70 + 10 = 80

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80 ÷ 2 = 40

Option 4:185 – 190 – 200 – 100

185 + 5 = 190

190 + 10 = 200

200 ÷ 2 = 100

Hence, the correct answer is Option 4.

**Q73. Answer: (a) 221/5 days**

Shortcut Trick

=> A = 1/20, B = 1/25

=> 2-day work = 1/20 + 1/25 = 9/100

=> 20 days (10 cycles) => work = 90/100

=> Remaining = 10/100

=> Day 21 (A) → 5/100 done => left 5/100

=> Day 22 (B) → 4/100 done => left 1/100

=> Day 23 (A) → completes 1/100 in 1/5 day

Therefore Answer = 221/5 days

Alternate Method

Given:

A = 20 days => 1 day work = 5 units

B = 25 days => 1 day work = 4 units

LCM Method:

=> Total work = 100 units

| Cycle (2 days) | Work done | Total |
|---|---|---|
| 1 | 9 | 9 |
| ... | ... | ... |
| 10 | 9 | 90 |

Calculations:

=> After 20 days => 90 units completed

=> Remaining = 10 units

=> Day 21 (A) => +5 => remaining 5

=> Day 22 (B) => +4 => remaining 1

=> Day 23 (A) => completes 1 unit in 1/5 day

Final Answer: 221/5 days

Additional Information

1. LCM Method: Convert work into units (100 here)

2. Cycle Approach: Solve in repeating 2-day pattern

3. Remaining Work: Handle partial day carefully

4. Key Trick: Last day often fractional in alternate work problems

**Q74. Answer: (a) School Management Software**

The correct answer is School Management Software.

Key Points

• Customized Software, also known as Bespoke Software or tailor-made software, is a type of application specifically developed for a particular organization or user to meet their unique business requirements. School Management Software is a prime example of this because it is designed to handle specific administrative tasks like student admissions, fee management, attendance tracking, and examination scheduling tailored to the needs of a specific educational institution. Hence, this option is correct.

• LibreOffice Calc is a general-purpose application software used for spreadsheet management. It is part of the LibreOffice suite, which is open-source and intended for use by a wide variety of users worldwide for diverse data calculation tasks. It is not built for one specific client. Hence, this statement is incorrect.

• Mozilla Firefox is a widely used web browser developed by the Mozilla Foundation. It serves as a general-purpose tool for accessing the World Wide Web. Since it is designed for the mass market and provides standardized features for all users globally,

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it does not fall under customized software. Hence, this statement is incorrect.

• Adobe Photoshop is a professional graphics editing software developed by Adobe Inc. It is a proprietary, off-the-shelf software used by photographers and designers for image manipulation and digital art. While highly advanced, it is sold as a standard product to millions of users rather than being customized for a single organization. Hence, this statement is incorrect.

• Unlike Generic Software, customized software offers the flexibility to integrate with existing legacy systems and can be scaled according to the growing data needs of the specific enterprise.

Additional Information

• Classification of Application Software: Application software is generally divided into two categories: General Purpose Software (packaged software) and Customized Software (tailor-made). General Purpose tools include Word Processors (like MS Word) and Database Management Systems (like MySQL), which are designed for common tasks.

• Characteristics of Customized Software: These programs are often higher in initial cost because they require a dedicated development team to write code from scratch. However, they provide a competitive advantage as the features and functions are optimized for specific workflows within a company or government agency.

• Examples of Customized Software: Common examples beyond schools include Hospital Management Systems, Banking Portals for specific banks, Inventory Control Systems for a particular factory, and Payroll Packages tailored to a country's specific tax laws.

• Maintenance and Ownership: In customized software, the client usually owns the source code or has exclusive rights to the intellectual property. The maintenance is performed by the developers based on the evolving needs of the user, whereas, in off-the-shelf software, updates are controlled by the vendor (like Microsoft or Google).

Important Points

• Software Development Life Cycle (SDLC): The creation of customized software follows a rigorous SDLC including requirement analysis, designing, coding, testing, and deployment. This ensures the applications perform exactly what the user requires without unnecessary bloatware.

• User Interface (UI) and Experience (UX): For customized software like School Management Systems, the UI is often simplified so that teachers, parents, and students with varying levels of technical expertise can navigate the portal easily.

• Data Security: Customized software provides enhanced security measures as the architecture is not publicly known, making it less susceptible to mass hacking attempts compared to popular general-purpose software.

**Q75. Answer: (a) 42**

Shortcut Trick

=> Distances: 20×90 = 1800, 72×66 = 4752

=> Total distance = 6552

=> Total time = 90 + 66 = 156

=> Average speed = 6552 / 156 = 42

Therefore Answer = 42

Alternate Method

Given: Speed1 = 20 m/min, Time1 = 90 min

=> Speed2 = 72 m/min, Time2 = 66 min

Formula: Average speed = Total distance / Total time

=> Distance1 = 20 × 90 = 1800

=> Distance2 = 72 × 66 = 4752

=> Total distance = 1800 + 4752 = 6552

=> Total time = 90 + 66 = 156

=> Average speed = 6552 / 156 = 42 m/min

Therefore Final Answer = 42

Additional Information

Average Speed: Total distance / Total time

Key Rule: Do not average speeds directly

Distance: Speed × Time

Shortcut Tip: Always compute total values first

**Q76. Answer: (c) -1/4a**

Shortcut Trick

=> $2x(2x + 1) = 1 \Rightarrow 4x^2 + 2x - 1 = 0$

=> Product of roots = $c/a = (-1)/4$

=> If one root = a

=> Other root = (−1/4) ÷ a = −1/(4a)

Therefore Answer = −1/(4a)

Alternate Method

Given: One root = a

Formula: Product of roots = c/a

=> 2x(2x + 1) = 1

=> $4x^2 + 2x - 1 = 0$

=> Product of roots = (−1)/4

=> Let roots = a and b

=> a × b = (−1)/4

=> b = (−1/4) ÷ a

=> b = −1/(4a)

Therefore Final Answer = −1/(4a)

Additional Information

Product of Roots: c/a

Sum of Roots: −b/a

Quadratic Formation: Convert into standard form first

Shortcut: Use product when one root is known

**Q77. Answer: (c) Remove the file**

The correct answer is Remove the file.

Key Points

• The primary function of the Delete key on a computer keyboard, when a file or folder is selected on the desktop or in a file explorer, is to remove the file from its current location.

• In Windows Operating Systems, pressing the Delete key typically moves the selected item to the Recycle Bin. This is considered a logical deletion rather than a permanent physical deletion, allowing the user to restore the file if it was deleted by mistake. Hence, the statement regarding removing the file is correct.

• Opening the file is usually achieved by pressing the Enter key or double-clicking the mouse. The Delete key does not have the functionality to execute or open a file. Hence, this option is incorrect.

• Renaming a file is performed by pressing the F2 function key on Windows or by clicking the file name once after it is already selected. The Delete key is not used for renaming. Hence, this option is incorrect.

• Copying a file involves the Ctrl + C shortcut or selecting Copy from the context menu. The Delete key performs the opposite action of copying or pasting as it removes the data entry from the directory. Hence, this option is incorrect.

Additional Information

• Recycle Bin/Trash: This is a system folder that stores deleted files temporarily. Files remain here until the user chooses to "Empty Recycle Bin," which then frees up the storage space on the Hard Disk Drive (HDD) or Solid State Drive (SSD).

• Shift + Delete: This is a power-user shortcut. Pressing Shift and Delete simultaneously will permanently delete the file without moving it to the Recycle Bin. This action is generally irreversible through standard OS tools.

• File Management: This refers to the manipulation of files (creation, modification, and deletion). The Graphical User Interface (GUI) has made these tasks intuitive since the 1980s, specifically with the introduction of Windows 95 and Classic Mac OS.

• Keyboard Shortcuts:

• Ctrl + X: To Cut (remove from current place to move elsewhere).

• Ctrl + V: To Paste.

• Ctrl + Z: To Undo a deletion immediately after it occurs.

Important Points

• Operating System Variations: On macOS, the Delete key alone does not remove a file from the desktop; users must press Command + Delete to move a file to the Trash.

• Network Drives: It is important to note that files deleted from Network Shared Drives or USB Flash Drives often do not go to the Recycle Bin and are deleted permanently even if only the Delete key is pressed.

• Data Recovery: Even when a file is "permanently" deleted, the binary data often remains on the storage medium until it is overwritten by new data. Forensic software can sometimes recover these files.

• Confirmation Dialogs: Modern Operating Systems often allow users to enable or disable a Confirmation Dialog (a pop-up box) that asks, "Are you sure you want to move this file to the Recycle Bin?" to prevent accidental data loss.

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**Q78. Answer: (b) Air Force Station Hindan, Ghaziabad**

The correct answer is Air Force Station Hindan, Ghaziabad.

Key Points

• The 93rd anniversary of the Indian Air Force was celebrated on October 8, 2025, at Air Force Station Hindon in Ghaziabad, Uttar Pradesh.

• The ceremonial parade was reviewed by Air Chief Marshal AP Singh, Chief of the Air Staff.

• The event showcased both heritage and modern aircraft, highlighting the operational strength and indigenous capabilities of the IAF.

• The Heritage Flight included restored aircraft such as the Tiger Moth and HT-2.

• Modern aircraft displayed during the parade included Rafale, MiG-29, and Apache helicopters.

• A major aerial display marking the celebrations was later held on November 9, 2025, in Guwahati, Assam.

Additional Information

• Evolution of IAF Day Venues:

• The 90th anniversary in 2022 was held in Chandigarh, marking the first time the parade moved out of Delhi/NCR.

• The 91st anniversary in 2023 was hosted in Prayagraj, Uttar Pradesh, featuring a massive flypast over the Sangam area.

• The 92nd anniversary in 2024 took place in Chennai, Tamil Nadu, with a record-breaking aerial display over Marina Beach involving over 72 aircraft.

• History of the Indian Air Force:

• The IAF was officially established on October 8, 1932, as an auxiliary air force of the Royal Air Force of the United Kingdom.

• After India became a Republic in 1950, the prefix "Royal" was dropped, and it became the Indian Air Force.

• It is currently the fourth largest air force in the world in terms of both personnel and aircraft assets.

• Command Structure:

• The IAF operates through five operational commands and two functional commands (Maintenance Command and Training Command).

• The Eastern Air Command, which will oversee the 2025 event, is responsible for the defense of the air space over West Bengal, Assam, Arunachal Pradesh, and other North-Eastern states.

• Leadership and Rank:

• The President of India is the Supreme Commander of the Armed Forces.

• The Chief of the Air Staff (CAS), an Air Chief Marshal, is the professional head of the organisation. Air Chief Marshal Amar Preet Singh assumed the designation of CAS in September 2024.

Important Points

• Significance of the 2025 Venue: Choosing Guwahati serves as a message of inclusive development and military applications in the Act East policy framework. It allows the local numerical value of the population in the North-East to witness India's aerial features firsthand.

• Aircraft Participation: Celebrations typically include examples of India's indigenous prowess, such as the HAL Tejas, along with advanced platforms like the Rafale, Su-30 MKI, and C-17 Globemaster.

• Public Outreach: The move to different locations aims to inspire the youth of various states to join the Indian Air Force and serves as a major survey of the organisation's logistical capabilities to mobilize for events on a national scale.

**Q79. Answer: (b) 8**

Given number: 21673458

Logic:

Add 1 to each odd digit

Subtract 1 from each even digit

Original number: 2 1 6 7 3 4 5 8

| Digit | Type | Operation | New Digit |
|---|---|---|---|
| 2 | Even | 2 − 1 | 1 |
| 1 | Odd | 1 + 1 | 2 |
| 6 | Even | 6 − 1 | 5 |
| 7 | Odd | 7 + 1 | 8 |
| 3 | Odd | 3 + 1 | 4 |

| | | | |
|---|---|---|---|
| 4 | Even | 4 − 1 | 3 |
| 5 | Odd | 5 + 1 | 6 |
| 8 | Even | 8 − 1 | 7 |

New number: 1 2 5 8 4 3 6 7

Greatest digit = 8

Smallest digit = 1

Product = 8 × 1 = 8

Hence, the correct answer is Option 2.

**Q80. Answer: (c) Ditaji Kambundji**

The correct answer is Ditaji Kambundji.

Key Points

• Ditaji Kambundji won the gold medal in the women's 100m hurdles at the World Athletics Championships Tokyo 2025.

• Tobi Amusan secured the silver medal in the event.

• Grace Stark won the bronze medal.

• Kambundji's winning performance placed her in the world's all-time top 10 for the event, according to Watch Athletics.

Additional Information

• Tobi Amusan:

• She is a Nigerian track and field athlete who currently holds the World Record in the 100m hurdles with a time of 12.12 seconds, set during the 2022 World Athletics Championships in Eugene, Oregon.

• Born on 23 April 1997, she is a former World Champion (2022) and a three-time Commonwealth Games gold medalist. Her functions on the track are characterized by an exceptionally fast lead-leg clearance.

• Grace Stark:

• Representing the United States, Grace Stark was born on 6 May 2001. She is an alumna of the University of Florida and was the NCAA champion in the 100m hurdles.

• Her applications of strength and speed made her a finalist in both the 2024 Olympics and the 2025 World Championships.

• Ditaji Kambundji:

• A Swiss hurdler born on 20 May 2002, she is the younger sister of sprinter Mujinga Kambundji.

• She holds the European U23 record and has been a consistent podium finisher in the European Athletics Championships, representing Switzerland at the highest international level.

Important Points

• Venue and Infrastructure: The Japan National Stadium in Tokyo serves as the primary location for the 2025 World Athletics Championships. The stadium features a state-of-the-art synthetic track designed to maximize energy return for sprinters.

• Championship Dates: The 2025 event is scheduled from 13 September to 21 September 2025. This timing is chosen to provide optimal weather conditions in Japan for high-performance athletics.

• Historical Context: The United States has historically dominated the 100m hurdles, with athletes like Kendra Harrison, Nia Ali, and now Masai Russell maintaining a legacy of gold medals and world-leading data points in timing.

• Qualification Standards: To compete in the World Athletics Championships, athletes must meet strict entry standards or qualify via the World Athletics Rankings. For the women's 100m hurdles, the standard typically requires a numerical value below 12.73 seconds.

**Q81. Answer: (d) Swaraj as the birthright of every Indian**

The correct answer is Swaraj as the birthright of every Indian.

Key Points

• Bal Gangadhar Tilak, a prominent leader of the Extremist Phase of the Indian National Movement, famously declared, "Swaraj is my birthright and I shall have it!". This principle emphasized that self-rule was an inherent right of every Indian rather than a gift to be granted by the British. Hence, statement 4 is correct.

• While Tilak was known for his aggressive stance and support for revolutionary spirit, he primarily focused on mass mobilization and passive resistance (such as Boycott and Swadeshi) rather than advocating for a complete armed revolution as the sole methodology. Hence, statement 1 is incorrect.

• Tilak's ideology was rooted in national unity and cultural pride; he did not emphasize communal representation. In fact, he was a key architect of the Lucknow Pact in 1916, which aimed at Hindu-Muslim unity to demand self-government. Hence, statement 2 is incorrect.

• The Extremist leaders, including Tilak, believed that political freedom (Swaraj) must precede economic reforms or social

changes, arguing that without the power to govern, meaningful economic progress was impossible. Hence, statement 3 is incorrect.

• Tilak used tools like National Education and mass agitation to instill a sense of pride and demand for Swaraj among the common people, shifting the movement from the elite classes to the masses.

Additional Information

• The Extremist Phase (1905–1919): This period was characterized by a more radical approach to the Indian National Congress, led by the trio Lal-Bal-Pal (Lala Lajpat Rai, Bal Gangadhar Tilak, and Bipin Chandra Pal). They grew disillusioned with the Moderate methods of "Prayer, Petition, and Protest" after the Partition of Bengal in 1905.

• Literary Contributions: Tilak used his newspapers, Kesari (in Marathi) and The Mahratta (in English), to spread nationalist ideas and criticize British policies. He also wrote the Gita Rahasya while imprisoned in Mandalay Jail, Burma, between 1908 and 1914.

• Cultural Mobilization: To bridge the gap between the Congress and the common people, Tilak transformed traditional festivals into political platforms. He started the Ganpati Festival in 1893 and the Shivaji Festival in 1895 to foster national spirit and unity.

• Home Rule Movement: In April 1916, Tilak launched the Indian Home Rule League at Belgaum. His league operated in Maharashtra (excluding Bombay), Karnataka, Central Provinces, and Berar, demanding self-government within the British Empire.

Important Points

• The Surat Split (1907): The ideological difference between the Moderates and Extremists led to a formal split in the Indian National Congress during the Surat Session. The Extremists, led by Tilak, wanted to extend the Swadeshi movement nationwide, while Moderates wanted to confine it to Bengal.

• Father of Indian Unrest: British colonial authorities, specifically Valentine Chirol, described Bal Gangadhar Tilak as the "Father of Indian Unrest" due to his influence in inciting anti-British sentiment.

• Anti-Liquor and No-Tax Campaigns: Tilak organized No-Tax campaigns in Maharashtra during the famine of 1896-97 and was a staunch advocate of Prohibition (anti-liquor movements) to improve the socio-economic condition of the poor.

• Legacy: Tilak's death on August 1, 1920, coincided with the launch of the Non-Cooperation Movement by Mahatma Gandhi, marking a transition from the Extremist phase to the Gandhian Era of the national struggle.

**Q82. Answer: (b) BYA 31**

The logic followed here is:

So, 'BYA 31' will replace the question mark in the given series.

Hence, the correct answer is "Option 2".

**Q83. Answer: (d) Malabar coast**

The correct answer is Malabar coast.

Key Points

• The Western Coastal Plain is a narrow strip of land located between the Western Ghats and the Arabian Sea, stretching from the Gulf of Kutch in the north to Kanyakumari in the south.

• The Malabar coast constitutes the southern stretch of the Western Coastal Plain, primarily running along the state of Kerala and the southern part of Karnataka.

• It extends approximately from Mangalore to Kanyakumari and is famous for its scenic beauty, backwaters, and sandy beaches.

• A unique feature of the Malabar coast is the presence of Kayals (backwaters), which are used for fishing, inland navigation, and tourism. Vembanad Lake is the most prominent example of these backwaters.

• The region experiences a tropical monsoon climate and is one of the first places in India to receive rainfall from the Southwest Monsoon in the month of June.

Additional Information

• Konkan Coast: This refers to the northern stretch of the Western Coastal Plain. It extends from Daman in the north to Goa in the south, covering the coastal districts of Maharashtra and Goa. It is known for its rugged terrain and mango cultivation, especially the Alphonso variety.

• Kannad Coast: Also known as the Canara Coast, it represents the central stretch of the Western Coastal Plain. It lies between the Konkan Coast to its north and the Malabar Coast to its south, stretching along the state of Karnataka from Goa to Mangalore.

• Coromandel Coast: This is the southern stretch of the Eastern Coastal Plain. It extends from the delta of the Krishna River to Kanyakumari, covering the coastal areas of Andhra Pradesh and Tamil Nadu. Unlike the western coast, it receives significant rainfall from the Northeast Monsoon during October and November.

• Gujarat Plain: This is the northernmost part of the western coastline, formed by the alluvial deposits of rivers like the Sabarmati, Mahi, Narmada, and Tapi. It includes the Rann of Kutch and the Saurashtra peninsula.

Important Points

• The Western Coastal Plain is an example of a submerged coastal plain. This submergence provides natural conditions for the development of ports and harbors.

• Major ports located on the western coast include Kandla (Gujarat), Mumbai and Jawaharlal Nehru Port (Maharashtra), Marmagao (Goa), New Mangalore (Karnataka), and Kochi (Kerala).

• The average width of the Western Coastal Plain is approximately 50 km to 100 km, making it much narrower than the Eastern Coastal Plain, which has wide deltas formed by rivers like the Godaveri, Mahanadi, and Cauvery.

• The Malabar Coast is historically significant as the "Spice Coast of India," where ancient trade with Arabs, Romans, and later Europeans (starting with Vasco da Gama in 1498) took place for black pepper and cardamom.

• Ecologically, the Western Ghats adjacent to these plains are a biodiversity hotspot, influencing the orographic rainfall patterns of the coastal stretches.

**Q84. Answer: (d) 6**

Given number: 4813576

Logic:

Add 1 to each odd digit

Subtract 2 from each even digit

Original number: 4 8 1 3 5 7 6

| Digit | Type | Operation | New Digit |
|---|---|---|---|
| 4 | Even | 4 − 2 | 2 |
| 8 | Even | 8 − 2 | 6 |
| 1 | Odd | 1 + 1 | 2 |
| 3 | Odd | 3 + 1 | 4 |
| 5 | Odd | 5 + 1 | 6 |
| 7 | Odd | 7 + 1 | 8 |
| 6 | Even | 6 − 2 | 4 |

New number: 2 6 2 4 6 8 4

Highest digit = 8

Lowest digit = 2

Difference = 8 − 2 = 6

Hence, the correct answer is Option 4.

**Q85. Answer: (c) Expansionary Fiscal Policy**

The correct answer is Expansionary Fiscal Policy.

Key Points

• Expansionary Fiscal Policy is the most effective tool used by a government during a recession to stimulate economic growth and increase the level of Aggregate Demand.

• The primary objective of this policy is to close a recessionary gap, reduce unemployment, and prevent a prolonged economic depression.

• The government achieves this through two main instruments: increasing Government Spending (on infrastructure, healthcare, education, etc.) and decreasing Taxation to leave more disposable income with consumers and businesses.

• When the government increases its Expenditure, it creates a multiplier effect, where an initial injection of spending leads to a larger overall increase in National Income and Gross Domestic Product (GDP).

• By reducing Income Tax or Corporate Tax, the government encourages Consumer Spending and Private Investment, which further fuels economic recovery during periods of low Consumer Confidence.

Additional Information

• Contractionary Fiscal Policy:

• This policy is the opposite of expansionary policy and is used when an economy is overheating or experiencing high Inflation.

• The government reduces Public Spending and increases Tax Rates to suck liquidity out of the system and reduce Aggregate Demand.

• It is typically employed during the Expansion or Peak phase of the Business Cycle to maintain price stability.

• Neutral Fiscal Policy:

• This occurs when Government Spending is fully funded by Tax Revenue, resulting in a Balanced Budget.

• In this state, the government's fiscal stance has a neutral effect on the level of economic activity, as the Budget Deficit is near

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Zero.

• Fiscal Policy in India:

• In India, fiscal policy is formulated by the Ministry of Finance and presented annually in the Union Budget under Article 112 of the Constitution of India.

• The Fiscal Responsibility and Budget Management (FRBM) Act, 2003 was enacted to institutionalize financial discipline and reduce India's fiscal deficit to manageable levels, targetting a limit of 3% of GDP.

• A recent example of Expansionary Fiscal Policy in India is the Atmanirbhar Bharat Abhiyan launched in May 2020, which provided a stimulus package worth approximately Rs. 20 Lakh Crore to combat the COVID-19 induced economic slowdown.

• Recessionary Indicators:

• A Recession is technically defined as two consecutive quarters of negative GDP growth.

• During this phase, Industrial Production declines, Consumer Price Index (CPI) growth slows down, and Unemployment Rates rise significantly.

Important Points

• Deficit Financing: To implement expansionary policy, governments often resort to Borrowing, leading to a Fiscal Deficit. This is managed by issuing Government Bonds or treasury bills.

• Crowding Out Effect: One risk of excessive Expansionary Fiscal Policy is that heavy government borrowing may lead to higher Interest Rates, which can "crowd out" Private Investment by making loans more expensive for businesses.

• Time Lags: Fiscal policy often suffers from Implementation Lags because changes in taxation or spending projects require Parliamentary Approval and administrative planning, unlike Monetary Policy which can be adjusted more quickly by the Reserve Bank of India (RBI).

• John Maynard Keynes: The concept of using government intervention to manage demand during a Recession is a core tenet of Keynesian Economics, popularized during the Great Depression of the 1930s.

**Q86. Answer: (c) 90**

Shortcut Trick

=> Ratio = 3 : 5 : 7

=> Smallest + Largest = 3 + 7 = 10 parts = 60

=> 1 part = 6

=> Total parts = 3 + 5 + 7 = 15

=> Sum = 15 × 6 = 90

Therefore Answer = 90

Alternate Method

Given:

Ratio = 3 : 5 : 7

Smallest + Largest = 60

Formula:

If ratio = a : b : c => numbers = ak, bk, ck

Calculations:

=> Numbers = 3k, 5k, 7k

=> 3k + 7k = 60

=> 10k = 60 => k = 6

=> Numbers = 18, 30, 42

=> Sum = 18 + 30 + 42 = 90

Final Answer: 90

Additional Information

1. Ratio Conversion: Multiply ratio by common factor k

2. Pair Sum Trick: Use given pair to find k quickly

3. Total Sum: Sum of ratios × k

4. Shortcut: Directly use parts instead of full expansion

**Q87. Answer: (a) Bahadur Shah Zafar**

The correct answer is Bahadur Shah Zafar.

Key Points

• Bahadur Shah Zafar was the last Mughal Emperor of India, reigning from 1837 to 1857. During the First War of Independence

(1857), he was proclaimed the Emperor of Hindustan by the rebellious sepoys. Hence, the statement regarding his exile is correct.

• Following the fall of Delhi to the British forces in September 1857, he took shelter at Humayun's Tomb. He was eventually captured by Major William Hodson on September 20, 1857.

• After a military trial held at the Red Fort in Delhi, he was found guilty of treason and conspiracy. He was subsequently exiled to Rangoon (now Yangon) in Burma (present-day Myanmar) in 1858.

• He lived in Rangoon under British custody until his death on November 7, 1862, at the age of 87. His burial site in Rangoon later became a famous Dargah.

• The exile of Bahadur Shah Zafar marked the formal end of the Mughal Empire in India, which had ruled for over 300 years.

Additional Information

• Rani Lakshmibai: She was the queen of the princely state of Jhansi. She is one of the most iconic figures of the 1857 revolt. She did not go into exile; instead, she died on the battlefield fighting the British forces led by Sir Hugh Rose in Gwalior on June 18, 1858. Hence, this statement is incorrect.

• Nana Sahib: Born as Dhondu Pant, he was the adopted son of the last Maratha Peshwa, Baji Rao II. He led the rebellion in Kanpur. After the British recaptured Kanpur, he escaped to the jungles of Nepal in 1859, and his ultimate fate remains a mystery. Hence, this statement is incorrect.

• Ahmadullah Shah: Often referred to as the Maulavi of Faizabad, he was a prominent leader of the 1857 revolt in the Awadh region. He was known for his courage and was eventually killed by the Raja of Powayan, who betrayed him for a reward in June 1858. Hence, this statement is incorrect.

• The First War of Independence led to significant administrative changes, including the passing of the Government of India Act 1858, which transferred power from the East India Company to the British Crown.

Important Points

• Major Hodson, the officer who arrested Bahadur Shah Zafar, also executed his sons, Mirza Mughal and Mirza Khizr Sultan, and his grandson Mirza Abu Bakht at Khooni Darwaza in Delhi to ensure no successors to the throne remained.

• Bahadur Shah Zafar was not just a political figure but also a renowned Urdu poet. He used the pen name 'Zafar' (meaning victory). His poetry often reflected the sorrow of his exile and the loss of his motherland.

• The 1857 Revolt served as a symbol of Hindu-Muslim unity, as both communities fought side-by-side under the leadership of the Mughal Emperor against colonial rule.

• The British decision to exile him to Burma was a strategic move to remove the focal point of Indian resistance from the subcontinent, thereby preventing any further rallying around the Mughal crown.

**Q88. Answer: (a) Rajasthan**

The correct answer is Rajasthan.

Key Points

• The Harappan Civilization, also known as the Indus Valley Civilization, was a Bronze Age society that required significant amounts of copper to produce tools, weapons, and ornaments. Rajasthan, specifically the Khetri region, was the most prominent internal source of copper for these ancient people.

• Archaeological evidence suggests that the Harappans established a network to procure copper from the Ganeshwar-Jodhpura culture located in the Khetri area of Rajasthan. This region is still famous for its Khetri Copper Mines. Hence, the statement regarding Rajasthan being a major source is correct.

• Recent chemical analyses of Harappan copper artifacts have shown traces of Nickel, which match the chemical composition of copper found in Oman (located on the southeastern tip of the Arabian Peninsula). This indicates that while Rajasthan was a primary local source, the Harappans also engaged in long-distance maritime trade for copper.

• The acquisition of raw materials like copper from Rajasthan and Oman allowed the Harappans to develop metallurgical skills, enabling them to create Bronze by alloying copper with Tin.

Additional Information

• Geographical Reach and Resources:

• Afghanistan: This region was primarily a source for Lapis Lazuli (a precious blue stone), particularly from the site of Shortughai. It was also a likely source for Tin, which was essential for making Bronze. Hence, while Afghanistan provided minerals, it was not the primary source for copper compared to Rajasthan.

• Karnataka: In South India, the Kolar region in Karnataka is believed to have been the major source of Gold for the Harappan people. Hence, Karnataka is associated with gold rather than copper in the Harappan context.

• Maharashtra: Sites like Daimabad represent the Late Harappan phase or the Jorwe culture. While these sites used copper, the primary mining sources were located further north in the Aravalli Range of Rajasthan. Hence, Maharashtra was a settlement area rather than a primary mining hub for the core Harappan period.

• Bihar: During the Harappan period (approx. 2600 BCE to 1900 BCE), there is no significant archaeological evidence to suggest that Bihar served as a major mineral supplier to the Indus Valley. Copper hoarding cultures appeared later in the Gangetic Valley. Hence, Bihar is not the correct answer.

Important Points

• Trade and Transport: The Harappans used Bullock Carts for land transport and Boats for riverine and maritime trade. The Lothal dockyard in Gujarat is a testament to their advanced maritime capabilities.

• Chronology: The Mature Harappan Phase lasted from 2600 BCE to 1900 BCE. The systematic procurement of minerals like Steatite from Iran, Carnelian from Bharuch (Gujarat), and Shell from Nageshwar or Balakot showcases their complex trade economy.

• Ganeshwar-Jodhpura Culture: This non-Harappan culture in Rajasthan provided an abundance of copper objects to the Harappans. Their distinctive Pottery and high volume of copper tools suggest they were specialized metallurgists who traded their surplus with the urban centers of the Indus Valley.

**Q89. Answer: (b) Kalhana**

The solution is in Hindi. Read it online.

**Q90. Answer: (b) 0**

Shortcut Trick

=> Last two digits = A0

=> A0 divisible by 4 => (10A) divisible by 4

=> 10A divisible by 4 => A must be even

=> Smallest even digit = 0

Therefore Answer = 0

Alternate Method

Given:

Number = 54468A0

Formula:

A number is divisible by 4 if its last two digits are divisible by 4

Calculations:

=> Last two digits = A0 = 10A

=> 10A divisible by 4

=> 10A = 4k => A must be even

=> Possible values: 0, 2, 4, 6, 8

=> Minimum value = 0

Final Answer: 0

Additional Information

1. Divisibility Rule: Only last two digits matter for 4

2. Even Requirement: 10A divisible by 4 => A must be even

3. Possible Digits: 0, 2, 4, 6, 8

4. Minimum Concept: Choose smallest valid digit

**Q91. Answer: (b) P**

Given: Seven people P, Q, R, B, C, D and O are sitting around a circular table facing the centre.

P sits third to the left of Q.

Only one person sits between Q and B when counted from the right of Q.

Only two people sit between O and C when counted from the left of O.

D is an immediate neighbour of O.

Now, third to the right of R → B, C, P → P

Hence, the correct answer is Option 2.

**Q92. Answer: (d) California**

The correct answer is California.

Key Points

• California is the only state in the United States that predominantly experiences a Mediterranean climate, which is characterized by hot, dry summers and mild, wet winters.

• This specific climatic condition is found on the western coasts of continents between 30° and 45° latitude, influenced by cold ocean currents and subtropical high-pressure systems.

• The climate is exceptionally suitable for viticulture (grape growing) and the cultivation of diverse fruits and vegetables that cannot

thrive in areas with harsh winters or humid summers.

• California's Central Valley and Coastal Ranges serve as the primary regions for these agricultural activities, benefiting from long growing seasons and fertile soils.

• Because the Mediterranean climate lacks rain during the crucial summer growing period, California has developed sophisticated irrigation systems to channel water from the Sierra Nevada mountains to farms.

Additional Information

• Geographic Location: California is located on the West Coast of the United States, bordered by the Pacific Ocean. Its unique topography, including the Central Valley, Sierra Nevada, and Coastal Ranges, creates various microclimates.

• Agricultural Diversity: The state produces more than 400 different agricultural commodities. It is the leading producer in the United States for almonds, walnuts, pistachios, strawberries, and grapes.

• Comparison with Other Options:

• Alaska: Experiences Arctic and Subarctic climates. The growing season is very short, and the extreme cold prevents the cultivation of Mediterranean crops like vineyards.

• Texas: Features a diverse range of climates, including Humid Subtropical in the east and Semi-Arid in the west. While it has a large agricultural sector (notably cotton and cattle), it does not have a Mediterranean climate.

• Florida: Classified as Humid Subtropical to Tropical. Unlike the Mediterranean climate, Florida receives heavy rainfall during the summer months, which is ideal for citrus but different from the dry-summer regime of California.

• Global Context: Other regions sharing this climate include the Mediterranean Basin in Europe and North Africa, Central Chile, Western Australia, and the Western Cape of South Africa.

Important Points

• Vineyards and Wine: California accounts for about 80% of the total wine production in the United States. Famous regions include Napa Valley and Sonoma County, which were recognized globally after the 1976 Judgment of Paris.

• Economic Impact: The agricultural industry in California generates over $50 billion in annual cash receipts. It provides nearly half of all United States-grown fruits, nuts, and vegetables.

• Climate Features: In a Mediterranean climate, the evapotranspiration rates are highest when precipitation is lowest, making water management the most critical factor for California's farmers.

• Data and Facts: The state has approximately 24 million acres of farmland. Major exports include dairy products and tree nuts to countries like Canada, China, and the European Union.

• Historical Context: The development of vineyards in California dates back to the 18th century, initially established by Spanish missionaries for religious purposes before expanding into a commercial powerhouse.

**Q93. Answer: (c) 306**

Shortcut Trick

=> Use weighted average

=> Total = (12×184 + 73×234 + 80×390)

=> = 2208 + 17082 + 31200 = 50490

=> Total members = 12 + 73 + 80 = 165

=> Average = 50490 ÷ 165 = 306

Therefore Answer = 306

Alternate Method

Given:

Group A: 12 members, avg = 184

Group B: 73 members, avg = 234

Group C: 80 members, avg = 390

Formula:

Overall average = Total expenditure ÷ Total members

Calculations:

=> Total expenditure of A = 12 × 184 = 2208

=> Total expenditure of B = 73 × 234 = 17082

=> Total expenditure of C = 80 × 390 = 31200

=> Total expenditure = 2208 + 17082 + 31200 = 50490

=> Total members = 12 + 73 + 80 = 165

=> Overall average = 50490 ÷ 165 = 306

Final Answer: 306

Additional Information

1. Weighted Average: (Σ fx) ÷ Σ f
2. Total Value: Average × Number of items
3. Key Idea: Larger group impacts average more
4. Shortcut Tip: Direct multiplication saves time

**Q94. Answer: (c) Mission Sudarshan Chakra**

The correct answer is Mission Sudarshan Chakra.

Key Points

• The Mission Sudarshan Chakra is a major initiative announced in August 2025 to bolster India's aerial security through a sophisticated, multi-layered indigenous air and missile defence system.

• This mission aims to deploy the Long Range Surface-to-Air Missile (LR-SAM) system, which has been internally developed under Project Kusha by the Defence Research and Development Organisation (DRDO). Hence, the statement regarding its objective of providing a multi-layered indigenous defence is correct.

• The system is designed to provide comprehensive coverage against a variety of aerial threats, including stealth fighters, unmanned aerial vehicles (UAVs), cruise missiles, and guided precision weapons. Hence, the statement regarding its target capabilities is correct.

• The Mission Sudarshan Chakra will feature three distinct interception layers with ranges of 150 km, 250 km, and 350 km, ensuring that threats are neutralized at significant distances from the Indian mainland. Hence, the statement regarding its multi-layered range is correct.

• This indigenous system is often compared to the Russian S-400 Triumf in terms of capability, aiming to reduce India's dependency on foreign military hardware while enhancing strategic autonomy. Hence, the statement regarding its comparison to global systems is correct.

Additional Information

• Mission Shakti:

• Conducted on 27 March 2019, it was India's first successful Anti-Satellite (ASAT) missile test.

• It demonstrated India's capability to intercept a Low Earth Orbit (LEO) satellite at an altitude of 300 km.

• This mission propelled India into an elite group of four nations (including USA, Russia, and China) possessing space warfare capabilities.

• Agni Defence Initiative:

• While the Agni series primarily focuses on Intermediate-range and Intercontinental Ballistic Missiles (ICBM), they form the core of India’s nuclear deterrence.

• The latest variant, Agni-Prime, is a two-stage canisterized missile with a range between 1,000 km and 2,000 km, designed for quick deployment.

• S-400 Triumf System:

• India signed a deal worth $5.43 billion with Russia in October 2018 for five squadrons of this mobile surface-to-air missile system.

• It can track 100 targets simultaneously and engage up to 36 targets within a range of 400 km.

Important Points

• The LR-SAM or Project Kusha, under Mission Sudarshan Chakra, utilizes advanced active electronically scanned array (AESA) radars for superior target acquisition.

• The implementation of this system is a critical part of the Make in India initiative in the defence sector, aiming for 80% indigeneity in components.

• The system is expected to be integrated with the Integrated Air Command and Control System (IACCS) of the Indian Air Force (IAF), providing a unified picture of the airspace.

• This mission specifically addresses security concerns along the Line of Actual Control (LAC) and the Line of Control (LOC), providing a robust shield against potential two-front aerial threats.

**Q95. Answer: (b) Kumbh Mela**

The correct answer is Kumbh Mela.

Key Points

• The Kumbh Mela is a major Hindu pilgrimage and festival that is celebrated in a cycle of approximately 12 years at four river-bank pilgrimage sites. These locations include Prayagraj (at the Triveni Sangam of the Ganga, Yamuna, and the mythical Saraswati), Haridwar (Ganges), Nashik (Godavari), and Ujjain (Shipra). Hence, the option regarding Kumbh Mela is correct.

• In Prayagraj, the festival held every 12 years is specifically referred to as the Purna Kumbh. There is also an Ardh Kumbh (Half Kumbh) held every 6 years at Prayagraj and Haridwar.

• The Kumbh Mela was inscribed on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity in December 2017, recognizing it as the world's largest peaceful religious gathering. Hence, the statement regarding its cultural significance is correct.

• The festival features mass bathing rituals, religious discourses by Sadhus and Saints, and various cultural events, attracting tens of millions of pilgrims from across the globe.

Additional Information

• Astrological Timing: The exact date and year of the Kumbh Mela are determined by astrological calculations based on the positions of Jupiter (Brihaspati), the Sun, and the Moon. In Prayagraj, it is held when Jupiter is in Aries or Taurus and the Sun and Moon are in Capricorn during the Magha month.

• Mythological Origin: The festival finds its roots in the Samudra Manthan (churning of the ocean) mentioned in ancient Puranas. It is believed that Lord Vishnu, while transporting the Amrit (nectar of immortality) in a Kumbh (pot), spilled four drops at the four locations where the mela is now held.

• Economic Impact: The Kumbh Mela is a massive administrative and logistical undertaking by the Government of Uttar Pradesh. During the 2019 Ardh Kumbh, the government spent over Rs. 4,200 crore, and the event reportedly generated significant employment and tourism revenue.

• Governance and Safety: Modern iterations of the mela use AI-based crowd management, CCTV surveillance, and integrated command centers to manage the safety of over 200 million attendees.

Important Points

• Hemis Festival: This is a famous Buddhist festival celebrated in Ladakh, India, at the Hemis Monastery. It commemorates the birth anniversary of Guru Padmasambhava (founder of Tibetan Buddhism) and is held in June/July. It features the traditional Cham Dance (masked dance). Hence, this statement is not the correct answer for the Prayagraj fair.

• Pushkar Mela: Located in Ajmer district of Rajasthan, this is one of the world's largest camel and livestock fairs. It takes place annually during the Hindu month of Kartik (November) and coincides with Kartik Purnima. It is centered around the sacred Pushkar Lake and the only prominent Brahma Temple. Hence, this statement is not the correct answer for the 12-year cycle fair.

• Surajkund Mela: This is an International Crafts Mela held annually in February at Surajkund, Faridabad (Haryana). It is a showcase of Indian handicrafts, handlooms, and cultural heritage, organized by the Haryana Tourism Department. Each year, a Partner Nation and a Theme State are selected. Hence, this statement is not the correct answer.

• Naga Sadhus: One of the most distinctive features of the Kumbh Mela is the presence of Naga Sadhus (warrior monks) belonging to various Akharas, who take the first Shahi Snan (Royal Bath) before the general public.

**Q96. Answer: (b) 576**

Shortcut Trick

=> Volume conserved

=> Sphere radius = 12 cm, wire radius = 0.2 cm

=> $L = (4/3 \times 12^3) \div (0.2^2)$

=> $= (4/3 \times 1728) \div 0.04 = 2304 \div 0.04 = 57600$ cm

=> = 576 m

Therefore Answer = 576 m

Alternate Method

Given:

Diameter of sphere = 24 cm => radius = 12 cm

Diameter of wire = 4 mm = 0.4 cm => radius = 0.2 cm

Formula:

Volume of sphere = $(4/3)\pi r^3$

Volume of cylinder = $\pi r^2 h$

Calculations:

=> $(4/3)\pi(12)^3 = \pi(0.2)^2 \times h$

=> $(4/3) \times 1728 = 0.04 \times h$

=> $2304 = 0.04h$

=> $h = 2304 \div 0.04 = 57600$ cm

=> $h = 57600 \div 100 = 576$ m

Final Answer: 576 m

Additional Information

1. Volume Conservation: Volume remains same after melting

2. Sphere Volume: $(4/3)\pi r^3$

3. Cylinder Volume: $\pi r^2 h$

4. Unit Conversion: 1 m = 100 cm

**Q97. Answer: (b) 18 – 324 – 334 – 294**

The logic followed here is:

Logic:

First → Second: Square

Second → Third: + 10

Third → Fourth: − 40

Check given sets:

15 → 225 → 235 → 195

=> $15^2 = 225$

=> 225 + 10 = 235

=> 235 − 40 = 195

9 → 81 → 91 → 51

=> $9^2 = 81$

=> 81 + 10 = 91

=> 91 − 40 = 51

Now, checking options:

Option 1: 16 – 256 – 276 – 246

=> $16^2 = 256$

=> 256 + 10 = 266

Option 2: 18 – 324 – 334 – 294

=> $18^2 = 324$

=> 324 + 10 = 334

=> 334 − 40 = 294

Option 3: 10 – 100 – 110 – 90

=> $10^2 = 100$

=> 100 + 10 = 110

=> 110 − 40 = 70

Option 4: 8 – 64 – 74 – 104

=> $8^2 = 64$

=> 64 + 10 = 74

=> 74 − 40 = 34

Hence, the correct answer is Option 2.

**Q98. Answer: (a) Due to Kharif agricultural operations**

The correct answer is Due to Kharif agricultural operations.

Key Points

• The primary reason for the increase in the share of workers in the rural agriculture sector during the months of July to September is the onset of the Kharif sowing season. This period coincides with the Southwest Monsoon, which provides the necessary rainfall for major crops. Hence, statement 1 is correct.

• Agricultural operations during this window involve labor-intensive activities such as land preparation, sowing, and transplantation (especially for Paddy). This leads to a seasonal surge in employment opportunities within rural areas.

• The Periodic Labour Force Survey (PLFS) often records these seasonal fluctuations, showing a higher Worker Population Ratio (WPR) in agriculture during the monsoon quarter compared to the summer months.

• Urban migration typically slows down or reverses during this time as workers return to their villages to tend to their ancestral farms. Therefore, migration is not the cause of the increase in rural agricultural labor. Hence, statement 2 is incorrect.

• While government schemes like MGNREGA provide support, the demand for agricultural labor is driven by the natural crop cycle rather than the introduction of new schemes alone. Hence, statement 3 is incorrect.

• A decline in manufacturing jobs might lead to disguised unemployment in agriculture, but the specific spike in the July-September window is a recurring seasonal phenomenon tied to farming. Hence, statement 4 is incorrect.

Additional Information

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• Kharif Crops: These are "monsoon crops" sown at the beginning of the rainy season (June-July) and harvested in September-October. Key examples include Rice (Paddy), Maize, Jowar, Bajra, Cotton, and Groundnut. These crops require high temperatures and high humidity.

• Rabi Crops: These are "winter crops" sown in October-November and harvested in March-April. Major crops include Wheat, Barley, Gram, and Mustard. They require a cool climate during growth and a warm climate during germination and harvesting.

• Zaid Crops: These are grown in the short season between Rabi and Kharif (usually March to June). Examples include Watermelon, Cucumber, and various Vegetables.

• Economic Impact: Agriculture contributes approximately 18-20% to India's Gross Value Added (GVA). The July-September quarter is critical for Food Security and rural income levels, which in turn drives Rural Consumption for the rest of the Financial Year.

• Labour Force Trends: In India, nearly 45-47% of the total workforce is still dependent on agriculture. The Female Labour Force Participation Rate (LFPR) often sees a sharper increase during the Kharif season as women play a vital role in transplantation and weeding.

Important Points

• Southwest Monsoon: It accounts for nearly 75% of India's total annual rainfall. Regions like Punjab, Haryana, Uttar Pradesh, and West Bengal are major hubs for Kharif production.

• Employment Elasticity: Agriculture acts as a "shock absorber" for the Indian economy. During periods of urban economic slowdown, the rural sector absorbs the excess labor force, leading to an increase in the number of agricultural workers.

• Data Sourcing: The National Statistical Office (NSO) releases the PLFS reports which track the Unemployment Rate (UR) and Labour Force Participation Rate (LFPR) on a quarterly basis for urban areas and annually/quarterly for rural trends.

• Geographical Distribution: States with high irrigation coverage like Punjab rely less on the timing of the monsoon compared to rain-fed regions in Central India and the Deccan Plateau.

**Q99. Answer: (d) 12 years**

Shortcut Trick

=> Let Tejasvi = Trishana = x => Meena = 2x

=> 4 yrs ago: (x − 4) : (2x − 4) = 1 : 3

=> 3(x − 4) = (2x − 4)

=> 3x − 12 = 2x − 4 => x = 8

=> Trishana after 4 yrs = 8 + 4 = 12

Therefore Answer = 12

Alternate Method

Given:

Tejasvi and Trishana are twins => ages = x, x

Sum of their ages = Meena => Meena = 2x

4 years ago ratio = 1 : 3

Formula:

Ratio = (Present age − 4)

Calculations:

=> Tejasvi (4 yrs ago) = x − 4

=> Meena (4 yrs ago) = 2x − 4

=> (x − 4) / (2x − 4) = 1 / 3

=> 3(x − 4) = 2x − 4

=> 3x − 12 = 2x − 4

=> x = 8

=> Trishana's present age = 8

=> After 4 years = 8 + 4 = 12

Final Answer: 12

**Q100. Answer: (a) India, Australia, Canada**

The correct answer is India, Australia, Canada.

Key Points

• The ACITI Partnership, which stands for the Australia-Canada-India Trilateral Initiative, was officially announced in November 2025 to strengthen strategic and economic ties between the three nations.

• The primary objective of this partnership is to secure Supply Chain Resilience, particularly in the sector of Critical Minerals like

Lithium, Cobalt, and Rare Earth Elements.

• This initiative aims to integrate Australia and Canada's status as global mining leaders with India's rapidly growing Manufacturing Sector and its massive demand for clean energy components.

• The partnership focuses on Technological Cooperation in deep-sea mining, sustainable mineral processing, and the development of Green Hydrogen infrastructure.

• By aligning their policies, these three countries seek to reduce global over-dependence on single-source suppliers and ensure a stable flow of materials necessary for Electric Vehicles (EVs) and Semiconductor production.

Additional Information

• Australia's Strategic Role:

• Located in the Southern Hemisphere, Australia is the world's largest producer of Lithium and a major exporter of Iron Ore and Gold.

• Through ACITI, Australia provides the raw material security needed by India for its Energy Transition goals.

• Canada's Contribution:

• As a North American powerhouse, Canada possesses vast mineral wealth in the Canadian Shield and advanced Mining Technology.

• Canada emphasizes ESG (Environmental, Social, and Governance) standards in mining, ensuring that the ACITI Partnership promotes ethical and sustainable resource extraction.

• India's Industrial Ambitions:

• India, the fifth-largest economy in the world, requires a steady supply of minerals to fuel its Make in India and Production Linked Incentive (PLI) schemes.

• The partnership is crucial for India to achieve its Net Zero Emissions target by the year 2070.

• Global Economic Context:

• The ACITI Partnership complements other international frameworks like the Minerals Security Partnership (MSP) and the Quad (comprising India, Australia, Japan, and the USA).

• It reflects a broader shift towards Friend-shoring, where democratic nations partner to build reliable trade networks for Strategic Autonomy.

Important Points

• Key Minerals: The focus is on 15 to 20 critical minerals that are essential for High-Tech Electronics and Defense Equipment.

• Research and Development: The three nations have pledged to set up joint Innovation Hubs to research Battery Recycling and Circular Economy models.

• Bilateral Agreements: This trilateral initiative is supported by existing bilateral pacts, such as the India-Australia Economic Cooperation and Trade Agreement (ECTA) and India-Canada strategic dialogues.

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