RRB NTPC CBT 2 (Level-4) Official paper (Held On: 10 May 2022 Shift 1) (Previous Year Paper)

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FULL TEST

Q1. Read the given statement and conclusions carefully. Decide which of the given conclusions logically follow(s) from the statement.

Statement:

India is a country of multiple languages.

Conclusions:

I. All Indians can speak multiple languages.

II. Every country has multiple languages.

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

Q2. SN Ghormade took over which charge in July 2021?

(a) Chief of the Air Staff
(b) Director General of Air Operations
(c) Vice Chief of Naval Staff
(d) Deputy Chief of Integrated Defence Staff

Q3. In 1955, the Village and Small-Scale Industries Committee, also called the _____, noted the possibility of using small-scale industries for promoting rural development.

(a) Karve Committee
(b) Nehru Committee
(c) Narasimham Committee
(d) Gandhi Committee

Q4. When did PM Narendra Modi announce National Hydrogen Mission to generate hydrogen from green energy sources?

(a) May 2021
(b) November 2021
(c) August 2021
(d) January 2021

Q5. In each of the number-pairs, the second number is obtained by performing a certain mathematical operation on the first number. Three of the following pairs follow the same pattern and thus form a group. Select the number-pair that does NOT belong to that group.

(a) 127 : 62
(b) 473 : 235
(c) 333 : 160
(d) 869 : 433

Q6. Find the arithmetic mean of 37, 85, 65 and 23.

(a) 47.5
(b) 50
(c) 52.5
(d) 55

Q7. If 23/3 more than a number is 25/6, then find the number.

(a) 7/2
(b) 11/3
(c) -7/2
(d) -11/3

Q8. If an 8-digit number 256139A4 is divisible by 11, find the value of A.

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

Q9. Shubham secured 345 marks out of 600 in the annual examination. Find the percentage of marks obtained by him in the examination.

(a) 57.5
(b) 57.25
(c) 58.5
(d) 58.25

Q10. Select the combination of letters that when sequentially placed in the blanks of the given series will complete the series.

_ BCD _ _ ABC _ _ E _ BC _ _ _ ABC_ DE

(a) AADEDDDDED
(b) ADEADDEDDD
(c) ADEDDADDED
(d) ADDADDEDDE

Q11. In each of the given number-clusters, the number on the right side of = (the equal to sign) is calculated by performing certain mathematical operations on the two numbers on the left of = (the equal to sign). All three number-clusters follow the same pattern. Select the number from among the given options that can replace the question mark (?) in the third number-cluster.

12, 33 = 57

10, 28 = 48

14, 39 = ?

(a) 67
(b) 71
(c) 57
(d) 61

Q12. By selling a chair for Rs. 2858.77, a person gains 27%. Find the cost price of the chair.

(a) Rs. 2250
(b) Rs. 2251
(c) Rs. 2151
(d) Rs. 2150

Q13. In India, appointments of persons other than district judges to the judicial service of a State are made by the _____.

(a) Chief Justice of the High Court
(b) Prime Minister

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(c) President of India
(d) Governor of the State

Q14. In the year _____ the Parmahansa Mandali was founded in Poona, Satara and other towns of Maharashtra.
(a) 1849
(b) 1809
(c) 1829
(d) 1839

Q15. In a certain code language, LOCAL is written as MADOM and GLOBAL is written as HMACOM. How will ROMAN be written in that language?
(a) SANOO
(b) SANAM
(c) SPNOM
(d) SONAM

Q16. Under which Article of the Constitution of India is the Village Panchayat organised?
(a) Article 38
(b) Article 39
(c) Article 37
(d) Article 40

Q17. 'Alkap' is a rural dance-drama performance prevalent in the parts of Jharkhand and _____.
(a) Gujarat
(b) Chhattisgarh
(c) Rajasthan
(d) West Bengal

Q18. In a certain code language,
'get ready now' is coded as 'li ah tc',
'ready for vacation' is coded as 'cs li pa',
'travel for work now' is coded as 'pa vj ah rb'.
(Note: All codes are two letter codes only)
What is the code for 'travel' in the given code language?
(a) ah
(b) Either 'pa' or 'cs'
(c) pa
(d) Either 'vj' or 'rb'

Q19. Ram and Rahim together have Rs. 1210. If 1/3 of Ram's money is equal to 2/5 of Rahim's amount, then what is the amount (in Rs.) that Rahim has?
(a) 660
(b) 650
(c) 560
(d) 550

Q20. The diagonal of a rectangle is 53 cm and its area is 1260 cm^2. What is the perimeter (in cm) of the rectangle?
(a) 144
(b) 152
(c) 148
(d) 146

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Q21. Find the total surface area (in m²) of a cone, if its slant height is 32 m and diameter of its base is 48 m.
[Use π = 22/7]

(a) 12077 4/7
(b) 4424
(c) 4224
(d) 12067 4/7

Q22. Alok ranked 19^(th) from the top and 38^(th) from the bottom in a class. How many students are there in the class?

(a) 57
(b) 56
(c) 46
(d) 55

Q23. A boy walking at the rate of 4 km per hour crosses a square field diagonally in 36 seconds. What is the area (in m²) of the field?

(a) 800
(b) 800/√2
(c) 800 √2
(d) 1600

Q24. If sin θ = 4/5, and 0° < θ < 90°, then find the value of
(3 tan θ-5 cos θ)/(3 sec θ-4 cot θ)

(a) 1
(b) 1/4
(c) 1/2
(d) 0

Q25. The Ancient Monuments Preservation Act was enacted in the year _____.

(a) 1905
(b) 1902
(c) 1901
(d) 1904

Q26. A man covers 250 km, 120 km and 50 km at the speed of 50 km/h, k km/h and 25 km/h, respectively. If his average speed for the whole journey is 42 km/h, then what is the value of k?

(a) 45
(b) 35
(c) 36
(d) 40

Q27. The Red Fort Complex in New Delhi was inscribed on the UNESCO World Heritage List in the year _____.

(a) 2005
(b) 2007
(c) 2000
(d) 2010

Q28. On 16 February 2021, Ngozi Okonjo-Iweala was appointed as the seventh Director-General of the WTO. Which country does she belong to?

(a) Uganda
(b) Nigeria
(c) Kenya
(d) Zambia

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Q29. The least populated district of India as per 2011 Census is located in which of the following states?

(a) Uttarakhand
(b) Himachal Pradesh
(c) Arunachal Pradesh
(d) Assam

Q30. The value of 41/3 ÷[2 2/3-1/3 ×(4 1/2-3 1/3)] is

(a) 1 14/25
(b) 1 1/25
(c) 1 37/41
(d) 1 2/5

Q31. Find the area of an isosceles triangle whose base is 54 cm long and each equal side is 45 cm long.

(a) 1944 sq.cm
(b) 1215 sq.cm
(c) 972 sq.cm
(d) 1620 sq.cm

Q32. Which term did the farm scientist M S Swaminathan coin, which implies productivity improvement in perpetuity without ecological and social harm?

(a) Forever Revolution
(b) Green Revolution
(c) Farm-fresh Revolution
(d) Evergreen Revolution

Q33. JUG is related to LSI as per the English alphabetical order in the same way as WIN is related to YGP. Following the same pattern, APT is related to _____.

(a) CRR
(b) CNV
(c) CNR
(d) CRV

Q34. The HCF of 1683, 2244 and 5049 is x. The sum of digits of x is

(a) 15
(b) 11
(c) 13
(d) 12

Q35. Select the letter-cluster from among the given options that can replace the question mark (?) in the following series.
AEJOT, XBGLQ, UYDIN, ?

(a) RVBGJ
(b) RVBFJ
(c) RUBDG
(d) RVAFK

Q36. New Year is observed in different regions with different names as given below:

List I	List II		
1.	Navreh	a.	Malayali New year
2.	Ugadi	b.	Odia New year
3.	Vishu	c.	Telugu New year
4.	Pana Sankranti	d.	Kashmiri Hindu New year

Which of the following options presents the correct match?

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

Q37. Sunil starts walking from Point R. He walks 28 m towards the west, turns right and walks for 20 m to reach point M. He then takes a left turn, walks for 30 m, takes a left turn and walks for 28 m to reach Point S. He finally takes a left turn and walks for 48 m to reach Point Z.

In which direction is Point Z with respect to Point R? (All turns are 90° turns only)

(a) South-West
(b) North-West
(c) South
(d) North

Q38. VR Chaudhari was appointed to which post in September 2021?

(a) Director General of Air Operations
(b) Air Officer in Charge of Personnel
(c) Air Officer Commanding-in-Chief
(d) Chief of the Air Staff

Q39. Which of the following has the shortest wavelength?

(a) Visible rays
(b) Gamma rays
(c) Infrared rays
(d) X-rays

Q40. _____ is NOT a tributary of the river Ganga.

(a) Sutlej
(b) Kosi
(c) Gandak
(d) Son

Q41. How many medals did India win at the 2021 ASBC Asian Youth and Junior Boxing Championships?

(a) 35
(b) 39
(c) 40
(d) 36

Q42. To do a certain work, the ratio of the efficiencies of A, B and C is 3 : 5 : 8. Working together, they can complete the same work in 15 days. If only A and B work together for 12 days and leave, and then C comes to complete the remaining work, for how many days will C work?

(a) 18
(b) 10
(c) 15
(d) 12

Q43. Amit's birthday on 16^(th) April 2021 was on a Saturday. On which day was his wife's birthday on 3^(rd) June 2021?

(a) Tuesday
(b) Friday
(c) Monday
(d) Sunday

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Q44. In each of the given number-clusters, the number on the right side of = (the equal to sign) is calculated by performing certain mathematical operations on the two numbers on the left of = (the equal to sign). All three number-clusters follow the same pattern. Select the number from among the given options that can replace the question mark (?) in the third number-cluster.

8, 35 = 29

10, 48 = 52

12, 57 = ?

(a) 87
(b) 75
(c) 95
(d) 67

Q45. 10 less than a given number K, 10 more than the given number K, and 38 more than the given number K are in continued proportion. Find the given number K, where K > 0.

(a) 60
(b) 40
(c) 50
(d) 70

Q46. Eight people M, N, P, S, T, V, X and Y are sitting in a straight row and all are facing north. M sits second from one of the extreme ends of the row. Only two people sit between M and N. P sits second to the right of N. As many people sit to the right of P as to the left of S. More than three people sit between S and T. V sits to the immediate right of X. Who sits third to the left of Y?

(a) P
(b) X
(c) V
(d) T

Q47. Who is known as the father of genetics?

(a) Robert Hook
(b) Charles Darwin
(c) EP Odum
(d) Gregor Mendel

Q48. Ten people are sitting in two parallel rows 1 and 2. A, B, C, D and E are sitting in row 1 facing north, and V, W, X, Y and Z are sitting in row 2 facing south, in such a way that each member in row 1 faces a member of row 2.

A sits second from the right end of the row. W faces an immediate neighbour of A. X sits third to the right of W. The one who faces X, sits to the immediate right of B. Only one person sits between B and C. V sits to the immediate right of Y. D does not sit at any of the extreme ends of the row.

Who faces Z?

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

Q49. Six friends are sitting in a circle facing the centre of the circle. Veena and Sadvi are the immediate neighbours of Pooja. Anil and Guna are the immediate neighbours of Giri. Anil is to the immediate left of Veena. Who is to the immediate right of Veena?

(a) Guna
(b) Anil
(c) Pooja
(d) Sadvi

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Q50. Which of the following keys is used to create a new paragraph in MS-Word?

(a) Esc
(b) Enter
(c) Spacebar
(d) Ctrl

Q51. Simplify:

[(7 × 9) + (3 × 8) + 3] ÷ [(9 × 4) + (72 ÷ 8)]

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

Q52. 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 pharmacists are statisticians.

Some statisticians are mathematicians.

Conclusions:

I. All pharmacists are mathematicians.

II. Some pharmacists are mathematicians.

III. Some mathematicians are statisticians.

IV. Some statisticians are pharmacists.

(a) Both conclusions IV and I follow.
(b) Both conclusions I and II follow.
(c) Both conclusions II and III follow.
(d) Both conclusions III and IV follow.

Q53. As per Economic Survey 2021-22, the _____ sector contributed the most to the GDP of India during the year.

(a) Medical
(b) Service
(c) Agricultural
(d) Education

Q54. The series of coalescing alluvial fans along a mountain front is called a:

(a) bajada
(b) floodplain
(c) bouma sequence
(d) mesa

Q55. In 2018, the Hon'ble Prime Minister announced that India would phase-out single use plastic by which year?

(a) 2021
(b) 2022
(c) 2023
(d) 2020

Q56. In which year did the Indian Parliament pass the Citizenship Act?

(a) 1955
(b) 1953
(c) 1959
(d) 1956

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Q57. What will be the mean of all the prime numbers between 10 and 22?

(a) 13
(b) 15
(c) 16
(d) 14

Q58. Ram and Dipti each invested a sum of Rs. 8000 for a period of two years at 30% compound interest per annum. However, while for Ram the interest was compounded annually, for Dipti it was compounded every eight months. How much more will Dipti receive as interest compared to Ram at the end of the two-year period?

(a) Rs. 312
(b) Rs. 320
(c) Rs. 304
(d) Rs. 296

Q59. Which of the following is primarily an economic union of the Post-Soviet states located in Eastern Europe, Western Asia and Central Asia?

(a) Andean Community
(b) European Union
(c) Eurasian Economic Union
(d) CARICOM Single Market and Economy

Q60. In a certain code language,

'heard their voice' is coded as 'nu ca es',

'their car was heard' is coded as 'hy ta es nu',

'voice was heard' is coded as 'es ta ca'.

(Note: All codes are two letter codes only)

What is the probable code for 'heard car' in the given code language?

(a) hy es
(b) nu hy
(c) es ta
(d) ta ca

Q61. Which of the following is a bowed instrument that Pundit Ram Narayan, an Indian musician popularised and made him known internationally?

(a) Mandolin
(b) Guitar
(c) Veena
(d) Sarangi

Q62. The value of (12-[(3-5) × 4] ÷ 8-8+[6 ÷(12 × 2)])/(9 × 15 ÷(12 × 10)-[12 ÷(6 × 2)]) is:

(a) 42
(b) 21/17
(c) 48
(d) 3/4

Q63. Ravish has read 4/5 of a book while Soma has read only 5/8 of the book she is reading. Both however have another 120 pages of their respective books remaining to be read. What fraction of the number of pages read by Ravish has been read by Soma?

(a) 5/12
(b) 7/12
(c) 25/32
(d) 1/2

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Q64. In a group of five children (K, L, O, M, N) with different heights, K is the tallest while L is the shortest. O is the second shortest person in that group. M is taller than N. Who among them is the third tallest?

(a) M
(b) L
(c) O
(d) N

Q65. If in a code language, 'Red' is called 'Green', 'Green' is called 'Pink', 'Pink' is called 'Brown', and 'Brown' is called 'Violet', then which coloured light is used to stop vehicles on traffic Signal?

(a) Brown
(b) Green
(c) Red
(d) Violet

Q66. The Himalayan mountain range is a kind of _____.

(a) block mountains
(b) volcanic mountains
(c) relict mountains
(d) fold mountains

Q67. Tehri Dam built on the river Bhagirathi is situated in which of the following states?

(a) Himachal Pradesh
(b) Uttarakhand
(c) Uttar Pradesh
(d) Sikkim

Q68. According to the UN department of economic and social affairs data, _____ had the largest diaspora in the world by end of 2020.

(a) China
(b) Singapore
(c) South Africa
(d) India

Q69. Rama remembers that she met her brother on Saturday, which was after the 20^(th) day of a particular month. If the 1^(st) day of that month was Tuesday, then on which date did Rama meet her brother?

(a) 26th
(b) 23rd
(c) 25th
(d) 24th

Q70. The Malpighian tubules are characteristic of:

(a) Echinodermata
(b) Arthropoda
(c) Annelida
(d) Chordata

Q71. River Ganga does NOT pass through which of the following states?

(a) Uttarakhand
(b) Bihar
(c) Madhya Pradesh
(d) Uttar Pradesh

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Q72. Which Indian boxer was elected as the chairperson of the International Boxing Association (AIBA) champions and veterans committee in March 2021?

(a) Mary Kom
(b) Mohammed Ali Qamar
(c) Devendro Singh
(d) Vijender Singh

Q73. Euro is the common currency of which of the following international groupings?

(a) Gulf Cooperation Council
(b) Association of South Asian Nations
(c) South Asian Association for Regional Cooperation
(d) European Union

Q74. Ruchira was supposed to complete a task in 22 days. However, during the first 10 days she did only 1/30 of the work on each day. What share of the work will Ruchira have to do daily from the 11^(th) day so that the work is completed on time?

(a) 2/39
(b) 3/44
(c) 1/18
(d) 1/19

Q75. Kautilya in Arthashastra has mentioned _____ sources of law.

(a) four
(b) two
(c) seven
(d) eleven

Q76. What was the population density of India, as per the data of Census 2011?

(a) 382 persons/km2
(b) 250 persons/km2
(c) 470 persons/km2
(d) 324 persons/km2

Q77. Which of the following soil particles are the finest in their size?

(a) Sand
(b) Silt
(c) Pebble
(d) Clay

Q78. If 21^(st) February 2005 was a Sunday, then what would be the day of the week on 21^(st) February 2007?

(a) Wednesday
(b) Monday
(c) Thursday
(d) Tuesday

Q79. Who won the 'NSG Counter-IED and Counter-Terrorism Innovator Award 2021'?

(a) Manoj Chaudhury
(b) Shishir Sinha
(c) Shailesh Ganpule
(d) K Krishnaiah

Q80. A cylinder is inscribed in a sphere. The radius of the sphere is 5/6 times the height of the cylinder. What is the ratio of the volume of the cylinder to the volume of the sphere?

(a) 27 : 50
(b) 72 : 125

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(c) 6 : 5
(d) 36 : 25

Q81. Four number-pairs have been given, out of which three are alike in some manner and one is different. Select the one that is different.
(a) 64 : 216
(b) 216 : 512
(c) 125 : 343
(d) 343 : 728

Q82. A working clock is placed on a table in such a manner that at 9.00 p.m., its hour hand is pointing towards north. If the same clock remains in the same position, in which direction will the minute hand point at 2.00 a.m.?
(a) East
(b) North
(c) South
(d) West

Q83. Select the number from among the given options that can replace the question mark (?) in the following series.
0, 1, 2, 5, 26, ?
(a) 475
(b) 677
(c) 69
(d) 27

Q84. The book 'Clear Light of Day' has been written by _____.
(a) Anita Desai
(b) Jhumpa Lahiri
(c) Kiran Desai
(d) Nikita Lalwani

Q85. The lengths of a pair of parallel sides of a trapezium are respectively 18 cm and 15 cm and the perpendicular distance between these two sides is 12 cm. What is the area (in cm^2) of the trapezium?
(a) 297
(b) 396
(c) 198
(d) 99

Q86. The Net National Product can be calculated by subtracting Depreciation from _____.
(a) Direct Taxes
(b) Gross Domestic Product
(c) Gross National Product
(d) National Income

Q87. A sphere has a radius of 8 cm. A solid cylinder has a base radius of 4 cm and a height of h cm. If the total surface area of the cylinder is half the surface area of the sphere, then find the height of the cylinder.
(a) 15 cm
(b) 12 cm
(c) 10 cm
(d) 9 cm

Q88. Study the given digit-letter-symbol sequence carefully and answer the question that follows.
(Left) 6 $ + S r 3 B 6 A * ? # c < Z R & d & G ! q(Right)
If the given sequence is written in the reverse order, then which element will be 5^(th) to the left of the 8^(th) element from the right end?
(a) B

(b) c
(c) +
(d) Z

Q89. A, B and C can complete a work in 12, 16 and 24 days respectively. B and C worked together for 4 days then C left the work and A replaced him. In how many days will the remaining work be completed?

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

Q90. Punit, Qumar, Rohit, Sheetal, Tabir, and Umesh live in a multi-storeyed building. Qumar lives immediately below the floor where Umesh lives. Sheetal lives immediately below the floor where Qumar lives. Tabir lives on one of the floors below the floors where Qumar and Sheetal live but he lives on one of the floor above the floor where Punit lives. Tabir lives immediately below the floor where Rohit lives. Rohit lives immediately below the floor where Sheetal lives. Who lives on the top floor?

(a) Punit
(b) Qumar
(c) Umesh
(d) Sheetal

Q91. A, B, C, D, J, K, L and M are sitting around a square table facing the centre of the table. Four of them are sitting at either of the corners while the other four are sitting at the exact centre of either of the sides.

D sits at one of the corners of the table. Only one person sits between D and C. Only three people sit between C and B. M sits second to the right of B. K sits to the immediate left of M. A is NOT an immediate neighbour of B. Only three people sit between A and L. Who sits to the immediate right of J?

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

Q92. Two statements I and II are given. These statements may be either independent causes or may be the effects of independent causes or a common cause. One of these statements may be the effect of the other statement. Read both the statements and decide which of the following options correctly depicts the relationship between these two statements.

Statements:

I. The school bus with teachers and students couldn't reach the school on time.

II. A major accident took place on the road blocking the traffic.

(a) If statement I is the cause, statement II could be its effect
(b) Both statements I and II could be effects of some common cause
(c) Both statements I and II are independent causes
(d) If statement II is the cause, statement I could be its effect

Q93. Six people C, D, E, K, L and M are each of a different height. E is shorter than only L. Only one person is shorter than C. K is shorter than D but taller than M. How many people are shorter than K?

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

Q94. By selling 8 pens for Rs. 75, a shopkeeper loses 25%. How many pens should he sell for Rs. 372 so as to earn a 24% profit?

(a) 20
(b) 24
(c) 18

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(d) 30

Q95. Kritika lends Rs. 64000 to Nidhi for a year at 25% interest per annum, compounded half yearly. Find the interest that has to be paid by Nidhi.

(a) Rs. 17100
(b) Rs. 17000
(c) Rs. 17200
(d) Rs. 17300

Q96. On 15 February 2021, which of the following authors was honoured with the Sanctuary Lifetime Service Award 2020?

(a) Shashi Tharoor
(b) Vikram Seth
(c) Arundhati Roy
(d) S Theodore Baskaran

Q97. Six people A, B, C, D, E and F are sitting around a circular table facing the centre. C sits second to the left of D. A is an immediate neighbour of D. F sits third to the left of A. B sits second to the left of E.

Who sits to the immediate right of C?

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

Q98. k is the greatest number which, when divides 2996, 4752 and 7825, the remainder in each case is the same. The product of the digits of k is

(a) 120
(b) 84
(c) 72
(d) 108

Q99. How many such pairs of letters are there in the word 'CLUSTERS' (in both the forward and backward directions) which have as many letters between them in the word as there are in the English alphabetical order?

(a) 1
(b) 2
(c) 0
(d) 3

Q100. Select the option that is related to the fifth letter-cluster in the same way as the fourth letter-cluster is related to the third letter-cluster and the second letter-cluster is related to the first letter-cluster.

HTWCGY : WTHCGY :: ALTMHY : TLAMHY :: LGETDR : ?

(a) RDTEGL
(b) EGLRTD
(c) EGLTDR
(d) EGTLDR

Q101. Which of the following is most often used in the food industry as a chemical leavening agent in baked foods such as cakes, muffins and cookies?

(a) Calcium oxychloride
(b) Sodium sulphate
(c) Sodium bicarbonate
(d) Sodium chloride

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Q102. Kavita has deposited Rs. 4000 with the bank for two years at 6.25% simple interest per annum. What will be the total amount that Kavita will receive at the end of the two-year term?

(a) Rs. 4475
(b) Rs. 4625
(c) Rs. 4400
(d) Rs. 4500

Q103. Simplify the following expression.

81.7100 + 198.0020 - 2071.1985 + 9.0900 + 1591.42

(a) -190.8765
(b) -190.9765
(c) 190.9865
(d) -190.9865

Q104. Which of the following options is the closest approximate value which will come in place of question mark(?) in the following equation?

6.05 - 15.95 ÷ 3.95 + 2.99 × 7.04 = ?

(a) 30
(b) 13
(c) 18
(d) 23

Q105. The area of a square is $81x^2 + 72x + 16$. Find the measure of each side of the square, where $x > 0$.

(a) 9x + 2
(b) (9x/2+2)
(c) 2(9x/2+2)
(d) 2(9x/2+1)

Q106. The mode and the mean of a grouped data are 27.5 and 28.5 respectively. Find the median, correct to two places of decimal, using empirical relation.

(a) 9.83
(b) 19.83
(c) 28.17
(d) 27.17

Q107. The market structure called monopoly exists where there _____ in any market.

(a) are multiple buyers
(b) is a stiff competition between top brands
(c) is no seller
(d) is exactly one seller

Q108. Shambhu Maharaj was a renowned personality associated with which of the following dance forms?

(a) Kathakali
(b) Odissi
(c) Manipuri
(d) Kathak

Q109. Which of the following elements is not included in the circular flow of Income in a simple economy?

(a) Factor payments
(b) Goods and services
(c) Depreciation
(d) Spending

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Q110. _____ is a group of hunter gatherers native to Central Africa, mainly to Congo.

(a) Bedouin
(b) Ainu
(c) Pygmies
(d) Kirghiz

Q111. Mahatma Gandhi headed to _____ to end the salt monopoly by introducing the Salt Satyagraha.

(a) Surat
(b) Dandi
(c) Delhi
(d) Sabarmati

Q112. According to the inscriptions of Chola dynasty, _____ is the land that is gifted to temples.

(a) Vellanvaggi
(b) Tirunamattukkani
(c) Shalabhoga
(d) Brahmadeya

Q113. The Fundamental Duties of citizens were added to the Constitution of India by the _____.

(a) 51^(st) Amendment Act
(b) 23^(rd) Amendment Act
(c) 42^(nd) Amendment Act
(d) 1^(st) Amendment Act

Q114. Let N be the least number which when divided by 15, 25, 35, 40 and 42, the remainder in each case is 1 and N is divisible by 271. What is the sum of digits of N?

(a) 17
(b) 14
(c) 13
(d) 18

Q115. If a man walks at 7/8 of his usual speed, he reaches his office 20 minutes late than the usual time. Find the usual time he takes (in minutes).

(a) 120
(b) 100
(c) 140
(d) 160

Q116. _____ is a magnetically thin coated piece of plastic wrapped around wheels which is sequential access and is often used for backing up large amounts of data.

(a) SSD
(b) Magnetic tape
(c) Hard disk
(d) DRAM

Q117. If 'P&Q' indicates that 'P is the son of Q', and 'P$Q' indicates that 'P is the sister of Q', then which of the following expressions would indicate that 'Y is the mother of Z'?

(a) Z$Y&X
(b) X&Y$Z
(c) X$Y&Z
(d) Z&Y$X

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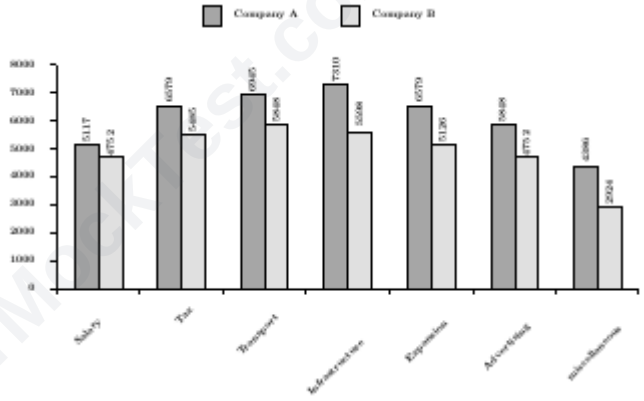
Q118. The Prayag Sangeet Samiti at Prayagraj was established in the year _____ to teach Hindustani classical music.

(a) 1952
(b) 1901
(c) 1926
(d) 1915

Q119. Which of the following neighbouring countries of India has the largest land area?

(a) China
(b) Pakistan
(c) Myanmar
(d) Bangladesh

Q120. The expenditures (in thousands) of two companies (A and B) on various heads in a given year are provided in the following bar graph.



The expenditure made by both companies together on salary was approximately what percentage of their expenses on Infrastructure?

(a) 57%
(b) 95%
(c) 29%
(d) 76%

ANSWER KEY

1	b	2	c	3	a	4	c	5	c	6	c	7	c	8	b	9	a	10	c
11	a	12	b	13	d	14	a	15	a	16	d	17	d	18	d	19	d	20	d
21	c	22	b	23	a	24	c	25	d	26	d	27	b	28	b	29	c	30	c
31	c	32	d	33	b	34	d	35	d	36	b	37	a	38	d	39	b	40	a
41	b	42	a	43	b	44	a	45	a	46	c	47	d	48	d	49	c	50	b
51	c	52	d	53	b	54	a	55	b	56	a	57	b	58	c	59	c	60	a
61	d	62	a	63	a	64	d	65	b	66	d	67	b	68	d	69	a	70	b
71	c	72	a	73	d	74	c	75	a	76	a	77	d	78	d	79	c	80	b
81	d	82	a	83	b	84	a	85	c	86	c	87	b	88	b	89	c	90	c
91	d	92	d	93	b	94	b	95	b	96	d	97	a	98	d	99	d	100	c
101	c	102	d	103	b	104	d	105	c	106	c	107	d	108	d	109	c	110	c
111	b	112	b	113	c	114	c	115	c	116	b	117	d	118	c	119	a	120	d

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SOLUTIONS

Q1. Answer: (b) Neither conclusion I nor II follows

Conclusions:

I. All Indians can speak multiple languages. - Does not follow (The statement implies that multiple languages exist in India. However, this is not enough to determine if every Indian speaks more than one language or not.)

II. Every country has multiple languages. - Does not follow (The statement does not mention any other country apart from India. So, this cannot be determined.)

Hence, neither conclusion I nor II follows.

Q2. Answer: (c) Vice Chief of Naval Staff

The correct answer is Vice Chief of Naval Staff.

Key Points

• S. N. Ghormade

• Vice Admiral SN Ghormade assumed charge as the Vice Chief of Naval Staff at a formal ceremony held at South Block in New Delhi.

• Vice Admiral SN Ghormade takes over from Vice Admiral G Ashok Kumar who retired in July after a service of 39 years.

• He is an alumnus of the National Defence Academy (NDA), Khadakwasla, Naval Staff College at the United States Naval War College, Newport, Rhode Island, and the Naval War College, Mumbai.

• He was commissioned into the Indian Navy on January 1, 1984, and is a Navigation and Direction specialist.

• He has had extensive operational tenures onboard frontline warships of the Indian Navy.

• During his career spanning over 37 years, he has been through a myriad of operational and staff appointments.

• Vice Admiral Ghormade's important operational appointments include Commands of Guided Missile Frigate INS Brahmaputra, Submarine Rescue Vessel INS Nireekshak, and Minesweeper INS Alleppey, and Second-in-Command of Guided Missile Frigate INS Ganga.

• INS Nireekshak was awarded the Unit Citation for the first time during his command.

• Vice Admiral Ghormade was awarded the Ati Vishisht Seva Medal on 26 January 2017 and Nausena Medal in 2007 by the President of India, and Commendation by the Chief of the Naval Staff in 2000.

Additional Information

• Chief of the Air Staff: VR Chaudhari

• Director-General of Air Operations: Sanjeev Kapoor

• Deputy Chief of Integrated Defence Staff: Sanjay Jasjit Singh

Q3. Answer: (a) Karve Committee

The correct answer is Karve Committee.

Key Points

• Karve Committee

• In 1955, the Village and Small-Scale Industries Committee, also called the Karve Committee, noted the possibility of using small-scale industries for promoting rural development.

• A ‘small-scale industry’ is defined with reference to the maximum investment allowed on the assets of a unit.

• This limit has changed over a period of time.

• In 1950 a small-scale industrial unit was one that invested a maximum of rupees five lakh. Now it is 1 cr.

• It is believed that small-scale industries are more ‘labor intensive’ i.e., they use more labor than the large-scale industries and, therefore, generate more employment.

• But these industries cannot compete with the big industrial firms.

• It is obvious that the development of small-scale industries requires them to be shielded from large firms.

• For this purpose, the production of a number of products was reserved for the small-scale industry; the criterion of reservation being the ability of these units to manufacture the goods.

• They were also given concessions such as lower excise duty and bank loans at lower interest rates.

Q4. Answer: (c) August 2021

The correct answer is August 2021.

Key Points

• National Hydrogen Mission (NHM)

• Prime Minister launched the National Hydrogen Mission on India's 75th Independence Day i.e. 15th August 2021.

• The Mission aims to aid the government in meeting its climate targets and making India a green hydrogen hub.

• This will help in meeting the target of production of 5 million tonnes of Green hydrogen by 2030 and the related development of renewable energy capacity.

• Hydrogen and Ammonia are envisaged to be the future fuels to replace fossil fuels.

• Production of these fuels by using power from renewable energy termed green hydrogen and green ammonia is one of the major requirements for the environmentally sustainable energy security of the nation.

• The government of India is taking various measures to facilitate the transition from fossil fuel-based feedstocks to green hydrogen / green ammonia.

• This policy is one of the major steps in this endeavor.

• Significance of the National Hydrogen Mission

1. This will reduce dependence on fossil fuels and also reduce crude oil imports.

2. The objective also is for our country to emerge as an export Hub for Green Hydrogen and Green Ammonia.

3. The implementation of this Policy will provide clean fuel to the common people of the country.

4. The production of renewable energy (RE) in the form of RE will be the basic ingredient in making green hydrogen.

5. This in turn will help in meeting the international commitments for clean energy.

Additional Information

• Type of Hydrogen

• Grey Hydrogen: It is extracted from hydrocarbons (fossil fuels, natural gas).

• Blue Hydrogen: It is manufactured from natural gas

• Brown Hydrogen: It is manufactured using Coal without carbon sequestration.

• Green Hydrogen: Generated from renewable energy (like Solar, Wind).

Q5. Answer: (c) 333 : 160

The logic followed here is :-

(Second number × 2) + 3 = First number

1) 127 : 62

= (62 × 2) + 3

= 124 + 3

= 127

2) 473 : 235

= (235 × 2) + 3

= 470 + 3

= 473

3) 333 : 160

= (160 × 2) + 3

= 320 + 3

= 323 ≠ 333

4) 869 : 433

= (433 × 2) + 3

= 866 + 3

= 869

Therefore Here, pair '333 : 160' does NOT belong to that group.

Hence, the correct answer is "333 : 160".

Q6. Answer: (c) 52.5

Given:

The given number = 37, 85, 65 and 23

Formula used:

Mean = Sum of observations/Number of observations

Calculation:

According to the question

The sum of the number = (37 + 85 + 65 + 23)

=> 210

The arithmetic mean = Sum of observations/Number of observations

=> 210/4

=> 52.5

Therefore The required mean is 52.5

Q7. Answer: (c) -7/2

Given:

23/3 more than a number is 25/6

Calculation:

Let the number be x

According to the question

=> 23/3 + x = 25/6

=> x = (25/6 – 23/3)

=> x = (25 – 46)/6

=> x = -21/6

=> x = -7/2

Therefore The required number is -7/2

Q8. Answer: (b) 8

Given:

The 8 digit number = 256139A4

Concept used:

Divisibility rule of 11 - Take the alternating sum of the digits in the number, read from left to right. If that is divisible by 11, so is the original number.

Calculation:

According to the question

The 8 digit number = 256139A4

=> (2 + 6 + 3 + A) = (5 + 1 + 9 + 4)

=> 11 + A = 19

=> A = (19 – 11)

=> A = 8

Therefore The required value of A is 8

Q9. Answer: (a) 57.5

Shortcut Trick

Required Percentage = (Marks Obtained ÷ Total Marks) × 100

Required Percentage = (345 ÷ 600) × 100

Required Percentage = 345 ÷ 6 = 57.5%

Therefore The correct option is A.

Alternate Method

Given:

Marks obtained by Shubham = 345

Total maximum marks = 600

Formula Used:

Percentage = (Value obtained ÷ Total Value) × 100

0

345 (Obtained)

600 (Total)

Percentage = (345 ÷ 600) × 100

Calculations:

=> Required Percentage = (345 ÷ 600) × 100

=> Percentage = 345 ÷ 6

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=> Percentage = 57.5%

Therefore The correct option is A.

Additional Information

Percentage Change

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

Fraction to Percentage Conversion

To convert any fraction x/y into a percentage, multiply it by 100. Example: 1/4 × 100 = 25%.

Decimal to Percentage

Multiply the decimal by 100 and add the % sign. Example: 0.575 × 100 = 57.5%.

Q10. Answer: (c) ADEDDADDED

Given :- _ BCD _ _ ABC _ _ E _ BC _ _ _ ABC_ DE

By checking options and substituting accordingly.

1) AADEDDDDED → A B C D A D - A B C E D E - D B C D D E - A B C D D E

2) ADEADDEDDD → A B C D D E - A B C A D E - D B C E D D - A B C D D E

3) ADEDDADDED → A B C D D E - A B C D D E - A B C D D E - A B C D D E

• Here "A B C D D E" is repeated.

4) ADDADDEDDE → A B C D D D - A B C A D E - D B C E D D - A B C E D E

• Option (3) gives the pattern of :- A B C D D E - A B C D D E - A B C D D E - A B C D D E.

Hence, the correct answer is "ADEDDADDED".

Q11. Answer: (a) 67

The logic followed here is :-

(First number × 2) + Second number = Third number

1) 12, 33 = 57

= (12 × 2) + 33

= 24 + 33

= 57

and

2) 10, 28 = 48

= (10 × 2) + 28

= 20 + 28

= 48

Similarly,

3) 14, 39 = ?

= (14 × 2) + 39

= 28 + 39

= 67

Hence, the correct answer is "67".

Q12. Answer: (b) Rs. 2251

Shortcut Trick

Multiplier method: Selling Price (SP) = Cost Price (CP) × (100 + Gain%) ÷ 100

Given SP = Rs. 2858.77 and Gain = 27%

127% of CP = 2858.77

1% of CP = 2858.77 ÷ 127 = 22.51

100% (CP) = 22.51 × 100 = 2251

Therefore The correct answer is Rs. 2251.

Alternate Method

Given: Selling Price (SP) = Rs. 2858.77, Profit Percentage = 27%

Formula: Cost Price (CP) = [SP ÷ (100 + Profit%)] × 100

=> CP = [2858.77 ÷ (100 + 27)] × 100

=> CP = [2858.77 ÷ 127] × 100

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=> CP = 22.51 × 100

=> CP = 2251

Therefore The correct answer is Rs. 2251.

Additional Information

Profit and Loss Basics

When SP > CP, there is a Profit. Profit = SP − CP. Profit% is always calculated on the Cost Price unless stated otherwise.

Unitary Method

If 127 units represent the Selling Price (100 + 27), then 100 units represent the Cost Price.

Q13. Answer: (d) Governor of the State

The correct answer is Governor of the State

Key Points

• Subordinate Courts

• The State judiciary consists of a high court and a hierarchy of subordinate courts, also known as lower courts

• The subordinate courts are so-called because of their subordination to the state high court.

• They function below and under the high court at the district and lower level

• Constitutional Provisions

• Articles 233 to 237 in Part VI of the Constitution make the provisions for the organization of subordinate courts

• Appointment of District Judge

• The appointment, posting and promotion of district judges in a state are made by the Governor of the State in consultation with the High court of the State

• Appointment of other Judges

• Appointment of persons (other than district judges) to the judicial service of a state is made by the Governor of the State after consultation with the State Public Service Commission and the High court.

Additional Information

• Appointment :

• The governor of a state is appointed by the president of India. The factors based on which the president evaluates the candidates is not mentioned in the Constitution.

• The function of the Governer:

• The primary function of the governor is to preserve, protect and defend the constitution and the law as incorporated in their oath of office under Article 159 of the Indian constitution.

• All the governor's actions, recommendations and supervisory powers (Article 167c, Article 200, Article 213, Article 355, etc.) over the executive and legislative entities of a state shall be used to implement the provisions of the Constitution.

• Executive powers related to administration, appointments and removals.

• Legislative powers are related to lawmaking and the state legislature, that is State Legislative Assembly (Vidhan Sabha) or State Legislative Council (Vidhan Parishad

Q14. Answer: (a) 1849

The correct answer is 1849.

Key Points

• Paramahansa Mandali

• It was founded in 1849 by Dadoba Pandurang, Durgaram Mehtaji, and a group of friends in Bombay.

• Its founders believed in one God and were primarily interested in breaking caste rules.

• At its meetings, members took food cooked by low caste people.

• They also believed in education for women, and widow remarriage.

Additional Information

• Dadoba Pandurang in his book Dharma Vivechan outlined seven principles of this new movement:

1. God alone should be worshipped;

2. Real religion is based on love and moral conduct;

3. Spiritual religion is one;

4. Every individual should have freedom of thought;

5. Our actions and speech should be consistent with reason;

6. Mankind is one caste;

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7. The right kind of knowledge should be given to all.

• These principles denied polytheism of popular Hinduism, the caste system, and the Brahmanical monopoly of knowledge.

• All members were required to take a pledge that they would abandon caste restrictions and take food and drink prepared by a member of a lower caste.

Q15. Answer: (a) SANOO

The logic followed here is :-

• Consonants are increased + 1.

• Here 'O' is written as 'A'.

• Here 'A' is written as 'O'.

LOCAL is written as MADOM

and,

• GLOBAL is written as HMACOM.

Similarly,

• ROMAN will be written as :

Hence, the correct answer is "SANOO".

Q16. Answer: (d) Article 40

The correct answer is Article 40.

Key Points

• Article 40

• Article 40 is related to the Directive Principles of State Policy mentioned in Part IV of the Indian Constitution

• Article 40 reads 'To organize village panchayats and endow them with necessary powers and authority to enable them to function as units of self-governments'.

• It is based on Gandhian Ideology.

• Panchayati Raj System

• Through the 73rd Constitutional Amendment Act, 1992, the government fulfilled the constitutional obligation stated in Article 40.

• Three-tier ‘Panchayati Raj System’ was introduced at the Village, Block, and District levels in almost all parts of the country.

Additional Information

• Directive Principles of State Policy (DPSP)

• Part IV of the Constitution of India from Articles 36–51 contains the Directive Principles of State Policy (DPSP)

• The concept of DPSP in the Indian Constitution is borrowed from the Irish Constitution

• The Directive Principles are classified on the basis of their ideological source and objectives.

1. Socialist Principles

2. Gandhian Principles

3. Liberal and Intellectual Principles

Q17. Answer: (d) West Bengal

The correct answer is West Bengal.

Key Points

• Alkap is a village dance-drama performance prevalent in Jharkhand's Rajmahal hills and West Bengal's Rajshahi, Murshidabad, and Malda area.

• It is done by groups of 10-12 dancers, with one or two lead singers.

• The troops recite popular folklore and mythical stories, with comedic sketches known as kap sprinkled throughout.

• The dance is commonly linked with Shiva's Gajan festival.

Additional Information Some important folk dances:

States	Folk Dances
Gujarat	• Bhavai - Dandia - Garba - Padhar - Tippani
Chhattisgarh	• Saila Dance - Karma Dance - Sau Nacha - Pandavani - Panthi Dance
Rajasthan	• Ghoomar - Kathputli - Kabelia - Bhavai - Kacchi Ghodi
West Bengal	• Gambhira - Chhau - Kirtan Dance - Alkap - Kushan Dance

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Q18. Answer: (d) Either 'vj' or 'rb'

The logic followed here is :-

Therefore Here, 'travel' is coded as either vj or rb.

Hence, the correct answer is "Either 'vj' or 'rb' ".

Q19. Answer: (d) 550

Shortcut Trick

Ratio of Ram to Rahim amount → (1/3) × Ram = (2/5) × Rahim

Ram : Rahim = (2/5) : (1/3) = (2 × 3) : (5 × 1) = 6 : 5

Total units = 6 + 5 = 11 units

11 units = Rs. 1210 => 1 unit = Rs. 110

Rahim's share = 5 units = 5 × 110 = Rs. 550

Therefore The correct answer is Rs. 550.

Alternate Method

Given:

Total amount of Ram (A) and Rahim (B) = Rs. 1210

Condition: (1/3) of A = (2/5) of B

Calculations:

=> (1/3)A = (2/5)B

=> A/B = (2/5) ÷ (1/3)

=> A/B = (2/5) × 3/1 = 6/5

=> Ratio A : B = 6 : 5

=> Sum of ratio = 6 + 5 = 11

=> Rahim's share = (5/11) × 1210

=> Rahim's share = 5 × 110

=> Rahim's share = Rs. 550

Therefore The correct answer is Rs. 550.

Additional Information

Ratio Division Rule

If a total amount T is divided in the ratio x : y, then the share of the first part is [x/(x+y)] × T and the second part is [y/(x+y)] × T.

Proportion of Fractions

When fractions are involved in equality (e.g., mA = nB), the ratio of the quantities is the inverse of the coefficients: A : B = n : m.

Unitary Method in Ratios

Total Value ÷ Total Ratio Units gives the value of 1 unit, which can then be multiplied by any specific part of the ratio to find its respective value.

Q20. Answer: (d) 146

Shortcut Trick

Direct formula for Perimeter from Diagonal (d) and Area (A): $(l + b)^2 = d^2 + 2 \times A$.

=> $(l + b)^2 = 53^2 + 2 \times 1260 = 2809 + 2520 = 5329$.

=> $(l + b) = \sqrt{5329} = 73$ cm.

=> Perimeter = 2 × (l + b) = 2 × 73 = 146 cm.

Therefore The correct answer is 146 cm.

Alternate Method

Given:

Diagonal (d) of the rectangle = 53 cm

Area (A) of the rectangle = 1260 cm^2

Formula Used:

1. Diagonal $(d)^2 = l^2 + b^2$

2. Area = l × b

3. Perimeter = 2(l + b)

Calculations:

=> $l^2 + b^2 = 53^2 = 2809$

=> $l \times b = 1260$

=> Multiplying Area by 2: $2lb = 2 \times 1260 = 2520$

=> We know that $(l + b)^2 = l^2 + b^2 + 2lb$

=> $(l + b)^2 = 2809 + 2520 = 5329$

=> $l + b = \sqrt{5329} = 73$ cm

=> Perimeter $= 2(l + b) = 2 \times 73 = 146$ cm

Therefore The correct answer is 146 cm.

Additional Information

Properties of Rectangle

A rectangle is a quadrilateral where all four angles are right angles (90°). Opposite sides are equal and parallel, and diagonals bisect each other and are equal in length.

Algebraic Identity

The identity $(a + b)^2 = a^2 + b^2 + 2ab$ is essential for solving problems involving the sum of squares and the product of two variables, such as length and breadth.

Pythagoras Theorem in Rectangles

The diagonal of a rectangle forms a right-angled triangle with the length and breadth. Thus, $\text{Diagonal}^2 = \text{Length}^2 + \text{Breadth}^2$.

Perimeter vs Area

Area is the product of dimensions (lb), while Perimeter is the total length of the boundary 2(l+b). For a fixed area, the perimeter is minimum when the rectangle is a square.

Q21. Answer: (c) 4224

Given:

Slant height = 32 m

Diameter of a cone = 48 m

Formula used:

Total surface area of cone $= \pi rl + \pi r^2$

Calculation:

According to the question

Radius of the cone = 48/2 = 24 m

Slant height of the cone = 32 m

Now,

Total surface area of cone $= \pi rl + \pi r^2$

=> $(22/7 \times 24 \times 32) + (22/7 \times 24 \times 24)$

=> $(16,896/7 + 12,672/7)$

=> $29,568/7$

=> $4224\ m^2$

Therefore The total surface area of a cone is $4224\ m^2$

Q22. Answer: (b) 56

According to the given information:-

Alok ranked 19th from the top and 38th from the bottom in a class.

Number of students in the class = 38 + 19 - 1

Number of students in the class = 57 - 1

Therefore Here, Number of students in the class = 56

Hence, the correct answer is "56".

Q23. Answer: (a) 800

Shortcut Trick

Speed in m/s = $4 \times (5/18) = 10/9$ m/s.

Diagonal (Distance) = Speed × Time = $(10/9) \times 36 = 40$ m.

Area of Square = $(\text{Diagonal}^2) \div 2 = (40 \times 40) \div 2 = 800\ m^2$.

Therefore The correct answer is $800\ m^2$.

Alternate Method
Given:
Speed of the boy = 4 km/hr
Time taken to cross diagonally = 36 seconds
Formula used:
1. Distance = Speed × Time
2. Speed (m/s) = Speed (km/hr) × (5/18)
3. Area of square = (Diagonal²) / 2
Calculations:
=> Speed = 4 × (5/18) m/s = 10/9 m/s
=> Length of the diagonal = Speed × Time
=> Diagonal (d) = (10/9) × 36 = 10 × 4 = 40 m
=> Area of the square field = d^2 / 2
=> Area = (40 × 40) / 2
=> Area = 1600 / 2 = 800 m^2
Therefore The correct answer is 800 m^2.
Additional Information
Diagonal and Side Relationship
In a square, the diagonal (d) is related to the side (a) by the formula: $d = a\sqrt{2}$.
Area Formulas for Square
Area can be calculated either as $(Side)^2$ or $(Diagonal^2) \div 2$.
Unit Conversion
To convert km/hr to m/s, multiply by 5/18. To convert m/s to km/hr, multiply by 18/5.

Q24. Answer: (c) 1/2

Shortcut Trick
Given sin θ = 4/5, use the standard 3-4-5 Pythagorean triplet.
Perpendicular (P) = 4, Hypotenuse (H) = 5 => Base (B) = 3.
Substitute values: tan θ = 4/3, cos θ = 3/5, sec θ = 5/3, cot θ = 3/4.
Expression = [3(4/3) − 5(3/5)] / [3(5/3) − 4(3/4)] = [4 − 3] / [5 − 3] = 1/2.
Therefore The correct answer is 1/2.
Alternate Method
Given: sin θ = 4/5 and 0° < θ < 90° (First Quadrant).
Formula: $\sin^2\theta + \cos^2\theta = 1$ | tan θ = sin θ/cos θ | sec θ = 1/cos θ | cot θ = 1/tan θ
=> cos θ = $\sqrt{(1 - \sin^2\theta)} = \sqrt{(1 - 16/25)} = \sqrt{(9/25)} = 3/5$
=> tan θ = (4/5) ÷ (3/5) = 4/3
=> sec θ = 1 ÷ (3/5) = 5/3
=> cot θ = 1 ÷ (4/3) = 3/4
=> Value = [3 × (4/3) − 5 × (3/5)] ÷ [3 × (5/3) − 4 × (3/4)]
=> Value = (4 − 3) ÷ (5 − 3) = 1/2
Therefore The correct answer is 1/2.
Additional Information
Pythagorean Triplets
Sets of three positive integers a, b, and c such that a2 + b2 = c2. Common examples include (3, 4, 5), (5, 12, 13), and (8, 15, 17).
Trigonometric Identities
Fundamental relations like $\sec^2\theta - \tan^2\theta = 1$ and $\text{cosec}^2\theta - \cot^2\theta = 1$ are essential for simplifying complex expressions.

Q25. Answer: (d) 1904

The correct answer is 1904.
Key Points
• The Ancient monuments Preservation Act was passed in the year 1904.
• It was an Act to provide for the preservation of Ancient Monuments and objects of archaeological, historical, or artistic interest.

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• It was passed during the time of Lord Curzon.

• This Act preserves and restores ancient Indian monuments by Archaeological Survey of India (ASI).

• ASI department was made to collect the historical documents and importance, conduct excavations and bring the ancient historical information into the light.

Additional Information

• Archeological Survey of India (ASI):

• ASI was founded by Alexander Cunningham in 1861.

• He also became its first Director-General.

• Sir Alexander Cunningham was a British army engineer with the Bengal Engineer Group.

• Alexander Cunningham was appointed to the newly created position of an archaeological surveyor to the government of India in 1861.

• The (ASI) Archaeological Survey of India is an Indian government agency attached to the Ministry of Culture.

• ASI is responsible for archaeological research and the conservation and preservation of cultural monuments in our country.

Q26. Answer: (d) 40

Shortcut Trick

Total distance = 250 + 120 + 50 = 420 km.

Total time needed = Total distance ÷ Average speed = 420 ÷ 42 = 10 hours.

Time for first and third parts = (250 ÷ 50) + (50 ÷ 25) = 5 + 2 = 7 hours.

Time for second part = 10 − 7 = 3 hours.

Value of k = Distance ÷ Time = 120 ÷ 3 = 40 km/h.

Therefore The correct answer is 40.

Alternate Method

Given:

Distances: d1 = 250 km, d2 = 120 km, d3 = 50 km

Speeds: v1 = 50 km/h, v2 = k km/h, v3 = 25 km/h

Average Speed = 42 km/h

Formula Used:

Average Speed = Total Distance ÷ Total Time

Time = Distance ÷ Speed

250 km

50 km/h

120 km

k km/h

50 km

25 km/h

Average Speed = 42 km/h

Calculations:

=> Total Distance = 250 + 120 + 50 = 420 km

=> Total Time = Total Distance ÷ Average Speed

=> Total Time = 420 ÷ 42 = 10 hours

=> Time for segment 1 (t1) = 250 ÷ 50 = 5 hours

=> Time for segment 3 (t3) = 50 ÷ 25 = 2 hours

=> Time for segment 2 (t2) = Total Time − (t1 + t3)

=> t2 = 10 − (5 + 2) = 3 hours

=> Speed of segment 2 (k) = Distance2 ÷ t2

=> k = 120 ÷ 3 = 40 km/h

Therefore The correct answer is 40.

Additional Information

Average Speed for Two Equal Distances

If a person covers two equal distances at speeds x and y, then Average Speed = 2xy ÷ (x + y).

Average Speed for Three Equal Distances

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If three equal distances are covered at speeds x, y, and z, then Average Speed = 3xyz ÷ (xy + yz + zx).

Speed Unit Conversion

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

Q27. Answer: (b) 2007

The correct answer is 2007.

Key Points

• Red Fort Complex

• It was built by the Mughal Emperor Shah Jahan.

• Shah Jahan commissioned construction of the Red Fort on 12 May 1638, when he decided to shift his capital from Agra to Delhi.

• Red Fort is the fusion of the Timurids and the Persians architectural styles.

• Ustad Ahmad Lahauri was the architect of the Red Fort.

• Indo-Islamic and Mughal architectural styles are present in the Red Fort Complex.

• The fort was designated a UNESCO World Heritage site in 2007.

• It is situated on the Banks of River Yamuna.

Additional Information

• Shah Jahan

• Shahjahan was the fifth Mughal emperor of India and was the son of Jahangir.

• His grandfather Akbar gave him the name Khurram.

• He was given the title of "The Builder of the Marvels" as he had a remarkable ability to design new structures and redesign old forts.

• He built the Taj Mahal in Agra, the Moti Masjid in Lahore, the Jama Masjid of Delhi, and Section of Agra Fort, etc.

Q28. Answer: (b) Nigeria

The correct answer is Nigeria.

Key Points

• On 16 February 2021, Ngozi Okonjo Iweala was appointed as the first Woman Director-General of World Trade Organisation (WTO).

• She belongs to Nigeria.

• Okonjo-Iweala assumed office on 1 March 2021, and became both the first woman and the first African to hold this position.

• Okonjo-Iweala, the former finance minister of Nigeria, will succeed Roberto Azevedo, who stepped down in August 2020.

• She is the seventh Director-General of the WTO. Her term of office will expire on 31 August 2025.

Additional Information

• The World Trade Organisation is an international organization set up in 1995 by replacing the General Agreement on Trade and Tariffs (GATT) under the Marrakesh Agreement.

• The World Trade Organization (WTO) is the only global international organization dealing with the rules of trade between nations.

• The WTO has 164 members and 25 observer governments.

• Headquarters - Geneva, Switzerland.

Q29. Answer: (c) Arunachal Pradesh

The correct answer is Arunachal Pradesh.

Key Points

• Dibang valley district of Arunachal Pradesh displays the lowest population in the country with a population of 7,948.

• Dibang Valley is a district of Arunachal Pradesh named after the Dibang River or the Talon as the Mishmis call it.

• It is the least populated district in India and has an area of 9,129 square kilometres.

• The Dibang River originates in the mountains of Arunachal Pradesh and flows through the length of the valley which is named after it.

• The Dibang has multiple tributaries and only once it debouches into the plains is it called by its name.

• Some of the major rivers of the Dibang Valley District are Ahui, Emra, Mathun, Dri, Tangon, Ithun, and Ange.

• According to the Census 2011, Arunachal Pradesh has the lowest population density.

Additional Information

• The second-lowest populated district of India is Anjaw which is also in Arunachal Pradesh.

• It had a population of 21,167 in Census 2011.

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• The highest populated district in India was Thane in Census 2011 with a population of 1.1 Crore.
• North 24 Pargana was the second most populated district in India with a population of 1.08 Crore.
• Bihar has the highest population density in Census 2011.
• Uttar Pradesh has the highest population in Census 2011.
• Maharashtra has the second-highest Population in Census 2011.

Q30. Answer: (c) 1 37/41

Concept Used:
Follow the BODMAS rule according to the table given below:
Calculation:
41/3 ÷[2 2/3-1/3 ×(4 1/2-3 1/3)]
=> 13/3 ÷ [8/3 – 1/3 × (9/2 – 10/3)]
=> 13/3 ÷ [8/3 – 1/3 × (27 – 20)/6]
=> 13/3 ÷ [8/3 – 1/3 × 7/6]
=> 13/3 ÷ [8/3 – 7/18]
=> 13/3 ÷ [(48 – 7)/18]
=> 13/3 ÷ 41/18
=> 13/3 × 18/41
=> 78/41
=> 1 37/41
Therefore The required value is 1 37/41

Q31. Answer: (c) 972 sq.cm

Shortcut Trick
In an isosceles triangle, the altitude to the base bisects the base into two equal parts of 27 cm each (54 ÷ 2 = 27).
Using Pythagorean triplet (9, 12, 15) scaled by 3 → (27, 36, 45).
Height (h) = 36 cm.
Area = 1/2 × Base × Height = 1/2 × 54 × 36 = 27 × 36 = 972 sq.cm.
Therefore The correct answer is 972 sq.cm.
Alternate Method
Given:
Base (b) = 54 cm
Equal sides (a) = 45 cm
Formula Used:
Area of Isosceles Triangle = (b/4) × √(4a² − b²)
Calculations:
=> Area = (54/4) × √(4 × 45² − 54²)
=> Area = 13.5 × √(4 × 2025 − 2916)
=> Area = 13.5 × √(8100 − 2916)
=> Area = 13.5 × √5184
=> Area = 13.5 × 72
=> Area = 972 sq.cm.
Therefore The correct answer is 972 sq.cm.
Additional Information
Heron's Formula
For a triangle with sides a, b, c and semi-perimeter s = (a+b+c)/2, Area = √[s(s−a)(s−b)(s−c)].
Height of Isosceles Triangle
The altitude (h) drawn to the base (b) of an isosceles triangle with equal sides (a) is given by h = √(a² − (b/2)²).
Properties of Isosceles Triangle
The angles opposite to the equal sides are equal, and the altitude to the base bisects both the base and the vertex angle.

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Q32. Answer: (d) Evergreen Revolution

The correct answer is Evergreen Revolution.

Key Points

• MS Swaminathan is an Indian geneticist.

• M S Swaminathan is considered as the "father of the green revolution in India".

• Evergreen revolution refers to productivity improvement in perpetuity without ecological and social harm.

• Dr.M.S.Swaminathan coined the term ‘‘Evergreen Revolution” to highlight the pathway of increasing production and productivity in a manner such that short and long-term goals of food production are not mutually antagonistic. The logic is to produce more from less, less land, less pesticide, less water and it must be an evergreen revolution to get sustainable agriculture.

• Dr. Swaminathan was the chairman of the national commission on farmers in India.

• He developed high-yielding varieties of wheat in India as a part of the green revolution.

• The spread of the green revolution enabled India to achieve self-sufficiency in food grains.

• The Green Revolution in India was first introduced in Punjab.

• MS Swaminathan served as a Member of Parliament (Rajya Sabha) from 2007 to 2013.

Important Points

• William S Gaud is a former administrator of the United States Agency for international development.

• He coined the term 'green revolution' first time.

• The green revolution is the initiative launched for the development of new crop varieties to increase agricultural production in developing countries.

• Norman Borlaug is considered the "father of the green revolution".

Additional Information

Revolution	Purpose
Golden Revolution	Related with Overall Horticulture, Honey, Fruit Production
Blue Revolution	Related with Fish Production
Grey Revolution	Related with Fertilizers
White Revolution	Related with Dairy, Milk Production
Yellow Revolution	Related with Oil Seed Production
Pink Revolution	Related with Meat and Poultry Production
Black Revolution	Related with Petroleum Production

Q33. Answer: (b) CNV

The logic followed here is :-

• JUG is related to LSI.

and,

• WIN is related to YGP.

Similarly,

• APT is related to :

Hence, the correct answer is "CNV".

Q34. Answer: (d) 12

Given:

The HCF of 1683, 2244 and 5049 is x.

Concept used:

HCF - The greatest number which divides each of the two or more numbers

Calculation:

=> 1683 = 3 × 3 × 11 × 17

=> 2244 = 2 × 2 × 3 × 11 × 17

=> 5049 = 3 × 3 × 3 × 11 × 17

The HCF = (3 × 11 × 17)

=> 561

So,

=> x = 561

Now,

The sum of digits of x = (5 + 6 + 1)

=> 12

Therefore The required sum of digits of x is 12

Q35. Answer: (d) RVAFK

The logic followed here is :-

• All letters are decreased by -3.

Hence, the correct answer is "RVAFK".

Q36. Answer: (b) 1 - (d), 2 - (c), 3 - (a), 4 - (b)

The correct answer is 1 - (d), 2 - (c), 3 - (a), 4 - (b).

Key Points

• Navreh

• It is the lunar new year that is celebrated in Kashmir.

• It is the Sanskrit word ‘Nav-Varsha’ from where the word ‘Navreh’ has been derived.

• It falls on the first day of the Chaitra Navratri.

• Ugadi

• The festival of Ugadi is celebrated on the first day of Chaitra month as per the Hindu calendar

• Ugadi, also known as Yugadi, is a renowned South Indian festival mainly celebrated in Andhra Pradesh, Karnataka, and Telangana to commemorate the beginning of a new year.

• For Ugadi, doors in homes are adorned with mango leaf decorations called toranalu or Torana in Kannada

• Vishu

• It is a Hindu festival celebrated in the Indian state of Kerala, Tulu Nadu region in Karnataka, Mahé district of Union Territory of Pondicherry, neighboring areas of Tamil Nadu, and their diaspora communities.

• "Vishu" means "equal" in the Sanskrit language.

• It is called Malayali New year

• The festival marks the first day of Medam, the ninth month in the solar calendar followed in Kerala.

• Pana Sankranti

• Oriya New Year is also known as Pana Sankranti and it is observed as the first day of the Oriya Calendar.

• It is also known as ‘Maha Vishuba Sankranti,’ ‘Maha Sankranti,’ and ‘Mesha Sankranti’ is a festival that is widely celebrated across Odisha as the traditional New Year

• Pana Sankranti is named after ‘Pana,’ the main fruit drink which is prepared in Odisha’s traditional culture.

Q37. Answer: (a) South-West

From the given information the direction of Sunil is as follows :

Therefore Here, 'Z' is in south-west direction with respect to 'R'.

Hence, the correct answer is "South-West".

Q38. Answer: (d) Chief of the Air Staff

The correct answer is Chief of the Air Staff.

Key Points

• Air Chief Marshal Vivek Ram Chaudhari took over as the Chief of the Air Staff (CAS) on 30 September 2021.

• He is the 27^(th) Chief of the Air Staff of the Indian Air Force.

• He took over the charge from his predecessor RKS Bhadauria.

• The appointments for the post are made by the Appointments Committee of the Cabinet.

Additional Information

• The supreme commander of the Indian Armed Forces (President) : Droupadi Murmu (Article 52)

• Union Defence Minister: Rajnath Singh

• Chief of Army Staff (COAS): Manoj Pandey

• Chief of Naval Staff (CNS): R Harikumar

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(as of May 2022)

Q39. Answer: (b) Gamma rays

The correct answer is Gamma Rays.

Key Points

• Gamma rays have the shortest wavelength and highest frequency (energy) in the electromagnetic spectrum.
• They are electromagnetic waves with wavelengths in the range of 10^(-12)m and frequencies around 10^(20)- 10^(24)Hz.
• They have a high penetrating power.
• They are a result of decaying radioactive material and can also be found in outer space.
• They are used in medical applications for sterilisation of equipment and cancer treatment.

Additional Information

• Other radiations in the Electromagnetic spectrum are:

Q40. Answer: (a) Sutlej

The correct answer is Sutlej.

Key Points

• Sutlej is a tributary of River Indus.
• Shutudri is the name of the river mentioned during Vedic age.
• It starts from Lake Rakshastal and is a major river among the five rivers of Punjab.

Additional Information

• Ganga is the major river system in India.
• It starts from the Gangotri in the Himalayas and drains into the Bay of Bengal.
• The major tributaries of the Ganga are:
• Right bank tributaries: Yamuna, Chambal, Banas, Ken, Betwa, Son, Rihand, Koel
• Left bank tributaries : Bhagirathi, Alakananda, Ramganga,Ghahgra, Gomti, Gandak, Rapti, Kosi

Q41. Answer: (b) 39

The correct answer is 39.

Key Points

• 2021 ASBC Asian Youth & Junior Boxing Championships were held in Dubai.
• India won 39 medals in the competition of which 14 are gold.
• The competition was conducted at the levels of Junior and Youth groups.

Additional Information

• ASBC stands for Asian Boxing Confederation that conducts Boxing championships at various levels.
• 2022 ASBC Asian Youth and Junior Boxing Championships were held in Amman, Jordan.

Q42. Answer: (a) 18

Shortcut Trick

Total efficiency = 3 + 5 + 8 = 16 units/day.

Total work = Total efficiency × Total days = 16 × 15 = 240 units.

Work done by A and B in 12 days = (3 + 5) × 12 = 96 units.

Remaining work = 240 − 96 = 144 units.

Time taken by C = Remaining work ÷ Efficiency of C = 144 ÷ 8 = 18 days.

Therefore The correct answer is 18 days.

Alternate Method

Given efficiencies: A = 3, B = 5, C = 8.

Working together, (A + B + C) completes work in 15 days.

Person	Days	Total Work	Efficiency
A + B + C	15	240	16
A	•	3	

B	•	5	
C	•	8	

=> Total work = 15 × 16 = 240 units.

=> Efficiency of A + B = 3 + 5 = 8 units/day.

=> Work completed by A and B in 12 days = 12 × 8 = 96 units.

=> Remaining work = 240 − 96 = 144 units.

=> Time taken by C to finish remaining work = 144 ÷ 8 = 18 days.

Therefore The correct answer is 18 days.

Additional Information

Efficiency and Time Relationship

Efficiency is inversely proportional to the time taken to complete the work (Efficiency prop. to 1 ÷ Time).

Work and Wages

Wages are generally distributed among workers in the ratio of the work done by them, which is the same as the ratio of their efficiencies if they work for the same duration.

Pipes and Cisterns

This concept is identical to Time and Work, where the efficiency of an inlet pipe is positive and the efficiency of an outlet/leakage pipe is negative.

Q43. Answer: (b) Friday

We know that:

In an ordinary year, there are 365 days and on dividing 365 by 7,

• We get remainder = 1 so this extra one day is taken as odd day.

Similarly, in an leap year, there are 366 days and on dividing 366 by 7,

• we get remainder = 2 so this extra two days is taken as odd days.

Thus, the remainder, which we get after dividing the number of days by 7 is considered as odd days.

Given 16th April 2021 was on a Saturday.

• Number of days in month of April = 30 days

• Remaining number of days in month of April after 16^(th) April = 14 days.

• Number of days in month of May = 31 days.

• Number of days until 3^(rd) June = 3 days

Therefore The total number of days = 14 + 31 + 3

Therefore The total number of days = 48

=> The number of odd days from 16th April 2021 until 3rd June 2021 = 48 ÷ 7 = 6 odd days

Therefore 16th April 2021, it was Saturday + 6 odd days = Friday.

Therefore Here, Amit's wife's birthday on 3rd June 2021 is 'Friday'.

Hence, the correct answer is "Friday".

Q44. Answer: (a) 87

The logic followed here is :-

(Second number + Third number)^(1/2) = First number.

1) 8, 35 = 29

= (35 + 29)^(1/2)

= 64^(1/2)

= 8

2) 10, 48 = 52

= (48 + 52)^(1/2)

= 100^(1/2)

= 10

Similarly,

3) 12, 57 = ?

=> (57 + x)^(1/2) = 12

=> 57 + x = 12²

=> 57 + x = 144

=> x = 144 - 57

=> x = 87

Hence, the correct answer is "87".

Q45. Answer: (a) 60

Shortcut Trick

The terms K − 10, K + 10, and K + 38 are in Continued Proportion (Geometric Progression).

Common ratio r = (Difference of 2nd and 3rd terms) ÷ (Difference of 1st and 2nd terms)

r = (38 − 10) ÷ (10 − (−10)) = 28 ÷ 20 = 7/5

So, (K + 10) ÷ (K − 10) = 7/5. By Componendo and Dividendo: 2K ÷ 20 = 12 ÷ 2

=> K ÷ 10 = 6 => K = 60

Therefore The correct answer is 60.

Alternate Method

Given: Three terms (K − 10), (K + 10), and (K + 38) are in continued proportion.

Formula Used: If three numbers a, b, and c are in continued proportion, then b² = a × c.

Calculations:

=> (K + 10)² = (K − 10)(K + 38)

=> K² + 20K + 100 = K² + 38K − 10K − 380

=> 20K + 100 = 28K − 380

=> 28K − 20K = 100 + 380

=> 8K = 480

=> K = 480 ÷ 8

=> K = 60

Therefore The correct answer is 60.

Additional Information

Continued Proportion

Three quantities a, b, and c are in continued proportion if the ratio of the first to the second is equal to the ratio of the second to the third (a:b = b:c).

Mean Proportional

In the proportion a:b = b:c, b is called the mean proportional between a and c, calculated as b = √(a × c).

Geometric Progression (GP)

Quantities in continued proportion are always in GP where the common ratio r = b/a = c/b.

Componendo and Dividendo Rule

If x/y = p/q, then (x + y)/(x − y) = (p + q)/(p − q). This is useful for solving fractional equations quickly.

Q46. Answer: (c) V

Eight people M, N, P, S, T, V, X and Y are sitting in a straight row and all are facing north.

1) M sits second from one of the extreme ends of the row.

Case (i) :

Case (ii) :

2) Only two people sit between M and N.

Case (i) :

Case (ii) :

3) P sits second to the right of N.

Case (i) :

Case (ii) :

4) As many people sit to the right of P as to the left of S.

Here case (i) gets eliminated.

5) More than three people sit between S and T.

6) V sits to the immediate right of X.

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Thus seating arrangement of all eight people :

Therefore Here, 'V' sits third to the left of 'Y'.

Hence, the correct answer is "V".

Q47. Answer: (d) Gregor Mendel

The correct answer is Gregor Mendel.

Key Points

• Gregor Mendel is a mathematician and biologist from the Austrian Empire (now Czech republic).

• He is called as Father of Genetics for his extensive research and observations done on pea plants and their characteristics.

• He coined the terms recessive and dominant and used statistical models to learn the behaviour of the plant.

• He developed principles of inheritance that explained the transmission of genes.

• His observations were later verified with experiments that laid the foundation of the modern field of Genetics.

Additional Information

• Charles Darwin

• He is an English biologist.

• He is known for his work on the evolution of life and the principles of the Theory of natural selection.

• He is the author of the famous book “Origin of Species”.

• Robert Hook

• He is an English scientist and mathematician.

• He is known for using a microscope and observing a microorganism for the first time.

• He also devised the equation describing elasticity which is known as Hooke’s law.

• EP Odum

• He is an American biologist.

• He is known for his work and explaining the concept of the ecosystem.

Q48. Answer: (d) B

Ten people are sitting in two parallel rows 1 and 2.

• A, B, C, D and E are sitting in row 1 facing north.

• V, W, X, Y and Z are sitting in row 2 facing south.

1) A sits second from the right end of the row.

2) W faces an immediate neighbour of A.

• Case (i) :

• Case (ii) :

3) X sits third to the right of W.

4) The one who faces X, sits to the immediate right of B.

5) Only one person sits between B and C.

6) V sits to the immediate right of Y.

7) D does not sit at any of the extreme ends of the row.

• Thus the final arrangement:

Therefore Here, 'Z' is sitting opposite and faces 'B'.

Hence, the correct answer is "B".

Q49. Answer: (c) Pooja

Six friends are sitting in a circle facing the centre of the circle.

1) Anil is to the immediate left of Veena.

2) Anil and Guna are the immediate neighbours of Giri.

3) Veena and Sadvi are the immediate neighbours of Pooja.

Therefore Here, 'Pooja' is immediate right of 'Veena'.

Hence, the correct answer is "Pooja".

Q50. Answer: (b) Enter

The correct answer is Enter.

• The shortcut key to create a new paragraph in MS Word is the ‘Enter’ key.

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• This key takes control to a new paragraph in the document.
• The settings in the paragraph tab like spacing and indentation are followed during the creation of the new paragraph.
• 'Shift+Enter' is used to go to a new line in MS Word.

Q51. Answer: (c) 2

Concept Used:

Follow the BODMAS rule according to the table given below:

Calculation:

[(7 × 9) + (3 × 8) + 3] ÷ [(9 × 4) + (72 ÷ 8)]

=> [(7 × 9) + (3 × 8) + 3] ÷ [(9 × 4) + 9]

=> [(7 × 9) + (3 × 8) + 3] ÷ (36 + 9)

=> [(7 × 9) + (3 × 8) + 3] ÷ 45

=> [63 + (3 × 8) + 3] ÷ 45

=> [63 + (24 + 3)] ÷ 45

=> (63 + 27) ÷ 45

=> 90 ÷ 45

=> 2

Therefore The required value is 2

Q52. Answer: (d) Both conclusions III and IV follow.

The least possible Venn diagram for the given statements is as shown below :-

Conclusions:

I. All pharmacists are mathematicians → False (As All pharmacists are statisticians and Some statisticians are mathematicians so, All pharmacists are mathematicians, hence, false)

II. Some pharmacists are mathematicians → False (As All pharmacists are statisticians and Some statisticians are mathematicians so, Some pharmacists are mathematicians hence, false)

III. Some mathematicians are statisticians → True (As Some statisticians are mathematicians so, Some mathematicians are statisticians it is definitely true)

IV. Some statisticians are pharmacists → True (As All pharmacists are statisticians so, Some statisticians are pharmacists it is definitely true)

Therefore Here, Conclusions III and IV are true.

Hence, the correct answer is "Both conclusions III and IV follow".

Q53. Answer: (b) Service

The correct answer is Service.

Key Points

• According to the Economic Survey 2021-2022, The Service sector has seen a growth rate of 8.2% and contributed over 50% of India's GDP in 2021-2022.
• Nirmala Sithraman presented the Economic Survey 2021-22 in Parliament on 31st January 2022.
• Some other fiscal developments as per the Survey are as follows:
• The revenue receipts(April-November 2021) from Central Government have gone up by 67.2%.
• Gross Tax Revenue registered a growth of over 50% (April-November 2021).
• Central Government debt has gone up from 49.1%(2019-20) to 59.3%(2020-21) of GDP
• As per the Economic Survey 2021-22, the foreign exchange reserves touched USD 633.6 billion(as of Dec 31, 2021).
• According to the Economic Survey 2021-22, the repo rate was maintained at 4% in 2021-22.
• The Economic Survey also revealed that Rs. 89,066 crores was raised via 75 Initial Public Offering (IPO) issues in April-November 2021.

Additional Information

• The Economic Survey was first released in 1950-51 and presented with the budget until 1964.
• The Economic Survey was separated from the budget after 1964.
• V Anantha Nageswaran is the current Chief Economic Advisor(CEA).

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Q54. Answer: (a) bajada

The correct answer is bajada.

Key Points

• Bajada

• It is a depositional feature made up of alluvial material laid down by the intermittent streams.

• Bajada is formed by the coalescence of alluvial fans.

• These fan-shaped deposits form from the deposition of sediment by a stream from the upland region onto flat land at the base of a mountain.

• Bajadas are common in arid areas where a large quantity of sediment is deposited by flash floods.

• Bajadas frequently contain playa lakes.

Additional Information

• Floodplain:- At times the river overflows and leads to the flooding at banks, depositing layers of sediments causing the formation of a flat fertile floodplain.

• Mesa is an elevated area of land that is much larger and is slightly less elevated than a Buttes.

• Bouma sequence describes a characteristic sequence of sedimentary structures occurring in sedimentary rocks.

Q55. Answer: (b) 2022

The correct answer is 2022.

Key Points

• In June 2018, Prime Minister Narendra Modi said India will eliminate SUP (single-use plastics) by 2022.

• This was reinforced during the fourth United Nations Environment Assembly (UNEA) held in March 2019, where India piloted two resolutions - one relating to SUPs and Sustainable Nitrogen management.

• A National Level Taskforce has also been constituted by the Ministry of Environment, Forest and Climate Change (MoEFCC) for taking coordinated efforts to eliminate identified single-use plastic items and effective implementation of Plastic Waste Management Rules, 2016.

• Recently, the Ministry of Environment, Forest, and Climate Change vide notification dated 12th August 2021, notified the Plastic Waste Management (Amendment) Rules, 2021.

• The amendment basically aims to prohibit identified single-use plastic items, having low utility and high littering potentials, by the year 2022.

Additional Information

• The manufacture, import, stocking, distribution, sale, and use of the following single-use plastic, including polystyrene and expanded polystyrene, commodities shall be prohibited with effect from the 1st July, 2022:

• Earbuds with plastic sticks, plastic sticks for balloons, plastic flags, candy sticks, ice-cream sticks, polystyrene [Thermocol] for decoration;

• Plates, cups, glasses, cutlery such as forks, spoons, knives, straw, trays, wrapping or packing films around sweet boxes, invitation cards, and cigarette packets, plastic or PVC banners less than 100 micron, stirrers.

Q56. Answer: (a) 1955

The correct answer is 1955.

Key Points

• The Citizenship Act of 1955

• The Citizenship Act of 1955 prescribes five ways of acquiring citizenship:

1. By Birth

2. By Descent

3. By Registration

4. By Naturalisation

5. By Incorporation of Territory- If any foreign territory becomes a part of India, the Government of India specifies the persons who among the people of the territory shall be the citizens of India.

• The Citizenship Act, 1955, prescribes three ways of losing citizenship whether acquired under the Act or before it under the Constitution:

1. By Renunciation only a single citizenship

2. By Termination

3. By Deprivation

• According to The Citizenship Act, 1955, if any foreign territory becomes a part of India, the Government of India specifies the persons who among the people of the territory shall be the citizens of India. Such persons become the citizens of India from the

notified date.

• Single Citizenship - Though the Indian Constitution is federal and envisages a dual polity (Centre and states), it provides for only single citizenship, that is, Indian citizenship. The citizens in India owe allegiance only to the Union. There is no separate state citizenship.

Additional Information

• Citizenship Amendment Act, 2019

• The Bill amends the Citizenship Act, of 1955, and grants citizenship to the Hindus, Sikhs, Buddhists, Jains, Parsis, and Christian communities from Afghanistan, Bangladesh, and Pakistan, who entered India on or before December 31, 2014.

• To obtain citizenship by naturalization, one of the qualifications is that the person must have resided in India or have been in the service of the central government for at least 11 years before applying for citizenship.

• But the act reduced the period to five years for Hindus, Sikhs, Buddhists, Jains, Parsis, and Christian communities.

Q57. Answer: (b) 15

Given:

The mean of all the prime numbers between 10 and 22

Concept used:

Prime number - A number which has only two factors 1 and itself

Formula used:

Mean = sum of observations/Number of observations

Calculation:

The prime number between 10 and 22 is

=> 11, 13, 17, 19

The sum of all prime numbers = (11 + 13 + 17 + 19) = 60

The mean of all the prime numbers between 10 and 22 = (60/4)

=> 15

Therefore The required mean is 15

Q58. Answer: (c) Rs. 304

Given:

Ram and Dipti each invested a sum of Rs. 8000 for a period of two years at 30% compound interest per annum.

Rate of interest of Ram is compound annually

Rate of interest of Dipti is compounded every eight months

Formula used:

A = P(1 + r/100)^t

Calculation:

When rate of interest is compounded eight months of Dipti = (30 × 8/12)%

=> 20%

Time for Dipti = (2 × 12/8) = 3 years

Now,

CI for Ram is

=> A = P(1 + r/100)^t

=> A = 8000(1 + 30/100)²

=> 8000(1 + 3/10)²

=> (8000 × 13/10 × 13/10)

=> (80 × 169)

=> 13,520

Interest = A – P

=> Rs. (13,520 – 8000)

=> Rs. 5520

Now,

CI for Dipti is

=> A = P(1 + r/100)^t

=> A = 8000(1 + 20/100)³

=> 8000(1 + 1/5)³

=> 8000(6/5)³

=> (8000 × 216/125)

=> (64 × 216)

=> 13,824

Interest = A – P

=> Rs. (13,824 – 8000)

=> Rs. 5824

Now,

Dipti receive as interest compared to Ram at the end of the two-year period = Rs. (5824 – 5520)

=> Rs. 304

Therefore The required interest is Rs. 304

Q59. Answer: (c) Eurasian Economic Union

The correct answer is Eurasian Economic Union.

Key Points

• The economic union of states located in Eastern Europe, Western Asia, and Central Asia is the Eurasian Economic Union (EAEU).

• On 29th May 2014 the Treaty on the Eurasian Economic Union was signed by the leaders of Russia, Belarus, and Kazakhstan.

• It came into force on 1st January 2015.

• Kazakhstan, Kyrgyzstan, Russia, Belarus, and Amenia are members of the Eurasian Economic Union.

• The official/ working language of the Eurasian Economic Union is Russian.

• Cuba, Moldova, Uzbekistan, and Iran are observer countries in Eurasian Economic Union.

• It encourages free movement of goods and services, competition and antitrust regulations, provides for common policies in the macroeconomic sphere, technical regulations, foreign trade, and investment, etc.

• The chairman of the Board of the Eurasian Economic Commission is Mikhail Myasnikovich. (May 2022)

Additional Information

• European Union:

• The European Union is a group of 27 countries and was formed in the year 1993.

• It is headquartered in Brussels, Belgium.

• The purpose of the European Union is to:

• Promote peace among nations.

• Establish a unified economic and monetary system.

• Promote inclusion and combat discrimination.

• Break down barriers to trade and borders.

• Encourage technological and scientific developments.

• Environmental protection campaign.

• The United Kingdom left the European Union membership in the year 2020 taking the total tally to 27 member countries.

• CARICOM Single Market and Economy (Caribbean Single Market and Economy)

• It is a group of 15 member countries (currently 13 active) and was formed in 1989 at Grande Anse, Grenada.

• This treaty has transformed the Common Market into the Single Market.

• Andean Community (CAN)

• It was formed on 26 May 1969, in Quito, Ecuador.

• The Headquarters of CAN are located in Lima, Peru.

• It is a South American organization founded to encourage industrial, agricultural, social, and trade cooperation.

• It is a trade bloc of four countries - Bolivia, Colombia, Ecuador, and Peru.

• Chile, Argentina, Brazil, Paraguay, and Uruguay are associate members while Panama, Mexico, and Spain are Observers.

Q60. Answer: (a) hy es

The logic followed here is :-

Thus code for "heard" is "es".

code for "car" is "hy".

Therefore Here, 'heard car' is coded as 'es hy' or 'hy es'.

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Hence, the correct answer is "hy es".

Q61. Answer: (d) Sarangi

The correct answer is Sarangi.

Key Points

• Pundit Ram Narayan

• He is a Hindustani classical musician who plays the bowed instrument, the sarangi.

• He is credited with popularizing the sarangi as a solo classical instrument.

• He was born in 1927 in Amber village in Rajasthan.

Additional Information

• Guitar is a musical instrument usually consisting of six strings.

• The guitar originally evolved from the instrumental sitar.

• Baiju Dharmajan is famous for playing the Guitar.

• Veena is an Indian string instrument that has been named after Saraswati, the Hindu goddess.

• Asad Ali Khan was an Indian musician who played the plucked string instrument Rudra veena.

Important Points

• Sarod is the most ancient musical instrument.

• Ustad Ali Akbar Khan and Brij Narayan are some of the notable exponents of Sarod.

• Tabla is one of the most popular musical instruments in India. It consists of a pair of drums.

• Zakir Hussain is a famous Indian tabla player.

• Sitar is also a popular musical instrument that has a long neck.

• Ustad Imrat Khan and Pandit Ravishankar are famous Sitar players.

• Hari Prasad Chaurasia is famous for playing the flute.

• Pandit Shiv Kumar Sharma is a renowned santoor player.

Q62. Answer: (a) 42

Concept Used:

Follow the BODMAS rule according to the table given below:

Calculation:

(12-[(3-5) × 4] ÷ 8-8+[6 ÷(12 × 2)])/(9 × 15 ÷(12 × 10)-[12 ÷(6 × 2)])

=> (12-[(3-5) × 4] ÷ 8-8+[6 ÷24])/(9 × 15 ÷(12 × 10)-[12 ÷12])

=> (12-[(3-5) × 4] ÷ 8-8+1/4)/(9 × 15 ÷(12 × 10)-1)

=> (12-[-2 × 4] ÷ 8-8+1/4)/(9 × 15 ÷120-1)

=> (12-[-8] ÷ 8-8+1/4)/(9 × 1/8-1)

=> (12- [-1]-8+1/4)/(9 /8-1)

=> (13-8+1/4)/(9 /8-1)

=> (5+1/4)/(9 /8-1)

=> ((20+1)/4)/((9 -8)/8)

=> (21/4)/(1/8)

=> 21/4 × 8/1

=> (21 × 2)

=> 42

Therefore The required value is 42

Q63. Answer: (a) 5/12

Given:

Ravish has read 4/5 of a book

Soma has read only 5/8 of the book

Both however have another 120 pages of their respective books remaining to be read

Calculation:

Ravish has read 4/5 of a book

The remaining read of Ravish = (1 – 4/5) = 1/5

Soma has read only 5/8 of the book

The remaining read of Soma = (1 – 5/8) = 3/8

Now,

Total pages in Ravish book

=> 1/5 = 120 pages

=> 600 pages

Total pages in Soma book

=> 3/8 = 120

=> 320 pages

Now,

The fraction of the number of pages read by Ravish has been read by Soma is

=> (320 × 5/8)/(600 × 4/5)

=> 200/480

=> 5/12

Therefore The fraction of the number of pages read by Ravish has been read by Soma is 5/12

Q64. Answer: (d) N

According to the given information:-

1) K is the tallest while L is the shortest.

2) O is the second shortest person in that group.

3) M is taller than N.

Therefore Here, 'N' is third tallest in the given group.

Hence, the correct answer is "N".

Q65. Answer: (b) Green

From the given information :-

Word	Called
Red	Green
Green	Pink
Pink	Brown
Brown	Violet

We know that 'Red' coloured light is used to stop vehicles on traffic signal.

Therefore Here, 'Red' is called 'Green'.

Hence, the correct answer is "Green".

Q66. Answer: (d) fold mountains

The correct answer is fold mountains.

Key Points

• Himalayan mountain range:

• The Himalayas are a type of young fold mountains.

• Fold mountains are formed due to the collision of tectonic plates.

• When two tectonic plates collide they get compressed resulting in the upliftment of Earth's crust.

• Young because the Himalayas are still in the process of formation.

• Includes the Himalayas, Purvanchal, and their extensions Arakan Yoma (Myanmar) and Andaman and Nicobar Islands (but we will consider these as islands only).

• It is the youngest and highly unstable landmass in India. [Continent – Continent Convergence]

• Tectonic movements are very common.

Additional Information

• Block Mountains are also known as fault mountains.

• These mountains are formed due to natural faults (break up of bedrock) in the earth's crust as a result of being extended and stretched by the tensile forces.

• Block mountains are created by widely breaking up in a large area of bedrock that displaced the earth's crust vertically.

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• These vertical displacements result in tilting the earth's crust and lead to high slopes.
• These mountains have massive structures, steep slopes, and smooth topography.
• The Sierra Nevada Mountains (North America), Harz Mountains (Germany), and Vosges Mountain (Rhine Valley).
• Residual mountains (relict mountains) are those mountains that have been eroded by the agents of degradation such as winds, rain, frost, and running water.
• The hard rocks that are left behind are called residual mountains.
• Aravallis in India, The Sierras of central Spain and Mesas of the USA are some examples of residual mountains.
• A volcanic mountain starts out as a simple crack in the Earth called a volcanic vent.
• Magma erupts out of the ground as lava flows, clouds of ash, and explosions of rock.
• This material falls back to Earth around the vent and piles up around it.
• Over time (and sometimes quite quickly) a volcanic mountain builds up, with the familiar cone shape.
• Mount Merapi, is a volcanic mountain peak located near the centre of the island of Java, Indonesia.

Q67. Answer: (b) Uttarakhand

The correct answer is Uttarakhand.

Key Points

• Tehri Dam
• The tallest dam in India is the Tehri dam built across the Bhagirathi River.
• The Tehri Dam is the highest dam in India and one of the highest in the world.
• It is a multi-purpose rock and earth-fill embankment dam in Uttarakhand, India

Additional Information

• Major Dams and their location

Dam name	River	Location
Baglihar Dam	Chenab	Jammu and Kashmir
Tehri Dam	Bhagirathi	Uttarakhand
Bhakra Nangal	Sutlej	Himachal Pradesh
Sardar Sarovar	Narmada	Gujarat
Hirakud Dam	Mahanadi	Odisha
Nagarjuna Sagar	Krishna	Between the Nalgonda district of Telangana and Guntur district of Andhra Pradesh.

Q68. Answer: (d) India

The correct answer is India.

Key Points

• Indian Diaspora
• As per International Organisation for Migration's (IOM) latest report, Global Migration Report 2020, India continues to be the largest country of origin of international migrants with a 17.5 million-strong diaspora across the world.
• The top three countries of origin of international migrants – are India (17.5 million) > Mexico (11.8 million) > China (10.7 million).
• Between the years 2000 and 2020, the migrant population living overseas grew in nearly all areas and countries worldwide.
• As per the UN Report, "India experienced the largest gain during that period nearly 10 million
• According to the UN's International Migration 2020 Highlights, India's diaspora, the largest in the world, is distributed across a number of major countries of destination.

Q69. Answer: (a) 26th

Given :-

Rama met her brother on Saturday of a particular month.

1st day of that month was Tuesday.

Therefore Here Tuesday + 4 = Saturday

Hence 1 + 4 = 5

Therefore 5^(th) of that month is Saturday.

Saturday comes on 5^(th), 12^(th), 19^(th), 26^(th).

Rama remembers that she met her brother after the 20th day of a particular month which is on Saturday.

Therefore Here Saturday falls on 26^(th) of that particular month after 20^(th) day of that month.

Hence, the correct answer is "26^(th)".

Q70. Answer: (b) Arthropoda

The correct answer is Arthropoda.

Key Points

• The Malpighian tubule

• It is the excretory organ of the phylum Arthropoda (Insects).

• The Malpighian tubule is a narrow tubule-like structure made up of a single-cell layer.

• It excretes nitrogenous products and other metabolites.

• In insects, a Malpighian tubule is present in the abdominal cavity.

Additional Information

• Excretion

• It is the process of removal of nitrogenous wastes from the body of an organism.

• Excretion is performed by a specialized group of cells or organs called excretory organs.

• Different organisms have different types of excretory organs

• Eg. Flatworms – Protonephridia & flame cells, Earthworms – Nephridia, Insects – Malpighian tubules, Crustaceans – green glands, All chordates - Kidneys

Important Points

• Different organisms use different types of organs to remove excreta

Organisms	Excretory Organs
Unicellular Animals / Amoeba	Surface of the body
Platyhelminthes/ Flatworms	Flame cells
Roundworms/Earthworms	Nephridia
Arthropods/ Cockroaches	Malpighian tubules
Crustaceans / Prawns	Antennal glands / Green Glands
Vertebrates	Kidney

Q71. Answer: (c) Madhya Pradesh

The correct answer is Madhya Pradesh.

Key Points

Ganga river

• - The Ganga is the most important river in India both from the point of view of its basin and cultural significance.

• It rises in the Gangotri glacier near Gaumukh (3,900 m) in the Uttarkashi district of Uttarakhand.

• Here, it is known as the Bhagirathi. It cuts through the Central and the Lesser Himalayas in narrow gorges.

• At Devprayag, the Bhagirathi meets the Alaknanda; hereafter, it is known as the Ganga.

• The Ganga enters the plains at Haridwar.

• From here, it flows first to the south, then to the south-east and east before splitting into two distributaries, namely the Bhagirathi and the Padma.

• The river has a length of 2,525 km.

• It flows through the states of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, and West Bengal.

• The Ganga basin covers about 8.6 lakh sq. km area in India alone.

• The Ganga river system is the largest in India and has a number of perennial and non-perennial rivers originating in the Himalayas in the north and the Peninsula in the south, respectively.

• The Son is its major right-bank tributary.

• The important left bank tributaries are the Ramganga, the Gomati, the Ghaghara, the Gandak, the Kosi and the Mahananda.

• The river finally discharges itself into the Bay of Bengal near the Sagar Island.

• The Yamuna, the westernmost and the longest tributary of the Ganga, has its source in the Yamunotri glacier on the western slopes of the Banderpunch range (6,316 km).

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• It joins the Ganga at Prayag (Allahabad)

Confusion Points

• The Ganga River Basin

• About 79% area of the Ganga basin is in India.

• The basin covers 11 states viz., Uttarakhand, Uttar Pradesh, Madhya Pradesh., Rajasthan, Haryana, Himachal Pradesh, Chhattisgarh, Jharkhand, Bihar, West Bengal, and Delhi.

Q72. Answer: (a) Mary Kom

The correct answer is Mary Kom.

Key Points

• Mary Kom

• Six-time world champion M C Mary Kom has been picked as the chairperson of the International Boxing Association's (AIBA) champions and veterans committee

• The 37-year-old was voted to the post by AIBA's board of directors on March 03, 2021.

• The committee was created in December 2020 by the world body as part of its reforms.

• Mary Kom was named for the position after voting by the AIBA's board of directors.

• The committee consists of the most respected worldwide boxing veterans and champions who have achieved significant results and who are ready to share their experiences.

Additional Information

• International Boxing Association (AIBA)

• The International Boxing Association (IBA), previously known as the Association Internationale de Boxe Amateur (AIBA)

• It is an independent sports organization

• Formation: 29–30 November 1946

• Headquarters: Lausanne, Switzerland

• President: Umar Nazarovich Kremlev

Q73. Answer: (d) European Union

The correct answer is European Union.

Key Points

• The Euro

• Euro, monetary unit and currency of the European Union (EU).

• It was introduced as a noncash monetary unit in 1999, and currency notes and coins appeared in participating countries on January 1, 2002.

• After February 28, 2002, the euro became the sole currency of 12 EU member states, and their national currencies ceased to be legal tender.

• Other states subsequently adopted the currency. The euro is represented by the symbol €.

• The euro is the most tangible proof of European integration around 341 million people use it every day, making it the second most-used currency worldwide.

• The benefits of the common currency are immediately obvious to anyone travelling abroad or shopping online on websites based in another EU country.

• Currently, the euro (€) is the official currency of 19 out of 27 EU member countries which together constitute the Eurozone, officially called the euro area

• Although all EU countries are part of the Economic and Monetary Union (EMU), 19 of them have replaced their national currencies with the single currency, the euro.

• These EU countries form the euro area, also known as the eurozone.

• The countries are Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

Q74. Answer: (c) 1/18

Shortcut Trick

Work done in first 10 days = 10 × (1/30) = 1/3

Remaining work to be completed = 1 − 1/3 = 2/3

Remaining time available = 22 − 10 = 12 days

Daily share of work required = (2/3) ÷ 12 = 1/18

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Therefore The correct answer is 1/18.

Alternate Method

Given:

Total duration = 22 days

Daily work (Day 1 to 10) = 1/30

Calculations:

=> Total work done in the first 10 days = 10 × (1/30) = 1/3

=> Remaining work to be done = 1 − 1/3 = 2/3

=> Number of days remaining to finish the task = 22 − 10 = 12 days

=> Daily work share required for the remaining period = (Remaining Work) ÷ (Remaining Days)

=> Daily work share = (2/3) ÷ 12

=> Daily work share = 2 / (3 × 12)

=> Daily work share = 2 / 36 = 1/18

Therefore The correct answer is 1/18.

Additional Information

Concept of Work Rate

The rate of work is defined as the amount of work completed per unit of time. If a person completes a task in 'n' days, their daily work rate is 1/n.

Work-Time Relation

Total Work = Time × Efficiency (or Rate). For multi-phase tasks, Total Work = Sum of (Rate_i × Time_i).

Remaining Work Calculation

When a fraction 'f' of work is completed, the remaining work is always (1 − f). This is crucial for planning resources to meet deadlines.

Q75. Answer: (a) four

The correct answer is four.

Key Points

• Kautilya in Arthshastra has mentioned four sources of law.

• The Vedas, the Anvikshaki (the science of reasoning), the science of government, and the science of economics (Varta of agriculture, cattle, and trade).

• The Arthashastra is an old Indian discourse on statecraft, economic policy, and military strategy, written in Sanskrit. It is one of the sources to learn about the history of the Mauryan Period.

• It had a wide influence on Sanskrit literature.

• Kautilya, also recognized as Vishnugupta and Chanakya, is traditionally credited as the author of the text.

• Arthashastra entails the science (sastra) of wealth/earth/polity (artha). 'Artha' however is a bit wider and an all-embracing term with different meanings.

• In a simple way, 'Arthashastra' can be explained as 'science and art of politics and diplomacy.

• This treatise is divided into sixteen books dealing with virtually every topic concerned with the running of a state, taxation, law, diplomacy, military strategy, economics, bureaucracy, etc.

• The book is a masterwork that includes an array of topics like statecraft, politics, strategy, selection, and training of employees, leadership skills, legal systems, accounting systems, taxation, fiscal policies, civil rules, internal and foreign trade, etc.

• Arthashastra backs rational ethics to the conduct of the affairs of the state.

• The emphasis is on the systematization of law and uniformity of law throughout the empire.

• Thus, it is clear that Chandragupta's advisor, Kautilya became very famous for his great text Arthashastra.

Q76. Answer: (a) 382 persons/km2

The correct answer is 382 persons/km2.

Key Points

• As per the Census of India 2011, the population density of India was 382 per square km.

• The Indian Census is the most credible source of information on Demography (Population characteristics), Economic Activity, Literacy and Education, Housing Household Amenities, Urbanization, Fertility and Mortality, etc.

• Census 2011 was the 15th National Census of the Country.

• Census was introduced in India during the era of Lord Mayo in the year 1872. It came into force in 1881.

• This census was conducted under the guidance of Mr. C. Chandramouli.

• The slogan of census 2011 was ‘Our Census, Our future’.

• The population of the nation as per the provisional figures of Census 2011 was 1210.19 million of which 623.7 million (51.54%) were males and 586.46 million (48.46%) were females. Uttar Pradesh is the most populous state in India its population is more than the population of Brazil.

Q77. Answer: (d) Clay

The correct answer is Clay.

Key Points

• Clay soil particles are the finest in their size.

• Clay soils feel very sticky and roll like plasticine when wet.

• They can hold total water than most other soil types and, although only about half of this is available to plants, crops seldom suffer from drought.

• They swell when wet and shrink when dried, so a certain amount of restructuring can take place in these soils depending on weather conditions.

• They lie wet in winter and so stock should be taken off the land to avoid poaching (the compaction of soils by animals’ hooves).

• They are very late warming up in the spring because water heats up more slowly than mineral matter.

• They are normally fairly rich in potash but are deficient in phosphates.

• Clay soils usually need large infrequent dressings of lime.

Additional Information

• Sand is a granular material composed of finely divided rock and mineral particles. Sand has various compositions but is defined by its grain size.

• Sand, soil, or mud that collects at the sides or on the bottom of a river.

• Pebble is a smooth round stone that is found in or near water.

Q78. Answer: (d) Tuesday

We know that:

In an ordinary year, there are 365 days and on dividing 365 by 7,

• We get remainder = 1 so this extra one day is taken as odd day.

Similarly, in an leap year, there are 366 days and on dividing 366 by 7,

• we get remainder = 2 so this extra two days is taken as odd days.

Thus, the remainder, which we get after dividing the number of days by 7 is considered as odd days.

Given 21st February 2005 was a Sunday.

Since 2005 is non-leap year.

• Number of odd days from year 21st February 2005 to 21st February 2007 = (1 + 1) = 2 Odd days.

Therefore On 21st February 2005, it was Sunday + 2 = Tuesday.

Therefore Here, 'Tuesday' is day of the week on 21st February 2007.

Hence, the correct answer is "Tuesday".

Q79. Answer: (c) Shailesh Ganpule

The correct answer is Shailesh Ganpule.

Key Points

• Shailesh Ganpule has received the ‘NSG Counter-IED & Counter-Terrorism Innovator Award 2021' for his design of a blast-resistant helmet.

• He is a professor from IIT Roorkee.

• The ‘blast-resistant helmet’ designed by Prof. Shailesh Ganpule is an advanced version of conventional helmets.

• It protects military personnel from IED-induced blast waves with a technology readiness of 4.

Additional Information

• Shishir Sinha, is a professor in the Department of Chemical Engineering, Indian Institute of Technology Roorkee.

Q80. Answer: (b) 72 : 125

Given:

A cylinder is inscribed in a sphere

The radius of the sphere is 5/6 times the height of the cylinder.

Formula used:

Volume of cylinder = $\pi r^2 h$

Volume of sphere = $4/3\ \pi r^3$

Calculation:

The radius of the sphere is 5/6 times the height of the cylinder.

The radius of sphere = 5

The height of cylinder = 6

Now,

According to the figure

=> (Radius of cylinder)^2 = $(5)^2 – (3)^2$

=> (Radius of cylinder)2 = (25 – 9)

=> (Radius of cylinder)2 = 16

=> Radius of cylinder = 4

Now,

=> Volume of cylinder/Volume of sphere = $\pi r2h/4/3\ \pi r^3$

=> $[\pi \times (4)^2 \times 6]/[4/3 \times \pi \times (5)^3]$

=> $(16 \times 6)/(4/3 \times 125)$

=> 96/(500/3)

=> 288/500

=> 72/125

=> 72 : 125

Therefore The required ratio is 72 : 125

Q81. Answer: (d) 343 : 728

The logic followed here is :-

First number^3 : (First number + 2)^3

1) 64 : 216

2) 216 : 512

3) 125 : 343

4) 343 : 728

Therefore Here, '343 : 728' is different from other three alternatives.

Hence, the correct answer is "343 : 728".

Q82. Answer: (a) East

The logic followed here is :-

• A working clock is placed on a table in such a manner that at 9.00 p.m., its hour hand is pointing towards north.

• If the same clock remains in the same position, the direction of minute hand point at 2.00 a.m. is as shown below :

Therefore Here, the minute hand of 2.00 a.m. is pointing towards 'East'.

Hence, the correct answer is "East".

Q83. Answer: (b) 677

The logic followed here is :-

Hence, the correct answer is "677".

Q84. Answer: (a) Anita Desai

The correct answer is Anita Desai.

Key Points

• Clear Light of Day is a novel published in 1980 by Indian novelist and three-time Booker Prize finalist Anita Desai.

• Set primarily in Old Delhi, the story describes the tensions in a post-partition Indian family, starting with the characters as adults and moving back into their lives throughout the course of the novel.

• Anita Desai, born Anita Mazumdar (born 24 June 1937) is an Indian novelist and the Emerita John E. Burchard Professor of Humanities at the Massachusetts Institute of Technology.

• She received a Sahitya Akademi Award in 1978 for her novel Fire on the Mountain, from the Sahitya Akademi.

Additional Information

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• Jhumpa Lahiri
• Jhumpa Lahiri was born in 1967 in London.
• Her first novel was the 'Namesake' published in 2003.
• She won Pulitzer Prize for her debut short story collection ‘Interpreter of Maladies’ in 1999.
• Kiran Desai
• Kiran Desai is an Indian author.
• Desai's first novel, "Hullabaloo in the Guava Orchard" was published in 1998 and it won the Betty Trask Award.
• Her novel "The Inheritance of Loss" won the 2006 Man Booker Prize and the National Book Critics Circle Fiction Award.
• In January 2015, The Economic Times listed her as one of the 20 "most influential" global Indian women.
• Nikita Lalwani
• Nikita Lalwani is a novelist, story writer, and author born in Kota, Rajasthan in 1973 and raised in Cardiff, Wales. Other books by Nikita Lalwani are “The Village”, “New States Man”, “AIDS Sutra” etc.

Q85. Answer: (c) 198

Shortcut Trick
Area of Trapezium = 1/2 × (Sum of parallel sides) × Height
Sum of sides = 18 + 15 = 33 cm
Height = 12 cm
Area = 1/2 × 33 × 12 = 33 × 6 = 198 cm²
Therefore The correct answer is 198 cm².
Alternate Method
Given:
Parallel side a = 18 cm
Parallel side b = 15 cm
Perpendicular distance (height) h = 12 cm
Formula Used:
Area of Trapezium = 1/2 × (a + b) × h
Calculations:
=> Area = 1/2 × (18 + 15) × 12
=> Area = 1/2 × 33 × 12
=> Area = 33 × 6
=> Area = 198 cm²
Therefore The correct answer is 198 cm².
Additional Information
Properties of Trapezium
A quadrilateral with at least one pair of parallel sides. The non-parallel sides are called legs.
Isosceles Trapezium
A trapezium where the non-parallel sides are equal in length and base angles are equal.
Median of Trapezium
The line segment connecting the midpoints of the legs. Length = (a + b) ÷ 2.

Q86. Answer: (c) Gross National Product

The correct answer is Gross National Product.
Key Points
• Net National Product (NNP):
• NNP is obtained by subtracting depreciation value (i.e. capital stock consumption) from GNP.
• Net National Product (NNP) = Gross National Product − Depreciation.
Additional Information
• Gross Domestic Product (GDP):
• It is the total money value of all final goods and services produced within the geographical boundaries of the country during a given period of time.
• GDP = C + G + I
• C = Consumption expenditure

• G = Government expenditure

• I = Investment expenditure

• Gross National Product (GNP):

• It refers to the money value of the total output of production of final goods and services produced by the nationals of a country during a given period of time, generally a year.

• National Income (NI):

• When NNP is calculated at factor cost (FC) it is called National Income.

• The measure is calculated by deducting indirect taxes and adding subsidies in NNP at Market Price (MP).

• In India, the Wholesale Price Index (WPI) is the weighted average price of 676 items with the base year 2011-12.

Q87. Answer: (b) 12 cm

Shortcut Trick

Surface area of the sphere = $4\pi R^2 = 4 \times \pi \times 8^2 = 256\pi$ cm²

Total surface area (TSA) of the cylinder = $1/2 \times 256\pi = 128\pi$ cm²

Using the formula TSA of cylinder = $2\pi r(r + h)$ where r = 4 cm:

=> $2 \times \pi \times 4 \times (4 + h) = 128\pi$

=> $8\pi(4 + h) = 128\pi$ => $4 + h = 16$ => $h = 12$

Therefore The correct answer is 12 cm.

Alternate Method

Given:

Radius of sphere (R) = 8 cm

Base radius of solid cylinder (r) = 4 cm

Total Surface Area of cylinder = 1/2 × Surface Area of sphere

R = 8 cm

r = 4 cm

h = ?

TSA (Cylinder) = 1/2 × SA (Sphere)

Formula Used:

Surface Area of sphere = $4 \times \pi \times R^2$

Total Surface Area of solid cylinder = $2 \times \pi \times r \times (r + h)$

Calculations:

=> Surface Area of sphere = $4 \times \pi \times (8)^2$

=> Surface Area of sphere = $4 \times \pi \times 64 = 256\pi$ cm²

=> Total Surface Area of cylinder = $1/2 \times 256\pi = 128\pi$ cm²

=> $2 \times \pi \times r \times (r + h) = 128\pi$

=> $2 \times \pi \times 4 \times (4 + h) = 128\pi$

=> $8\pi \times (4 + h) = 128\pi$

=> $4 + h = 128\pi \div 8\pi$

=> $4 + h = 16$

=> $h = 16 - 4 = 12$ cm

Therefore The correct answer is 12 cm.

Additional Information

Cylinder Area & Volume

Curved Surface Area = $2\pi rh$, Total Surface Area = $2\pi r(r + h)$, Volume = $\pi r^2 h$

Sphere Area & Volume

Surface Area = $4\pi R^2$, Volume = $(4/3)\pi R^3$

Hemisphere Area & Volume

Curved Surface Area = $2\pi R^2$, Total Surface Area = $3\pi R^2$, Volume = $(2/3)\pi R^3$

Q88. Answer: (b) c

The logic followed here is :-

Given sequence is : (Left) 6 $ + S r 3 B 6 A * ? # c < Z R & d & G ! q(Right)

After writing the given sequence in reverse order the sequence is as follows :
• (Left) q ! G & d & R Z < c # ? * A 6 B 3 r S + $ 6 (Right)
The 8^(th) element from right end is = 6
(Left) q ! G & d & R Z < c # ? * A 6 B 3 r S + $ 6 (Right)
The element which is 5th to the left of the 8th element from the right end is = C
(Left) q ! G & d & R Z < c # ? * A 6 B 3 r S + $ 6 (Right)
Therefore Here, The element which is 5th to the left of the 8th element from the right end is 'c'.
Hence, the correct answer is "c".
Shortcut Trick
To find the element on either of the sides in the given series:
1) If both elements are given from the same side:
• Left - Left = Left (Counting element from Left side)
• Right - Right = Right (Counting element from Right side)
2) If both elements are
given from different side:
• Left + Right = Right (Counting element from Right side)
• Right + Left = Left (Counting element from Left side)
TRICK:
Left + Right = Right (Counting element from Right side)
5 + 8 = 13^(th) element from right side.
13^(th) element from right side = c.
(Left) q ! G & d & R Z < c # ? * A 6 B 3 r S + $ 6 (Right)
Hence, "c" is the correct answer.

Q89. Answer: (c) 4 days

Given:
Time taken by A = 12 days
Time taken by B = 16 days
Time taken by C = 24 days
B and C worked together = 4 days
Formula used:
Work = Efficiency × Time
Calculation:
LCM of 12, 16 and 24 is 48
Efficiency of A = (48/12) = 4 units/day
Efficiency of B = (48/16) = 3 units/day
Efficiency of C = (48/24) = 2 units/day
Time taken by B and C together for 4 days = [4 × (3 + 2)]
=> (4 × 5) = 20 units
The remaining work = (48 – 20) = 28 units
Now,
Time taken by B and A to complete the remaining work = [28/(3 + 4)]
=> 28/7 days
=> 4 days
Therefore The required time is 4 days

Q90. Answer: (c) Umesh

According to the given information :-
Punit, Qumar, Rohit, Sheetal, Tabir, and Umesh live in a multi-storeyed building.
1) Qumar lives immediately below the floor where Umesh lives and Sheetal lives immediately below the floor where Qumar lives.

Person lives in that floor Case (i)	Case (ii)	Case (iii)	Case (iv)

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Umesh			
Qumar	Umesh		
Sheetal	Qumar	Umesh	
	Sheetal	Qumar	Umesh
		Sheetal	Qumar
			Sheetal

2) Rohit lives immediately below the floor where Sheetal lives.

Here case (iv) gets eliminated.

Persons lives in that floor Case (i)	Case (ii)	Case (iii)
Umesh		
Qumar	Umesh	
Sheetal	Qumar	Umesh
Rohit	Sheetal	Qumar
	Rohit	Sheetal
		Rohit

3) Tabir lives immediately below the floor where Rohit lives and Tabir lives on one of the floors below the floors where Qumar and Sheetal live but he lives on one of the floor above the floor where Punit lives.

Here case (ii) and (iii) get eliminated.

Persons lives in that floor
Umesh
Qumar
Sheetal
Rohit
Tabir
Punit

Therefore Here, 'Umesh' lives on top floor.

Hence, the correct answer is "Umesh".

Q91. Answer: (d) D

A, B, C, D, J, K, L and M are sitting around a square table facing the centre of the table.

Four of them are sitting at either of the corners while the other four are sitting at the exact centre of either of the sides

1) D sits at one of the corners of the table and Only one person sits between D and C.

Case (i) :

Case (ii) :

2) Only three people sit between C and B.

Case (i) :

Case (ii) :

3) M sits second to the right of B.

Here case (ii) gets eliminated.

4) K sits to the immediate left of M.

5) A is NOT an immediate neighbour of B and Only three people sit between A and L.

Thus the final siting positions of all eight people is as follows :

Therefore Here, 'D' sits to the immediate right of 'J'.

Hence, the correct answer is "D".

Q92. Answer: (d) If statement II is the cause, statement I could be its effect

1. A bus reaching the school late cannot cause a major accident on the road. Therefore, option 1 is eliminated.

2. It is not possible to establish a common event that can cause the delay of a school bus as well as a major road accident. - Therefore, option 2 is eliminated.

3. A major road accident obstructing the traffic can cause the school bus to reach late in the school. Therefore, I and II cannot be independent causes. Therefore, option 3 is eliminated.

Hence, statement II is the cause and statement I could be its effect.

Q93. Answer: (b) Two

The logic followed here is :-

Six people C, D, E, K, L and M are each of a different height.

1) E is shorter than only L.

2) Only one person is shorter than C.

3) K is shorter than D but taller than M.

Therefore Here, two people are shorter than 'K'.

Hence, the correct answer is "Two".

Q94. Answer: (b) 24

Shortcut Trick

Use the formula: (Quantity1 × Price1%) ÷ Amount1 = (Quantity2 × Price2%) ÷ Amount2

Here, Price% is (100 − Loss%) or (100 + Profit%).

=> (8 × 75) ÷ 75 = (n × 124) ÷ 372

=> 8 = (n × 124) ÷ 372

=> 8 = n ÷ 3

=> n = 24

Therefore The correct answer is 24 pens.

Alternate Method

Given: Case 1: Selling Price (SP1) = Rs. 75 for 8 pens, Loss = 25%. Case 2: Profit = 24%, Total SP2 = Rs. 372.

Formulas: CP = SP × 100 ÷ (100 − Loss%) | SP = CP × (100 + Profit%) ÷ 100

=> SP of 1 pen in Case 1 = 75 ÷ 8 = Rs. 9.375

=> CP of 1 pen = 9.375 × 100 ÷ 75 = Rs. 12.5

=> Required SP of 1 pen for 24% profit = 12.5 × 124 ÷ 100 = Rs. 15.5

=> Number of pens for Rs. 372 = 372 ÷ 15.5 = 24

Therefore The correct answer is 24.

Additional Information

Unitary Method for SP

When the Cost Price is constant, the Selling Price is directly proportional to the (100 ± Profit/Loss) percentage.

Inverse Relation

For a fixed total amount, the Quantity sold is inversely proportional to the Selling Price per unit.

Q95. Answer: (b) Rs. 17000

Shortcut Trick

For half-yearly compounding, Rate (r) = 25% ÷ 2 = 12.5% and Time periods (n) = 2.

Effective interest rate for 2 periods = r + r + (r × r)/100

=> Net Rate = 12.5 + 12.5 + (12.5 × 12.5)/100 = 26.5625%

Interest = 64000 × 26.5625% = 64000 × 0.265625 = 17000

Therefore The correct answer is Rs. 17000.

Alternate Method

Given: Principal (P) = Rs. 64000, Annual Rate (R) = 25%, Time (T) = 1 year, Compounding = Half-yearly.

Formula Used: Amount (A) = $P[1 + (r/100)]^n$, where r = R/2 and n = T × 2.

Start

Rs. 64000

6 Months

1 Year

+12.5%

+12.5%

Timeline of Compounding

=> Half-yearly rate (r) = 25% ÷ 2 = 12.5%

=> Number of half-years (n) = 1 × 2 = 2

=> 12.5% as a fraction = 1/8

=> Amount = 64000 × $(1 + 1/8)^2$

=> Amount = 64000 × (9/8) × (9/8)

=> Amount = 1000 × 81 = 81000

=> Compound Interest = Amount − Principal

=> Interest = 81000 − 64000 = 17000

Therefore The correct answer is Rs. 17000.

Additional Information

Effective Interest Rate for Compounding

When interest is compounded k times a year, the effective annual rate is [1 + (R/(k × 100))]^k − 1.

Difference between SI and CI

For 2 years (or periods), the difference between CI and SI is given by P × $(R/100)^2$.

Successive Percentage Formula

Compound interest can be calculated as a net percentage change: Net % = x + y + (xy/100), where x and y are periodic rates.

Q96. Answer: (d) S Theodore Baskaran

The correct answer is S Theodore Baskaran.

Key Points

• Writer, historian, naturalist, and activist, S Theodore Baskaran has won the 2020 Sanctuary Reserve Lifetime Service Award.

• The award was instituted by the Sanctuary Nature Foundation.

• Theodore was chosen for the award for his dedication to wildlife conservation and his writing prowess in English and Tamil that contribute to the conservation discourse.

• For his nature writings in Tamil, Theodore was awarded a Lifetime Achievement Award (Iyal Virudhu) by the Canada Literary Garden in 2014 in Toronto.

Q97. Answer: (a) A

Six people A, B, C, D, E and F are sitting around a circular table facing the centre.

1) C sits second to the left of D.

2) A is an immediate neighbour of D.

Case (i) :

Case (ii) :

3) F sits third to the left of A.

4) B sits second to the left of E.

Therefore Here, 'A' sits immediate right of 'C'.

Hence, the correct answer is "A".

Q98. Answer: (d) 108

Given:

k is the greatest number which, when divides 2996, 4752 and 7825, the remainder in each case is the same.

Concept used:

HCF - The greatest number which divides each of the two or more numbers

Calculation:

According to the question

=> (7825 – 4752) = 3073

=> (7825 – 2996) = 4829

=> (4752 – 2996) = 1756

Now,

HCF of 3073, 4829 and 1756 is

=> 3073 = 7 × 439

=> 4829 = 11 × 439

=> 1756 = 2 × 2 × 439

So, k = 439

Now,

The product of the digits of k = (4 × 3 × 9)

=> 108

Therefore The product of the digits of k is 108

Q99. Answer: (d) 3

The alphabets are positioned as in the following order:

Given word → CLUSTERS

The given word can be represented as follows,

So, In the forward direction → "ST" and "RS".

In the backward direction → "RT".

Therefore Here, three pairs are there in word 'CLUSTERS', each of which has many letters between them in the word (both forward and backward direction) as they have between them in the English Alphabet.

Hence, the correct answer is "3".

Q100. Answer: (c) EGLTDR

The logic followed here is :-

• HTWCGY : WTHCGY

and,

• ALTMHY : TLAMHY

Similarly,

• LGETDR : ?

Hence, the correct answer is "EGLTDR".

Q101. Answer: (c) Sodium bicarbonate

The correct answer is Sodium bicarbonate.

Key Points

• Sodium bicarbonate is most often used in the food industry as a chemical leavening agent in baked foods such as cakes, muffins and cookies.

• Sodium bicarbonate (NaHCO3) is known as baking soda.

• It is a white-coloured salt of Sodium.

• Also known as Sodium hydrogen carbonate.

Important Points

• BAKING SODA:

• As the name suggests it is used in baking certain products like cakes, muffins, and cookies. etc.

• In baking, it is used as a chemical leavening agent which produces carbon dioxide in reaction to an acid (like vinegar).

• Carbon dioxide produces bubbles that help the cake or cookie rise to tender, moist, and fluffy perfection.

• It is basic or alkaline in nature.

• It is a popular antacid for heartburn and indigestion because it can neutralize stomach acid.

• Baking soda becomes activated when it's combined with both an acidic ingredient and a liquid.

Additional Information

• Calcium Oxychloride:

• Bleaching powder chemical name is Calcium oxychloride or Calcium hypochlorite.

• Its chemical formulae are CaOCl2.

• Bleaching powder is used as a disinfectant.

• Sodium Sulphate:

• The formula for sodium is – Na+, and Sulphate is – SO42-.

• So, the formula for Sodium Sulphate is – Na2SO4.

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• Sodium sulfate is used to dry organic liquids. As a filler in powdered home laundry detergents.
• Na2SO4 is used in manufactured paper, glass, dyes, and pharmaceuticals.
• It is often used in its decahydrate form, which is also known as Glauber's salt.
• It is also called salt cake.
• Sodium Chloride:
• Sodium chloride, is commonly known as salt.
• It is an ionic compound with the chemical formula NaCl,
• NaCl represents a 1:1 ratio of sodium and chloride ions.

Q102. Answer: (d) Rs. 4500

Given:
Principal = Rs. 4000
Rate = 6.25%
Time = 2 years
Formula used:
SI = (P × R × T)/100
A = P + SI
Calculation:
According to the question
SI = (P × R × T)/100
=> Rs. (4000 × 6.25 × 2)/100
=> Rs. (80 × 6.25)
=> Rs. 500
Now,
A = P + SI
=> Rs. (4000 + 500)
=> Rs. 4500
Therefore The total amount that Kavita will receive at the end of the two-year term is Rs. 4500

Q103. Answer: (b) -190.9765

Given:
81.7100 + 198.0020 – 2071.1985 + 9.0900 + 1591.42
Calculation:
81.7100 + 198.0020 – 2071.1985 + 9.0900 + 1591.42
=> 279.712 – 2071.1985 + 9.0900 + 1591.42
=> 1880.222 – 2071.1985
=> -190.9765
Therefore The required value is -190.9765

Q104. Answer: (d) 23

Given:
6.05 - 15.95 ÷ 3.95 + 2.99 × 7.04 = ?
Calculation:
According to the question
The closest approximate value is
=> 6 – 16 ÷ 4 + 3 × 7
=> 6 – 4 + 3 × 7
=> 6 – 4 + 21
=> 27 – 4
=> 23
Therefore The required value of ? is 23

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Q105. Answer: (c) 2(9x/2+2)

Given:

The area of a square = 81x2 + 72x + 16

Formula used:

Area of square = a^2

$(a + b)^2 = a^2 + 2ab + b^2$

Calculation:

The area of a square = 81x2 + 72x + 16

=> $(9x)^2 + 2 \times 9x \times 4 + (4)^2$

=> $(9x + 4)^2$

Now,

=> $a^2 = (9x + 4)^2$

=> a = 9x + 4

Taking 2 as common, we get

=> 2(9x/2 + 2)

Therefore The required value is 2(9x/2+2)

Q106. Answer: (c) 28.17

Shortcut Trick

The Empirical Relation between Mean, Median, and Mode is: 3 × Median = Mode + 2 × Mean.

Substitute the values: 3 × Median = 27.5 + (2 × 28.5)

3 × Median = 27.5 + 57 = 84.5

Median = 84.5 ÷ 3 ≈ 28.17

Therefore The correct answer is 28.17.

Alternate Method

Given: Mode = 27.5, Mean = 28.5

Formula Used: Mode = 3(Median) − 2(Mean)

=> 27.5 = 3 × Median − 2 × 28.5

=> 27.5 = 3 × Median − 57

=> 3 × Median = 27.5 + 57

=> 3 × Median = 84.5

=> Median = 84.5 ÷ 3

=> Median = 28.166666...

=> Median ≈ 28.17

Therefore The correct answer is 28.17.

Additional Information

Empirical Formula

For a moderately skewed distribution, the relationship is Mode = 3 Median − 2 Mean, also known as Karl Pearson's formula.

Symmetric Distribution

In a perfectly Symmetric Distribution, the values of Mean, Median, and Mode are all equal (Mean = Median = Mode).

Skewness Direction

If Mean > Median > Mode, the distribution is Positively Skewed. If Mode > Median > Mean, it is Negatively Skewed.

Q107. Answer: (d) is exactly one seller

The correct solution is exactly one seller.

Key Points

• The market structure called monopoly exists where there is exactly one seller in any market.

• Monopoly:

• A monopoly exists in areas where one company, firm, or entity is the only - or dominant - seller that sells a product or service in an industry.

• This gives the seller enough power to keep other competitors away from the marketplace.

• A government can create a monopoly by nationalizing a product or service such as the postal service.

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• Due to the lack of competition a firm can charge a set price above what would be charged in a competitive market, thereby maximizing its revenue.
• The best example of a monopoly in the Indian market is Indian Railways.

Q108. Answer: (d) Kathak

The correct answer is Kathak.

Key Points

• Shambhu Maharaj was a renowned personality associated with Kathak dance forms.
• Shambhu Maharaj
• He was a Guru of the Indian classical dance form, Kathak, which belongs to Uttar Pradesh.
• He belongs to Lucknow Gharana.
• He received training from his father Kalka Prasad Maharaj, uncle Bindadin Maharaj and his eldest brother Achchan Maharaj.
• Dancer Lachhu Maharaj was also his elder brother.
• In 1952, he joined the Bharatiya Kala Kendra (later, the Kathak Kendra), New Delhi.
• He was awarded the Padma Shri in 1956 and the Sangeet Natak Akademi Fellowship in 1967.

Important Points

• Kathak is the classical dance of Uttar Pradesh.
• Kathak is considered to have originated from the acts of priests during the prayers in the temple.
• This dance was greatly developed in the royal court of the last Nawab of Awadh, Wajid Ali Shah.
• The period of Nawab Wajid Ali Shah who himself was a Kathak dancer was known as the Golden Age of Art of Awadh.

Additional Information

Eight classical dances of India
• Bharatanatyam (Tamilnadu) - Kathak (Uttar Pradesh) - Kuchipudi (Andhra Pradesh) - Odissi (Orissa) - Kathakali (Kerala) - Sattriya (Asam) - Manipuri (Manipur) - Mohiniyattam (Kerala)

Famous Kathak exponents
• Shambhu Maharaj - Birju Maharaj - Sitara Devi - Baijnath Prasad "Lacchu Maharaj" - Sunder Prasad - Mohanrao Kallianpurkar - Damayanti Joshi

Q109. Answer: (c) Depreciation

The correct answer is Depreciation.

Key Points

• Depreciation
• “Depreciation” means a decline in the value of fixed assets due to use, the passage of time or obsolescence.
• Depreciation is an accounting term used to determine the value of fixed assets.
• If a business enterprise procures a machine and uses it in a production process then the value of the machine declines with its usage.
• Even if the machine is not used in the production process, we can not expect it to realise the same sales price due to the passage of time or the arrival of a new model.
• Fixed assets are subject to depreciation.
• Depreciation has a significant effect in determining and presenting the financial position and results of operations of an enterprise.
• Hence, Depreciation is NOT included in the circular flow of Income in a simple economy.

Important Points

• The Net National Product of an economy is the GNP after deducting the loss due to depreciation.
• NNP = GNP – Depreciation
• NNP = GDP + income from abroad - Depreciation
• Net Domestic Product (NDP) is GDP estimated after deducting the loss due to depreciation
• This is essentially the net version of GDP, i.e, GDP minus the total value of the wear and tear (depreciation) that occurred in the assets while the products and services were created.
• NDP = GDP - Depreciation.

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Q110. Answer: (c) Pygmies

The correct answer is Pygmies.

In News

• Ainu

• Japan's government introduced a bill on 15 February 2019 to recognise the country's ethnic Ainu minority as an 'indigenous' people for the first time.

• The Japanese government in the late 19th century banned them from practising their customs and using their language.

• The government will also allow the Ainu to cut down trees in nationally-owned forests for use in traditional rituals.

• Bedouin

• India has donated solar-powered study lamps to Palestinian elementary school children from a marginalised Bedouin community.

• The lamps were donated as part of the 150th Gandhi Jayanti Students Solar Ambassador Workshop.

• The solar-powered study lamps supplied by the Indian Institute of Technology (IIT) Bombay aim at making the student beneficiaries the future propagators of renewable energy.

Key Points

• Pygmies are a group of hunter-gatherers native to Central Africa, mainly in Congo.

• Pygmies:

• They live scattered over a huge area in central and western Africa, in the Democratic Republic of Congo (DRC), Congo (Brazzaville), Cameroon, Gabon, Central African Republic, Rwanda, Burundi and Uganda.

• The different Pygmy groups speak different languages, mostly related to those of neighbouring non-Pygmy peoples.

• ‘Pygmy’ peoples are forest dwellers and know the forest, its plants and its animals intimately.

Additional Information

Bedouin	**They are nomadic pastoralists of the Arabian Peninsula who relied on their herds of goats, sheep, and camels for meat, milk, cheese, etc.**
Ainu	They are an indigenous ethnic group of people who live in Hokkaido in Japan.
Kirghiz	They are a Turkic ethnic group native to Central Asia, primarily Kyrgyzstan and parts of central Siberia.

Q111. Answer: (b) Dandi

The correct answer is Dandi.

Key Points

• Mahatma Gandhi headed to Dandi to end the salt monopoly by introducing the Salt Satyagraha.

• Salt Satyagraha:

• On March 12, 1930, Mahatma Gandhi started Salt Satyagraha from the Sabarmati Ashram.

• This journey is 240 km from Sabarmati Ashram.

• It was to end by reaching the coastal town of Dandi in Gujarat.

• On 6 April 1930, he reached Dandi and violated the 'Salt Law' by making a handful of salt and criminalizing himself in the eyes of the law.

• This is where the Civil Disobedience Movement started.

Important Points

• Outcomes of Salt Satyagraha

• On March 5, 1931, an agreement was signed between Gandhi and Irwin, also known as the Gandhi-Irwin Pact or the Delhi Pact.

• Gandhiji had given advance notice of his Salt March” to the Viceroy Lord Irwin, but Irwin failed to grasp the significance of the action.

• Under this agreement, the demand to allow people to settle on the seashore to make and collect salt was accepted.

Additional Information

• Salt Satyagraha in other parts of India

Leader	**Place**	**Date**
C. Rajagopalachari	Tiruchirapally to Vedaranniyam	13 April 1930- 28 April 1930

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K. Kelappan	Calicut to Poyannur	April 14, 1930 -April 21, 1930
Mahatma Gandhi	Sabarmati Ashram to Dandi	12 March 1930-6 April 1930 (24 Days)

Q112. Answer: (b) Tirunamattukkani

The correct answer is Tirunamattukkani.

Key PointsAccording to Chola Inscriptions, There were five types of "Land gifts" that Chola kings gave to their peoples

• The Cholas (8th-12th century AD):

• They are remembered as one of the longest-ruling dynasties in the southern regions of India.

• The reign of the Cholas began in the 9th century when they defeated the Pallavas to come into power.

• This rule stretched over for over five long centuries until the 13th century.

• The medieval period was the era of absolute power and development for the Cholas. This is when kings like Aditya I and Parantaka I.

• From here Rajaraj Chola and Rajendra Chola further expanded the kingdom into the Tamil region. Later Kulothunga Chola took over Kalinga to establish a strong rule.

• This magnificence lasted until the arrival of the Pandyas in the early 13th century.

Additional Information

• Tirunamattukkani or Devadan: Also known as land gifted to temples.

• Pallichchhandam: Land gifted to Jain institutions.

Q113. Answer: (c) 42^(nd) Amendment Act

The correct answer is the 42nd Amendment Act.

Key Points

• Fundamental Duties

• Article 51A of the Indian constitution deals with the fundamental duties.

• The Fundamental Duties of the Indian citizens were incorporated in the constitution in the year 1976.

• It was added upon the directions of the Swaran Singh Committee that was constituted by the government previously that year.

• Fundamental Duties act as a warning against anti-national and anti-social activities such as burning the national flag and destroying public property.

• The 11th fundamental duty was added in 2002 by the 86th amendment act.

Additional Information

• 51st Amendment Act, 1984

• It was enacted to provide for reservation of seats in the house of the people for scheduled tribes in Nagaland, Meghalaya, Mizoram and Arunachal Pradesh.

• And also for reservation of seats for scheduled tribes in the legislative assemblies of Nagaland and Meghalaya by suitably amending articles 330 and 332.

• 23rd Amendment Act, 1969

• It is proposed, as desired by the Government of Nagaland, not to make any reservation for the Scheduled Tribes in Nagaland either in the House of the People or in the State Legislative Assembly.

• Articles 330 and 332 of the Constitution are being amended for this purpose.

• 1st Amendment Act, 1951

• The 1st Amendment to the constitution of India was made in 1951.

• The 1st Amendment added the 9th schedule to the Indian constitution.

• It restricted the freedom of speech and expression.

• It inserted articles 31A and 31B into the Indian constitution.

Q114. Answer: (c) 13

Shortcut Trick

LCM of 15, 25, 35, 40, 42 = 4200.

Number N = 4200k + 1.

Check divisibility by 271: 4200 = 271 × 15 + 135.

So, 135k + 1 must be divisible by 271.

For k = 2, 135(2) + 1 = 271 (Divisible).

N = 4200(2) + 1 = 8401. Sum of digits = 8 + 4 + 0 + 1 = 13.

Therefore The correct answer is 13.

Alternate Method

Given: Divisors are 15, 25, 35, 40, 42. Remainder = 1. N is divisible by 271.

Formula Used: N = LCM(divisors) × k + Remainder

Calculations:

=> Prime factorization of divisors:

=> 15 = 3 × 5

=> 25 = 5^2

=> 35 = 5 × 7

=> 40 = 2^3 × 5

=> 42 = 2 × 3 × 7

=> LCM = 2^3 × 3 × 5^2 × 7 = 8 × 3 × 25 × 7 = 4200

=> The number is of the form N = 4200k + 1

=> To find k such that (4200k + 1) ÷ 271 leaves remainder 0:

=> (15 × 271 + 135)k + 1 = 15 × 271k + (135k + 1)

=> For N to be divisible by 271, (135k + 1) must be divisible by 271.

=> If k = 1, 135 + 1 = 136 (No)

=> If k = 2, 135 × 2 + 1 = 270 + 1 = 271 (Yes, divisible by 271)

=> N = 4200 × 2 + 1 = 8401

=> Sum of digits = 8 + 4 + 0 + 1 = 13

Therefore The correct answer is 13.

Additional Information

LCM and Remainder Theorem

The general form of a number which when divided by a, b, c leaves remainder r is LCM(a, b, c) × k + r.

Divisibility Check

To check divisibility of (Mk + r) by d, reduce M to its remainder when divided by d to simplify the calculation.

Q115. Answer: (c) 140

Shortcut Trick

Speed ratio (Usual : New) = 1 : 7/8 = 8 : 7

Since Distance is constant, Time ratio is the inverse = 7 : 8

Difference in time units = 8 − 7 = 1 unit

Given 1 unit = 20 min, then Usual Time = 7 units × 20 = 140 min

Therefore The correct answer is 140 min.

Alternate Method

Given:

New Speed = 7/8 of Usual Speed

Time delay = 20 min

Formula Used:

Distance = Speed × Time

Calculations:

=> Let usual speed be S and usual time be T.

=> Distance D = S × T

=> Also, D = (7/8)S × (T + 20)

=> S × T = (7/8)S × (T + 20)

=> T = (7/8) × (T + 20)

=> 8T = 7T + 140

=> 8T − 7T = 140

=> T = 140 min

Therefore The correct answer is 140 min.

Additional Information

Inverse Variation Property

When distance is constant, speed (S) and time (T) are inversely proportional (S1/S2 = T2/T1).

Average Speed Formula

For a round trip with speeds x and y, Average Speed = 2xy / (x + y).

Unit Conversion

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

Q116. Answer: (b) Magnetic tape

The correct answer is Magnetic tape.

Key Points

• Magnetic tape

• Magnetic tape is a secondary storage device used for storing files of data.

• Example: a company's payroll record

• Access is sequential and consists of records that can be accessed one after another as the tape moves along a stationary read-write mechanism.

• Sequential access is a term describing a group of elements (such as data in a memory array or a disk file or on magnetic tape data storage) being accessed in a predetermined, ordered sequence.

Additional Information

• SSD

• A solid-state drive (SSD) is a new generation of storage devices used in computers.

• SSDs use flash-based memory, which is much faster than a traditional mechanical hard disk.

• Upgrading to an SSD is one of the best ways to speed up your computer.

• Hard disk

• A hard disk is an electromechanical data storage device from which data is accessed in a random-access manner, individual blocks of data can be stored or retrieved in any order

• Both sequential and random access of data is possible in a hard disk

• DRAM

• Inside a dynamic RAM chip, each memory cell holds one bit of information and is made up of two parts: a transistor and a capacitor.

• As DRAM has a capacitor, it continuously leaks current.

• Therefore it requires frequent refresh which consumes power.

Q117. Answer: (d) Z&Y$X

Preparing the family tree using the following symbols:

If 'P&Q' indicates that 'P is the son of Q', and 'P$Q' indicates that 'P is the sister of Q'.

Symbol	&	$
Meaning	Son	Sister

1) Z$Y&X → Z is sister of Y, Y is son of X

Y is brother of Z.

2) X&Y$Z → X is son of Y, Y is sister of Z.

Y is sister of Z.

3) X$Y&Z → X is sister of Y, Y is son of Z.

Y is son of Z.

4) Z&Y$X → Z is son of Y, Y is sister of X.

Y is mother of Z.

Hence, the correct answer is "Z&Y$X".

Q118. Answer: (c) 1926

The correct answer is 1926.

Key Points

• Prayag Sangeet Samiti

• It was established on the auspicious day of Maha Shivaratri by Ranjit Singh, Late Baijnath Sahai and Late Satyanand Joshi.

• The Samiti is an organization registered under the Indian Societies Act of 1860.

• Present president of Prayag Sangeet Samiti is Dr. Milan Mukharjee.
• Vice Present president of Prayag Sangeet Samiti is Shri Prabhat Kumar Mukharjee and Shri Ajay Kumar.
• The Joint Secretary of Prayag Sangeet Samiti is Shri Arun Kumar.

Additional Information

• Hindustani classical music
• Hindustani classical music is the classical music of the northern regions of the Indian subcontinent.
• The major vocal forms or styles associated with Hindustani classical music are dhrupad, khyal, and tarana.
• Light classical forms include dhamar, trivat, chaiti, kajari, tappa, tap-khyal, ashtapadis, thumri, dadra, ghazal, and bhajan.

Q119. Answer: (a) China

The correct answer is China.

Key Points

• China
• China, officially known as the People's Republic of China, is a country in East Asia.
• It is the world's most populated country, having a population of around 1.4 billion.
• It covers approximately 9.6 million square kilometres.
• It is the world's third-largest country by area.
• China shares its borders with 14 Sovereign Countries.
• They are Afghanistan, Bhutan, India, Kazakhstan, Kyrgyzstan, Laos, Mongolia, Myanmar, Nepal, North Korea, Russia, Tajikistan, and Vietnam.

Additional Information

• India is the 7th largest country in the world with an area of 3,287,263 square kilometres.
• India has 2.41% of the landmass against the geographical area of the World but supports as much as 18% of the world's population.
• It measures 3214 km from North to South and 2933 from East to West.
• Largest country area wise
• Pakistan > Myanmar > Bangladesh
• Area of Pakistan: 796,100 km²
• Area of Myanmar: 676,578 km²
• Area of Bangladesh: 143,998 km²

Q120. Answer: (d) 76%

Calculation:

The expenditure made by both companies together on salary = (5117 + 4752)

=> 9869

The expenses on Infrastructure made by both companies together = (7310 + 5598)

=> 12908

The required percentage = (9869/12908 × 100)

=> 76.45% ~ 76%

Therefore The required percentage is 76%

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