RRB NTPC CBT-I Official Paper (Held On: 3 Feb 2021 Shift 1) (Previous Year Paper)

RRB NTPC • 2021 • 100 questions • 90 minutes • Answer key and solutions

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Q1. If one angle of a parallelogram is 48º less than twice the smallest angle, then the measure of the largest angle of the parallelogram will be:

(a) 104º
(b) 128º
(c) 120º
(d) 140º

Q2. Which of the following has successfully test-fired an indigenously developed 500 kg class guided bomb from a Sukhoi combat jet at Pokhran in Rajasthan in 2019?

(a) DRDO
(b) CSIR
(c) ISRO
(d) CSC

Q3. Which of the following elements is a versatile element that forms the basis for all living organisms and many of the things we use?

(a) Antimony
(b) Curium
(c) Carbon
(d) Barium

Q4. Who is the Chief Minister of Goa as of October 2020?

(a) Pramod Sawant
(b) Manohar Pawar
(c) Nikanth Bhonsle
(d) Rajesh Apte

Q5. The number 93248x6 is divisible by 11. The digit x is equal to:

(a) 5
(b) 8
(c) 2
(d) 7

Q6. Six persons M1, M2, M3, M4, M5 and M6 are sitting in a row facing towards north (not necessarily in the same order). Only three persons sit between M2 and M3. M3 is sitting to the immediate left of M5. Only three person sit between M1 and M5. M4 sits to the immediate left of M6 and is to the right of M3.

How many persons are sitting between M3 and M6?

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

Q7. In a division sum, the divisor is 2 times the quotient and 6 times the remainder. If the remainder is 8, find out the value of the dividend.

(a) 1160
(b) 840
(c) 408
(d) 240

Q8. A person invested 2/3 of his capital at the rate of 6%, 1/5 at the rate of 10% and the remainder at the rate of 15%. If his annual income is Rs 600, the capital will be

(a) Rs 5,000
(b) Rs 2,500
(c) Rs 4,500
(d) Rs 7,500

Q9. 7 orange trees, 28 apple trees and 42 mangoes trees have to be planted in rows such that each row contains the same number of trees of one variety only. Minimum number of rows in which the trees may be planted is:

(a) 5
(b) 14
(c) 1 1
(d) 12

Q10. Select the option that is related to the fourth term in the same way as the first term is related to the second term.

Shirt : Trousers : : ? : Table

(a) Furniture
(b) Bed
(c) Almirah
(d) Chair

Q11. The perimeter of an equilateral triangle is 36 m. The area of the triangle is (in m^2)

(a) $18\sqrt{3}$
(b) $36\sqrt{3}$
(c) $24\sqrt{3}$
(d) $12\sqrt{3}$

Q12. The ratio of the present ages of Alok and Anil is 3 : 4. If Alok's age 20 years from now will be 62 years, then what is Anil's present age?

(a) 56 years
(b) 64 years
(c) 52 years
(d) 60 years

Q13. When did the All-India Khilafat Committee pass a resolution declaring that no Muslim should serve in the British-Indian army?

(a) November 1922
(b) April 1919
(c) July 1921
(d) August 1920

Q14. Who among the following the constitutional powers and duties in relation to the accounts of Union and of the central government?

(a) The Vice President of India
(b) The Comptroller and Auditor General of India
(c) The President of India
(d) The Prime Minister of India

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Q15. The heritage town of Orchha has been included in the tentative list of UNESCO world heritage sites. The town is located in which state?

(a) Tamil Nadu
(b) Rajasthan
(c) Uttar Pradesh
(d) Madhya Pradesh

Q16. Which is the outermost covering of the cell that separates the contents of the cell from its external environment?

(a) Smooth muscle cell
(b) Nerve cell
(c) Plasma membrane
(d) Organelles

Q17. Which of the following is the traditional theatre of Kerala where eight plays are performed in eight days?

(a) Yakshagana
(b) Krishnanattam
(c) Therukoothu
(d) Maach

Q18. what minimum value should be assigned to 'x' so that 2346x45 is exactly divisible by 9?

(a) 5
(b) 2
(c) 9
(d) 3

Q19. Select the term that can replace the question mark (?) in the following series.

AC, CF, EJ, GO, ?

(a) IU
(b) JU
(c) JV
(d) IV

Q20. If $\cos x + 1/(\cos x) = 2$, then find the value of $\cos^n x + 1/(\cos^n x)$

(a) 2
(b) 8
(c) 6
(d) 4

Q21. Four letter-cluster have been given, out of which three are alike in some manner and one is different. Select the odd one

(a) JLN
(b) OQS
(c) UWY
(d) ADG

Q22. If an article is sold at 150% profit, then the ratio of its cost price to its selling price will be:

(a) 2 : 3
(b) 2 : 5
(c) 1 1
(d) 1 : 3

Q23. Which of the following states holds India's highest graphite reserves according to the Geological Survey of India?

(a) Arunachal Pradesh
(b) Andhra Pradesh
(c) Odisha

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(d) Manipur

Q24. If the length, breadth and height of a room are 15 m, 20 m, 30 m respectively, then what will be the area of four walls of the room?

(a) 1800 m²
(b) 2400 m²
(c) 2800 m²
(d) 2100 m²

Q25. The pair of equations 2^(x+y)=16 and 64^(x-y)=2 has:

(a) Infinite solutions
(b) No common solution
(c) Unique solution X = 25over 12, y=23/12
(d) Unique solution X = 25over 12, y = 25/12

Q26. 1200 apples were distributed among a group of boys. Each boy got thrice many of the apples as the number of boys in that group. The number of boys in the group was:

(a) 15
(b) 40
(c) 20
(d) 25

Q27. What is the LCM of 22, 24, 48 and 16

(a) 48
(b) 176
(c) 64
(d) 528

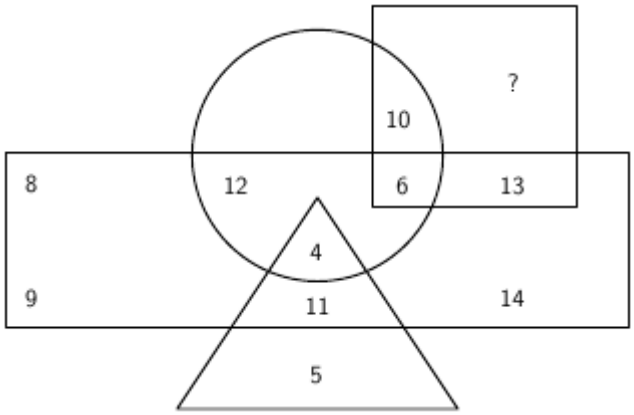
Q28. The difference between the simple interest recovered from two different sources on Rs 1,200 for 3 years is Rs 10.80. The difference between their rates of interest is:

(a) 0.03%
(b) 0.3%
(c) 0.6%
(d) 1%

Q29. Which of the following lakes is the largest fresh water lake in north-east India?

(a) Kolleru Lake
(b) Dal Lake
(c) Loktak Lake
(d) Pulicat Lake

Q30. In the given figure, rectangle represent 'male', triangle represents 'educated', circle represents 'urban' and square represents 'civil servants'. what is the count of educated males who hail from urban areas?



(a) 4
(b) 2
(c) 6
(d) 3

Q31. Which of the following state has announced to enact legislation for the 'right to water' to ensure availability of minimum 55 litres water in a day per person?
(a) Tamil Nadu
(b) Madhya Pradesh
(c) Odisha
(d) Haryana

Q32. _____ is a high level programming language for scientific and mathematical use.
(a) RFID
(b) EDP
(c) FORTRAN
(d) COBOL

Q33. In a certain code, ROAR is written as URDU. How will URDU be written in that code?
(a) VXDQ
(b) XUGX
(c) ROAR
(d) VSOV

Q34. Name the geostationary communication satellite launched by ISRO on board GSLV launched vehicle and especially designed for the Indian Air Force to enhance its communication capabilities.
(a) GSAT-7B
(b) GSAT-8B
(c) GSAT-7A
(d) GSAT-6B

Q35. The famous Ajanta Caves, a world heritage site, is located at which of the following places?
(a) Nasik
(b) Pune
(c) Aurangabad
(d) Mumbai

Q36. Name the scientist who proposed that electrons are embedded in a positive sphere.
(a) E. Rutherford
(b) Neils Bohr
(c) J. J Thompson
(d) Camillo Golgi

Q37. Who was the son of Shakuntala in Kalidasa's drama of Abhijnana Shakuntalam?
(a) Pradyumna
(b) Aniruddha
(c) Vikrama
(d) Bharata

Q38. Heavy water is so called because:
(a) it uses Deuterium, a heavier isotope of hydrogen, rather than Protium.
(b) its density is three times that of normal water.
(c) it is used in nuclear reactors.
(d) it is used by the heavy industries such as steel, chemicals etc.

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Q39. Which of the following beaches has become the first in Asia to get the Blue Flag certification?

(a) Chandrabhaga beach
(b) Bega beach
(c) Kovalam beach
(d) Marina beach

Q40. The price of mobile is first decreased by 20% and then increased by 10%. The net change in the price will be

(a) 10%
(b) 14%
(c) 15%
(d) 12%

Q41. The World Bank has tied with which bank to enable secondary bond trading recorded on Blockchain?

(a) Royal Bank of Canada
(b) Bank of Melbourne
(c) CIM bank
(d) Commonwealth Bank of Australia

Q42. Select the numbers that can replace the question mark (?) in the following series.

2, 10, 30, 68, ?, 222

(a) 120
(b) 103
(c) 110
(d) 130

Q43. If the diagonals of two squares are in the ratio of 3 : 5, then their areas will be in the ratio of:

(a) 2 : 5
(b) 9 : 25
(c) 13 : 25
(d) 15 : 25

Q44. The LCM of √36 and √64 is

(a) 640
(b) 72
(c) 24
(d) 360

Q45. In a class of 100 students, the mean marks obtained in a certain subject is 25 and in another class of 50 students, the mean marks obtained in the same subject is 70. The mean marks obtained by the students of both the classes taken together is:

(a) 25
(b) 60
(c) 40
(d) 30

Q46. A man travelled from a school to a park at a speed of 20 km/h and walked back at a speed of 5 Km/h. If the whole journey took 5 h, find the distance of the school from the park.

(a) 40 km
(b) 20 km
(c) 30 km
(d) 80 km

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Q47. Who among the following was the first Indian Governor of the Reserve Bank of India?

(a) Manmohan Singh
(b) Raghuram Rajan
(c) IG Patel
(d) CD Deshmukh

Q48. Which of the following has developed world's first malaria vaccine for the World Health Organization?

(a) Pfizer
(b) GlaxoSmithKline(GSK)
(c) Merck
(d) Johnson & Johnson

Q49. If $X + 1/X=4$, then find the value of $X^2 +1/(X^2)$

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

Q50. If a selling price of Rs 36 results in a 10% discount on a list price, what selling price will result in a 20% discount on the

(a) Rs 32
(b) Rs 60
(c) Rs 50
(d) Rs 36

Q51. 'Operation Vijay' is associated with which of the following wars?

(a) Indo-Pakistan war - 1971
(b) Indo-Pakistan War-1947
(c) Indo-Pakistan War-1965
(d) Kargil War-1999

Q52. Who won the Rabindranath Tagore Literary Prize 2019 for Literature?

(a) Rana Dasgupta
(b) Swapan Saha
(c) Manoj Michigan
(d) N K Salil

Q53. Find the least common multiple of the numbers 36, 72 and 144.

(a) 110
(b) 108
(c) 144
(d) 220

Q54. Seven students A, B, C, D, E, F, and H give a test. No two students get the same marks. A gets more marks than B. H gets more marks than A. Only two students get more marks than C. D gets more marks than C and B but D doesn't get the highest marks.

If B did not get the lowest marks, then which of the following sequences of their marks is possible?

(a) H > D > C > E > A > B > F
(b) F > D > C > E > H > B > A
(c) E > C > D > H > A > B > F
(d) H > D > C > B > E > F > A

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Q55. The ratio of an interior angle to the exterior angle of a regular polygon is 4 : 1. The number of sides of the polygon is:

(a) 12
(b) 6
(c) 10
(d) 5

Q56. If PUNJAB is coded as OSKKCE, then how will PRAYAG be coded?

(a) POXJCZ
(b) OPXZCJ
(c) POXZCJ
(d) OPXJCZ

Q57. Name the state government that announced its decision to ban production, distribution, advertisement and sale of e-cigarette within its territory in May 2019?

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

Q58. IF a, b, c, d are four numbers, such that the LCM of a and b is b, the LCM of b and c is c and the LCM of c and d is d, then the LCM of a, b, c and d will be:

(a) d
(b) a
(c) c
(d) (a+b+c+d)over4

Q59. Name the state where India's longest (300 m) single-lane steel cable suspension bridge was inaugurated over river siang.

(a) Mizoram
(b) Assam
(c) Arunachal Pradesh
(d) Manipur

Q60. Which of following country has the highest number of operational nuclear reactors currently?

(a) France
(b) India
(c) United States
(d) China

Q61. In 1866, who organised the East India Association in London to discuss the Indian question and to influence British public officials to promote Indian welfare?

(a) Dadabhai Naoroji
(b) Ananda Mohan Bose
(c) B.G.Tilak
(d) W C Bannerjee

Q62. Who won the 'ICC Male Cricketer of the Decade' award in December 2020?

(a) Virat Kohli
(b) M S Dhoni
(c) Rohit Sharma
(d) David Warner

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Q63. If a × tan α = b, then the value of cos α will be

(a) bover a
(b) aover $a^2 + b^2$
(c) b over a^2+b^2
(d) aover $\sqrt{(a^2 + b^2)}$

Q64. Among the following propositions two are related in such a way that one is the denial of the other. Which are those propositions?

Propositions:

(a) All elephants are equal to cats.

(b) Some elephants are not equal to cats.

(c) Some elephants are equal to cats.

(d) Few elephants are also equal to cats.

(a) (a) and (b)
(b) (c) and (d)
(c) (a) and (d)
(d) (a) and (c)

Q65. If APPLE is coded as 25563 and RUNG is coded 7148, the PURPLE will be coded as:

(a) 517653
(b) 517563
(c) 617553
(d) 617563

Q66. Two natural numbers are in the ratio of 6 : 8 and their products is 768. The smaller number is:

(a) 8
(b) 12
(c) 32
(d) 24

Q67. Who wrote the book 'The Little Balance (La Balancitta)' in 1586?

(a) Archimedes
(b) Galileo Galilei
(c) James Prescott
(d) Carolus Linnaeus

Q68. In an examination 80% students passed in Physics, 70% passed in Chemistry while 15% students failed in both subjects. If 325 students passed in both the subjects, find the total number of students who appeared in the examination.

(a) 500
(b) 450
(c) 550
(d) 200

Q69. Select the option that is related to the third term in the same way as the second term is related to the first term.

Uttar Pradesh : Lucknow : : Madhya Pradesh : ?

(a) Jabalpur
(b) Gwalior
(c) Bhopal
(d) Indore

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Q70. What is the amount provided per year to the farmers holding up to 2 hectre under the Pradhan Mantri Kisan Samman Siddhi (PMKSS)?

(a) 8000 Rupees
(b) 4000 Rupees
(c) 6000 Rupees
(d) 5000 Rupees

Q71. Avanish is a friend of Harsh. Pointing to an old man, Avanish asked Harsh, "Who is he?" Harsh replied. "His son is my son's paternal uncle." How is the old man related to Harsh?

(a) Father's Father
(b) Brother
(c) Father's brother
(d) Father

Q72. Which Indian boxer created history by becoming India's only six-time world boxing champion?

(a) Kavita Goyat
(b) Sarjubala Devi
(c) Pinki Rani
(d) Mary Kom

Q73. 10 men can complete a task in 18 days. After 6 days, 5 more men join. In how many days, the remaining work will be completed?

(a) 10
(b) 6
(c) 8
(d) 12

Q74. Which of the following gases in the atmosphere is used up in three processes; combustion, respiration and in the formation of oxides of nitrogen?

(a) Carbon
(b) Hydrogen
(c) Helium
(d) oxygen

Q75. who was the founder of the News paper Bengal Gazette (1780 - India's first News paper?

(a) J.K. Hicky
(b) G.K. Gokhale
(c) Annie Besant
(d) B.G. Tilak

Q76. Which of the following is the border between India and Pakistan?

(a) Mannerheim line
(b) Durand Line
(c) Hinderburg Line
(d) Radcliffe Line

Q77. Who among following was known as the 'extremist leader' during the Freedom Movement of India?

(a) Gopal Krishna Gokhale
(b) Bal Gangadhar Tilak
(c) WC Bannerji
(d) Surendra Nath Bannerji

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Q78. If cot 3θ cot 6θ = 1, then the value of tan 15θ will be

(a) -√3
(b) 3√3
(c) -1/√3
(d) 0

Q79. If the Proposition 'All men are rich' is false, then which of the following propositions can be claimed certainly to be true?

(a) No rich person is a man.
(b) No man is rich.
(c) Some men are rich.
(d) Some men are not rich.

Q80. 15 person can fill 35 boxes in 7 days. How many persons are required to fill 65 boxes in 5 days?

(a) 36
(b) 33
(c) 39
(d) 49

Q81. what is the full form of NASSCOM?

(a) NATIONAL AFFILIATION OF SOFTWARE AND SERVICES COMPANIES
(b) NATIONAL ASSOCIATION OF SERVIES AND SOFTWARE AND COMPANIES
(c) NATIONAL AGENCIES OF SERVICES AND SOFTWARE AND COMPANIES
(d) NATIONAL ASSOCIATION OF SOFTWARE AND SERVICES COMPANIES

Q82. In which of the following Articles the concept of equality is enshrined?

(a) Article 30
(b) Article 14
(c) Article 21
(d) Article 19

Q83. Who among the following has been appointed as the Force Commander of UN mission in South Sudan in 2019?

(a) Gurupal Singh Sanga
(b) Abhay Krishna
(c) Surender Singh
(d) Shailesh Tinaikar

Q84. Which of the following refers to protection of data against accidental or intentional disclosure to unauthorised persons or unauthorised modification or destruction?

(a) Database
(b) Data Security
(c) Privacy data
(d) Data redundancy

Q85. From the following, name the region located in the western coast.

(a) The corromondal coast Region
(b) The Assam Region
(c) The Malabar Region
(d) Indus Plain Region

Q86. The given table shows the details of the expenditure incurred (in Rs. crores) by a tea garden during the years 2013 to 2017. Study the table carefully and answer the following question.

Year	**Items of Expenditure (in Rs. Crores)**				

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	Salary	Fuel etc	Bonus	Interest on Loans	Taxes
2013	60.5	20.0	0.8	4.88	18.6
2014	68.4	23.4	0.4	7.00	22.6
2015	62.8	19.4	0.86	8.85	16.8
2016	67.2	28.8	0.89	6.28	17.5
2017	84.0	30.2	0.96	10.11	21.6

In which year was the total expenditure on 'Taxes' and 'Interest on loans' less than the expenditure on 'Fuel etc'?

(a) 2016
(b) 2014
(c) 2015
(d) 2013

Q87. The given table shows the details of the expenditure incurred (in crores) by a tea garden from 2013 to 2017. Study the table carefully and answer the following question.

Year	**Items of Expenditure (in Rs. Crores)**				
	Salary	Fuel etc	Bonus	Interest on Loans	Taxes
2013	60.5	20.0	0.8	4.88	18.6
2014	68.4	23.4	0.4	7.00	22.6
2015	62.8	19.4	0.86	8.85	16.8
2016	67.2	28.8	0.89	6.28	17.5
2017	84.0	30.2	0.96	10.11	21.6

The average yearly expenditure on 'Salary' from 2013 to 2017 was approximately

(a) Rs 68.58 crores
(b) Rs 68.00 crores
(c) Rs. 67.58 crores
(d) Rs 69.58 crores

Q88. The given table shows the details of the expenditure incurred (in crores) by a tea garden from 2013 to 2017. Study the table carefully and answer the following question.

Year	**Items of Expenditure (in Rs. Crores)**				
	Salary	Fuel etc	Bonus	Interest on Loans	Taxes
2013	60.5	20.0	0.8	4.88	18.6
2014	68.4	23.4	0.4	7.00	22.6
2015	62.8	19.4	0.86	8.85	16.8
2016	67.2	28.8	0.89	6.28	17.5
2017	84.0	30.2	0.96	10.11	21.6

The range of expenditure incurred over the five-year period is most similar for which of the following items of expenditure?

(a) Interest on loans and Taxes
(b) Salary and Fuel etc
(c) Salary and Taxes

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(d) Fuel etc and Interest on Loans

Q89. The given table shows the details of the expenditure incurred (in crores) by a tea garden from 2013 to 2017. Study the table carefully and answer the following question.

Year	**Items of Expenditure (in Rs. Crores)**				
	Salary	Fuel etc	Bonus	Interest on Loans	Taxes
2013	60.5	20.0	0.8	4.88	18.6
2014	68.4	23.4	0.4	7.00	22.6
2015	62.8	19.4	0.86	8.85	16.8
2016	67.2	28.8	0.89	6.28	17.5
2017	84.0	30.2	0.96	10.11	21.6

In which year was the percentage increase of the expenditure on salary, as compared to the previous year, more than 20%?

(a) 2016
(b) 2015
(c) 2017
(d) 2014

Q90. Select the term that can replace the question mark (?) in the following series.

O2F, R5H, U10J, X17L, ?

(a) C82Q
(b) A26O
(c) B80M
(d) A26N

Q91. 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:

(a) All dogs are mammals.

(b) No animals are dogs.

Conclusion:

(i) No animals are mammals.

(ii) Some animals are not mammals

(iii) No dogs are animals.

(iv) All mammals are dogs

(a) Only conclusion (i) follows
(b) only conclusions (i) and (ii) follows
(c) only conclusion (iii) and (iv) follows
(d) only conclusion (iii) follows

Q92. Select the term that can replace the question mark (?) in the following series.

ACE, GIJ, LPO, PXT, ?

(a) SYG
(b) SZG
(c) SGY
(d) SGZ

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Q93. Identify the number that does NOT belong to the following series.

10, 14, 28, 32, 64, 68, 132

(a) 14
(b) 64
(c) 32
(d) 132

Q94. In a certain code language, 'NDRWCK' is written as 'GUGPTZ'. What is the code for 'MTSFHJ' in that code language?

(a) FKHYYY
(b) FOPXXX
(c) FKHZZZ
(d) FOPWWW

Q95. Eight persons A, B, C, D, E, F, G and H are sitting around a circular table facing towards the centre (not necessarily in the same order). A sits second to the right of C and C is third to the left of D. B is not the neighbour of C. B is second to the right of E. only one person sits between D and G. G is second to the left of H.

What is the position of G with respect to C?

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

Q96. In a certain code language, 'Horses are animals' is written as 'lu # @', ' Animals are mammals' are written as 'kt lu # ', 'Are horses mammals' is written as 'kt # @'. What is the code for 'Animals' in that code language?

(a) kt
(b) @
(c) lu
(d) #

Q97. A, B, C, D and E are five friends. B is elder to C but is shorter in the group. C is taller to B, but younger to D. A is elder to D but not as tall as E. E is younger to C and is taller to B and D.

Which of the following sequence of their ages cannot be possible?

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

Q98. Seven persons P, Q, R, S, A, B, and D are sitting one above the other on a ladder (not necessarily in the same order). B sits neither at the top nor at the bottom. Only four persons sit between P and R. S sits immediately above A. Only one person sits between R and D. D sits below S. B sits above Q.

Three of the following are similar in a certain way based on their seating arrangement and form a group. Which of the following does not belong to that group?

(a) P A
(b) D B
(c) S D
(d) B Q

Q99. How will you write 2.84 hours in hours, minutes and seconds?

(a) 2 hours 50 minutes 24 seconds
(b) 3 hours 24 minutes
(c) 2 hours 50 minutes 4 seconds
(d) 2 hours 8 minutes 4 seconds

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Q100. A man walks 10 m forward towards the direction of sunrise and then 10 m to his right. After that, every time turning to his left, he walks 5 m, 15m and 15 m, respectively. what is the likely direction he is in now with reference to his starting point?

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

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) 104º

Given:

One angle = 2× smallest angle - 48º

Formula:

Sum of adjacent angles in a parallelogram = 180º

Calculation:

Let smallest angle = x.

Then, the other angle = 2x - 48.

=> x + (2x - 48) = 180

Solving: => 3x - 48 = 180 => 3x = 228 => x = 76

Largest angle = 2x - 48 => Largest angle = 2×76 - 48 = 152 - 48 = 104º

Thus, the measure of the largest angle is 104º.

Q2. Answer: (a) DRDO

The correct answer is DRDO

Key Points

• Defence Research and Development Organisation (DRDO) successfully test fired an indigenously-developed 500 kg class guided bomb from a Sukhoi combat jet at Pokhran in Rajasthan.

• The test firing of the guided bomb came two days after the Indian Air Force successfully test fired the aerial version of the supersonic BrahMos cruise missile from a Sukhoi jet at the Andaman and Nicobar Islands.

• The BrahMos cruise missile travels at a speed of Mach 2.8, nearly three times that of sound.

Additional Information

• CSIR's mission is "to build a new CSIR for a new India", and CSIR's vision is to "Pursue science which strives for global impact, the technology that enables innovation-driven industry.

• ISRO's three major missions in 2022 - Gaganyaan, Aditya L-1 and Chandrayaan-3.

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Q3. Answer: (c) Carbon

The correct answer is Carbon

Key Points

• Carbon is a versatile element and is found in many different chemical compounds, including those found in space.

• Carbon is versatile because it can form single, double, and triple bonds.

• It can also form chains, branched chains, and rings when connected to other carbon atoms.

• Carbon is the most versatile, most adaptable, most useful element of all. Carbon is the element of life.

Additional Information

• Antimony is a semi-metal. In its metallic form it is silvery, hard and brittle.

• Curium is a member of a group of elements, the transuranic elements, that - with the exception of plutonium and neptunium - do not occur naturally on Earth.

• Barium is a chemical element with the symbol Ba and atomic number 56. It is the fifth element in group 2 and is a soft, silvery alkaline earth metal.

Q4. Answer: (a) Pramod Sawant

The correct answer is Pramod Sawant

Key Points

• Pramod Sawant is the Chief Minister of Goa as of October 2020.

• He succeeded Manohar Parrikar after his demise in March 2019.

• Pramod Sawant is a member of the Bharatiya Janata Party (BJP).

• He was sworn in as the Chief Minister of Goa on March 19, 2019.

Additional Information

• Pramod Sawant is a qualified Ayurveda practitioner and has a Bachelor's degree in Ayurveda, Medicine, and Surgery from the Ganga Ayurvedic Medical College in Kolhapur.

• He also holds a Master's degree in Social Work from the Tilak Maharashtra University at Pune.

• Before becoming the Chief Minister, he served as the Speaker of the Goa Legislative Assembly from 2017 to 2019.

• Pramod Sawant has been actively involved in politics and social work, focusing on various developmental initiatives in Goa.

• Under his leadership, the Goa government has undertaken several initiatives aimed at improving infrastructure, healthcare, and education in the state.

Q5. Answer: (d) 7

Given:

Number = 93248x6

Divisor = 11

Concept used:

The number to be divisible by 11, for that the difference between the sum of even and odd places of digits must be divisible by 11.

Calculation:

Odd places sum = 9 + 2 + 8+ 6 = 25

Even places sum = 3 + 4 + x = 7 + x

Now, to be divisible by 11,

25 - (7 + x) = 11m (m = integer to represent multiple of 11)

18 - x = 11m

so, x must be 7, so the number will be divisible by 11.

Q6. Answer: (d) Two

From the given information:

Step 1: Only three persons sit between M2 and M3. M3 is sitting to the immediate left of M5.

Step 2: Only three persons sit between M1 and M5.

Step 3: M4 sits to the immediate left of M6 and is to the right of M3.

From the diagram we can see, there are two people between M3 and M6.

Hence, the correct answer is option 4).

Q7. Answer: (a) 1160

Given:
Divisor = 2Quotient = 6Remainder
Remainder = 8
Concept used:
Dividend = (Quotient x Divisor) + Remainder
Calculation:
Divisor = 6 × Remainder = 6 x 8 = 48
Divisor = 2 × Quotient
Quotient = 48/2 = 24
Dividend = (24 x 48) + 8 = 1160
Hence, the dividend is 1160.

Q8. Answer: (d) Rs 7,500

Given:
Total Annual Income = Rs 600
Fraction of capital invested at 6% = 2/3
Fraction of capital invested at 10% = 1/5
Fraction of capital invested at 15% = Remainder
Formula used:
Total Annual Income = (Part of Capital × Rate of Interest) + ...
Calculation:
Let total capital = C.
Fraction for 6% = 2/3 C
Fraction for 10% = 1/5 C
Fraction for 15% = 1 - (2/3 + 1/5) = 1 - (10/15 + 3/15) = 1 - 13/15 = 2/15 C
=> 600 = (2/3)C × 0.06 + (1/5)C × 0.10 + (2/15)C × 0.15
=> 600 = C(2/3 × 0.06 + 1/5 × 0.10 + 2/15 × 0.15)
=> 600 = C(0.04 + 0.02 + 0.02)
=> 600 = C × 0.08 => C = 600 / 0.08
=> C = 7500
Thus, the total capital will be Rs 7500.

Q9. Answer: (c) 1 1

Shortcut Trick
To find the minimum number of rows, we must maximize the number of trees per row.
Trees per row = HCF of 7, 28, and 42 = 7.
Number of rows = (7 ÷ 7) + (28 ÷ 7) + (42 ÷ 7)
Number of rows = 1 + 4 + 6 = 11.
Therefore The correct answer is 11.
Alternate Method
Given:
Number of Orange trees = 7
Number of Apple trees = 28
Number of Mango trees = 42
Formula Used:
Minimum Rows = (Total Trees) ÷ (HCF of tree counts)
Calculations:
=> Step 1: Find the Highest Common Factor (HCF) of 7, 28, and 42.
=> 7 = 7 × 1
=> 28 = 7 × 4
=> 42 = 7 × 6

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=> HCF = 7 (This is the maximum number of trees in each row).

=> Step 2: Calculate rows for each variety.

=> Orange rows = 7 ÷ 7 = 1

=> Apple rows = 28 ÷ 7 = 4

=> Mango rows = 42 ÷ 7 = 6

=> Total rows = 1 + 4 + 6 = 11

Therefore The correct answer is 11.

Additional Information

HCF and Minimum Groups

To find the minimum number of groups (rows, rooms, or containers) of equal size, we always calculate the HCF to determine the maximum possible size of one group.

LCM Applications

Conversely, LCM is used when we need to find the smallest common multiple, such as when bells toll together or runners meet at a starting point.

Q10. Answer: (d) Chair

The pattern in the given pair is:

Shirt : Trousers -- The pair is a couple of things that are used together.

Similarly,

? : Table -- ? will be an object that is used with table.

From the given options:

1) Furniture - Table is a type of furniture.

2) Bed - Bed is not used with table.

3) Almirah - Almirah is not used with table.

4) Chair - Chair is used with table.

Hence the correct answer is option 4)

Q11. Answer: (b) 36√3

Formula Used:

Area of equilateral triangle = (√3/4) × side²

Side of equilateral triangle = Perimeter / 3

Calculation:

Side of equilateral triangle = Perimeter / 3 = 36 /3 3 = 12 m

So,

Area of equilateral triangle

=> (√3/4) × side²

=> (√3/4) × 122

=> √3/4 × 12 × 12

=> √3 × 3 × 12 = 36√3

The area of the triangle is 36√3 m²

Q12. Answer: (a) 56 years

Shortcut Trick

Alok's present age = 62 − 20 = 42 years.

Given ratio of Alok's and Anil's present ages = 3 : 4.

3 units → 42 years

1 unit → 14 years

Anil's present age = 4 units = 4 × 14 = 56 years.

Therefore The correct answer is 56 years.

Alternate Method

Given:

=> Ratio of present ages of Alok and Anil = 3 : 4

=> Alok's age 20 years from now = 62 years

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Alok (3x)

14

14

14

3 units = 42 years

Anil (4x)

14

14

14

14

4 units = 56 years

Calculations:

=> Alok's present age = 62 − 20 = 42 years

=> Let the present ages of Alok and Anil be 3x and 4x respectively.

=> Since Alok's present age is 42 years, we equate it to 3x:

=> 3x = 42

=> x = 42 ÷ 3

=> x = 14

=> Anil's present age = 4x

=> Anil's present age = 4 × 14 = 56 years

Therefore The correct answer is 56 years.

Additional Information

Constant Age Difference

The difference between the ages of two individuals always remains constant at any point in time.

Past and Future Ages

If the present age is x years, the age n years ago was (x − n) years, and the age after n years will be (x + n) years.

Ratio of Ages

When the ratio of ages is given as a : b, their exact ages can be assumed as ax and bx, where x is a common multiplier.

Q13. Answer: (c) July 1921

The correct answer is Fri Jul 01 1921 00:00:00 GMT+0530 (India Standard Time)

Key Points

• Fri Jul 01 1921 00:00:00 GMT+0530 (India Standard Time) is the date when the All-India Khilafat Committee passed a resolution declaring that no Muslim should serve in the British-Indian army.

• The Khilafat Movement was a significant political and religious campaign launched by Muslims in British India to influence the British government and to protect the Ottoman Caliphate.

• The movement was led by prominent leaders such as Maulana Mohammad Ali and Shaukat Ali, who played a pivotal role in rallying Indian Muslims against British rule.

• It was closely associated with the Non-Cooperation Movement led by Mahatma Gandhi, which aimed at gaining self-governance and full independence for India.

• The resolution was part of a broader strategy to unite Muslims and Hindus in the struggle against colonial rule and to assert their political rights.

Additional Information

• The Khilafat Movement eventually declined after the abolition of the Caliphate by Mustafa Kemal Atatürk in 1924.

• Despite its decline, the movement had a lasting impact on Indian politics by fostering Hindu-Muslim unity and contributing to the broader struggle for Indian independence.

• The movement also highlighted the importance of religious and cultural issues in the anti-colonial struggle and set the stage for future collaborations between different communities in India.

Q14. Answer: (b) The Comptroller and Auditor General of India

The correct answer is The Comptroller and Auditor General of India

Key Points

• The Comptroller and Auditor General of India (CAG) is responsible for auditing the accounts of the Union and state governments and public sector organizations.

• The CAG is an independent authority established by the Constitution of India under Article 148.

• He is responsible for ensuring that public funds are used efficiently and for the purposes intended by Parliament.

• The CAG submits audit reports to the President of India, who then places them before both houses of Parliament.

Additional Information

• The CAG is appointed by the President of India and can only be removed from office in a manner similar to that of a Supreme Court judge, ensuring independence.

• The office of the CAG is considered one of the pillars of the democratic system of government in India.

• The CAG's reports are taken into consideration by the Public Accounts Committees (PACs) of the Parliament and state legislatures for scrutiny and action.

• The CAG also advises on the accounting system and form of accounts of the Union and states.

Q15. Answer: (d) Madhya Pradesh

The correct answer is Madhya Pradesh

Key Points

• Orchha is a heritage town that has been included in the tentative list of UNESCO world heritage sites.

• The town of Orchha is located in the state of Madhya Pradesh, India.

• Orchha is known for its historical significance and architecture, including palaces, temples, and cenotaphs built during the reign of the Bundela dynasty.

• The town is situated on the banks of the Betwa River and is a prominent tourist destination in Madhya Pradesh.

Additional Information

• UNESCO (United Nations Educational, Scientific and Cultural Organization) aims to identify, protect, and preserve cultural and natural heritage around the world considered to be of outstanding value to humanity.

• The inclusion of a site in the tentative list is a step towards its recognition as a World Heritage Site.

• Madhya Pradesh is home to several other UNESCO World Heritage Sites, including the Khajuraho Group of Monuments, the Buddhist Monuments at Sanchi, and the Rock Shelters of Bhimbetka.

• Orchha’s inclusion in the tentative list highlights its cultural and historical importance and promotes efforts towards its preservation and conservation.

Q16. Answer: (c) Plasma membrane

The correct answer is Plasma membrane

Key Points

• The plasma membrane is the outermost covering of the cell that separates the contents of the cell from its external environment.

• The plasma membrane is also known as the cell membrane.

• It is a semipermeable membrane that controls the movement of substances in and out of the cell.

• The plasma membrane is composed of a phospholipid bilayer with embedded proteins, which provide structural support and facilitate communication and transport.

• Key functions of the plasma membrane include protection, communication, and transport of nutrients and waste products.

Additional Information

• The plasma membrane is involved in various cellular processes such as cell signaling, cell adhesion, and maintaining the cell's potential.

• It is selectively permeable, allowing certain molecules to pass through while blocking others.

• The fluid mosaic model describes the structure of the plasma membrane as a mosaic of components that gives the membrane a fluid character.

• Different types of cells may have variations in their plasma membrane composition to suit their specific functions.

Q17. Answer: (b) Krishnanattam

The correct answer is Krishnanattam

Key Points

• Krishnanattam is the traditional theatre form of Kerala, where eight plays are performed over eight days.

• This theatre form is dedicated to the life and stories of Lord Krishna, showcasing various episodes from his life.

• Krishnanattam was created by the Zamorin of Calicut, Manaveda, in the 17th century.

• The plays are performed in a unique style that blends dance, drama, and music, reflecting the rich cultural heritage of Kerala.

• It is performed in the traditional temple theatres of Kerala and is an important cultural and religious event in the region.

Additional Information

• Yakshagana is a traditional theatre form of Karnataka, characterized by its unique blend of dance, music, and dialogue.
• Therukoothu is a street theatre form of Tamil Nadu, known for its vibrant costumes and elaborate performances.
• Maach is a traditional folk theatre form from the Malwa region of Madhya Pradesh.

Q18. Answer: (d) 3

Given:
Number = 2346x45
Divisor = 9
Concept used:
To be divisible by 9, the sum of all digits in a number must be divisible by 9.
Calculation:
Sum of given number = 2 + 3 + 4 + 6 + x + 4 + 5 = 24 + x
Now, the nearest number after 24 that is divisible by 9 is 27
27 - 24 = 3
Hence, x = 3.

Q19. Answer: (a) IU

According to the English alphabets and their positional values:
The logic follows:
The first alphabet is increased to 2 positional values.
The second alphabet is increased by + 1 from the previous positional value increase.
The pattern followed in the given series is:
Hence, the correct answer is option 1).

Q20. Answer: (a) 2

Given:
cos x +1/(cos x) = 2
Calculation:
Let cosx be t.
Now, according to question
cos x +1/(cos x) = 2
=> t + 1/t = 2
=> t^2 + 1 = 2t
=> t^2 + 1 - 2t = 0
=> $(t - 1)^2$ = 0
=> t = 1
=>cosx = 1
So, $\cos^n$ x +1/($\cos^n$ x)
= 1 + 1
= 2
Hence, The Required value is 2.

Q21. Answer: (d) ADG

According to the English alphabet and their positional values:
The pattern followed in the given options is:
Option 1)
Option 2)
Option 3)
Option 4)
So, ADG is the odd one.
Hence, the correct answer is option 4).

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Q22. Answer: (b) 2 : 5

Given:

Profit% = 150%

Formula used:

Profit % = (SP -CP)/CP × 100

SP = Selling price

CP = Cost price

Solution:

Let's put the given value in the formula,

Profit % = [SP/CP -1] × 100 ; 150/100 + 1 = SP/CP; SP/CP = 250/100 ; SP/CP = 5/2 ; CP/SP = 2/5

Hence, the ratio of cost price to selling price is 2 : 5.

Q23. Answer: (a) Arunachal Pradesh

The correct answer is Arunachal Pradesh

Key Points

• Arunachal Pradesh holds the highest graphite reserves in India according to the Geological Survey of India.

• Graphite is a naturally occurring form of crystalline carbon and is considered a vital industrial mineral.

• The state has a significant portion of India's total graphite resources, which plays a crucial role in various industries including batteries, lubricants, and refractories.

• The high reserves of graphite in Arunachal Pradesh contribute to its economic significance and potential for industrial development.

Additional Information

• Graphite is a key component in the production of lithium-ion batteries, which are essential for electric vehicles and renewable energy storage systems.

• The Geological Survey of India periodically assesses and updates the mineral resource data of the country.

• India's increasing focus on renewable energy and electric vehicles has heightened the importance of domestic graphite production.

• Efforts are being made to explore and develop these reserves sustainably to meet the growing industrial demand.

Q24. Answer: (d) 2100 m²

Shortcut Trick

The area of four walls of a room is simply its lateral surface area.

Lateral Surface Area = 2 × (length + breadth) × height

=> Area = 2 × (15 + 20) × 30

=> Area = 2 × 35 × 30 = 2100 m²

Therefore The correct answer is 2100 m².

Alternate Method

Given:

Length of the room (l) = 15 m

Breadth of the room (b) = 20 m

Height of the room (h) = 30 m

l = 15 m

b = 20 m

h = 30 m

Lateral Area

= Area of 4 walls

Formula Used:

Area of 4 walls = Lateral Surface Area of Cuboid = 2 × (l + b) × h

Calculations:

=> Area = 2 × (15 + 20) × 30

=> Area = 2 × 35 × 30

=> Area = 70 × 30

=> Area = 2100 m²

Therefore The correct answer is 2100 m².

Additional Information

Total Surface Area of Cuboid

Includes all 6 faces (4 walls + floor + ceiling) = 2(lb + bh + hl)

Volume of a Cuboid

The total space occupied by the room = l × b × h

Diagonal of a Cuboid

The length of the longest straight line or pole that can be placed inside the room = √(l² + b² + h²)

Q25. Answer: (c) Unique solution X = 25over 12, y=23/12

Calculation:

2^(x + y) = 16....(1)

64^(x - y) = 2.....(2)

(x + y) = 4

x- y = 1/6

Solving equation:

x = 25/12 and y = 23/12.

Q26. Answer: (c) 20

Given:

Apples = 1200

Calculation:

Let the number of boys in the group = m

Now, as per the given statement,

Each boy got 3m apples.

Thus total apples can be equated,

m x 3 x m = 1200

m² = 400

m = 20

Hence, there was a total of 20 boys in the group.

Q27. Answer: (d) 528

Given:

Numbers = 22, 24, 48, 16

Calculation:

LCM (Lowest Common Factor)

Factors(22) = 2 x 11

Factors(24) = 2 x 2 x 2 x 3 = 2^3 x 3^1

Factors(48) = 2 x 2 x 2 x 2 x 3 = 24 x 31

Factors(16) = 2 x 2 x 2 x 2 = 24

LCM (22, 24,48,16) = 2^4 x 3^1 x 11 = 528

Q28. Answer: (b) 0.3%

Given:

Principle = Rs. 1,200

Time = 3 years

SI1 - SI2 = Rs. 10.80

Formula used:

SI = (P × R × T)/100

here,

SI = Simple Interest

P = Principle

R = Rate

T = Time

Calculation:

SI1 = (1200 × R1× 3)/100 = 36R1 .....(1)

SI2 = (1200 × R2× 3)/100 = 36R2 .....(2)

Now, let's subtract the second equation from the first one,

SI1 - SI2 = 36R1 - 36R2

10.8 = 36(R1 - R2)

(R1 - R2) = 10.8over 36

(R1 - R2) = 0.3

Hence, the difference between their rates of interest is 0.3%.

Q29. Answer: (c) Loktak Lake

The correct answer is Loktak Lake

Key Points

• Loktak Lake is the largest freshwater lake in northeast India.

• It is located in the Indian state of Manipur.

• The lake is renowned for its phumdis (heterogeneous mass of vegetation, soil, and organic matter at various stages of decomposition) floating over it.

• It serves as a source of water for hydropower generation, irrigation, and drinking water supply in the region.

• The lake is also home to the Keibul Lamjao National Park, the only floating national park in the world, which is the last natural habitat of the endangered Sangai deer.

• Loktak Lake is an integral part of the culture and economy of Manipur, supporting the livelihoods of a large number of people through fishing and agriculture.

Additional Information

• Kolleru Lake is one of the largest freshwater lakes in India, located in Andhra Pradesh, but not in northeast India.

• Dal Lake is a famous lake in Srinagar, Jammu and Kashmir, known for its houseboats and tourism, but it is not in northeast India.

• Pulicat Lake is the second-largest brackish water lake in India, located on the border of Andhra Pradesh and Tamil Nadu, and not a freshwater lake in northeast India.

• Northeast India is a region known for its diverse cultures, languages, and natural landscapes, including several significant water bodies like Loktak Lake.

Q30. Answer: (a) 4

In the given Venn diagram, figure and its representation are mentioned in the table below:

Figure	Represents
Rectangle	Male
Triangle	Educated
Circle	Urban
Square	Civil Servants

From the given Venn diagram:

From the figure we can see that, there are 4 educated males who hail from urban areas.

Hence, the correct answer is option 1).

Q31. Answer: (b) Madhya Pradesh

The correct answer is Madhya Pradesh

Key Points

• Madhya Pradesh has announced to enact legislation for the 'right to water' to ensure the availability of a minimum of 55 liters of water per person per day.

• This initiative is aimed at providing guaranteed access to water, recognizing it as a basic human right.

• The legislation will ensure that every individual in the state has access to sufficient and safe water for daily needs.

• The move is part of broader efforts to address water scarcity and improve water management in the state.

Additional Information

• Water scarcity is a significant issue in many parts of India, affecting both rural and urban areas.

• Ensuring access to clean and adequate water is crucial for public health, economic development, and overall quality of life.

• Other states are also exploring similar measures to address water issues and ensure sustainable water management.

• The 'right to water' is increasingly being recognized globally as a fundamental human right, essential for the enjoyment of life and all human rights.

• Effective water legislation and management can help in achieving the United Nations Sustainable Development Goal 6, which aims to ensure availability and sustainable management of water and sanitation for all.

Q32. Answer: (c) FORTRAN

The correct answer is FORTRAN

Key Points

• FORTRAN is used for scientific programs and solving mathematical problems.

• FORTRAN is a general-purpose, compiled imperative programming language which is especially suited for numerical computation and scientific computing.

• FORTRAN was developed by IBM Company in the year 1950 for scientific and engineering applications, and subsequently came to dominate in scientific computing.

• For the past 30 years FORTRAN has been used for projects such as the design of bridges and airplane structures, it is used for factory automation control, for storm drainage design, and analysis of scientific data.

Additional Information

• RFID tags allow users to automatically and uniquely identify and track inventory and assets using wireless radio frequency waves.

• Event-driven programming is a programming paradigm in which the flow of the program is determined by events such as user actions (mouse clicks, key presses), sensor outputs, or message passing from other programs or threads.

Q33. Answer: (b) XUGX

The logic followed here is:

'ROAR' is written as 'URDU'

Similarly, for 'URDU'

So, 'URDU' is written as 'XUGX'

Hence, the correct answer is "Option 2".

Q34. Answer: (c) GSAT-7A

The correct answer is GSAT-7A

Key Points

• Indian Space Research Organisation's (ISRO) Geosynchronous Satellite Launch Vehicle (GSLV-F11) successfully launched the communication satellite GSAT-7A.

• This satellite is primarily for the Indian Air Force's communication purposes, such as ground to air communication.

• GSAT 7 satellites are advanced satellites developed by ISRO to meet the communication needs of the defence services. The GSAT 7 satellite was launched in August 2013.

• Also known as 'Angry Bird', the satellite will give a boost to the strategic communication and networking capabilities of the Indian Air Force.

Additional Information

• The GSAT 7 (Rukmini) is India's first military satellite. It provides a gamut of services for military communication needs, which includes low bit voice rate to high bit rate data facilities, including multi-band communications.

• The GSAT (Geosynchronous Satellite) satellites are India's indigenously developed communications satellites, used for digital audio, data, and video broadcasting.

Q35. Answer: (c) Aurangabad

The correct answer is Aurangabad

Key Points

• The 30 caves at Ajanta lie to the north of Aurangabad in the Indhyadri range of Western Ghats.

• The caves, famous for their temple architecture and many delicately drawn murals, are located on a 76 m high, horseshoe-shaped escarpment overlooking the Waghora (tiger) River.

• Cave 4 is the largest vihara and one of the most important caves at Ajanta.

• The decorated main entrance leads to a hall with twenty-eight pillars.

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Additional Information

• Nashik is a city in Maharashtra which has been the center of commerce and trade in India since the historical years. Famous for its numerous temples, the city is also much famed for its numerous vineyards and wine tasting tours.

• Historical landmarks in Pune include the Lal Mahal, the Kasba Ganapati temple and Shaniwar Wada. Major historical events involving the city include the Mughal–Maratha Wars and the Anglo-Maratha Wars.

• Mumbai is a mix of iconic old-world charm architecture, strikingly modern high rises, cultural and traditional structures, and whatnot.

Q36. Answer: (c) J. J Thompson

The correct answer is J. J Thompson

Key Points

• J. J Thompson proposed that electrons are embedded in a positive sphere.

• This model is often referred to as the plum pudding model of the atom.

• According to this model, the atom is composed of electrons surrounded by a "soup" of positive charge to balance the electrons' negative charges, similar to plums within a pudding.

• This theory was proposed in the year 1904.

• It was one of the earliest models to describe the internal structure of atoms.

Additional Information

• J. J Thompson is also credited with the discovery of the electron in 1897.

• His work on the electron led to the development of the field of atomic physics.

• Thompson's model was later replaced by the Rutherford model and then by the Bohr model of the atom.

• Despite its eventual replacement, Thompson's model was crucial in advancing the understanding of atomic structure at the time.

• Thompson was awarded the Nobel Prize in Physics in 1906 for his work on the conduction of electricity in gases.

Q37. Answer: (d) Bharata

The correct answer is Bharata

Key Points

• Bharata was the son of Shakuntala in Kalidasa's drama Abhijnana Shakuntalam.

• Kalidasa is one of the greatest Sanskrit poets and dramatists, known for his works that include plays, epic poems, and lyric poetry.

• Abhijnana Shakuntalam is one of Kalidasa's most famous plays, which tells the story of Shakuntala, her love for King Dushyanta, and their son Bharata.

• The play is a classic example of ancient Indian literature and has been translated into many languages around the world.

Additional Information

• Kalidasa lived during the Gupta dynasty, which is often referred to as the Golden Age of India due to its advancements in arts, science, and literature.

• His works are known for their rich imagery, emotional depth, and elegant use of the Sanskrit language.

• Other notable works by Kalidasa include Raghuvamsha, Kumarasambhava, and Meghaduta.

• The story of Shakuntala has been adapted into various forms, including theatre, dance, and film, highlighting its enduring popularity and cultural significance.

Q38. Answer: (a) it uses Deuterium, a heavier isotope of hydrogen, rather than Protium.

The correct answer is Option 1

Key Points

• Heavy water is known as such because it uses Deuterium, a heavier isotope of hydrogen, rather than Protium.

• Deuterium has one proton and one neutron, making it heavier than Protium, which has only one proton and no neutrons.

• Heavy water (D_2O) is used in certain types of nuclear reactors as a neutron moderator.

• Its density is slightly higher than that of normal water (H_2O), but it is not three times denser.

Additional Information

• Deuterium is a stable isotope of hydrogen with a natural abundance in Earth's oceans of about one atom in 6420 of hydrogen.

• Heavy water was first produced in 1932, and it has since been used in various scientific and industrial applications.

• The presence of deuterium in heavy water gives it different nuclear properties, which are crucial for its role in nuclear reactors.

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Q39. Answer: (a) Chandrabhaga beach

The correct answer is Chandrabhaga beach

Key Points

• Chandrabhaga beach has become the first beach in Asia to receive the Blue Flag certification.

• The Blue Flag certification is a globally recognized eco-label awarded to beaches, marinas, and sustainable boating tourism operators.

• To earn this certification, beaches must meet stringent environmental, educational, safety, and accessibility criteria.

• The certification is awarded by the Foundation for Environmental Education (FEE), which is a non-governmental organization.

Additional Information

• Chandrabhaga beach is located in the state of Odisha, India.

• It is renowned for its scenic beauty and cultural significance, being close to the UNESCO World Heritage site of Konark Sun Temple.

• The Blue Flag certification aims to promote sustainable development in freshwater and marine areas through stringent criteria dealing with water quality, environmental management, and safety.

• India is committed to enhancing the environmental quality of its beaches and promoting sustainable tourism practices.

Q40. Answer: (d) 12%

Given:

Decreased% = 20%

Increased% = 10%

Calculation:

Let, the price of the mobile be m.

Now,

Price after decrement of 20% = m - 20m/100 = m - 0.2m = 0.8m

Now, further, it is incremented by 10% = 0.8m + 10(0.8m) over 100 = 0.8m + 0.08m = 0.88m

Hence, the net change = (Initial - final) x 100 = (m - 0.88m) x 100 = 12%

Hence, the net change in price is 12%.

Q41. Answer: (d) Commonwealth Bank of Australia

The correct answer is Commonwealth Bank of Australia

Key Points

• The World Bank has tied with the Commonwealth Bank of Australia to enable secondary bond trading recorded on Blockchain.

• This initiative aims to leverage Blockchain technology to enhance the transparency and efficiency of bond trading.

• Blockchain technology can provide a secure, immutable ledger for recording transactions, ensuring data integrity and reducing the potential for fraud.

• This collaboration marks a significant step in the integration of advanced technologies within the financial sector.

Additional Information

• The World Bank has been at the forefront of adopting innovative technologies to improve financial systems globally.

• The Commonwealth Bank of Australia is one of the leading financial institutions in Australia, known for its commitment to technological advancements and innovation.

• Blockchain technology is increasingly being adopted in various sectors for its ability to provide decentralized, transparent, and secure transaction records.

• This initiative is expected to pave the way for future collaborations and advancements in the use of Blockchain in financial markets.

Q42. Answer: (d) 130

The pattern followed in the given series is:

(Cube of natural number + Natural number)

Hence the correct answer is option 4)

Q43. Answer: (b) 9 : 25

Given:

Formula used:

Length of diagonal of square = √2 x side

Area of square = $(side)^2$

Calculation:

Let the sides of two squares be s1 and s2

On equating the given ratio in the formula, we get,

The ratio of sides of the two square

$\sqrt{2}$ s1: $\sqrt{2}$ s2 = 3 : 5

The ratio of the area of two square

$s1^2:s2^2 = 3^2:5^2$

$s1^2:s2^2 = 9:25$

Hence, the ratio of their areas is 9: 25.

Q44. Answer: (c) 24

Given:

Numbers = $\sqrt{36}$ and $\sqrt{64}$

Concept used:

LCM (Lowest Common Multiple)

It is the product of the greatest power of each prime factor, involved in the numbers.

Calculation:

$\sqrt{36} = 6$; $\sqrt{64} = 8$

Factors(6) = 2 x 3

Factors(8) = 2^3

LCM(6,8) = 2^3 x 3 = 24

Hence, the LCM of the two given numbers is 24.

Q45. Answer: (c) 40

Shortcut Trick

Assuming the base average as the lowest mean (25), the excess mean for Class 2 is 70 − 25 = 45.

Total excess marks contributed by 50 students of Class 2 = 45 × 50 = 2250.

Distributing this excess equally among all students (100 + 50) = 2250 ÷ 150 = 15.

Combined mean = Base average + Net distributed excess = 25 + 15 = 40.

Therefore The correct answer is 40 marks.

Alternate Method

Given:

Class 1: Students (n1) = 100, Mean marks (x1) = 25

Class 2: Students (n2) = 50, Mean marks (x2) = 70

Formula Used:

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

Mean: 25

Mean: 70

Mean: x

70 − x

x − 25

100 Students (Ratio: 2)

50 Students (Ratio: 1)

Calculations:

=> Using direct formula: x = (100 × 25 + 50 × 70) ÷ (100 + 50)

=> x = (2500 + 3500) ÷ 150 = 6000 ÷ 150 = 40

=> Using Alligation method: (70 − x) ÷ (x − 25) = 100 ÷ 50

=> (70 − x) ÷ (x − 25) = 2 ÷ 1

=> 70 − x = 2 × (x − 25)

=> 70 − x = 2x − 50

=> 3x = 120 => x = 40

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Therefore The correct answer is 40 marks.

Additional Information

Weighted Average

Used when different sets of values have different counts or weights. The combined mean is strictly the sum of all elements divided by the total number of elements.

Alligation Method

A highly efficient visual approach to find the ratio in which two quantities are mixed. The ratio of their counts is inversely proportional to the differences of their means from the combined mean.

Net Deviation Method

Instead of multiplying large numbers, assume a base average and distribute the total net excess or deficit equally among all observations to easily obtain the final mean.

Q46. Answer: (b) 20 km

Shortcut Trick

Ratio of speeds for the two journeys = 20 : 5 = 4 : 1

Since the distance is constant, the ratio of time taken will be inversely proportional = 1 : 4

Total time in ratio units = 1 + 4 = 5 units

Given total time = 5 hours => 5 units = 5 hours => 1 unit = 1 hour

Time taken while travelling at 20 km/h = 1 hour

Distance = Speed × Time = 20 × 1 = 20 km

Therefore The correct answer is 20 km.

Alternate Method

Given:

Speed from school to park (S1) = 20 km/h

Speed from park to school (S2) = 5 km/h

Total time taken (T) = 5 hours

Formula Used:

Time = Distance ÷ Speed

Total Time = (Distance ÷ S1) + (Distance ÷ S2)

Total Time = 5 hours

Distance = D km

School

Park

Speed = 20 km/h

Speed = 5 km/h

Calculations:

Let the distance of the school from the park be D km.

=> D ÷ 20 + D ÷ 5 = 5

=> (D + 4D) ÷ 20 = 5

=> 5D ÷ 20 = 5

=> D ÷ 4 = 5

=> D = 4 × 5 = 20 km

Therefore The correct answer is 20 km.

Additional Information

Average Speed

When a certain distance is covered at speed 'x' and the same distance is covered at speed 'y', the average speed for the whole journey is given by 2xy ÷ (x + y).

Constant Distance Rule

If the distance traveled is constant, speed is inversely proportional to time (S prop. to 1/T). Therefore, S1/S2 = T2/T1.

Relative Speed

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

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Q47. Answer: (d) CD Deshmukh

The correct answer is CD Deshmukh

Key Points

• CD Deshmukh was the first Indian Governor of the Reserve Bank of India.

• He served as the Governor of the Reserve Bank of India from August 11, 1943, to June 30, 1949.

• CD Deshmukh played a significant role in the establishment of the Indian financial system post-independence.

• He was also involved in the negotiations for the Bretton Woods Agreement, which led to the establishment of the International Monetary Fund (IMF) and the World Bank.

• After his tenure at the RBI, CD Deshmukh went on to serve as India's Finance Minister from 1950 to 1956.

Additional Information

• The Reserve Bank of India (RBI) is the central banking institution of India, which controls the issuance and supply of the Indian rupee and manages the country's main payment systems.

• The RBI was established on April 1, 1935, during the British Rule in accordance with the provisions of the Reserve Bank of India Act, 1934.

• The RBI plays a crucial role in the development strategy of the Government of India, including maintaining monetary stability in the country.

• The headquarters of the Reserve Bank of India is located in Mumbai, Maharashtra.

• The RBI's functions include regulating the issue of banknotes, maintaining reserves to secure monetary stability, and operating the credit and currency system of the country to its advantage.

Q48. Answer: (b) GlaxoSmithKline(GSK)

The correct answer is GlaxoSmithKline(GSK)

Key Points

• GlaxoSmithKline(GSK) has developed the world's first malaria vaccine for the World Health Organization.

• The vaccine, known as RTS,S/AS01 (RTS,S), is the first and, to date, the only vaccine that has demonstrated it can significantly reduce malaria in children.

• Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female Anopheles mosquitoes.

• The development of this vaccine marks a significant milestone in global health, particularly in the fight against malaria.

Additional Information

• GlaxoSmithKline (GSK) is a British multinational pharmaceutical company headquartered in Brentford, London.

• GSK has a broad portfolio of products, including vaccines, pharmaceuticals, and consumer healthcare products.

• Malaria remains a major public health challenge, particularly in sub-Saharan Africa, where it is one of the leading causes of illness and death.

• The development and deployment of the malaria vaccine are seen as crucial steps toward achieving the WHO's goal of reducing the global malaria burden.

Q49. Answer: (d) 14

Given:

$X + 1/X = 4$

Formula used:

$(a + b)^2 = a^2 + b^2 + 2ab$

Calculation:

Here, in this case, according to formula,

$a = X$

$b = 1/X$

Now, we need to find $a^2 + b^2$,

so, we can write $a2 + b2 = (a + b)^2 - 2ab$

Now, let's put the values in the formula,

$X^2 + 1/(X^2) = (X + 1/X)^2 - 2(X)(1/X)$; $X^2 + 1/(X^2) = (4)^2 - 2 = 14$

Hence, its value is 14.

Q50. Answer: (a) Rs 32

Given:

Selling Price (SP1) with 10% discount = Rs. 36

Discount1 = 10%

Desired Discount2 = 20%

Formula used:

SP = List Price (LP) - Discount Amount

Discount Amount = (Discount% × LP) / 100

Calculation:

For 10% discount:

=> SP1 = LP × (1 - Discount1/100)

=> 36 = LP × (1 - 10/100)

=> 36 = LP × 0.9

=> LP = 36 / 0.9

=> LP = 40

Now, to find the selling price with a 20% discount:

=> SP2 = LP × (1 - Discount2/100)

=> SP2 = 40 × (1 - 20/100)

=> SP2 = 40 × 0.8

=> SP2 = 32

Therefore, the selling price that will result in a 20% discount on the list price is Rs. 32.

Q51. Answer: (d) Kargil War-1999

The correct answer is Kargil War-1999

Key Points

• Operation Vijay is associated with the Kargil War-1999.

• The Kargil War was fought between India and Pakistan in the Kargil district of Jammu and Kashmir and elsewhere along the Line of Control (LoC).

• It took place between May and July 1999.

• The operation aimed to clear the Kargil sector of infiltrators from the Pakistani Army.

• Indian forces successfully regained the high outposts, leading to a decisive victory.

Additional Information

• The conflict is also referred to as the Kargil conflict.

• It marked the first direct conflict between India and Pakistan since the 1971 Indo-Pakistan War.

• The war highlighted the need for high-altitude warfare training and better surveillance and intelligence.

• The success of Operation Vijay boosted the morale of the Indian Armed Forces and enhanced India's military reputation globally.

Q52. Answer: (a) Rana Dasgupta

The correct answer is Rana Dasgupta

Key Points

• Rana Dasgupta won the Rabindranath Tagore Literary Prize 2019 for Literature.

• The prize recognizes outstanding literary works and is named after the renowned Indian poet and Nobel laureate, Rabindranath Tagore.

• Rana Dasgupta is a celebrated author known for his works that explore themes of globalization, cultural identity, and the human condition.

• The award highlights the importance of literature in fostering cultural understanding and appreciation.

Additional Information

• The Rabindranath Tagore Literary Prize was established to honor the legacy of Rabindranath Tagore and to encourage contemporary writers to contribute to literature and culture.

• Rabindranath Tagore was the first non-European to win the Nobel Prize in Literature in 1913 for his work "Gitanjali."

• The prize includes a monetary award, a Tagore statuette, and a certificate of recognition.

• The award aims to promote global harmony and peace through the power of literature.

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Q53. Answer: (c) 144

Given:

Numbers are 36,72, and 144

Concept used:

LCM (Lowest Common Multiple)

It is the product of the greatest power of each prime factor, involved in the numbers.

Solution:

Factors(36) = 2 x 2 x 3 x 3

Factors(72) = 2 x 2 x 2 x 3 x 3

Factors(144) = 2 x 2 x 2 x 2 x 3 x 3

LCM(36, 72, 144) = 2 x 2 x 2 x 2 x 3 x 3 = 144.

Hence, the LCM of the given numbers is 144.

Q54. Answer: (a) H > D > C > E > A > B > F

Given: Seven students A, B, C, D, E, F, and H give a test.

No two students get the same marks.

1) A gets more marks than B. H gets more marks than A.

H > A > B

2) Only two students get more marks than C

> C > > > >

3) D gets more marks than C and B but D doesn't get the highest marks

D > C > > > > __

Given that, If B did not get the lowest marks

Now, After combining statements 1 and 3, we get;

Case 1: > D > C > H > A > B >

Case 2: H > D > C > > A > B

Now, checking the options

Option 1: H > D > C > E > A > B > F → True (It follows the case 2)

Option 2: F > D > C > E > H > B > A → False (It contradicts statement (1) as A > B)

Option 3: E > C > D > H > A > B > F → False (It contradicts statement (3) as D > C)

Option 4: H > D > C > B > E > F > A → False (It contradicts statement (1) as A > B)

So, Only H > D > C > E > A > B > F satisfies the all statements.

Hence, the correct answer is "Option (1)".

Q55. Answer: (c) 10

Given:

Exterior angle = 1a

Interior angle = 4a

Formula used:

(Exterior + Interior) angle = 180

Total number of sides of the polygon = 360/(Value of exterior angle)

Solution:

According to the question,

(Exterior + Interior) angle = 180°

1a + 4a = 180°

5a = 180°

a = 36°

Now, let's put the value of the exterior angle in the second formula to know the number of sides,

Total number of sides = 360/(Value of exterior angle)

= 360/36 = 10

Hence, the number of sides of the polygon is 10.

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Q56. Answer: (b) OPXZCJ

According to the English alphabet and their positional values:

The pattern followed in the given series is:

Similarly,

Hence the correct answer is option 2).

Q57. Answer: (a) Rajasthan

The correct answer is Rajasthan

Key Points

• Rajasthan announced its decision to ban the production, distribution, advertisement, and sale of e-cigarettes within its territory in May 2019.

• This move was part of the state's efforts to curb the usage of e-cigarettes, which were increasingly becoming popular, especially among the youth.

• The ban was implemented to address health concerns associated with e-cigarettes, including potential risks of addiction and other health issues.

• Rajasthan's decision was in line with the growing global and national trend of regulating or banning e-cigarettes due to their health implications.

Additional Information

• E-cigarettes are battery-operated devices that heat a liquid to create an aerosol, which typically contains nicotine, flavorings, and other chemicals.

• Despite being marketed as a safer alternative to traditional cigarettes, e-cigarettes have been found to carry significant health risks, including lung injury and addiction.

• The Indian government has been proactive in regulating tobacco products and has taken steps to reduce the consumption of both traditional and electronic cigarettes.

• In September 2019, the Union Cabinet approved an ordinance to ban e-cigarettes across India, following Rajasthan's earlier decision.

Q58. Answer: (a) d

Given:

LCM(a, b) = b

LCM(b, c) = c

LCM(c, d) = d

Concept used:

LCM (Lowest Common Multiple)

It is the product of the greatest power of each prime factor, involved in the numbers.

Solution:

Using the above, definition, we can say that is greater among all.

Since,

LCM(a, b) = b & LCM(b, c) = c

LCM(a, b, c) = c

Hence,

LCM(a,b,c,d) = d

Q59. Answer: (c) Arunachal Pradesh

The correct answer is Arunachal Pradesh

Key Points

• India's longest (300 m) single-lane steel cable suspension bridge was inaugurated over the river Siang in Arunachal Pradesh.

• This bridge is a significant infrastructure development aimed at improving connectivity and transportation in the region.

• The bridge enhances the accessibility to remote areas, facilitating better movement of people and goods.

• It is expected to boost the local economy by improving trade and tourism in Arunachal Pradesh.

Additional Information

• Arunachal Pradesh is known for its scenic beauty and is often referred to as the "Land of the Rising Sun" in India.

• The state shares international borders with Bhutan, China, and Myanmar.

• Arunachal Pradesh is home to several indigenous tribes and has a rich cultural heritage.

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• It is also known for its biodiversity and is a part of the Eastern Himalayan biodiversity hotspot.

• The state capital is Itanagar, and the official languages are English and Hindi.

Q60. Answer: (c) United States

The correct answer is 3) United States

Key Points

• The United States has the highest number of operational nuclear reactors in the world.

• As of the latest data, the United States operates 93 nuclear reactors across various locations in the country.

• The United States has a long history of nuclear energy development and has invested significantly in nuclear technology for both civilian and military purposes.

• These reactors contribute to a significant portion of the country's electricity generation, providing a reliable and low-carbon source of energy.

Additional Information

• Nuclear energy in the United States is regulated by the Nuclear Regulatory Commission (NRC).

• The first commercial nuclear power plant in the United States, Shippingport Atomic Power Station, began operation in 1958.

• Nuclear power accounts for nearly 20% of the total electricity generation in the United States.

• The country is also involved in international collaborations to enhance nuclear safety and innovation.

• Several states within the United States have policies supporting the continued use of nuclear energy due to its low greenhouse gas emissions.

Q61. Answer: (a) Dadabhai Naoroji

The correct answer is Dadabhai Naoroji

Key Points

• Dadabhai Naoroji organized the East India Association in London in 1866.

• The association was established to discuss the Indian question and influence British public officials to promote Indian welfare.

• Dadabhai Naoroji is often referred to as the "Grand Old Man of India" and was a prominent Indian political leader and social reformer.

• The East India Association played a significant role in advocating for Indian interests and raising awareness about the conditions in India under British rule.

Additional Information

• Dadabhai Naoroji was also the first Indian to be elected to the British Parliament, representing the Finsbury Central constituency from 1892 to 1895.

• He was a co-founder of the Indian National Congress and played a key role in the early years of India's independence movement.

• Naoroji's work and writings, including his book "Poverty and Un-British Rule in India," highlighted the economic exploitation of India by the British.

• He is also known for his theory of the "Drain of Wealth," which argued that India was being impoverished by the British economic policies.

Q62. Answer: (a) Virat Kohli

The correct answer is Virat Kohli.

Key Points

• In December 2020, the ICC introduced the "ICC Men's Cricketer of the Decade" award.

• The award aimed to honor the standout performer in international cricket from 2011 to 2020.

• It recognized the remarkable achievements and contributions of a cricketer over the decade.

• Indian cricket icon Virat Kohli was the recipient of this inaugural award.

• Kohli's exceptional batting records across all formats were highlighted.

• His leadership as captain of the Indian cricket team was also acknowledged.

Additional Information

• Virat Kohli was born on November 5, 1988, in Delhi, India.

• He made his international cricket debut in 2008.

• He was appointed captain of the Indian cricket team in 2013.

• Kohli has led the team to significant victories, including historic Test series wins abroad.

• Kohli is an advocate for fitness and healthy living, promoting these values beyond the cricket field.

Q63. Answer: (d) aover √(a² + b²)

Given:

a × tan α = b

Formula used:

tan²x = sec²x -1

Calculation:

Using the above identity, tan²α =(b²)/(a²)=sec²α-1

=> secα =√(1+(b²)/(a²))=1/cosα

=> cosα =1/(√(1+(b²)/(a²)))=a/(√(a²+b²))

Therefore If a × tan α = b, then the value of cos α will be aover √(a² + b²).

Q64. Answer: (a) (a) and (b)

From the given prepositions:

(a) All elephants are equal to cats.

(b) Some elephants are not equal to cats.

(c) Some elephants are equal to cats.

(d) Few elephants are also equal to cats.

We consider each option:

Option 1) (a) and (b) -- (a) says 'All elephants are equal to cats' and (b) says 'Some elephants are not equal to cats' which are two contradicting prepositions and are denial of each other.

Option 2) (c) and (d) -- (c) says 'Some elephants are equal to cats' and (d) says 'Few elephants are also equal to cats', these two prepositions are similar to each other and cannot be denial.

Option 3) (a) and (d) -- (a) says 'All elephants are equal to cats' and (d) says 'Few elephants are also equal to cats', here both of them are in accordance with each other and there is no denial.

Option 4) (a) and (c) -- (a) says 'All elephants are equal to cats' and (c) says 'Some elephants are equal to cats', we can see that both the prepositions are leading towards the same idea and there is no denial of any sort.

So, (a) and (b) are in denial.

Hence the correct answer is option 1)

Q65. Answer: (b) 517563

From the given codes we have:

APPLE is coded as 25563

and, RUNG is coded 7148

For the code of PURPLE we have the codes in the given examples, so

Hence, the correct answer is option 2).

Q66. Answer: (d) 24

Given:

Two natural numbers are in the ratio of 6 : 8 and their products is 768.

Concept used:

Substitution method

Calculation:

Let the numbers be x and y.

Then, x/y=6/8=3/4

And, xy = 768

Substituting y=4x/3 in the above equation.

(4x²)/3=768

Solving for x,

x=√((768× 3)/4)=24

Therefore The smallest number is 24.

Q67. Answer: (b) Galileo Galilei

The correct answer is Galileo Galilei

Key Points

• Galileo Galilei wrote the book 'The Little Balance (La Bilancetta)' in 1586.

• Galileo was an Italian polymath who made significant contributions to various fields including physics, astronomy, and scientific philosophy.

• 'The Little Balance' is a treatise on hydrostatics, which discusses the principles of balance and weight, and the method to determine the specific gravity of objects.

• Galileo's work laid the foundation for future scientific exploration and is considered a pivotal contribution to the scientific revolution.

Additional Information

• Galileo Galilei was born on 15 February 1564 and passed away on 8 January 1642.

• He is often referred to as the "father of observational astronomy," the "father of modern physics," the "father of the scientific method," and the "father of modern science."

• Galileo's other notable works include 'Dialogue Concerning the Two Chief World Systems' and 'Discourses and Mathematical Demonstrations Relating to Two New Sciences.'

• His advocacy of heliocentrism, the view that the Earth orbits the Sun, led to significant controversy with the Catholic Church during his lifetime.

• Galileo's methods and discoveries paved the way for future scientists such as Isaac Newton.

Q68. Answer: (a) 500

Shortcut Trick

Percentage of students passed in both = Passed in Physics + Passed in Chemistry + Failed in both − 100%

=> Passed in both = 80% + 70% + 15% − 100% = 65%

=> 65% of total students = 325

=> Total students = (325 ÷ 65) × 100 = 500

Therefore The correct answer is 500.

Alternate Method

Given:

Passed in Physics = 80%

Passed in Chemistry = 70%

Failed in both = 15%

Number of students passed in both = 325

Total Students = 100%

Failed in Both = 15%

Physics (80%)

Chemistry (70%)

15%

65%

5%

(Both)

Formula Used:

n(A U B) = n(A) + n(B) − n(A ∩ B)

Passed in at least one subject = 100% − Failed in both

Calculations:

=> Students passed in at least one subject = 100% − 15% = 85%

=> Let students passed in both subjects be x%.

=> 85% = 80% + 70% − x%

=> x% = 150% − 85% = 65%

=> Now, 65% of total students = 325

=> Total students = (325 ÷ 65) × 100

=> Total students = 5 × 100 = 500

Therefore The correct answer is 500.

Additional Information

Venn Diagram Basics

The Universal Set represents 100% of the population. Any overlapping region represents elements common to both sets, also

known as the intersection.

Two Sets Formula

$n(A \cup B) = n(A) + n(B) - n(A \cap B)$, where $n(A \cup B)$ is the total number of distinct elements in at least one of the sets.

Three Sets Formula

$n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(C \cap A) + n(A \cap B \cap C)$.

Q69. Answer: (c) Bhopal

The relation in the given pair is:

Uttar Pradesh : Lucknow -- State : Capital city

Similarly,

Madhya Pradesh : ? -- ? will be the capital city of Madhya Pradesh

From the given options:

Option 1) Jabalpur - A city in Madhya Pradesh

Option 2) Gwalior - A city in Madhya Pradesh

Option 3) Bhopal - Capital city of Madhya Pradesh

Option 4) Indore - A city in Madhya Pradesh

Hence the correct answer is option 3)

Q70. Answer: (c) 6000 Rupees

The correct answer is 6000 Rupees

Key Points

• Every farmer gets Rs 6,000 per year which is transferred every year in three equal installments of Rs 2,000 each over four months.

• PM Kisan Samman Nidhi Yojana was launched by Prime Minister Shri Narendra Modi for financial assistance to needy farmers.

• Earlier, the income support was given only to farmer families having cultivable land of up to 2 hectares.

Additional Information

• Other Important Yojanas By Government of India:

• Ujala Yojna

• Atal Pension Yojana

• Prime Minister Jeevan Jyoti Bima Yojana

• Pradhan Mantri Suraksha Bima Yojana

• AMRUT Plan

• Digital India Mission

• Gold Monetization Scheme

Q71. Answer: (d) Father

From the given information:

My son's paternal uncle = My brother

Preparing the family tree using the following symbols:

From the diagram, we can see that the old man is the father of Harsh's brother which means he is the father of Harsh.

Hence, the correct answer is option 4).

Q72. Answer: (d) Mary Kom

The correct answer is Mary Kom

Key Points

• Mary Kom created history by becoming India's only six-time world boxing champion.

• She achieved this milestone in the AIBA Women's World Boxing Championships.

• Mary Kom, also known as Magnificent Mary, has been a prominent figure in Indian boxing and a source of inspiration for many athletes.

• She has received numerous awards, including the Padma Bhushan, Padma Shri, and Rajiv Gandhi Khel Ratna Award.

Additional Information

• Mary Kom was born on 1st March 1983 in Kangathei, Manipur, India.

• She started her boxing career at a young age and quickly rose to prominence in the sport.

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• Besides her world championships, she has also won medals in the Asian Games, Commonwealth Games, and the Olympics.
• Mary Kom is also a Member of Parliament in the Rajya Sabha, showing her influence extends beyond sports.

Q73. Answer: (c) 8

Shortcut Trick

Using the M1D1 = M2D2 trick for remaining work:

Remaining days for the initial 10 men = 18 − 6 = 12 days.

New number of men after 5 join = 10 + 5 = 15 men.

10 × 12 = 15 × D

=> D = 120 ÷ 15 = 8 days.

Therefore The correct answer is 8 days.

Alternate Method

Given:

10 men can complete a task in 18 days.

After 6 days, 5 more men join.

Formula Used:

Total Work = Number of Men × Number of Days

Person	Days	Total Work	Efficiency
10 Men	18	180	10
15 Men	12	15	

Calculations:

=> Let total work = 10 men × 18 days = 180 units.

=> Total days for 15 men (10 + 5) to complete the whole work = 180 ÷ 15 = 12 days.

=> Work done by 10 men in the first 6 days = 10 units/day × 6 days = 60 units.

=> Remaining work = 180 − 60 = 120 units.

=> Now, remaining work is done by 15 men with an efficiency of 15 units/day.

=> Time required for remaining work = 120 units ÷ 15 units/day = 8 days.

Therefore The correct answer is 8 days.

Additional Information

Chain Rule (MDH Concept)

The relationship between Men (M), Days (D), Hours (H) and Work (W) is given by M1D1H1 ÷ W1 = M2D2H2 ÷ W2.

Efficiency vs Time Relation

Efficiency is inversely proportional to time. If the number of men increases, the days required to finish the same total work decreases proportionally.

Joining or Leaving Mid-way

Always equate the remaining work to the new combined efficiency. Remaining Work = Total Work − Work Done = New Efficiency × Remaining Time.

Q74. Answer: (d) oxygen

The correct answer is oxygen

Key Points

• Oxygen from the atmosphere is used up in three processes namely respiration, combustion, and formation of oxides of nitrogen.
• Oxygen plays a critical role in respiration, the energy-producing chemistry that drives the metabolisms of most living things.
• We humans, along with many other creatures, need oxygen in the air we breathe to stay alive.
• Oxygen is generated during photosynthesis by plants and many types of microbes.

Additional Information

• Carbon dioxide is used as a refrigerant, in fire extinguishers, for inflating life rafts and life jackets, blasting coal, foaming rubber and plastics, promoting the growth of plants in greenhouses, immobilizing animals before slaughter, and in carbonated beverages.
• Hydrogen is a clean fuel that, when consumed in a fuel cell, produces only water.
• Helium is a chemical element with the symbol He and atomic number 2. It is a colorless, odorless, tasteless, non-toxic, inert, monatomic gas and the first in the noble gas group in the periodic table.

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Q75. Answer: (a) J.K. Hicky

The correct answer is J.K. Hicky

Key Points

• J.K. Hicky was the founder of the newspaper Bengal Gazette, which was India's first newspaper.

• The Bengal Gazette was started in the year 1780.

• This newspaper is also known as Hicky's Bengal Gazette or the Calcutta General Advertiser.

• It was a weekly newspaper and played a significant role in the early days of Indian journalism.

Additional Information

• J.K. Hicky was an Irishman who came to India and started the Bengal Gazette.

• The newspaper was known for its critical articles on the British administration in India.

• Despite its short run, the Bengal Gazette set a precedent for the freedom of the press in India.

• Hicky faced several challenges and legal battles against the British authorities, leading to the eventual shutdown of the paper.

Q76. Answer: (d) Radcliffe Line

The correct answer is Radcliffe Line

Key Points

• The Radcliffe Line is the boundary demarcation line between India and Pakistan that was established during the partition of India in 1947.

• It was named after its architect, Sir Cyril Radcliffe, who was the chairman of the Boundary Commissions for both India and Pakistan.

• The line was drawn based on the distribution of religious communities, primarily Hindus and Muslims, in the regions.

• The Radcliffe Line divided the British Indian provinces of Punjab and Bengal into two new countries, India and Pakistan.

• It has been a focal point of several conflicts and disputes between the two nations since its inception.

Additional Information

• The partition of India led to one of the largest mass migrations in human history, with millions of people crossing the newly formed borders to join their chosen nation.

• The partition also led to significant communal violence, resulting in the loss of lives and displacement of populations.

• Several regions, including Kashmir, have remained contentious and a source of conflict between India and Pakistan.

• The Radcliffe Line was officially declared on 17th August 1947, two days after India gained independence from British rule.

• Despite the initial chaos and disputes, the Radcliffe Line remains the international boundary between India and Pakistan to this day.

Q77. Answer: (b) Bal Gangadhar Tilak

The correct answer is Bal Gangadhar Tilak

Key Points

• Bal Gangadhar Tilak was a prominent leader of the Indian independence movement.

• He was known as the 'extremist leader' due to his radical approach towards gaining independence from British rule.

• Tilak's famous slogan was "Swaraj is my birthright, and I shall have it."

• He was one of the first and strongest advocates of Swaraj or self-rule.

• His efforts laid the foundation for a more aggressive and assertive stance in the Indian freedom struggle.

Additional Information

• Gopal Krishna Gokhale was a moderate leader who believed in reforms through constitutional means.

• WC Bannerji and Surendra Nath Bannerji were also prominent leaders but were not categorized as extremists.

• The extremist leaders, including Tilak, believed in direct action and were willing to use confrontation to achieve their goals.

• Tilak's contributions significantly influenced subsequent leaders and movements in India's struggle for independence.

Q78. Answer: (c) -1/√3

Given:

$\cot 3\theta \times \cot 6\theta = 1$

Calculation:

$\tan A \times \tan B = 1$

$\Rightarrow A + B = 90°$ or $A = 90° - B$ $\cot A = 1/\tan A$ $\cot A \cot B = 1$

$\Rightarrow \tan A \times \tan B = 1$

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=> 3θ + 6θ = 90°

=> 9θ = 90°

=> θ = 10°

tan 15θ

=> tan (15 × 10°)

=> tan 150°

tan 150° = tan(180° - 30°) = -tan 30°

=> -1/√3

Q79. Answer: (d) Some men are not rich.

Some men are not rich.

Q80. Answer: (c) 39

Given:

15 person can fill 35 boxes in 7 days.

Formula used:

If x people finish a task in y days, then one person can finish 1/(x× y) part of the task in a day.

Calculation:

If 15 person can fill 35 boxes in 7 days, then a person can fill 1/(15× 7)× 35= 1/3 of a box in a day.

Let the people needed to fill 65 boxes in 5 days be x.

Then, x× 5 × 1/3= 65

Solving for x,

x = 39

Therefore To fill 65 boxes in 5 days, 39 persons are required.

Q81. Answer: (d) NATIONAL ASSOCIATION OF SOFTWARE AND SERVICES COMPANIES

The correct answer is NATIONAL ASSOCIATION OF SOFTWARE AND SERVICES COMPANIES

Key Points

• NATIONAL ASSOCIATION OF SOFTWARE AND SERVICES COMPANIES (NASSCOM) is a trade association of the Indian Information Technology (IT) and Business Process Outsourcing (BPO) industry.

• NASSCOM was established in 1988 and is a non-profit organization.

• The association is involved in policy advocacy and helps create a conducive business environment for the IT-BPM industry in India.

• NASSCOM's membership spans over 2800 companies, including Indian and multinational companies that have a presence in India.

• The organization is instrumental in promoting innovation and research in the field of IT and BPO services.

Additional Information

• NASSCOM organizes various events, conferences, and seminars to foster knowledge sharing and networking among industry professionals.

• The association also plays a pivotal role in skill development and talent nurturing in the IT sector through various initiatives and programs.

• NASSCOM has been actively involved in policy formulation and representation of the IT sector's interests at various government and international forums.

• The association's efforts are aimed at enhancing India's position as a global IT hub and ensuring sustainable growth of the industry.

Q82. Answer: (b) Article 14

The correct answer is Article 14

Key Points

• Article 14 of the Indian Constitution enshrines the concept of equality before the law and equal protection of the laws within the territory of India.

• It is a fundamental right that ensures that no person is discriminated against by the state on arbitrary grounds.

• This article is a cornerstone of the Indian legal system, providing a basis for challenging unjust laws and actions of the state.

• Article 14 is part of the larger framework of fundamental rights that are guaranteed to all citizens of India.

Additional Information

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• Article 14 is part of Part III of the Indian Constitution, which deals with fundamental rights.

• Equality before the law means that every individual, regardless of their status, is subject to the same laws and can seek the same legal protections.

• Equal protection of the laws means that individuals in similar circumstances should be treated alike by the law.

• The Constitution of India guarantees several other fundamental rights, including the right to freedom (Articles 19-22), the right against exploitation (Articles 23-24), and the right to constitutional remedies (Article 32).

• Article 14 is often invoked in cases of discrimination, arbitrary state action, and to ensure fairness in administrative and legislative actions.

• Judicial interpretations of Article 14 have expanded its scope to include various dimensions of equality, including substantive equality and non-arbitrariness.

Q83. Answer: (d) Shailesh Tinaikar

The correct answer is Shailesh Tinaikar

Key Points

• Shailesh Tinaikar was appointed as the Force Commander of the UN mission in South Sudan in 2019.

• He succeeded Lieutenant General Frank Mushyo Kamanzi of Rwanda.

• Shailesh Tinaikar has a distinguished military career and has served in various capacities within the Indian Army.

• His appointment reflects India's significant contribution to UN peacekeeping missions globally.

Additional Information

• The UN Mission in South Sudan (UNMISS) was established in 2011 following the country's independence.

• Its mandate includes supporting peace and security, monitoring human rights, and facilitating the delivery of humanitarian assistance.

• India has been one of the largest troop-contributing countries to UN peacekeeping missions.

• UNMISS plays a critical role in stabilizing South Sudan and supporting the peace process in the region.

Q84. Answer: (b) Data Security

The correct answer is Data Security

Key Points

• Data Security refers to the protection of data against accidental or intentional disclosure to unauthorized persons or unauthorized modification or destruction.

• It involves implementing measures such as encryption, access controls, and secure storage to safeguard data integrity and confidentiality.

• Ensuring data security is crucial for maintaining trust and compliance with legal and regulatory requirements.

• Data Security is a fundamental aspect of information security, which aims to protect sensitive information from breaches and cyber threats.

Additional Information

• Encryption is one of the key techniques used in data security to transform readable data into an unreadable format for unauthorized users.

• Access controls ensure that only authorized individuals can access or modify data, based on their roles and permissions.

• Data redundancy involves storing multiple copies of data to prevent loss in case of hardware failure or other issues.

• Organizations must regularly update their security policies and practices to address emerging threats and vulnerabilities.

• Data security is not only a technical challenge but also involves user education and awareness to prevent social engineering attacks and other security breaches.

Q85. Answer: (c) The Malabar Region

The correct answer is The Malabar Region

Key Points

• The Malabar Region is located on the western coast of India.

• This region is known for its unique geographical features, including a long coastline along the Arabian Sea.

• The Malabar Region includes parts of the Indian states of Kerala and Karnataka.

• This region is historically significant, having been a major center for spice trade and cultural exchange.

• The lush greenery and backwaters of the Malabar Coast make it a popular tourist destination.

Additional Information

• The Coromandel Coast is located on the southeastern coast of India.

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• The Assam Region is situated in the northeastern part of India, known for its tea gardens and biodiversity.
• The Indus Plain Region refers to the area around the Indus River, primarily located in Pakistan.
• The Malabar Region has been a melting pot of various cultures, including Hindu, Muslim, and Christian communities.
• The region is also known for its traditional art forms, such as Kathakali and Theyyam.

Q86. Answer: (a) 2016

Given:

The table showing the details of the expenditure incurred (in Rs. crores) by a tea garden during the years 2013 to 2017 is given.

Concept used:

Addition and compare

Calculation:

The total expenditure on 'Taxes' and 'Interest on loans' in 2016,

6.28 + 17.5 = 23.78 < 28.8

Therefore The year in which the total expenditure on 'Taxes' and 'Interest on loans' is less than the expenditure on 'Fuel etc' is 2016.

Q87. Answer: (a) Rs 68.58 crores

Given:

The table showing the details of the expenditure incurred (in Rs. crores) by a tea garden during the years 2013 to 2017 is given.

Concept used:

Average = (sum of observations)/(no. of observations)

Calculation:

Average = (60.5+68.4+62.8+67.2+84)/5=68.58

Therefore The average yearly expenditure on 'Salary' from 2013 to 2017 was approximately Rs 68.58 crores.

Q88. Answer: (a) Interest on loans and Taxes

Given:

The table showing the details of the expenditure incurred (in Rs. crores) by a tea garden during the years 2013 to 2017 is given.

Formula used:

Range = maximum value - minimum value

Calculation:

Range of Salary = 84.0 - 60.5 = 13.5

Range of Fuel etc = 30.2 - 19.4 = 10.8

Range of Bonus = 0.96 - 0.4 = 0.56

Range of Interest on loans = 10.11 - 4.88 = 5.23

Range of Taxes = 22.6 - 16.8 = 5.8

Therefore, The range of expenditure incurred over the five-year period is most similar for Interest on loans and Taxes.

Q89. Answer: (c) 2017

Given:

The table showing the details of the expenditure incurred (in crores) by a tea garden from 2013 to 2017 is given.

Formula used:

Percentage increase = (new value - old value)/(old value)× 100

Calculation:

In 2014,

Percentage increase of the expenditure on salary = (68.4-60.5)/60.5× 100=13.05%

In 2016,

Percentage increase of the expenditure on salary = (67.2-62.8)/62.8× 100=7%

In 2017,

Percentage increase of the expenditure on salary = (84-67.2)/67.2× 100=25%

Therefore The year in which the percentage increase of the expenditure on salary, as compared to the previous year was more than 20% is 2017.

Q90. Answer: (d) A26N

According to the English alphabet and its positional values:

The pattern followed in the given series is:

• First alphabet increase by 3 positional values.

• Numbers increase by 2 from the previous number.

• Last alphabet increase by 2 positional values.

Hence, the correct answer is option 4).

Q91. Answer: (d) only conclusion (iii) follows

Given Statements:

(a) All dogs are mammals.

(b) No animals are dogs.

The least possible Venn diagram for the given statement is:

Conclusions:

I. No animals are mammals. → False (There is no definite relation between mammals and animals, so this can be a possibility only.)

II. Some animals are not mammals → False (There is no definite relation between mammals and animals, so this can be a possibility only.)

III. No dogs are animals → True (No animals are dogs, this implies that no dogs are animals).

IV. All mammals are dogs → False (All dogs are mammals, this implies that some mammals are dogs).

So, only the conclusion (III) follows.

Hence, the correct answer is "Option (4)".

Q92. Answer: (c) SGY

According to the English alphabet and its positional values:

The pattern followed in the given series is:

• First alphabet decrease by -1 positional value of the previous difference.

• Second alphabet increase by +1 positional value of the previous difference.

• Third alphabet increase by 5 positional values.

Hence, the correct answer is option 3).

Q93. Answer: (d) 132

The pattern followed in the given series is:

Here we can see that the last term in the series is 132 but 68 × 2 = 136.

Thus 132 is the incorrect term in this series.

Hence, the correct answer is option 4).

Q94. Answer: (a) FKHYYY

According to the English alphabets and their positional values:

The pattern followed in the given series is:

• First and fourth alphabets are increased by 19 positional values.

• Second and fifth alphabets are increased by 17 positional values.

• Third and sixth alphabets are increased by 15 positional values.

'NDRWCK' is coded as 'GUGPTZ'

Similarly,

'MTSFHJ' is coded as '?'

Hence, the correct answer is option 1).

Q95. Answer: (c) Third to the left

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

1) A sits second to the right of C and C is third to the left of D.

2) B is second to the right of E.

3) B is not the neighbour of C.

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4) Only one person sits between D and G.

5) G is second to the left of H.

After positioning G and H only one position is left which will be occupied by the only person left i.e. F.

Thus, according to the final arrangement G is third to the left C.

Hence, "Option 3" is the correct answer.

Q96. Answer: (c) lu

We compare the given lines, we get:

From the comparison, we can see that the circle or oval shape represents animals and its code is lu.

Hence, the correct answer is option 3).

Q97. Answer: (d) A>D>C>B>E

Given: A, B, C, D and E are five friends.

1) C is taller to B, but younger to D.

Height based → C > B

Age based → D > C

2) A is elder to D but not as tall as E.

3) E is younger to C and is taller to B and D.

Height based → C/E > B/D > A

Age based → A > D > C > E

4) B is elder to C but is shorter in the group.

Height based → C > E > B/D > A

Age based →

Case 1) A > D/B > C > E

Case 2) B > A > D > C > E

Thus, out of all the options 'A>D>C>B>E' sequence of their ages is not possible.

Hence, "Option 4" is the correct answer.

Q98. Answer: (b) D B

Given: Seven persons P, Q, R, S, A, B, and D are sitting one above the other on a ladder (not necessarily in the same order).

Only four persons sit between P and R.

Case I

P
R

Case II

P
R

Only one person sits between R and D.

Case I

P
D
R

Case II

P
D
R

S sits immediately above A.

D sits below S.

Case I

P
S
A
D
R

Case II

P
S
A
D
R

B sits above Q. B sits neither at the top nor at the bottom.

So, case II not possible,

Case I

P
S

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A
D
B
R
Q

From question
Let's look at the pairs in the option:
PA: P and A are a gap of one in the sequence.
DB: D and B are adjacent in the sequence.
SD: S and D are a gap of one in the sequence.
BQ: B and Q are a gap of one in the sequence.
Hence the correct answer is "Option 2"

Q99. Answer: (a) 2 hours 50 minutes 24 seconds

Calculation:
Convert the decimal part (0.84 hours) to minutes:
0.84 hours × 60 minutes/hour = 50.4 minutes
Convert the decimal part of the minutes (0.4 minutes) to seconds:
0.4 minutes × 60 seconds/minute = 24 seconds
So, it can be written as 2 hours 50 minutes 24 seconds.

Q100. Answer: (b) North

From the given information:
Step 1: A man walks 10 m forward towards the direction of sunrise and then 10 m to his right.
Since the direction of sunrise is east.
Step 2: After that, every time turning to his left, he walks 5 m, 15m, and 15 m, respectively.
From the figure, we can see that he is in the north direction.
Hence the correct answer is option 2)

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