RRB NTPC CBT-I Official Paper (Held On: 4 Feb 2021 Shift 1) (Previous Year Paper)

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

Take this paper as a timed mock test

Practise under exam conditions, then review your answers after you submit.

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Scan the QR code or click the link to open it.

1 question is in Hindi and not printed here. Each one links to the online version, where you can read it.

Q1. In a right circular cylinder, the ratio of the curved surface area to the total surface areas is 5 : 9. Find the ratio of the height of the cylinder to the radius of the cylinder.

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

Q2. The east coast of India is a:

(a) coast with fjords
(b) low sedimentary coast
(c) concordant coastline
(d) rocky retreating coast

Q3. The difference between the compound interest and the simple interest on a principal sum of Rs. 24,000 in 2 years at same rate of interest is Rs. 60. The rate of interest is:

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

Q4. Valence electrons are present in the:

(a) outermost shell of an atom
(b) just outside an atom
(c) innermost as well as outermost shell of an atom
(d) innermost shell of an atom

Q5. Who designed the 'Statue of Unity', which was inaugurated by Prime Minister Narendra Modi on 31^(st) October 2018?

(a) Krishna Reddy
(b) Ramkinkar Baij
(c) S.N. Ganapathy
(d) Ram Vanji Sutar

Q6. Find the difference between median and mode of the following data:

2, 3, 5, 7, 2, 3, 3, 5, 7 and 9.

(a) 2
(b) -1
(c) 1
(d) -2

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Q7. Consider the given statement and decide which of the given assumptions is/are implicit in the statement.

Statement:

On his second visit, the doctor changed the prescription.

Assumptions:

I. The patient did not show improvement with the earlier prescription.

II. The patient did not take the earlier prescription seriously.

(a) Both assumptions I and II are implicit.
(b) Only assumption I is implicit.
(c) Only assumption II is implicit.
(d) None of the assumptions is implicit.

Q8. Name the famous Indian writer who has written novels like 'Untouchable' and 'Coolie'.

(a) Kamla Das
(b) RK Narayan
(c) Anita Desai
(d) Mulk Raj Anand

Q9. If $\sec\theta - \operatorname{cosec}\theta = 0$, then the value of $2\sin 2\theta - 3\cos 2\theta$ is:

(a) 1
(b) 1/2
(c) 2
(d) -1

Q10. In a certain code language, FURNITURE is written as RUFTINERU. How will FOUNTAINS be written as in that language?

(a) UOFATNSNI
(b) OFNUATSNI
(c) NIATNSUOF
(d) UOFNTNISI

Q11. Which of the following is a garrison town?

(a) Jalandhar
(b) Kota
(c) Surat
(d) Udaipur

Q12. The lengths of 2 adjacent sides of a square are increased by 35% and 25%. The area of the resulting rectangle exceeds the area of the square by:

(a) 68.75%
(b) 69.75 %
(c) 70.75 %
(d) 67.75 %

Q13. What is the name of the first dedicated Indian astronomy mission that is aimed at studying celestial sources in X-ray, optical and UV spectral bands simultaneously?

(a) AstroSat
(b) AstroMat
(c) XtroSat
(d) OpticoSat

Q14. If $11 = 11x/(1 - x)$, then the value of $(2x)^2$is:

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

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(d) 4

Q15. Origin of State Bank of India (SBI) goes back to the year:

(a) 1806
(b) 1851
(c) 1948
(d) 1951

Q16. What is the ancient name of Iran?

(a) Ceylon
(b) Mesopotamia
(c) Persia
(d) Gaul

Q17. Members of Rajya Sabha are elected for the duration of:

(a) 5 years
(b) 6 years
(c) 4 years
(d) 3 years

Q18. Who out of the following led the Khilafat movement?

(a) Muhammad Ali Jinnah
(b) Zakir Hussain
(c) Bakht Khan
(d) Shaukat Ali

Q19. Shubham said, "I have no brother or sister. This man in the photograph is the husband of my mother's daughter-in-law". Whose photograph is Shubham referring to?

(a) Cousin
(b) Son-in-law
(c) Self
(d) Son

Q20. What was the main focus of the first Five Year Plan of India?

(a) Growth of information technology
(b) Development of primary sector with focus on agriculture
(c) Rapid development of heavy industries
(d) Development of research and development related to space

Q21. If $\sin\theta - \operatorname{cosec}\theta = \sqrt{2}$, then the value of $\sin^3\theta - \operatorname{cosec}^3\theta$ is:

(a) 0
(b) % MathType!MTEF!2!1!+- % feaahqart1ev3aaatCvAUfeBSjuyZL2yd9gzLbvyNv2CaerbuLwBLn % hiov2DGi1BTfMBaeXatLxBI9gBaerbd9wDYLwzYbItLDharqqtubsr % 4rNCHbGeaGqiVu0Je9sqqrpepC0xbbL8F4rqqrFfpeea0xe9Lq-Jc9 % vqaqpepm0xbba9pwe9Q8fs0-yqaqpepae9pg0FirpepeKkFr0xfr-x % fr-xb9adbaqaaeGaciGaaiaabeqaamaabaabaaGcbaGaaGynamaaka % aabaGaaGOmaaWcbeaaaaa!3789! $5\sqrt{2}$ $5\sqrt{2}$
(c) % MathType!MTEF!2!1!+- % feaahqart1ev3aaatCvAUfeBSjuyZL2yd9gzLbvyNv2CaerbuLwBLn % hiov2DGi1BTfMBaeXatLxBI9gBaerbd9wDYLwzYbItLDharqqtubsr % 4rNCHbGeaGqiVu0Je9sqqrpepC0xbbL8F4rqqrFfpeea0xe9Lq-Jc9 % vqaqpepm0xbba9pwe9Q8fs0-yqaqpepae9pg0FirpepeKkFr0xfr-x % fr-xb9adbaqaaeGaciGaaiaabeqaamaabaabaaGcbaWaaSaaaeaaca % aIXaaabaWaaOaaaeaacaaIYaaaleqaaaaaaaaa!3795! $1/(\sqrt{2})$ $1/(\sqrt{2})$
(d) $2\sqrt{3}$ % MathType!MTEF!2!1!+- % feaahqart1ev3aaatCvAUfeBSjuyZL2yd9gzLbvyNv2CaerbuLwBLn % hiov2DGi1BTfMBaeXatLxBI9gBaerbd9wDYLwzYbItLDharqqtubsr % 4rNCHbGeaGqiVu0Je9sqqrpepC0xbbL8F4rqqrFfpeea0xe9Lq-Jc9 % vqaqpepm0xbba9pwe9Q8fs0-yqaqpepae9pg0FirpepeKkFr0xfr-x % fr-xb9adbaqaaeGaciGaaiaabeqaamaabaabaaGcbaGaaGynamaaka % aabaGaaGOmaaWcbeaaaaa!3789! $2\sqrt{3}$

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Q22. If one angle of a parallelogram is 28° less than thrice the smallest angle, then the largest angle of the parallelogram is:

(a) 126°
(b) 124°
(c) 128°
(d) 122°

Q23. There are five friends X, Y, Z, U and V. They are compared on the basis of height. Height of no two friends is same. U is shorter than Y but taller than X. Z is the tallest. X is taller than V. Who is the third tallest?

(a) V
(b) Y
(c) X
(d) U

Q24. What is the smallest five-digit number formed by using the digit 2, 3, 4, 0, 5?

(a) 20345
(b) 20435
(c) 02345
(d) 23045

Q25. The minimum value of $11 \sin^2 \theta + 12 \cos^2 \theta$ is:

(a) 1
(b) 11
(c) 0
(d) 12

Q26. The capacity of two pots is 132 litres and 69 litres, respectively. Find the maximum capacity of a container that can exactly measure the content of the two pots.

(a) 3060 cc
(b) 3000 cc
(c) 3080 cc
(d) 3040 cc

Q27. In which city of India did the East India Company set up their first trading center?

(a) Surat
(b) Mumbai
(c) Delhi
(d) Ahmedabad

Q28. Karan works twice as fast as Shyam. Working together, they can complete a task in 20 days. In how many days will Karan alone complete the same task?

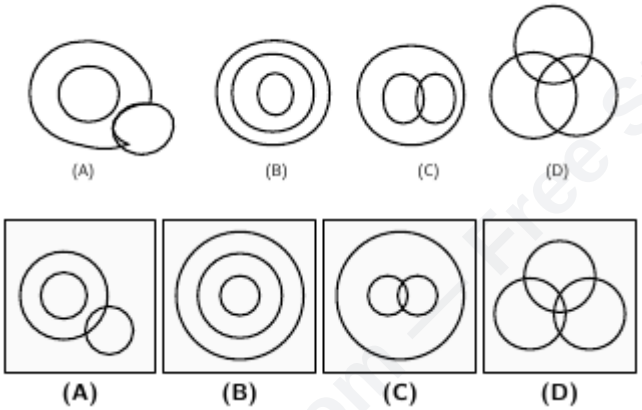
(a) 32 days
(b) 30 days
(c) 26 days
(d) 28 days

Q29. A tailor can make 5 pieces out of 1 m of cloth. He has 57.6 m of cloth. How many pieces can he make out of this cloth?

(a) 289
(b) 290
(c) 288
(d) 286

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Q30. Select the Venn diagram that best represents the relationship between the following classes.
Women, Married women, Lady doctor.



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

Q31. If J denotes addition, G denotes subtraction, M denotes multiplication, and B denotes division, then which of the following equations will NOT be correct?
(a) 6B2M8G10J4 = 20
(b) 6M5J4B2G10 = 22
(c) 4G16B2J6M5 = 26
(d) 8M2G6B3J7 = 21

Q32. If x = 12 and y = 7, then the value of $((x^2 + y^2 - xy)/(x^3 + y^3))$ is:
(a) 1/5
(b) 2/19
(c) 1/19
(d) 1/2

Q33. In which Indian city was the first successful Cotton mill set up?
(a) Patna
(b) Kolkata
(c) Chennai
(d) Mumbai

Q34. Select the letter that can replace the question mark (?) in the following series.
70, V, 63, R, 56, O, 49, ?
(a) N
(b) L
(c) K
(d) M

Q35. X and Y can complete a task in 28 days and 20 days, respectively. X started the task alone. After 4 days Y joined him till the completion of the task. How long did the task last?
(a) 10 days
(b) 14 days
(c) 12 days
(d) 8 days

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Q36. A sum of money becomes Rs. 6,400 in 2 years and Rs. 8,100 in 4 years on compound interest. Find the rate of compound interest.

(a) 14.5%
(b) 16.5%
(c) 12.5%
(d) 10.5%

Q37. What is G-7?

(a) 7 continents of the world
(b) 7 IMF-described advanced economies in the world
(c) 7 seas of the world
(d) 7 sister states of India

Q38. Which traveller from Uzbekistan visited India in the 11^(th) Century?

(a) Alberuni
(b) Seydi Ali Reis
(c) Ibn Battuta
(d) Mahmud Wali Balkhi

Q39. When did the Central Industrial Security Force come into existence in India?

(a) 1969
(b) 1989
(c) 1990
(d) 1970

Q40. Select the number that can replace the question mark (?) in the following series.

4, 13, 27, 82, 165, ?

(a) 496
(b) 497
(c) 494
(d) 495

Q41. What is the correct full form of MPEG from below?

(a) Motion Pictures Expert Group
(b) Micro Pictures Expert Group
(c) Many Pictures Expert Group
(d) Moving Picture Experts Group

Q42. Where are one-horned rhinoceros is found in India?

(a) Meghalaya
(b) Assam
(c) Bihar
(d) Madhya Pradesh

Q43. This question is in Hindi. Read it online.

Q44. Which one of these comprises the Golden Quadrilateral?

(a) Delhi-Jaipur-Agra-Meerut
(b) Delhi-Mumbai-Bangalore-Kolkata
(c) Delhi-Pune-Chennai-Bhubaneshwar
(d) Delhi-Mumbai-Chennai-Kolkata

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Q45. Where in India was the most complete fossil of rare dinosaur-Ichthyosaur found in 2016?

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

Q46. In which year was the British East India Company formed?

(a) 1600
(b) 1700
(c) 1650
(d) 1750

Q47. The HCF and LCM of two numbers are 60 and 420, respectively. If the first number is divided by 2, then the quotient is 60. The second number is:

(a) 170
(b) 150
(c) 190
(d) 210

Q48. What is the sum of the cubes of the natural numbers from 5 to 14?

(a) 10920
(b) 10935
(c) 10925
(d) 10930

Q49. The angles of a quadrilateral are in the ratio of 5 : 8 : 10 : 13. The smallest of these angles is:

(a) 45°
(b) 50 °
(c) 35 °
(d) 55 °

Q50. How does most of India's foreign trade take place?

(a) Through land and sea routes
(b) Through land and air routes
(c) Equally through land, air and sea routes each
(d) Through sea and air routes

Q51. What is the name of the world's smallest spacecraft launched by India?

(a) Sprites
(b) Spring
(c) Sparkle
(d) Star

Q52. The approach based on the idea that 'organisms which are more distantly related will accumulate a greater number of differences in their DNA' is called?

(a) Molecular phylogeny
(b) Metamorphosis
(c) Morphological approach
(d) The DNA study

Q53. There were 12 boys who got trapped in a cave in June 2018. A huge exercise had to be carried to rescue them. It became an internationally famous incident. Which country did this incident happen in?

(a) Thailand
(b) Malaysia
(c) Bhutan

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(d) Burma

Q54. Sohan decreased his expenses by 25%. Later, he decreased them further by 10%. By what percentage did his expenses decrease altogether?

(a) 31.5%
(b) 34.5 %
(c) 33.5 %
(d) 32.5 %

Q55. Which of the following is different from the rest?

Venus, Mars, Iapetus, Jupiter

(a) Mars
(b) Jupiter
(c) Iapetus
(d) Venus

Q56. The difference between the greatest and the smallest six-digit numbers is:

(a) 999999
(b) 988888
(c) 899999
(d) 888888

Q57. Pointing to a lady, Raman said, "The son of her only brother is the brother of my wife". How is the lady related to Raman?

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

Q58. If $x : y = 4 : 3$, then the value of $x^3 - y^3 : x^3 + y^3$ is:

(a) 39 : 91
(b) 37 : 91
(c) 38 : 91
(d) 36 : 91

Q59. The laws of inheritance were discovered by:

(a) Hugo dae Vries
(b) Charles Darwin
(c) Archibald Garrod
(d) Gregor Mendel

Q60. The sum of two numbers is 72. Their HCF and LCM are 2 and 102, respectively. The sum of the reciprocals of the same two numbers is:

(a) 5/17
(b) 7/19
(c) 8/19
(d) 6/17

Q61. If a, b, c, d and e are the digits of a number beginning from the left, then the number is:

(a) 1000a + 100b + 10c + 1d + e
(b) 10^4a + 10^3b + 10^2c + 10d + e
(c) 100a + 10b + 10c + d + e
(d) edcba

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Q62. X and Y can finish a task in 15 days and 20 days, respectively. The capacity of Z is 5/2 times that of X. Working together, in how many days will X, Y and Z finish the same task?

(a) 37/17 days
(b) 39/17 days
(c) 38/17 days
(d) 36/17 days

Q63. Who coined the phrase 'Survival of the fittest'?

(a) Herbert Spencer
(b) Albert Einstein
(c) Archimedes
(d) Charles Darwin

Q64. What is the function of alveoli?

(a) To aid in absorption of food
(b) To provide a surface where exchange of gases takes place
(c) To purify blood
(d) To help digest food

Q65. Which among the following is the largest unit of memory of a computer system?

(a) Exabyte
(b) Zetabyte
(c) Petabyte
(d) Yottabyte

Q66. As of 30^(th) November 2020, how many countries are members of the International Monetary Fund (IMF)?

(a) 190
(b) 99
(c) 198
(d) 89

Q67. Arrange the following in a meaningful order.

A. Pupa B. Imago C. Larva D. Egg

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

Q68. Name the strait that divides Morocco and Spain.

(a) Strait of Gibraltar
(b) Bering Strait
(c) Hudson Strait
(d) English Channel

Q69. Congress Party observed 26^(th) January 1930 as:

(a) Silent Protest Day
(b) Republic Day
(c) Independence Day
(d) Bharat Diwas

Q70. How many columns are there in a sheet of Excel 2010?

(a) 1024
(b) 16384
(c) 16024
(d) 1600

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Q71. Where was the Muslim League founded?

(a) Bihar
(b) Lucknow
(c) Kanpur
(d) Dhaka

Q72. A television manufacturer earns a profit of 10% by selling one TV set for Rs. 24,750. If the production cost is increased by 15%, then what should be the new selling price of the TV set so as to gain a profit of 15%?

(a) Rs. 27,756.25
(b) Rs. 29,756.25
(c) Rs. 26,756.25
(d) Rs. 28,756.25

Q73. Two number are in the ratio of 9 : 11. If 6 added to each number, then the ratio becomes 6 : 7. Find the greater number.

(a) 25
(b) 28
(c) 22
(d) 19

Q74. Kharai Camels are known to mainly feed on:

(a) Mangroves
(b) Cactus
(c) Joshua tree
(d) Brittlebush

Q75. Who was the founder of the Mizo National Front (MNF)?

(a) Laldenga
(b) Chawngbawla
(c) Lalnunmawia
(d) Khuangchera

Q76. World Bamboo Day is celebrated every year on _____.

(a) 18^(th) September
(b) 30^(th) December
(c) 10^(th) March
(d) 10^(th) July

Q77. What do paintings at Ajanta caves illustrate?

(a) Jataka tales
(b) Stories from vedas
(c) Mahabharata tales
(d) Ramayana tales

Q78. If the length, breadth and height of a room are 20 m, 25 m and 35 m, respectively, then what will be the total surface areas of the four walls of the room?

(a) 3140 m^2
(b) 3145 m^2
(c) 3150 m^2
(d) 3155 m^2

Q79. Read the following information carefully and answer the question that follows.

Sahil and Rohan are good at hockey and baseball. Gautam, Sahil and Mahesh are good at football and baseball. Kaushal and Gautam are good at cricket and volleyball. Kaushal and Rohan are good at hockey and volleyball.

Who is good at volleyball, hockey and baseball?

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(a) Kaushal
(b) Gautam
(c) Sahil
(d) Rohan

Q80. Which of the following country follow more than one time zones?

(a) USA
(b) Argentina
(c) China
(d) India

Q81. Which of the following is a part of 'global commons'?

(a) Asia
(b) Australia
(c) Africa
(d) Antarctica

Q82. What must be subtracted from each of the numbers 26, 44, 56 and 104 so that the remainders are in proportion?

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

Q83. Five friends P, Q, R, S and T are compared on the basis of their height (not necessarily in the same order). Height of T is between P and Q. T is taller than S. R's height is more than P and T.

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

I. R > P > T > Q > S

II. R > S > Q > T > P

III. Q > R > T > S > P

(a) II and III
(b) I and III
(c) Only II
(d) Only I

Q84. The sum of two numbers is 40 and their product is 60. The sum of their reciprocals is:

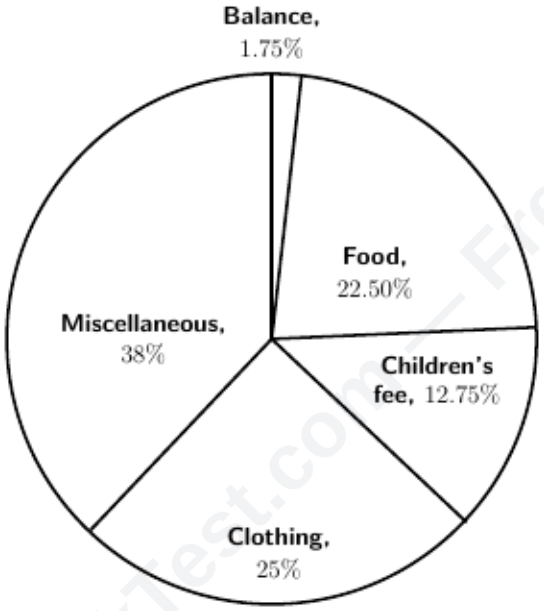
(a) 5/17
(b) % MathType!MTEF!2!1!+- % feaahqart1ev3aaatCvAUfeBSjuyZL2yd9gzLbvyNv2CaerbuLwBLn % hiov2DGi1BTfMBaeXatLxBI9gBaerbd9wDYLwzYbItLDharqqtubsr % 4rNCHbGeaGqiVu0Je9sqqrpepC0xbbL8F4rqqrFfpeea0xe9Lq-Jc9 % vqaqpepm0xbba9pwe9Q8fs0-yqaqpepae9pg0FirpepeKkFr0xfr-x % fr-xb9adbaqaaeGaciGaaiaabeqaamaabaabaaGcbaWaaSaaaeaaca % aI3aaabaGaaGymaiaaiEdaaaaaaa!3840! 1/2 7/19
(c) % MathType!MTEF!2!1!+- % feaahqart1ev3aaatCvAUfeBSjuyZL2yd9gzLbvyNv2CaerbuLwBLn % hiov2DGi1BTfMBaeXatLxBI9gBaerbd9wDYLwzYbItLDharqqtubsr % 4rNCHbGeaGqiVu0Je9sqqrpepC0xbbL8F4rqqrFfpeea0xe9Lq-Jc9 % vqaqpepm0xbba9pwe9Q8fs0-yqaqpepae9pg0FirpepeKkFr0xfr-x % fr-xb9adbaqaaeGaciGaaiaabeqaamaabaabaaGcbaWaaSaaaeaaca % aI3aaabaGaaGymaiaaiEdaaaaaaa!3840! 2/3 2/3
(d) % MathType!MTEF!2!1!+- % feaahqart1ev3aaatCvAUfeBSjuyZL2yd9gzLbvyNv2CaerbuLwBLn % hiov2DGi1BTfMBaeXatLxBI9gBaerbd9wDYLwzYbItLDharqqtubsr % 4rNCHbGeaGqiVu0Je9sqqrpepC0xbbL8F4rqqrFfpeea0xe9Lq-Jc9 % vqaqpepm0xbba9pwe9Q8fs0-yqaqpepae9pg0FirpepeKkFr0xfr-x % fr-xb9adbaqaaeGaciGaaiaabeqaamaabaabaaGcbaWaaSaaaeaaca % aI3aaabaGaaGymaiaaiEdaaaaaaa!3840! 3/4 6/17

Q85. If Z = 26 and ACT = 24, then BAT will be equal to:

(a) 24
(b) 23
(c) 26

(d) 21

Q86. Study the following pie diagram and answer the question that follows.



Approximately how many degrees of the central angle would represent expenditure on children's fees?

(a) 44°
(b) 46 °
(c) 42 °
(d) 50 °

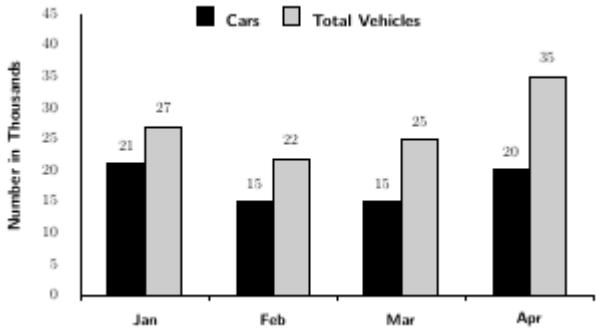
Q87. The given table represents the sales figures of physics and chemistry books in the years 2003, 2004, 2005 and 2006.

Year	2003	2004	2005	2006
Physics	300	425	475	515
Chemistry	450	550	590	700

In which year was the difference in the sale of the two subject books the least?

(a) 2004
(b) 2003
(c) 2006
(d) 2005

Q88. Study the given bar graph that shows the registration of cars and total vehicles for the first four months of the year 2015 in Delhi and answer the question that follows.

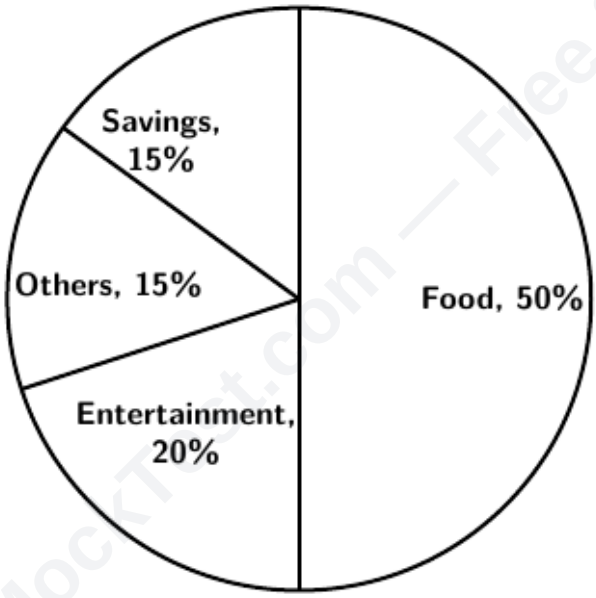


How many more vehicles, other than cars, were registered in April 2015 compared to January 2015?

(a) 8000

(b) 9000
(c) 5000
(d) 15000

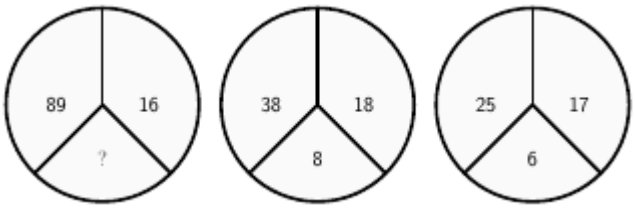
Q89. The given pie diagram shows how a student spent his pocket money amounting to Rs.3,500 during the course of a month.



How much more money (in Rs.) did he spend on food as compared with what he spent on entertainment?

(a) 525
(b) 700
(c) 875
(d) 1,050

Q90. Study the given pattern carefully and select the number that can replace the question mark (?) in it.



(a) 19
(b) 15
(c) 13
(d) 17

Q91. Identify the letter that does NOT belong to the following series.

X, U, Q, M, F, Y

(a) F
(b) Q
(c) Y
(d) M

Q92. Which of the following is NOT similar to the rest?

Coat, Shirt, Jacket, Sweater

(a) Sweater
(b) Shirt
(c) Coat
(d) Jacket

Q93. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some papers are pencils.

Some pencils are boards.

Conclusions:

I. No paper is a board.

II. All papers are boards.

III. Some boards are not papers.

(a) Only conclusion III follows.
(b) Either I or II follows.
(c) Only conclusion I follows.
(d) None of the conclusions follows.

Q94. 'Hand' is related to 'Finger' in the same way as 'Pen' is related to '_____'.

(a) Holder
(b) Ink
(c) Pencil
(d) Nib

Q95. In a certain code language, KNIFE is written as PMRUV. How will PAINTING be written as in that language?

(a) KARNGIMG
(b) KZRMGRMT
(c) KZNIGRGN
(d) GNITNIAD

Q96. Select the option that is related to the third term in the same way as the second term is related to the first term.

Carpenter : Saw :: Blacksmith : ?

(a) Gold
(b) Metal
(c) Wood
(d) Hammer

Q97. Select the number that can replace the question mark (?) in the following series.

223, 111, ?, 27, 13, 6.

(a) 54
(b) 52
(c) 55
(d) 56

Q98. If a cube of 3" × 3" × 3" is painted on all sides and then cut into 27 smaller cubes of 1" × 1" × 1", then how many such smaller cubes will be there that are painted only on two sides?

(a) 4
(b) 16
(c) 12
(d) 8

Q99. Which of the given options arranges the following in a logical order.

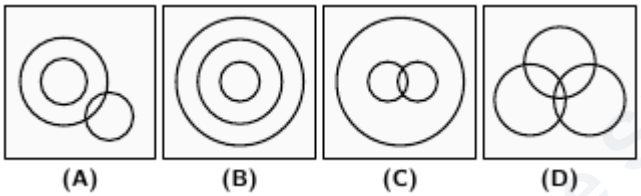
A. Bihar B. Nagaland C. Uttar Pradesh D. Rajasthan E. Assam

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

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Q100. Select the Venn diagram that best represents the relationship between the following classes.

Mothers, Females, Sisters



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

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) 5 : 4

Shortcut Trick

The ratio of Curved Surface Area (CSA) to Total Surface Area (TSA) for a cylinder is always h : (h + r).

Given h : (h + r) = 5 : 9.

By comparison: h = 5 units and h + r = 9 units.

=> r = 9 − 5 = 4 units.

The ratio of height to radius (h : r) is 5 : 4.

Therefore The correct answer is 5 : 4.

Alternate Method

Given:

Ratio of Curved Surface Area to Total Surface Area = 5 : 9

Formula Used:

Curved Surface Area (CSA) = 2πrh

Total Surface Area (TSA) = 2πr(h + r)

Calculations:

=> CSA / TSA = 5 / 9

=> (2πrh) / [2πr(h + r)] = 5 / 9

=> h / (h + r) = 5 / 9

=> 9 × h = 5 × (h + r)

=> 9h = 5h + 5r

=> 9h − 5h = 5r

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=> 4h = 5r

=> h / r = 5 / 4

Therefore h : r = 5 : 4

Therefore The correct answer is 5 : 4.

Additional Information

Volume of Cylinder

The volume (V) represents the space occupied by the cylinder and is calculated as $V = \pi r^2 h$.

Relation between TSA and CSA

Total Surface Area is the sum of the curved area and the area of two circular bases: $TSA = CSA + 2\pi r^2$.

Ratio of Areas to Radius

If the height (h) is equal to the radius (r), the ratio of CSA to TSA is exactly 1 : 2.

Q2. Answer: (b) low sedimentary coast

The correct answer is low sedimentary coast.

Key Points

• The east coast of India, especially it's south-eastern part (Tamil Nadu coast), appears to be a coast of emergence.

• The eastern coast of India is located along the east coast of India.

• It is washed by the Bay of Bengal and extends from the Ganga delta to Kanyakumari (North to South).

• Its width ranges from 80 to 100 km which makes it more extensive and broad than its western counterpart.

• It is an aggradational plain which means an increase in the land elevation.

• It is characterized by sea beaches, lagoons, and offshore bars.

Additional Information

• The Eastern and Western coasts of India are believed to be originated due to the faulting and subsidence of the Bay of Bengal and the Arabian Sea respectively.

• Although both the coasts extend from North and South and share some features, they are different from each other.

• The western coast of India is located along the west coast of India.

• It is located between Kerala and Gujarat and extends from the Arabian Sea to the Western Ghats.

• Its total length is 1400 km, its width ranges from 10 km to 80 km, and the elevation ranges from 150 m to 300 m above sea level.

• It is characterized by sandy beaches, mud-flats, sand dunes, alluvial tracts, estuaries, lagoons, residual hills, and more. It lacks deltas as the short and swift rivers are not able to make deltas on this coast.

Q3. Answer: (c) 5%

Given:

Difference between the compound interest and the simple interest = Rs. 60

Time period = 2 years

Principal amount = Rs. 24,000

Formula used:

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

$CI - SI = (PR^2)/(100^2)$

Calculation :

=> According to the question,

=> CI – SI = Rs. 60

=> $(24{,}000 \times R^2)/(100^2) = 60$

=> $R^2 = (60 \times 100^2)/24000$

=> $R^2 = (60 \times 10000)/24000 = 25$

=> $R = \sqrt{25} = 5\%$

Therefore, the rate of interest is 5%.

Q4. Answer: (a) outermost shell of an atom

The correct answer is the Outermost shell of an atom

Key Points

• Valence electrons are the electrons located at the outermost shell of an atom.

• These electrons play a crucial role in chemical reactions and determine how an atom forms bonds with other atoms

• The electrons present in the inner shell are core electrons.
• Valence electrons are all arranged in different orbitals or shells and are mostly negatively charged particles.
• One of the easiest ways to find valence electrons is by checking out the elements' place in the periodic table.
• The valency of an element is
• Equal to the number of valence electrons
• Equal to the number of electrons required to complete eight electrons in the valence shell.
• Valency of a metal=No. of Valence electrons
• Valency Of a non-metal=8-No. of valence electrons
• For Ex:
• Sodium(Z=11) Electronic Configuration=2,8,1
• Valency=1
• Magnesium(Z=2) Electronic Configuration=2,8,2
• Valency=2
• Chlorine(Z=17) Electronic Configuration=2,8,7
• Valency=8-7=1
• Oxygen=16 Electronic Configuration=2,8,6
• Valency=8-6=2

Q5. Answer: (d) Ram Vanji Sutar

The correct answer is Ram Vanji Sutar.

Key Points

• The Statue of Unity is the world's tallest statue.
• Its height is 182 meters.
• It is located in the state of Gujarat, India.
• It depicts Indian statesman and independence activist Vallabhbhai Patel.
• He was the first deputy prime minister and home minister of independent India and an adherent of Mahatma Gandhi.
• Ram Vanji Sutar is an Indian sculptor. He designed the Statue of Unity which is the world's tallest statue with a height of 182 metres, exceeding the Spring Temple Buddha by 54 metres.

Additional Information

• Krishna Reddy was an Indian master printmaker, sculptor, and teacher. He was considered a master intaglio printer and known for viscosity printing.
• Ramkinkar Baij was an Indian sculptor and painter, one of the pioneers of modern Indian sculpture and a key figure of Contextual Modernism.

Q6. Answer: (c) 1

Given:

2, 3, 5, 7, 2, 3, 3, 5, 7 and 9

Concept used:

Median = [(n/2)^(th)term + [(n/2)+1]^(th) term]/2, if n is even

Mode = Highest frequency data value

Calculation :

Median:

=> Arrange the given numbers in ascending order as,

=> 2, 2, 3, 3, 3, 5, 5, 7, 7, 9

=> Total number of values = 10, which is an even number

=> Median = [(10/2)th term + [(10/2)+1]th term]/2,

=> Median = (3 + 5)/2 = 4

=> Median = 4

Mode:

=> Mode = 3 (Highest frequency data value)

The difference between median and mode = 4 - 3 = 1

Therefore The difference between median and mode is 1.

Q7. Answer: (b) Only assumption I is implicit.

Given,

Statement: On his second visit, the doctor changed the prescription.

Assumption I: The patient did not show improvement with the earlier prescription. → This is implicit.

According to the given statement, we can say that patient did not show improvement with the earlier prescription and medication the doctor suggested that's why the doctor changed the prescription.

In Assumption II: The patient did not take the earlier prescription seriously. → This is not implicit.

The patient did not take the earlier prescription seriously, could not be the basis for changing the prescription because until the doctor is satisfied with the end result of the prescription suggested he/she will not change the prescription.

Hence, with respect to the statement, we can say that only Assumption I is Implicit.

Q8. Answer: (d) Mulk Raj Anand

The correct answer is Mulk Raj Anand.

Key Points

• Mulk Raj Anand (1905 – 2004) along with R. K. Narayan (1906 – 2001), Ahmad Ali (1910 -1994), and Raja Rao (1908 – 2006) are considered pioneers of Indo-Anglian fiction.

• He was known for his depiction of the lives of the poorer castes in traditional Indian society and was one of the first India-based writers in English to gain an international readership.

• “Untouchable” was the first novel written by Mulk Raj Anand published in 1935 followed by “Coolie” (1936) and “Two Leaves and a Bud” (1937).

• He was a recipient of the Padma Bhushan.

Additional Information

• Kamala Surayya, popularly known by her one-time pen name Madhavikutty and married name Kamala Das, was an Indian poet in English as well as an author in Malayalam from Kerala, India.

• Rasipuram Krishnaswami Iyer Narayanaswami was an Indian writer known for his work set in the fictional South Indian town of Malgudi. He was a leading author of early Indian literature in English along with Mulk Raj Anand and Raja Rao.

• Anita Desai, born Anita Mazumdar is an Indian novelist and the Emerita John E. Burchard Professor of Humanities at the Massachusetts Institute of Technology. As a writer, she has been shortlisted for the Booker Prize three times.

Q9. Answer: (c) 2

Given:

$\sec\theta - \operatorname{cosec}\theta = 0$

Concept used:

$\operatorname{Cosec}\theta = \operatorname{Sec}(90 - \theta)$

$\sin 90° = 1$

$\cos 90° = 0$

Calculation:

=> According to the question,

=> $\sec\theta - \operatorname{cosec}\theta = 0$

=> $\sec\theta = \operatorname{cosec}\theta$

=> $\sec\theta = \sec(90-\theta)$

=> $\theta = (90-\theta)$

=> $2\theta = 90$

=> So, $2\sin 2\theta - 3\cos 2\theta = 2\sin 90 - 3\cos 90$

=> $2 \times 1 - 3 \times 0 = 2$

Therefore, the value of $2\sin 2\theta - 3\cos 2\theta$ is 2

Q10. Answer: (a) UOFATNSNI

Given:

FURNTURE = RUFTINERU

Solution:

In the above, we can see a pattern, that is reverse three alphabets,

So, we can similarly write for FOUNTAINS as FOU NTA INS

Now, reverse them, in their groups of three

FOUNTAINS = FOU NTA INS = UOF ATN SNI = UOFATNSNI

Hence, the FOUNTAINS can be written as UOFATNSNI.

Q11. Answer: (a) Jalandhar

The correct answer is Jalandhar.

Key Points

• A garrison is any body of troops stationed in a particular location, originally to guard it.

• The term now often applies to certain facilities that constitute a military base or fortified military headquarters.

• A garrison is usually in a city, town, fort, castle, ship, or similar site.

• The main function of the garrison towns is to cater to the needs of defence and people employed in defence services of the nation.

• These are specially designed for the purpose of military, navy or airforce activities.

Additional Information

• Two garrison (cantonment) towns of India

• Ambala: is also known for its large Indian Army and Indian Air Force presence within its cantonment area which was established in the year 1843

• Jalandhar.

Q12. Answer: (a) 68.75%

Given :

Two adjacent sides of a square are increased by 35% and 25%

Concept Used:

Area of Square = Side²

Calculation:

=> Let the side of square be x.

=> Area of Square = x^2

=> Now, increase in sides of the square result in a rectangle with,

=> Length = x + 35% of x

=> Length = $x+35/100\times x=(20x+7x)/20=27x/20$

=> Breadth = x + 25% of x

=> Breadth = $x+25/100\times x = x+x/4=5x/4$

=> Area of Rectangle = $27x/20\times 5x/4=(27x^2)/16$

=> Increase in area = $(27x^2)/16-x^2=(27x^2-16x^2)/16=(11x^2)/16$

=> Percentage increase = $(11x^2)/16 \times 1/(x^2)\times100=68.75\%$ %.

Therefore the area of the resulting rectangle exceeds the area of the square by 68.75%.

Q13. Answer: (a) AstroSat

The correct answer is AstroSat.

Key Points

• AstroSat is the first dedicated Indian astronomy mission aimed at studying celestial sources in X-ray, optical and UV spectral bands simultaneously.

• The payloads cover the energy bands of Ultraviolet (Near and Far), and limited optical and X-ray regimes (0.3 keV to 100keV).

• AstroSat can lift off a mass of 1515 kg.

• It was launched on September 28, 2015, into a 650 km orbit inclined at an angle of 6 deg to the equator by PSLV-C30 from Satish Dhawan Space Centre, Sriharikota.

• The minimum useful life of the AstroSat mission is expected to be 5 years.

Additional Information

• With the success of this satellite, ISRO has proposed launching AstroSat-2 as a successor for Astrosat.

• After injection into Orbit, the two solar panels of AstroSat were automatically deployed in quick succession.

• The spacecraft control center at Mission Operations Complex (MOX) of ISRO Telemetry, Tracking and Command Network (ISTRAC), Bengaluru manages the satellite during its entire mission life.

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Q14. Answer: (b) 1

Given:

11=11x/(1-x)

Concept Used:

Basic Calculation

Calculation:

=> 11=11x/(1-x)

=> By the cross multiplication,

=> 11 × (1 – x) = 11x

=> 11 – 11x = 11x

=> 11 = 22x

=> x = 1/2

=> $(2x)^2=(2\times1/2)^2 = 1$

Therefore, the value of $(2x)^2$ is 1

Q15. Answer: (a) 1806

The correct answer is 1806.

Key Points

• The origin of the State Bank of India goes back to the first decade of the nineteenth century with the establishment of the Bank of Calcutta in Calcutta on 2 June 1806.

• Three years later the bank received its charter and was re-designed as the Bank of Bengal (2 January 1809).

• State Bank of India was incorporated on 01 July 1955.

• The Government of India nationalized the Imperial Bank of India in the year 1955 with the Reserve Bank of India taking a 60% stake and the name was changed to State Bank of India.

• SBI is the largest state-owned banking and financial services company in India.

Additional Information

• List of some pre-independent Banks and their starting years:

• The General Bank of India (1786-1791)

• Oudh Commercial Bank (1881-1958)

• Bank of Bengal (1809)

• Bank of Bombay (1840)

• Bank of Madras (1843)

• Allahabad Bank (1865)

• Punjab National Bank (1894)

• Bank of India (1906)

• Central Bank of India (1911)

• Canara Bank (1906)

• Bank of Baroda (1908)

Q16. Answer: (c) Persia

The correct answer is Persia.

Key Points

• In the Western world, Persia was historically thecommon name used for Iran.

• On the Nowruz of 1935, Reza Shah officially asked foreign delegates to use the Persian term Iran.

• The common adjective for citizens of Iran changed from Persian to Iranian.

• In 1959, the government of Mohammad Reza Pahlavi, Reza Shah's son, announced that both "Persia" and "Iran" can be used interchangeably, in formal correspondence.

Additional Information

• Sri Lanka, formerly known as Ceylon and officially the Democratic Socialist Republic of Sri Lanka, is an island country in South Asia. It lies in the Indian Ocean, southwest of the Bay of Bengal, and southeast of the Arabian Sea.

• Mesopotamia is famously referred to as the "Cradle of Civilization" because of the many cultural innovations and inventions that began there.

• Gaul was a region of Western Europe first described by the Romans. It was inhabited by Celtic and Aquitani tribes,

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encompassing present-day France, Belgium, Luxembourg, most of Switzerland, parts of Northern Italy, and Germany west of the Rhine. It covered an area of 494,000 km.

Q17. Answer: (b) 6 years

The correct answer is 6 years.

Key Points

• Rajya Sabha is composed of representatives of states and union territories.

• The Rajya Sabha consists of not more than two hundred fifty members.

• Members fall into two categories nominated and elected.

• Nominated members are twelve in number and they are nominated by the president from a person having special knowledge of practical experiments in matters such as literature, science, art, and social service.

• Rajya Sabha is also known as the Upper house or Council of States.

• The tenure of Rajya Sabha is six years where one-third of the total members retire every two years unlike Lok sabha it is a permanent house and not subject to dissolution.

• The current chairman of Rajya Sabha is Jagdeep Dhankha.

Additional Information

• The Lok Sabha, constitutionally the House of the People, is the lower house of India's bicameral Parliament, with the upper house being the Rajya Sabha.

• The total Seats in Lok Sabha is 543.

• The current speaker of Lok Sabha is Oam Birla.

Q18. Answer: (d) Shaukat Ali

The current answer is Shaukat Ali.

Key Points

• Shaukat Ali was an Indian Muslim member of the Khilafat Movement.

• He was the elder brother of the renowned political leader Mohammad Ali Jouhar.

• He was born on 10 March 1873 and died on 26 November 1938.

• The Khilafat movement (1919-1924) was an agitation by Indian Muslims allied with Indian nationalism in the years following World War I.

• Its purpose was to pressure the British government to preserve the authority of the Ottoman Sultan as Caliph of Islam following the breakup of the Ottoman Empire at the end of the war.

Additional Information

• Mohammed Ali Jinnah was the founder and first governor-general (1947–48) of Pakistan. He is revered as the father of Pakistan. He also sought the political union of Hindus and Muslims.

• Zakir Husain Khan was an Indian economist and politician who served as the third president of India, from 13 May 1967 until his death on 3 May 1969. He previously served as the governor of Bihar from 1957 to 1962 and as the second vice president of India from 1962 to 1967.

• General Bakht Khan was commander-in-chief of the Indian independent forces in the region of Delhi during the Indian Rebellion of 1857 against the East India Company.

Q19. Answer: (c) Self

Given:

Shubham has no brother or sister.

The man in the photograph is the husband of Shubham's mother's daughter-in-law.

Concept used:

Explanation:

As Shubham has no brother or sister, He is the only son of his mother.

So, his mother will have only one daughter-in-law.

And, hence, that daughter-in-law's husband will be the son of the mother, that is Shubham.

The man in the photograph is Shubham himself.

Q20. Answer: (b) Development of primary sector with focus on agriculture

The correct answer is Development of primary sector with focus on agriculture.

Key Points

• The First Five Year Plan in India was active between 1951 and 1956.

• The plan was based on the Harrod-Domar model.
• This plan gave priority to the agricultural sector of the country.
• The First Five Year Plan was presented before the parliament by Jawaharlal Nehru.
• Gulzarilal Nanda was the vice-president of the First Five Year Plan.
• Economist K N Raj is known as the architect of this plan.
• It was quasi-successful for the government.
• The target growth rate of the First Five Year Plan was 2.1% annual gross domestic product (GDP) growth.

Additional Information

• The second Five Year Plan gave priority to the Industrial development of the country.
• The fifth Five Year Plan gave priority to agriculture, industry, and mines.
• The eighth Five Year Plan gave priority to the development of human resources(Human Model).

Q21. Answer: (b) % MathType!MTEF!2!1!+- % feaahqart1ev3aaatCvAUfeBSjuyZL2yd9gzLbvyNv2CaerbuLwBLn % hiov2DGi1BTfMBaeXatLxBI9g...

Given:

sin θ – cosec θ = √2

Concept used:

$(a^3 – b^3) = (a – b)^3 + 3ab(a – b)$

cosec θ = 1/(sin θ)

Calculation:

=> $(\sin 3\theta – \text{cosec}3\theta) = (\sin\theta – \text{cosec}\theta)^3 + 3 \times (\sin\theta \times \text{cosec}\theta) \times (\sin\theta – \text{cosec}\theta)$

=> Putting the values, we get

=> $(\sin 3\theta – \text{cosec}3\theta) = (\sqrt{2})^3 + 3((\sin\theta)/(\sin\theta))(\sqrt{2})$

=> $(\sin 3\theta – \text{cosec}3\theta) = 2\sqrt{2}+3\sqrt{2}=5\sqrt{2}$

Therefore, the value of $\sin 3\theta – \text{cosec}3\theta$ is $5\sqrt{2}$.

Q22. Answer: (c) 128°

Given :

One angle of a parallelogram is 28° less than thrice the smallest angle.

Concept Used:

Sum of any two adjacent angles of a parallelogram = 180º

Calculation:

=> Let the smallest angle is x.

=> Other angle = 3x – 28

=> x + 3x – 28 = 180

=> 4x = 180 + 28 = 208

=> x = 208/4 = 52

=> So, the smallest angle is 52º, then

=> Largest angle = 3x – 28 = 3 × 52 – 28 = 156 – 28 = 128º

Therefore the largest angle is 128º.

Q23. Answer: (d) U

Given:

The height of all the friends is different.

U < Y

U > X

Z > U, V, X, Y

X > V

Solution:

As Z is the tallest among all 5,

1	2	3	4	5
				Z

Now,
U < Y & U > X
= X < U < Y
Means, that X will be in 1st or 2nd place.
Now, X > V
means V < X
so, X is in 2nd place, hence U will be in third place.

1	2	3	4	5
V	X	U	Y	Z

Hence, the third tallest is U.

Q24. Answer: (a) 20345

Given:
Digits = 2, 3, 4, 0, 5
Calculation:
=> To get the smallest five-digit number,
=> First digit = Lowest number other than 0 = 2
=> Second digit = 0
=> Third digit = Number just greater than 2 = 3
=> Fourth digit = Number just greater than 3 = 4
=> Fifth digit = Largest number = 5
Therefore, smallest five-digit number is 20345.

Q25. Answer: (b) 11

Given :
11 $\sin^2\theta$ + 12 $\cos^2\theta$
Concept used :
$\cos^2\theta = 1 - \sin^2\theta$
Calculation:
11 $\sin^2\theta$ + 12 $\cos^2\theta$
=> Putting the value of $\cos^2\theta$ in the equation, we get
=> 11 $\sin^2\theta$ + 12 $\cos^2\theta$ = 11 $\sin^2\theta$ + 12 × (1 – $\sin^2\theta$)
=> 11 $\sin^2\theta$ + 12 – 12 $\sin^2\theta$ = 12 – $\sin^2\theta$
=> For the value to be minimum, the value of $\sin^2\theta$ should be maximum.
=> So, 12 – $\sin^2\theta$ = 12 – 1 = 11
Therefore, the minimum value of 11 $\sin^2\theta$ + 12 $\cos^2\theta$ is 11.

Q26. Answer: (b) 3000 cc

Given:
The capacity of two pots is 132 liters and 69 litres, respectively.
Concept used:
1 litre = 1000 cubic centimeter(cc)
Calculation:
=> Maximum capacity of a container = HCF of 132 and 69
=> Factors of 132 = 2 × 2 × 3 × 11
=> Factors of 69 = 3 × 23
=> So, the Highest Common Factor of 132 and 69 = 3 Litres = 3000 cc
Therefore, the maximum capacity of a container that can exactly measure the content of the two pots is 3000 cc.

Q27. Answer: (a) Surat

The correct answer is Surat.
Key Points

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• Sir Thomas Roe's arrival in Jahangir's court was a significant event in modern Indian history as it was the first step towards establishing the British East India Company as a paramount power in the Indian subcontinent.

• In 1608, the British East India Company decided to open a factory in Surat. The English ambassador Captain Hawkins arrived at Jahangir's Court to seek permission for trade with India.

• The East India Company was an English, and later British, joint-stock company founded in 1600.

• It was formed to trade in the Indian Ocean region, initially with the East Indies, and later with East Asia.

Additional Information

• Initially, it was turned down due to Portuguese intrigue.

• The British thus established their first (temporary) factory at Masulipatnam in 1611.

• But, the first permanent British factory was established at Surat in 1613.

Q28. Answer: (b) 30 days

Given:

Karan works twice as fast as Shyam

Time taken together to complete a task = 20 days

Concept used:

Work = Efficiency × Time taken

Calculation:

=> Let us consider work done by Shyam in 1 day = x

=> So, the work done by Karan in 1 day = 2x

=> Now, time taken together to complete a task = 20 days

=> Work done by both Karan and Shyam together in 1 day = 1/20

=> 2x + x = 1/20

=> 3x = 1/20

=> x = 1/(20× 3)=1/60

=> So, work done by Karan in 1 day = 2x = 2 × 1/60 = 1/30

Time taken by Karan to complete the work = Work/Efficiency = 1/([1/30]) = 30 days

Therefore, the time taken by Karan to complete the work is 30 days.

Q29. Answer: (c) 288

Given:

Length of cloth required to make 5 pieces = 1 m

Length of cloth available = 57.6 m

Calculation:

=> In 1 m cloth, the number of pieces made = 5

=> In 57.6 m cloth, number of pieces made = 57.6 × 5 = 288 pieces

Therefore, 288 pieces can be made out of cloth.

Q30. Answer: (b) C

Given:

Women, Married Women & Lady Doctor.

Explanation:

Married women & Lady doctors come under the category of Women. In conclusion, married women and lady doctor are subsets of women.

Now, there is a possibility that a married woman can be a lady doctor as well or not and vice versa also holds true. In conclusion, we can say that there is an intersection between married women and lady doctor.

Option A: A lady doctor or married woman is not a woman is illogical, so it is not true.

Option B: All the married women already doctors or all the lady doctors are married is not true, hence this is incorrect.

Option C: It represents the relation correctly as per the above explanation.

Option D: A lady doctor or married woman is not a woman is illogical, so it is not true.

Hence, the C option depicts the correct relation.

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Q31. Answer: (a) 6B2M8G10J4 = 20

Given:

J = +

G = -

M = x

B = ÷

Concept used:

BODMAS

Calculation:

Let's replace the alphabet with their signs, and solve applying BODMAS.

Option A: 6B2M8G10J4 = 6 ÷ 2 x 8 - 10 + 4 = 3 x 8 - 10 + 4 = 24 - 10 + 4 = 28 - 10 = 18

Option B: 6M5J4B2G10 = 6 x 5 + 4 ÷ 2 - 10 = 6 x 5 + 2 - 10 = 30 + 2 - 10 = 32 - 10 = 22

Option C: 4G16B2J6M5 = 4 - 16 ÷ 2 + 6 x 5 = 4 - 8 + 6 x 5 = 4 - 8 + 30 = 34 - 8 = 26

Option D: 8M2G6B3J7 = 8 x 2 - 6 ÷ 3 + 7 = 8 x 2 - 2 + 7 = 16 - 2 + 7 = 23 - 2 = 21

Hence, we can say that 6B2M8G10J4 = 20 is not correct.

Q32. Answer: (c) 1/19

Given:

x = 12, y = 7

Concept Used:

$a^3 + b^3 = (a + b)(a^2 + b^2 – ab)$

Calculation:

=> $(x^2+y^2-xy)/(x^3+y^3)$

=> $(x^2+y^2-xy)/(x+y)(x^2+y^2-xy)$

=> $1/(x+y)$

Substituting the value of x and y we get,

=> $1/(12+7)=1/19$

Therefore, the value of $(x^2+y^2-xy)/(x^3+y^3)$ is 1/19

Q33. Answer: (d) Mumbai

The correct answer is Mumbai.

Key Points

• Bombay Spinning and Weaving Company was the first cotton mill to be established in Bombay, India, on 7 July 1854 at Tardeo by Cowaszee Nanabhoy Davar (1815–73) and his associates.

• In India, the cotton textile industry is mainly located in the cotton-producing states of Gujarat, Maharashtra, and Tamilnadu.

• This place was an important financial place with ports facilitating the export of raw cotton from England and China and It is located near a cotton-growing area.

• Cotton is a natural fiber that grows on a plant. It is both a food and fiber crop, and the plant is a leafy, green shrub related to the hibiscus species of plants.

Additional Information

• Once the capital of the mighty Mauryan emperor Ashoka, Kusumpura (as Patna was then called), transformed into Pushpapura, followed by Pataliputra and Azeemabad to finally become Patna.

• Kolkata is a city of colonial architecture, museums, art galleries, traditional food, temples, music and theatre. It is an amalgamation of traditional and modern. It is famous for its theatre and films.

• Chennai exhibits a perfect amalgamation of art, architecture, dance, music and drama. Famous as the biggest cultural and economic centre down south, Chennai was earlier known as Madras.

Q34. Answer: (d) M

Given:

70, V, 63, R, 56, O, 49, ?

Solution:

As we can see from the above pattern, the next series will be having an alphabet.

V - 4 = 22 - 4 = 18 = R

R - 3 = 18 - 3 = 15 = O

O - 2 = 15 - 2 = 13 = M

The gap is decreasing by one alphabet consecutively,

The series will be 70, V, 63, R, 56, O, 49, M

Q35. Answer: (b) 14 days

Given:

X and Y can complete a task in 28 days and 20 days, respectively.

Concept used:

Efficiency = (Total units of work)/(Time taken)

Calculation:

Let us consider the total work = 1 unit

=> Work done by x in 1 day = 1/28

=> Work done by x in 4 days = 1/28×4 =1/7

=> Remaining work = 1-1/7=6/7

=> Work done by x and y in 1 day = 1/28+1/20=3/35

=> Now, 6/7 of work done by x and y in = 35/3 × 6/7=10 days

=> Total time = 10 + 4 = 14 days

Hence, the total time taken for the task is 14 days.

Q36. Answer: (c) 12.5%

Given:

Amount in 2 years = Rs 6400

Amount in 4 years = Rs 8100

Formula used:

In Compound Interest,

A = P [1 + (R/100)]^T

where, A = Amount, P = Principle, T = Time and R = Rate

Calculation:

=> Let the sum of money be P.

=> For the period of 2 years,

=> $6400 = P (1+r/100)^2$

=> $P = 6400/((1+r/100)^2)$ → (1)

=> For the period of 4 years,

=> 8100 = P (1+r/100)^4

=> P = 8100/((1+r/100)^4) → (2)

=> Equating both (1) and (2), we get

=> $((1+r/100)^2)/((1+r/100)^4)=6400/8100$

=> $(1+r/100)^2=8100/6400$

=> 1 + r/100 = √(8100/6400)=90/80

=> r/100=9/8-1

=> r = 1/8× 100 = 12.5%

Therefore, the rate of compound interest is 12.5%.

Q37. Answer: (b) 7 IMF-described advanced economies in the world

The correct answer is 7 IMF-described advanced economies in the world.

Key Points

• The Group of Seven is an inter-governmental political forum consisting of Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States. In addition, the European Union is a 'non-enumerated member.

• The G7 provides global leadership and plays a powerful catalyst role on issues that are later taken up by other fora with broader global and regional membership.

• The G7 brings together the world's advanced economies to influence global trends and tackle pervasive and crosscutting issues.

• The G7 is an organized group of seven countries that are regarded as some of the world's largest 'advanced' economies that are highly positioned in global trade and the international financial system.

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Additional Information

• The Leaders of the Group of Seven (G7), who met in Elmau, Germany, on 26-28 June 2022, were joined by the Leaders of Argentina, India, Indonesia, Senegal, and South Africa, as well as Ukraine.

• The choice of Taormina as the headquarters of the G7 was announced by the then Prime Minister Matteo Renzi on 4 July 2016.

Q38. Answer: (a) Alberuni

The correct answer is Alberuni.

Key Points

• Al-Biruni wrote Kitab-Ul-Hind and it was written in Arabic.

• Al-Biruni spent years in the company of Brahmana priests and scholars, learning Sanskrit, and studying religious and philosophical texts.

• He translated several Sanskrit works, including Patanjali's work on grammar, into Arabic.

• Al-Biruni's Kitab-ul-Hind, written in Arabic, is simple and lucid.

• It is a voluminous text, divided into 80 chapters on subjects such as religion and philosophy, festivals, astronomy, alchemy, manners and customs, social life, weights and measures, iconography, laws and metrology.

Additional Information

• Seydi Ali Reis was an Ottoman admiral and navigator. Known also as Katib-i Rumi. He commanded the left wing of the Ottoman fleet at the naval Battle of Preveza in 1538.

• Abu Abdullah Muhammad ibn Battutah was a Berber Maghrebi scholar and explorer who travelled extensively in the lands of Afro-Eurasia, largely in the Muslim world.

• Mahmud bin Amir Ali Balkhi, a Central Asian traveler to India in Jahangir's reign was horrified to see a group of 23 Muslims in Banaras who had deserted their religion and turned Hindu.

Q39. Answer: (a) 1969

The correct answer is 1969.

Key Points

• CISF was set up under an Act of the Parliament of India on 10 March 1969.

• Its strength was 2,800.

• On 15 June 1983, CISF was subsequently made an armed force of India by another Act of Parliament passed.

• The government raised the sanctioned strength from 145,000 to 180,000 personnel in April 2017.

• The CISF is governed by the Union Ministry of Home Affairs.

Additional Information

• CISF is a unique organization in the paramilitary forces of India which works for airways, seaways, and some of the major installations in India.

• The CISF plays an important role in Disaster Management.

• The headquarter of CISF are in New Delhi.

Q40. Answer: (a) 496

Given:

4, 13, 27, 82, 165, ?

Solution:

Hence, the series will be 4, 13, 27, 82, 165, 496.

Q41. Answer: (d) Moving Picture Experts Group

The correct answer is Moving Picture Experts Group.

Key Points

• The Moving Picture Experts Group (MPEG) is an alliance of working groups established jointly by ISO and IEC that sets standards for media coding.

• It is also including compression coding of audio, video, graphics, and genomic data; and transmission and file formats for various applications.

• It is a popular format for movies that are distributed on the internet.

• They use a specific type of compression that makes streaming and downloading much quicker than other popular video formats.

Additional Information

• The MPEG standards are an evolving set of standards for video and audio compression and for multimedia delivery developed by the Moving Picture Experts Group (MPEG).

• MPEG-1 was designed for coding progressive video at a transmission rate of about 1.5 million bits per second.

Q42. Answer: (b) Assam

The correct answer is Assam.

Key Points

• One horned Rhinoceros:

• They are found in the Indian subcontinent.

• The one-horned rhinoceros (Indian rhinoceros) are the largest of the rhino species.

• They are mainly found in Assam, West Bengal, and Uttar Pradesh.

• There are 2,640 rhinoceros in four protected areas in Assam.

• 90% are found in Kaziranga National Park.

• It is listed as Vulnerable on the IUCN Red List.

• The National Rhino Conservation Strategy was launched in the year 2019 for the conservation of big-horned rhinos.

• Indian Rhino Vision 2020 was launched in 2005, it is an ambitious effort to attain a wild population of at least 3,000 greater one-horned rhinos spread over seven protected areas in the Indian state of Assam by the year 2020.

Additional Information

• National Parks:

• In Arunachal Pradesh

• Namdapha National Park

• Mouling National Park

• West Bengal

• Sunderban National Park

• Buxa National Park

• Gorumara National Park

Neora Valley National Park

• Singalila National Park

• Jaldapara National Park

• Tripura

• Clouded Leopard National Park

• Rajbari National Park

Q43. Answer: (c)

Given:

Shapes of quadrilateral (Rectangle, Square, Parallelogram) and triangle.

Explanation:

A quadrilateral is a plane figure that has four sides or edges, so all figures other than a triangle falls into the category of a quadrilateral.

In the above shapes, all the shapes have four sides except the triangle(which has 3 sides).

So, the triangle is an odd shape among the given shapes.

Q44. Answer: (d) Delhi-Mumbai-Chennai-Kolkata

The correct answer is Delhi-Mumbai-Chennai-Kolkata.

Key Points

• The Golden Quadrilateral is a national highway network connecting most of the major industrial, agricultural, and cultural centres of India.

• It forms a quadrilateral connecting the four major metro cities of India, viz., Delhi (north), Kolkata (East), Mumbai (west), and Chennai (south).

• The main objective of these superhighways is to reduce the distance and time between the four megacities of India.

• Other cities connected by this network include Ahmedabad, Bengaluru, Balasore, Bhubaneswar, Cuttack, Durgapur, Jaipur, Kanpur, Pune, Kolhapur, Surat, Vijayawada, Ajmer, Vizag, Bodhgaya, Varanasi, Allahabad, Agra, Mathura, Dhanbad, Gandhinagar, Udaipur, and Vadodara.

Additional Information

• The maximum density of Roads is in Goa.

• National Highways are 2% of the total Roads in India.

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• National Highways are the longest in Uttar Pradesh.
• Total Road length is maximum in Maharashtra.
• In the world, the maximum length of Roads is in the USA.

Q45. Answer: (b) Gujarat

The correct answer is Gujrat.

Key Points

• Ichthyosaur is a 152 million-year-old fossil.
• It was discovered for the first time in India (Kutch desert region of Gujarat).
• Rajasaurus is a genus of carnivorous abelisaurid theropod dinosaurs from the Late Cretaceous of India.
• Masiakasaur is a genus of small predatory theropod dinosaurs from the Late Cretaceous of Madagascar.
• In Malagasy, masiaka means "vicious"; this genus name means "vicious lizard".
• Barapasaurus is a genus of basal sauropod dinosaur from the Early Jurassic rocks of India.

Additional Information

• Dinosaurs:
• dinosaurs are a diverse group of reptiles of the clade Dinosauria.
• They first appeared during the Triassic period, between 243 and 233.23 million years ago, although the exact origin and timing of the evolution of dinosaurs is the subject of active research.

Q46. Answer: (a) 1600

The correct answer is 1600.

Key Points

• The East India Company was an English, and later British, joint-stock company founded in 1600.
• It was formed to trade in the Indian Ocean region, initially with the East Indies, and later with East Asia.
• In 1600, a group of English businessmen asked Elizabeth I for a royal charter that would let their voyage to the East Indies on behalf of the crown in exchange for a monopoly on trade.
• The merchants put up nearly 70,000 pounds of their own money to finance the venture, and the East India Company was born.

Additional Information

• It was started as a monopolistic trading body so that England could participate in the East Indian spice trade.
• The East India Company, which once owned India, in one of the great ironies of history, is now owned by an Indian entrepreneur named Sanjiv Mehta.
• The company was founded in 1600 to import spices, tea, and exotic items to Europe from India.
• For years the company remained dormant, stuck in memories and history books.

Q47. Answer: (d) 210

Given:

HCF = 60, LCM = 420

Divisor = 2, Quotient = 60

Concept Used:

HCF × LCM = Product of two numbers

Dividend = Divisor × Quotient + Remainder

Calculation:

=> Let the two numbers be x and y.

=> Dividend = Divisor × Quotient + Remainder

=> x = 2 × 60 + 0 = 120

=> HCF × LCM = Product of two numbers

=> 60 × 420 = 120 × y

=> 25200 = 120y

=> y=25200/120=210

Therefore, the second number is 210

Q48. Answer: (c) 10925

Given:

Numbers = 5 to 14

Concept Used:

Sum of Cubes of n natural numbers = $(n^2(n+1)^2)/4$

Calculation:

=> Numbers = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

=> Firstly, we will calculate the sum of the cubes of numbers from 1 to 14,

=> Sum of the cubes of first 14 natural numbers = $(14^2(14+1)^2)/4=(196\times 225)/4=44100/4 = 11025$

=> Sum of the cubes of first 4 natural numbers = $(4^2(4+1)^2)/4=(16\times 25)/4 = 100$

=> Sum of the cubes of natural numbers from 5 to 14 = 11025 – 100 = 10,925

Therefore, the sum of the cubes of the natural numbers from 5 to 14 is 10,925.

Q49. Answer: (b) 50 °

Given:

Ratio of angles of a quadrilateral = 5 : 8 : 10 : 13

Concept Used:

Sum of all the angles of a quadrilateral = 360°

Calculation:

=> Let the angles of a quadrilateral be 5x, 8x, 10x and 13x.

=> 5x + 8x + 10x + 13x = 360°

=> 36x = 360°

=> x=360/36=10

=> Smallest angle = 5x = 5 × 10 = 50º

Therefore, the smallest angle is 50°.

Q50. Answer: (d) Through sea and air routes

The correct answer is Through sea and air routes.

Key Points

• India is surrounded by water on three sides and has a coastline of 7516.6 km.

• This geographical feature has made sea transport the major player in carrying out the international trade of India.

• Most of India’s foreign trade is carried through sea and air routes.

• However, a small portion is also carried through land routes to neighboring countries like Nepal, Bhutan, Bangladesh, and Pakistan.

• According to the Ministry of Shipping, around 95% of India's trading by volume and 70% by value is done through maritime transport.

• However, sea alone is not sufficient to transport India’s exports, which include perishable materials which can only be transported through the air.

• Although the demand for air freight is limited by cost so, cargo shipped by air has high values per unit and is very time-sensitive.

• The air cargo sector is known to be the barometer of the economic health of a country because of the cost factor.

Additional Information

• Major sea trading ports of India: Kandla Port, Mumbai Port, Chennai Port, Kolkata Port, Cochin Port, Vizag port etc.

Q51. Answer: (a) Sprites

The correct answer is Sprites.

Key Points

• The world's smallest spacecraft was launched successfully by an Indian rocket.

• The world's smallest spacecraft ever launched has successfully been placed in low Earth orbit by ISRO's PSLV rocket.

• Its name is Sprites,.

• The dimensions are 3.5cmx3. 5cm.

• They weigh 4 grams each and run on sunlight.

Additional Information

• The Indian Space Research Organisation is the national space agency of India.

• Its headquartered in Bangalore.

• It operates under the Department of Space which is directly overseen by the Prime Minister of India.

• The Chairman of ISRO acts as the executive of DOS as well.

Q52. Answer: (a) Molecular phylogeny

The correct answer is Molecular phylogeny.

Key Points

• Molecular phylogeny is a relatively new scientific discipline that involves the comparative analysis of the nucleotide sequences of genes and the amino acid sequences and structural features of proteins from which evolutionary histories and relationships, and in some cases also functions, can be inferred.

• Molecular phylogenetics is the branch of phylogeny that analyzes genetic, hereditary molecular differences, predominantly in DNA sequences, to gain information on an organism's evolutionary relationships.

• From these analyses, it is possible to determine the processes by which diversity among species has been achieved.

• Phylogenetics is important because it enriches our understanding of how genes, genomes, species (and molecular sequences more generally) evolve.

Additional Information

• Metamorphosis, in biology, striking change of form or structure in an individual after hatching or birth. Hormones called molting and juvenile hormones, which are not species-specific, apparently regulate the changes.

• The morphological approach relies on recognizing and understanding the meanings of root words and affixes. The earliest approaches to reading are sound/letter correspondences and phonological awareness training.

• DNA Research is an internationally peer-reviewed journal which aims at publishing papers of highest quality in broad aspects of DNA and genome-related research.

Q53. Answer: (a) Thailand

The Correct answer is Thailand.

Key Points

• In June and July 2018, a junior association football team was rescued from Tham Luang Nang Non, a cave system in Chiang Rai province, northern Thailand.

• Twelve members of the team, aged 11 to 16, and their 25-year-old assistant coach entered the cave on 23 June after a practice session.

• Shortly after they entered, heavy rainfall began and partially flooded the cave system, blocking their way out and trapping them deep within.

• Efforts to locate the group were hampered by rising water levels and strong currents, and the team were out of contact with the outside world for more than a week.

• The cave rescue effort expanded into a massive operation amid intense worldwide public interest and involved international rescue teams.

• On 2 July, after advancing through narrow passages and muddy waters, British divers John Volanthen and Rick Stanton found the group alive on an elevated rock about 4 kilometers (2.5 miles) from the cave mouth.

• After days of pumping water from the cave system and a respite from the rainfall, the rescue teams worked quickly to extract the group from the cave before the next monsoon rain, which was expected to bring additional downpours on 11 July.

• Between 8 and 10 July, all 12 boys and their coach were rescued from the cave by an international team.

• The rescue effort involved as many as 10,000 people, including more than 100 divers, scores of rescue workers, representatives from about 100 governmental agencies, 900 police officers, and 2,000 soldiers.

Q54. Answer: (d) 32.5 %

Given:

Decrease in expenses = 25%

Further decrease in expenses = 10%

Calculation:

=> Let Sohan's expense be Rs x.

=> After decrease of 25%,

=> Sohan's expense = x-25/100× x=(4x-x)/4=Rs 3x/4

=> Further decrease of 10%,

=> Sohan's expense = 3x/4-10/100× 3x/4=3x/4-3x/40

=> Sohan's expense = (30x-3x)/40=Rs 27x/40

=> Overall decrease = x-27x/40=(40x-27x)/40=Rs 13x/40

=> Percentage of the overall decrease in expenses = (13x/40)/x× 100=(13× 100)/40=32.5%

Therefore, the percentage by which his expenses decreased altogether is 32.5%.

Q55. Answer: (c) Iapetus

Given:

Venus, Mars, Iapetus, Jupiter

Explanation:

From the given list, Venus, Mars, & Jupiter are planets of our Solar System whereas Iapetus is a moon of Saturn.

Hence, the Iapetus is different from the rest given names of the planet.

Q56. Answer: (c) 899999

Given:

Greatest and smallest six-digit number

Calculation:

=> Greatest six-digit number = 999999

=> Smallest six-digit number = 100000

=> Difference = 999999 – 100000 = 899999

Therefore, the difference between the greatest and smallest six-digit number is 899999.

Q57. Answer: (c) Wife's father's sister

Given that,

Raman pointed to a lady and said that the son of her only brother is the brother of Raman's wife.

Based on the data given, the following family tree diagram can be drawn,

According to the family tree diagram, the lady is Raman's wife's father's sister.

Hence, the correct answer is "Wife's father's sister".

Q58. Answer: (b) 37 : 91

Given:

x : y = 4 : 3

Calculation:

x3 - y3 : x3 + y3

=> $(4^3 - 3^3) : (4^3 + 3^3)$

=> (64 - 27) : (64 + 27)

=> 37 : 91

Therefore The correct answer is option (2).

Q59. Answer: (d) Gregor Mendel

The correct answer is Gregor Mendel.

Key Points

• The way in which traits are passed from one generation to the next and sometimes skip generations was first explained by Gregor Mendel.

• By experimenting with pea plant breeding, Mendel developed three principles of inheritance that described the transmission of genetic traits, before anyone knew genes existed.

• Gregor Mendel, through his work on pea plants, discovered the fundamental laws of inheritance. He deduced that genes come in pairs and are inherited as distinct units, one from each parent.

• Gregor Johann Mendel, OSA was a biologist, meteorologist, mathematician, Augustinian friar and abbot of St. Thomas' Abbey in Brünn, Margraviate of Moravia.

Additional Information

• Hugo dae Vries discovered the Austrian monk's paper of 1866 on the breeding of garden peas, and he was careful to attribute the original discovery of the laws of heredity to Mendel in his subsequent publications.

• The theory of natural selection was explored by 19th-century naturalist Charles Darwin. Natural selection explains how the genetic traits of a species may change over time. This may lead to speciation, the formation of a distinct new species.

• In 1908 British physician Archibald Garrod proposed the important idea that the human disease alkaptonuria, and certain other hereditary diseases, were caused by inborn errors of metabolism, suggesting for the first time that linked genes had molecular action at the cell level.

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Q60. Answer: (d) 6/17

Given:

Sum of two numbers = 72

HCF of two numbers = 2

LCM of two numbers = 102

Concept Used:

LCM × HCF = Product of two numbers

Calculation:

=> Let the two numbers be x and y.

=> According to the question, x + y = 72

=> Putting the values in the formula, we get

=> 2 × 102 = xy

=> xy = 204

=> We have to find, 1/x+1/y

=> 1/x+1/y=(y+x)/xy

=> 72/204=6/17

Therefore, the sum of the reciprocals of the number is 6/17.

Q61. Answer: (b) 10^4a + 10³b + 10²c + 10d + e

Given:

Digits of a number = a, b, c, d and e

Concept Used:

Place Value System

Calculation:

=> Number beginning from the left, we get

=> Number = abcde

=> Place value of e = 1

=> Place value of d = 10

=> Place value of c = 100 = 10²

=> Place value of b = 1000 = 10³

=> Place value of a = 10000 = 10^4

Therefore, the number is 104a + 103b + 102c + 10d + e.

Q62. Answer: (b) 39/17 days

Given:

X can finish a task in = 15 days

Y can finish a task in = 20 days

The capacity of Z = 5/2 × Capacity of X

Concept Used:

Capacity or Efficiency = Work/Time

Calculation:

Let us consider the total work = 1 unit

=> One day work for X = 1/15

=> One day work for Y = 1/20

=> Capacity of Z = 5/2 × Capacity of X → (1)

=> Capacity of Z = 1/Time

=> Capacity of X = 1/15

=> Substituting in (1) we get

=> 1/Time=5/2 × 1/15

=> 1/Time=1/6

=> Time taken for Z to complete a task is 6 days.

=> Capacity of working together by X, Y, and Z for the task is,

=> X + Y + Z = 1/15+1/20+1/6

=> X + Y + Z = (4+3+10)/60

=> X + Y + Z = 17/60

=> The days were taken by X+Y+Z together to complete the task,

=> X + Y + Z = 60/17=39/17 days

Therefore, by working together a task can be completed in 39/17 days.

Q63. Answer: (a) Herbert Spencer

The correct answer is Herbert Spencer.

Key Points

• Survival of the fittest, a term made famous in the fifth edition (published in 1869) of On the Origin of Species by British naturalist Charles Darwin.

• It suggested that organisms best adjusted to their environment are the most successful in surviving and reproducing.

• Herbert Spencer (1820–1903) was an English philosopher who initiated a philosophy called 'Social Darwinism'.

• He coined the term 'survival of the fittest' seven years before Darwin's publication of his theory of natural history.

• The Origin of the Species in 1859.

Additional Information

• Albert Einstein was a German-born theoretical physicist, widely acknowledged to be one of the greatest and most influential physicists of all time. He is famous for his Theory of Relativity. He also won the Nobel Prize in Physics.

• Archimedes was well known for his inventions and scientific discoveries. The most famous of these were the Archimedes' Screw (a device for raising water that is still used in crop irrigation and sewage treatment plants today) and Archimedes' principle of buoyancy.

• The theory of natural selection was explored by 19th-century naturalist Charles Darwin. Natural selection explains how genetic traits of a species may change over time.

Q64. Answer: (b) To provide a surface where exchange of gases takes place

The correct answer is To provide a surface where exchange of gases takes place.

Key Points

• The alveoli are where the lungs and the blood exchange oxygen and carbon dioxide during the process of breathing in and breathing out.

• Oxygen breathed in from the air passes through the alveoli and into the blood and travels to the tissues throughout the body.

• Alveoli are tiny air sacs present in the lungs which appear like a bunch of grapes.

• These are also known as pulmonary alveoli.

• They mainly promote the exchange of gases.

• Whereas, whereas nephrons are classified into renal corpuscle and renal tubule.

• These are mainly concerned with blood filtration.

Additional Information

• Alveoli are the endpoint of the respiratory system which starts when we inhale air into the mouth or nose.

• The oxygen-rich air travels down the trachea and then into one of the two lungs via the right or left bronchus.

• Carbon dioxide molecules, a by-product of cellular respiration, are diffused back into the alveolus where they are expelled out of the body through the nose or mouth.

• During inhalation, alveoli expand as the negative pressure in the chest is created by the contraction of the diaphragm.

• During exhalation, the alveoli recoil (spring back) as the diaphragm relaxes.

Q65. Answer: (d) Yottabyte

The correct answer is Yottabyte.

Key Points

• A Yottabyte is a measure of computer storage capacity.

• It equals approximately a trillion bytes. Mostly the storage capacity of large storage devices is measured in YottaBytes.

• In computer systems, a unit of data that is eight binary digits long is known as a byte.

• The kilobyte is the smallest unit of memory measurement but greater than a byte.

• A kilobyte is 103 or 1,000 bytes abbreviated as ‘KB’.

• A megabyte (MB) is a data measurement unit applied to a digital computer or media storage.

• One MB equals one million (106 or 1,000,000) bytes.

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• GB stands for "gigabyte".

• " A gigabyte is 1 billion bytes.

• A gigabyte is a measurement of data storage for computers, tablets, smartphones, gaming consoles, and other computing devices.

• A terabyte is more precisely defined as 1,024 gigabytes (GB).

Additional Information

• Computer Storage measured in:

• 1 YB (Yottabyte) = 1024 TB

• 1 TB (Terabytes) = 1024 GB

• 1 GB (Gigabytes) = 1024 MB

• 1 Mb (Megabytes) = 1024KB

• 1 KB (Kilobytes) = 1024 byte

Q66. Answer: (a) 190

The correct answer is 190.

Key Points

• 190 countries are members of the International Monetary Fund (IMF).

• The IMF is a global organization that aims to promote international monetary cooperation and exchange rate stability.

• Member countries contribute to the IMF's resources and have voting rights proportional to their financial contributions.

• The IMF provides financial assistance to member countries facing balance of payments problems.

• It also conducts economic surveillance and provides policy advice to its member countries to promote economic stability and growth.

Additional Information

• International Monetary Fund (IMF)

• The IMF was established in 1944 during the Bretton Woods Conference in New Hampshire, United States.

• IMF Headquarters- Washington, D.C.

• It was created to promote international monetary cooperation and exchange rate stability.

• Initially, its primary focus was on managing the international monetary system based on fixed exchange rates.

• It has played a significant role in stabilizing economies, promoting economic growth, and reducing poverty worldwide.

Q67. Answer: (c) D → C → A → B

According to the given information, we need to arrange the given options in a sequential manner corresponding to a butterfly's life stages.

The order of the life stages is:

D. Egg

C. Larva

A. Pupa

B. Imago

Thus, the arrangement will be D → C → A → B.

Thus, option 3 is correct.

Q68. Answer: (a) Strait of Gibraltar

The correct answer is Strait of Gibraltar.

Key Points

• The strait of Gibraltar separates Morocco and Spain.

• It joins the Mediterranean Sea and the Atlantic Ocean.

• A strait is a waterway that connects two larger bodies of water.

• It is also a channel of water that lies between two land masses.

Additional Information

• Located between Alaska and Russia, the Bering Strait is the only marine gateway between the icy Arctic and the Pacific Ocean. At its narrowest point, the strait is only 55 miles wide.

• Hudson Strait links the Atlantic Ocean and the Labrador Sea to Hudson Bay in Canada. This strait lies between Baffin Island and Nunavik.

• The English Channel also called the British Channel is an arm of the Atlantic Ocean that separates Southern England from

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northern France and links to the southern part of the North Sea by the Strait of Dove.

Q69. Answer: (c) Independence Day

The correct answer is Independence Day.

Key Points

• A public declaration was made on 26 January 1930 – a day which the Congress Party urged Indians to celebrate as Independence Day.

• The declaration was passed due to the breakdown of negotiations between leaders of the freedom movement and the British over the question of dominion status for India.

• The decade closed with the Congress resolving to fight for Purna Swaraj (complete independence) in 1929 under the presidentship of Jawaharlal Nehru.

• Consequently, “Independence Day” was observed on 26th January 1930, all over the country.

Additional Information

• The Indian National Congress, colloquially the Congress Party, is a political party in India with widespread roots. Founded in 1885, it was the first modern nationalist movement to emerge in the British Empire in Asia and Africa.

• Silent Protest Day is on the second Friday of April.

• Republic Day is on the 26th of January.

• Bharat Diwas is on the 15th of August.

Q70. Answer: (b) 16384

The correct answer is 16384.

Key Points

• Microsoft Excel Starter 2010 is a spreadsheet program designed for everyday tasks such as setting up a budget, maintaining an address list, or keeping track of a list of to-do items.

• Excel Starter is part of Microsoft Office Starter 2010.

• MS Excel is a commercial spreadsheet application that is produced and distributed by Microsoft for Microsoft Windows and Mac OS operating systems.

• It features the ability to perform basic calculations, use graphing tools, create pivot tables and create macros, among other useful features.

• For MS Excel 2010, Row numbers range from 1 to 1048576; in total 1048576 rows and Columns range from A to XFD; in total 16384 columns.

Additional Information

• Microsoft Office is a suite of applications designed to help with productivity and completing common tasks on a computer.

• You can create and edit documents containing text and images, work with data in spreadsheets and databases, and create presentations and posters.

• The three major Microsoft Office pieces include the word processor (Word), the spreadsheet (Excel), and the visual presentation tool (PowerPoint).

Q71. Answer: (d) Dhaka

The correct answer is Dhaka.

Key Points

• The All-India Muslim League was a political party established in 1906 in British India.

• The party arose out of the need for the political representation of Muslims in British India, especially in the event of the Indian National Congress-sponsored massive Hindu opposition to the 1905 partition of Bengal.

• It led the movement calling for a separate Muslim nation to be created at the time of the partition of British India (1947).

• The Muslim League was founded in 1906 to safeguard the rights of Indian Muslims.

• Khwaja salimullah was the founder of Muslim league.

• Around 3000 delegates attended a conference of the Muhammadan Educational Conference in Dhaka on 30 December 1906.

Additional Information

• The Hindu Mahasabha (All-India Hindu Grand Assembly) is a Hindu nationalist political party in India. It was Founded in 1915, the Mahasabha functioned mainly as a pressure group advocating the interests of orthodox Hindus before the British Raj and within the Indian National Congress.

• The National-Christian Defense League was a far-right political party of Romania formed by A. C. Cuza. National-Christian Defense League.

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Q72. Answer: (b) Rs. 29,756.25

Given:

Selling price of TV = Rs 24,750

Profit percentage = 10%

Production cost increase = 15%

New profit percentage = 15%

Formula Used:

Cost Price = 100/(100+Profit%)× SP

Selling Price = (100+Profit%)/100× CP

Calculation:

=> Cost price of a TV set = 100/(100+10)× 24750

=> Cost price of a TV set = 10/11× 24750=Rs 22500

=> With an increase of 15%,

=> New cost price of a TV set = 22500 + 15% of 22500

=> New cost price of a TV set = 22500+15/100× 22500 = 22500 + 3375 = Rs 25875

=> New profit percentage to earn = 15%

=> Selling Price = (100+15)/100× 25875

=> Selling Price = 115/100× 25875 = 115 × 258.75 = Rs 29,756.25

Therefore, the new selling price of the TV set to gain a profit of 15% is Rs 29,756.25

Q73. Answer: (c) 22

Given:

Ratio of two numbers = 9 : 11

Adding 6 to each number, new ratio = 6 : 7

Calculation:

=> Let the numbers be 9x and 11x.

=> According to the question,

=> (9x+6)/(11x+6)=6/7

=> 7(9x + 6) = 6(11x + 6)

=> 63x + 42 = 66x + 36

=> 66x – 63x = 42 – 36

=> 3x = 6

=> x = 6/3=2

=> Greater number = 11x = 11 × 2 = 22

Therefore, the greater number among the two is 22

Q74. Answer: (a) Mangroves

The correct answer is Mangroves.

Key Points

• The Kharai camels are a unique breed of camel found only in Kutch of Gujarat and feed on mangroves on the island offshore.

• The Kharai camels can swim up to three kilometers into the sea in search of mangroves, their primary food.

• People consume their milk, while male calves are sold for economic returns. Hence it can be domesticated.

• Given the breed's ability to survive both on land and sea, the Kharai camel is one of the most preferred choices of graziers in the arid coastal region of Kutch.

Additional Information

• Cactus can be distinguished from other succulent plants by the presence of areoles, small cushionlike structures with trichomes (plant hairs), and, in almost all species, spines or barbed bristles (glochids).

• Joshua tree forests tell a story of survival, resilience, and beauty borne through perseverance. They are the silhouette that reminds those of us who live here that we are home.

• Brittlebush is one of the most common yellow-flowered silvery-gray bushes in lower deserts. Brittlebush is aptly named as the branches are easily snapped off because of brittle stems.

Q75. Answer: (a) Laldenga

The correct answer is Laldenga.

Key Points

• Laldenga was a Mizo nationalist and politician from Mizoram in northeast India.

• He was the founder of the Mizo National Front, a social organization turned political party.

• He was the first Chief Minister of Mizoram, the office of which he held from 1986 to 1988.

• The Mizo National Front is a regional political party in Mizoram, India.

• MNF emerged from the Mizo National Famine Front, which was formed by Pu Laldenga to protest against the inaction of the Indian central government towards the famine situation in the Mizo areas of the Assam state in 1959.

Additional Information

• Dr. F. Lalnunmawia is a Mizo National Front politician from Mizoram and resides at Samtlang, Aizawl, Mizoram. He has been elected to the Mizoram Legislative Assembly from Aizawl South 3 Constituency.

• Khuangchera was no “Indian” freedom fighter. There is no evidence that he had any fraternal feelings towards “mainland” brown people or wanted the Zo country to be ruled by a New Delhi-based Brown administration.

Q76. Answer: (a) 18^(th) September

The correct answer is 18th September.

Key Points

• World Bamboo Day is celebrated every year on September 18.

• The day is observed to raise awareness about the fast-growing grass plant Bamboo.

• Its day was established by World Bamboo Organisation (WBO) at the 8th World Bamboo Congress held in Bangkok in 2009.

Additional Information

• Bamboos are a diverse group of evergreen perennial flowering plants in the subfamily Bambusoideae of the grass family Poaceae.

• Bamboo is a tall, tree-like grass of the family Poaceae.

• It comprises more than 115 genera and 1,400 species.

• They are fast-growing perennials, with some species growing as much as 30 cm per day.

• Bamboo can be used in various ways including as food, as a substitute for wood, as building, and as construction material.

• It can also be used for handicrafts and paper.

• Bamboo has environmental benefits as it can be planted to reclaim severely degraded sites and wastelands.

• It also plays a significant role in soil and water conservation.

• It is also a good soil binder.

Q77. Answer: (a) Jataka tales

The correct answer is Jataka tales.

Key Points

• The Jatakas are a voluminous body of literature native to South Asia which mainly concern the previous births of Gautama Buddha in both human and animal form.

• According to Peter Skilling, this genre is "one of the oldest classes of Buddhist literature".

• The Jatakamala contains 34 Jatakas written by Arya Sura (sometimes spelled Aryasura).

• The stories in the Jatakamala focus on the perfections, especially those of generosity, morality, and patience.

• The Ajanta Caves are approximately 30 rock-cut Buddhist cave monuments dating from the 2nd century BCE to about 480 CE in the Aurangabad district of Maharashtra state in India.

Additional Information

• The Vedas, meaning “knowledge,” are the oldest texts of Hinduism. They are derived from the ancient Indo-Aryan culture of the Indian Subcontinent and began as an oral tradition that was passed down through generations before finally being written in Vedic Sanskrit between 1500 and 500 BCE.

• The Mahabharata is an ancient Indian epic where the main story revolves around two branches of a family - the Pandavas and Kauravas - who, in the Kurukshetra War, battle for the throne of Hastinapura.

• The Ramayana is an ancient Sanskrit epic which follows Prince Rama's quest to rescue his beloved wife Sita from the clutches of Ravana with the help of an army of monkeys.

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Q78. Answer: (c) 3150 m²

Given:

Length of room = 20 m

Breadth of room = 25 m

Height of room = 35 m

Formula Used:

Total Surface Area of the four walls = 2(l + b)h

Calculation:

=> Putting the values in the formula, we get

=> Total surface area of the four walls of the room = 2(20 × 35 + 25 × 35)

=> Total surface area of the four walls of the room = 2(700 + 875) = 2 × 1575

=> Total surface area of the four walls of the room = 3150 m²

Therefore, the total surface area of the four walls of the room is 3150 m².

Q79. Answer: (d) Rohan

Given that,

Thus, Rohan is good at volleyball, hockey and baseball.

Hence, the correct answer is 'option 4'.

Q80. Answer: (a) USA

The correct answer is USA.

Key Points

• A time zone is a region of the globe that observes a uniform standard time for legal, commercial, and social purposes.

• Time zones tend to follow the boundaries of countries and their subdivisions because it is convenient for areas in close commercial or other communication to keep the same time.

• Time in the United States, by law, is divided into nine standard time zones covering the states, territories, and other US possessions.

• The USA has 9 time zones:

• Atlantic, Eastern Central Mountain, Pacific, Alaska, Hawaii, American, and Chamorro.

Additional Information

• Argentina is located at a longitude that would naturally put it in the UTC−04:00 or UTC−05:00 time zone; however, it actually uses the UTC−03:00 time zone.

• China covers five time zones (Zhongyuan, Longshu, Tibet, Kunlun, and Changbai Time Zones.

• India has only one-time zone. The country has officially observed India Standard Time (IST) since 1947.

Q81. Answer: (d) Antarctica

The correct answer is Antarctica.

Key Points

• The Global Commons refers to those areas or regions of the world that require common international governance and management.

• These areas have been referred to as the common heritage of mankind and include the global or world ocean which is governed by the UN Convention on the Law of the Sea.

• The Earth’s atmosphere requires collective endeavor to deal with the problem of pollution affecting the global atmosphere.

• The polar regions include the Antarctic and Arctic; the ocean floor and lastly outer space, which is governed by the Outer Space Treaty.

• These areas are also referred to as the international global resource domains.

Additional Information

• Antarctica is the southernmost continent and the site of the South Pole.

• It is virtually uninhabited.

• It is fully an ice-covered landmass.

• Most cruises to the continent visit the Antarctic Peninsula, which stretches toward South America.

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Q82. Answer: (c) 8

Given:

Numbers = 26, 44, 56 and 104

Concept Used:

If four numbers a, b, c and d are in proportion, then a/b=c/d.

Calculation:

=> Let the number subtracted be x.

=> Putting the value in the formula, we get

=> (26-x)/(44-x)=(56-x)/(104-x)

=> Cross-multiplying the term, we get

=> (26 – x)(104 – x) = (44 – x)(56 – x)

=> 2704 – 26x – 104x + x^2 = 2464 – 44x – 56x + x^2

=> 2704 – 2464 = – 100x + 130x

=> 30x = 240

=> x = 240/30=8

Therefore, the number which is subtracted from each of the given numbers to make them in proportion is 8.

Q83. Answer: (c) Only II

According to the given statements we have:

1) Five friends P, Q, R, S and T are compared on the basis of their height (not necessarily in the same order). Height of T is between P and Q.

P > T > Q or Q > T > P

2) T is taller than S.

T > S

3) R's height is more than P and T.

R > P, T

Let us check which is not possible

I. R > P > T > Q > S

=> From 2, T > Q, S and from 1, 3 we have R > P > T

This is possible

II. R > S > Q > T > P

=> From 2, T > S

This is not possible

III. Q > R > T > S > P

=> From 2, T > S and from 1, 3 we have R > P > T

This is possible

Thus, only II is true.

Hence, the correct answer is 'option 3'.

Q84. Answer: (c) % MathType!MTEF!2!1!+- % feaahqart1ev3aaatCvAUfeBSjuyZL2yd9gzLbvyNv2CaerbuLwBLn % hiov2DGi1BTfMBaeXatLxBI9g...

Given:

Sum of two numbers = 40

Product of two numbers = 60

Calculation:

=> Let the numbers be x and y.

=> According to the question,

=> x + y = 40

=> xy = 60

=> We have to find, 1/x+1/y

=> 1/x+1/y=(y+x)/xy

=> Putting the values, we get

=> 1/x+1/y=40/60=2/3

Therefore, the sum of the reciprocals of two numbers is 2/3.

Q85. Answer: (b) 23

Given that,

• Z = 26

• ACT = 24

Now, from the table, the positional value of Z is 26.

Also from the table the positional value of the letters of ACT are:

A = 1

C = 3

T = 20

Adding the positional values we get,

1+ 3+ 20 = 24.

In a similar manner, for BAT we get,

From the table the positional value of the letters of BAT are:

B = 2

A = 1

T = 20

Adding the positional values we get,

2 + 1 + 20 = 23.

Thus, option 2 is correct.

Q86. Answer: (b) 46 °

Given:

Concept Used:

Complete angle of a circle = 360º

Calculation:

=> Percentage of expenditure on children's fee = 12.75 %

=> Degrees of central angle which represents expenditure on children's fee = 12.75% of 360

=> Degrees of central angle which represents expenditure on children's fee = 12.75/100× 360=459/10≈ 46

Therefore, 46º of the central angle would represent expenditure on children's fees.

Q87. Answer: (d) 2005

Given:

Year	2003	2004	2005	2006
Physics	300	425	475	515
Chemistry	450	550	590	700

Calculation:

=> Difference in the sales of the two subject books for the year 2003 = 450 – 300 = 150

=> Difference in the sales of the two subject books for the year 2004 = 550 – 425 = 125

=> Difference in the sales of the two subject books for the year 2005 = 590 – 475 = 115

=> Difference in the sales of the two subject books for the year 2006 = 700 – 515 = 185

Therefore, the difference in the sale of the two subject books is least in the year of 2005.

Q88. Answer: (b) 9000

Given:

Calculation:

=> Total vehicles registered in January = 27000

=> Number of cars registered in January = 21000

=> Other vehicles registered in January except Cars = 27000 – 21000 = 6000

=> Total vehicles registered in April = 35000

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=> Number of cars registered in April = 20000

=> Other vehicles registered in April except Cars = 35000 – 20000 = 15000

=> Difference between other vehicles registered in January and April except cars = 15000 – 6000 = 9000

Therefore, the number of extra vehicles other than cars registered in April than January is 9000

Q89. Answer: (d) 1,050

Given:

Total pocket money = Rs 3,500

Calculation:

=> Amount spend on entertainment = 20% of 3500

=> Amount spend on entertainment = 20/100× 3500=Rs 700

=> Amount spend on food = 50% of 3500

=> Amount spend on food = 50/100× 3500=Rs 1750

=> More amount spent on food than entertainment = 1750 – 700 = Rs 1050

Therefore, Rs 1,050 is spend more on food as compared to entertainment.

Q90. Answer: (b) 15

The logic follows here is:

The third number is the quotient: When the sum of the first and second number is divided by 7.

According to the given information,

The third pattern is given as,

and, the second pattern is given as,

Similarly for the first pattern,

Hence, the correct answer is option 2).

Q91. Answer: (d) M

Given series is, X, U, Q, M, F, Y.

Thus, clearly, M does not belong to the series, therefore M should be replaced by L to satisfy the above pattern.

Hence, the correct answer is option 4).

Q92. Answer: (b) Shirt

Given words are, Coat, Shirt, Jacket, Sweater.

Coat, jacket, and Sweater are all garments that are worn as second clothing over primary clothing and are worn especially in winter.

Whereas, Shirts are worn irrespective of the season.

Thus, option 2 is correct.

Q93. Answer: (d) None of the conclusions follows.

Given that,

• Some papers are pencils.

• Some pencils are boards.

Let us check all the conclusions as:

I. No paper is a board → Unfollow: Since given that some papers are pencils and some pencils are boards. So, some boards can be papers. This is not true.

II. All papers are boards → Unfollow: Since given that some papers are pencils and some pencils are boards. So, some boards can be papers but no all. This is not true.

III. Some boards are not papers → Unfollow: Since given that some papers are pencils and some pencils are boards. So, some boards can be papers. This is not true.

Thus, none of the conclusions follows.

Hence, option 4 is correct.

Q94. Answer: (d) Nib

Given that,

'Hand' is related to 'Finger' in the same way.

Now, fingers are the vital means or tools that a hand uses to do everyday tasks. Without fingers, a hand is useless to write.

Now, option 1 is Holder. A holder does not significantly help a pen to be used for writing. Thus, this option is incorrect.
Now, option 2 is ink. Ink is not the tool for a pen that helps it to write. Thus, this option is incorrect.
Now, option 3 is a pencil. This is inappropriate. Thus, this option is incorrect.
Now, option 4 is the nib. A nib for a pen is the basic tool used for the pen to write, like the fingers for a hand. This option is correct.
Thus, option 4 is correct.

Q95. Answer: (b) KZRMGRMT

The logic follows here is:
Each letter is coded as the corresponding letter in the reversed English Alphabet series.
Given:
KNIFE is written as PMRUV
Now, in a similar manner for PAINTING, we get,
Hence, the correct answer is option 2).

Q96. Answer: (d) Hammer

According to the given information,
The relation is given as, Carpenter : Saw.
Now, a carpenter uses a saw as the primary tool for his carpentry.
Option 1 is given as Gold, it's an object used by goldsmiths to make jewellery. Thus, this option is incorrect.
Option 2 is given as Metal, It's an object to make utensils by the blacksmith. Thus, this option is incorrect.
Option 3 is given as wood, It's an object to make furniture for the carpenter. Thus, this option is incorrect.
Option 4 is given as a hammer, which is the primary tool for a blacksmith. Thus, this option is correct.
Thus, option 4 is correct.

Q97. Answer: (c) 55

The logic here is:
Thus the missing term is 55.
Hence, the correct answer is 'option 3'.

Q98. Answer: (c) 12

Shortcut Trick
For a cube of side n × n × n, the number of smaller cubes with exactly 2 sides painted is given by the formula: 12(n − 2).
Given n = 3 (since the large cube is 3" × 3" × 3" and small cubes are 1" × 1" × 1").
=> Number of cubes with 2 sides painted = 12 × (3 − 2)
=> 12 × 1 = 12.
Therefore The correct answer is 12.
Alternate Method
Given:
=> Dimensions of large cube = 3" × 3" × 3"
=> Dimensions of small cube = 1" × 1" × 1"
=> Total small cubes = (3 × 3 × 3) / (1 × 1 × 1) = 27
Calculations:
=> Number of divisions on each edge (n) = 3 / 1 = 3
=> Cubes with 2 sides painted are located at the edges, excluding the corners.
=> On each edge, there are 3 cubes. The 2 cubes at the ends are corners (3 sides painted).
=> Cubes with 2 sides painted per edge = 3 − 2 = 1
=> Total edges in a cube = 12
=> Total cubes with 2 sides painted = 12 edges × 1 cube/edge = 12
Therefore The correct answer is 12.
Additional Information
General Formulas for Painted Cubes
For a cube divided into n^3 smaller cubes:
3 Sides Painted

Always 8 (the cubes at the corners of the large cube).

1 Side Painted

Calculated as $6(n-2)^2$ (cubes at the center of each of the 6 faces).

0 Sides Painted (Unpainted)

Calculated as $(n-2)^3$ (the inner core of the cube).

Q99. Answer: (d) D → C → A → E → B

Given:

A. Bihar B. Nagaland C. Uttar Pradesh D. Rajasthan E. Assam

We need to arrange them in a logical order.

Arranging the states of India from west to east, we get,

D. Rajasthan

C. Uttar Pradesh

A. Bihar

E. Assam

B. Nagaland

Thus, the order is D → C → A → E → B.

Hence, the correct answer is option 4).

Q100. Answer: (c) C

According to the given information,

The classes are given as,

Mothers, Females, Sisters.

Now option A is given as,

Here, Sisters has no intersection with Mothers. Thus, this option is incorrect.

Now option B is given as,

Here, sisters are shown to be a complete subset of Mothers but that is incorrect since not all sisters are mothers. Thus, this option is incorrect.

Now option C is given as,

Here, Sisters have an intersection with Mothers, and both classes are subclass of Females. Thus, this option is correct.

Now option D is given as,

Here, Sisters and Mothers are intersections of the class of Females but not a subclass of it. Thus, this option is incorrect.

Hence, the correct answer is option 3).

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