Prepp

Your Personal Exams Guide

- NDA
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- SSC CGL
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RRB NTPC 2021 (CBT 1) Previous Year Paper (16 Jan 2021) Shift 1

Total Time: 1 Hour : 30 Minute **Total Marks:** 100

Instructions

Sl No.	Section Name	No. of Question	Maximum Marks	Negative Marks	Positive Marks
1	Test	100	100	0.33	1

1.) A total of 90 minutes is allotted for the examination.

2.) The server will set your clock for you. In the top right corner of your screen, a countdown timer will display the remaining time for you to complete the exam. Once the timer reaches zero, the examination will end automatically. The paper need not be submitted when your timer reaches zero.

3.) There will, however, be sectional timing for this exam. You will have to complete each section within the specified time limit. Before moving on to the next section, you must complete the current one within the time limits.

Test

1. If the polynomial $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by another polynomial $3x^2 + 4x + 1$, the remainder comes out to be $ax + b$, find a and b. **(+1, -0.33)**

   a. a = 3; b = 1

   b. a = 1; b = 2

   c. a = 1; b = 3

   d. a = 1; b = 1

---

2. P, Q and R are on a trip by a car. P drives during the first hour at an average speed of 40 km/h. Q drives during the next 2 hours at an average speed of 50 km/h. R drives for the next 3 hours at an average speed of 60km/h. If they reached their destination after exactly 6 hours, then find their mean speed approximately **(+1, -0.33)**

   a. 50.23 km/h

   b. 61.35 km/h

   c. 45.25 km/h

   d. 53.33 km/h

---

3. Select the option that is related to the third number in the same way as the first number is related to the second number. **(+1, -0.33)**

   14 : 210 :: 16 : ?

   a. 240

b. 256

c. 212

d. 271

---

4. Which two signs (mathematical operators) should be interchanged to make the given equation correct? **(+1, -0.33)**

56 – 8 + 42 ÷ 6 × 5 = 19

a. – and ×

b. + and –

c. ÷ and –

d. + and ÷

---

5. _ _ _ _ _ _ _ _ are a kind of waste disposal system of the cell. They help to keep the cell clean by digesting any foreign materials as well as worn-out cell organelles. **(+1, -0.33)**

a. Mitochondria

b. Plastids

c. Lysosomes

d. Golgi

---

6. The states of Maharashtra and Gujarat were created in _ _ _ _ _ _ _ _ _. **(+1, -0.33)**

a. 1962

b. 1959

c. 1961

d. 1960

---

7. Consider the given statement and decide which of the given assumptions is/are implicit in the statement. **(+1, -0.33)**

Statement: Many farmers are taking up organic farming.

Assumptions:

I. Organic farming is easy to practice.

II. Organic farming is more beneficial to farmers.

a. Either assumption I or II is implicit.

b. Neither assumption I nor II is implicit.

c. Only assumption I is implicit.

d. Only assumption II is implicit.

---

8. In 1915, Mahatma Gandhi returned to India permanently from _ _ _ _ _ _ _. **(+1, -0.33)**

a. Britain

b. South Africa

c. Kenya

d. USA

---

9. Calculate the compound interest on Rs.15,000 in one year at 4% per annum, if the interest is compounded half yearly. **(+1, -0.33)**

a. Rs. 5606

b. Rs. 600

c. Rs. 606

d. Rs. 6060

---

10. Find three numbers such that their ratio is 3 : 4 : 5 and their HCF is 7. **(+1, -0.33)**

a. 24; 32; 40

b. 6; 8; 10

c. 21; 28; 35

d. 12; 16; 20

---

11. In 1752, which American scientist showed that lightning and the spark from your clothes are essentially the same phenomena? **(+1, -0.33)**

a. Galileo Galilei

b. Benjamin Franklin

c. Thomas Edison

d. Archimedes

---

12. Four number clusters have been given, out of which three are alike in some manner and one is different. Select the number clusters that is different **(+1, -0.33)**

from the rest.

a. 2439

b. 2336

c. 1236

d. 1113

---

13. 3 boys and 5 girls can finish a project in 6 days, while 2 boys and 7 girls can finish it in 8 days. In how many days will 8 girls complete it? **(+1, -0.33)**

a. 33

b. 30

c. 35

d. 36

---

14. ISRO launched the Chandrayaan-1 spacecraft in _ _ _ _ _ _ _. It was uniquely equipped to confirm the presence of solid ice on the moon. **(+1, -0.33)**

a. 2007

b. 2008

c. 2009

d. 2006

---

15. A book has 250 pages. Person A reads 6 pages in an hour. Person B reads 8 pages in an hour. There are two chapters of 72 pages that are difficult for **(+1, -0.33)**

person B to read in the book, so person B takes double the time to read those pages. Who among them will finish the book first and how much sooner than the other?

a. Person A, 1 h 35 min

b. Person B, 1 h 25 min

c. Person B, 1 h 35 min

d. Person A, 1 h 25 min

---

16. Which of the following is **NOT** a part of a personal computer? **(+1, -0.33)**

a. USB

b. CPU

c. ROM

d. RAM

---

17. To commemorate his victory over Gujarat, Akbar built 'Gate of Magnificence' the highest gateway of India at Fatehpur Sikri. What is another name for this gateway? **(+1, -0.33)**

a. Kashmiri Gate

b. Buland Darwaza

c. India Gate

d. Gateway of India

---

18. UN was founded as a successor to the League of Nations on 24th October _ _ _ _ _ _ _ _ _. (+1, -0.33)

a. 1946

b. 1945

c. 1943

d. 1944

---

19. The total population of a village is 4,000. The number of males and females increases by 10% and 20% respectively and consequently the population of the village becomes 4500. What was the number of males in the village prior to the new members coming in? (+1, -0.33)

a. 3000

b. 4000

c. 2000

d. 2500

---

20. The Japanese leg of the Tokyo 2021 Olympic torch relay have been scheduled to start from _ _ _ _ _ _ _ in March 2021. (+1, -0.33)

a. Kyoto

b. Fukushima

c. Sapporo

d. Hiroshima

---

21. _ _ _ _ _ _ _ is a well known constellation that can be seen in the evening. This constellation is also known as 'the Hunter'. (+1, -0.33)

a. Orion

b. Ursa Major

c. Cassiopeia

d. Draco

---

22. Unnat Bharat Abhiyan is related with: (+1, -0.33)

a. Developing India by identifying and creating 'Smart Cities'

b. Developing rural India with the help of higher education institutions

c. Improving the living conditions by improving cleanliness and public sanitation

d. Making India a super power through investments in science and technology

---

23. The Bokaro Steel Plant was set up in India in 1964 with _ _ _ _ _ _ _ collaboration. (+1, -0.33)

a. British

b. Swiss

c. German

d. Soviet

---

24. If 5 tanα = 4, then find the value of $\frac{5\ sin\alpha-3\ cos\alpha}{5\ sin\alpha+2\ cos\alpha}$ **(+1, -0.33)**

a. $\frac{1}{2}$

b. 3

c. $\frac{1}{6}$

d. 6

---

25. Select the option that is related to the third term in the same way as the second term is related to the first term. **(+1, -0.33)**

WAITER : 242923 :: JUMPER : ?

a. 302923

b. 312623

c. 312923

d. 252923

---

26. If a man sold 20 books for Rs. 1800, gaining there by the cost price of 5 books, then find the cost price of a book. **(+1, -0.33)**

a. Rs. 68

b. Rs. 50

c. Rs. 85

d. Rs. 72

---

27. Which of the following numbers will completely divide $(4^{61} + 4^{62} + 4^{63} + 4^{64})$? **(+1, -0.33)**

a. 3

b. 13

c. 10

d. 11

---

28. The difference of two numbers is 20% of the larger number. If the smaller number is 40, then find the larger number. **(+1, -0.33)**

a. 60

b. 50

c. 45

d. 40

---

29. At what rate percent per annum will the simple interest in 15 years on a sum of money be $\frac{3}{4}$ of the sum invested? **(+1, -0.33)**

a. 6%

b. 4%

c. 3%

d. 5%

---

30. Find the mean of the following data: **(+1, -0.33)**

x :	19	21	23	25	27	29	31
f :	13	15	16	18	16	15	13

a. 28

b. 25

c. 30

d. 20

---

31. A number when divided by 280 leaves 73 as the remainder. When the same number is divided by 35, the remainder will be: **(+1, -0.33)**

a. 7

b. 3

c. 4

d. 2

---

32. Which of the following is an input device? **(+1, -0.33)**

a. Optical character reader

b. Inkjet printer

c. Headphones

d. Projector

---

33. In which year was Delhi officially announced as the Capital of British India **(+1, -0.33)**

by then Emperor George V?

a. 1913

b. 1910

c. 1911

d. 1907

---

34. The popular sword dance in the Kumaun region of Uttarakhand is called _ _ _ _ _ _ _. **(+1, -0.33)**

a. Kathak

b. Lavani

c. Chholiya

d. Ghoomar

---

35. Find the value of 7 × 0.7 × 0.07 × 0.007 × 70 **(+1, -0.33)**

a. 0.016807

b. 0.0016807

c. 0.16807

d. 1.6807

---

36. _ _ _ _ _ _ are known as electronegative elements because they form negatively charged ions by the gain of electrons. **(+1, -0.33)**

a. Non-metals

b. Mixtures

c. Alloys

d. Compounds

---

37. Tony purchases two cars A and B at a total cost of Rs. 6,50,000. He sells car A with 20% profit and car B at a loss of 25% and gets the same selling price for both the cars. What are the purchasing prices of car A and car B respectively? **(+1, -0.33)**

a. Rs. 2,00,000; Rs. 4,50,000

b. Rs. 4,50,000; Rs. 2,00,000

c. Rs. 3,00,000; Rs. 3,50,000

d. Rs. 2,50,000; Rs. 4,00,000

---

38. Calculate the smallest number which should be subtracted from 0.000327 to make it a perfect square. **(+1, -0.33)**

a. 0.04

b. 0.03

c. 0.000004

d. 0.000003

---

39. The deputy prime minister of India (from 1977 to 1979) was: **(+1, -0.33)**

a. Jagjivan Ram

b. JB Kriplani

c. JC Shah

d. Morarji Desai

---

40. The _ _ _ _ _ _ _ _ region is responsible for 80% of Germany's total steel production. **(+1, -0.33)**

a. Munich

b. Stuttgart

c. Hanover

d. Ruhr

---

41. Ram has a movie in his pen drive that takes 1.75 GB of space. He wants to share it with his friends. The speed of transferring the file is 2 MB/s. How much time will it take to transfer the file? **(+1, -0.33)**

(1 GB = 1000 MB)

a. 14 min 33 s

b. 14 min 35 s

c. 14 min 34 s

d. 14 min 36 s

---

42. If $a\cos\theta - b\sin\theta = c$, then find the value of $a\sin\theta + b\cos\theta$. **(+1, -0.33)**

a. $\sqrt{a^2+b^2+c^2}$

b. $\pm\sqrt{a^2+b^2-c^2}$

c. $\sqrt{b^2+c^2-a^2}$

d. $\pm\sqrt{a^2+c^2-b^2}$

---

43. Four number-pairs have been given, out of which three are alike in some manner and one is different. Select the number-pair that is different from the rest. **(+1, -0.33)**

a. 28 : 784

b. 19 : 361

c. 23 : 539

d. 17 : 289

---

44. The longest running train in the Indian railway network in terms of distance and time is _ _ _ _ _ _ _ _. **(+1, -0.33)**

a. Vivek Express

b. Yoga Express

c. Golden Chariot

d. Samjhauta Express

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45. The Lucknow Pact of 1916 provided a joint political platform for the moderates, radicals of the Indian national Congress and the _ _ _ _ _ _ _ _. **(+1, -0.33)**

a. Muslim League

b. British

c. Communist

d. Swaraj Party

---

46. Which of the following is an example of a spreadsheet? (+1, -0.33)

a. Microsoft Power Point

b. Microsoft Excel

c. Microsoft Outlook

d. Microsoft Word

---

47. _ _ _ _ _ _ _ was India's first indigenously made film in colour. (+1, -0.33)

a. Raja Harishchandra

b. Chhota Chetan

c. Kisan Kanya

d. Alam Ara

---

48. A glass cylinder with diameter 20 cm has water to a height of 9 cm. A metal cube of 8 cm edge is immersed in it completely. Calculate the height (correct to I decimal place) by which the water will rise in the cylinder (by taking π = 3.142). (+1, -0.33)

a. 1.4 cm

b. 2 cm

c. 1.6 cm

d. 2.6 cm

---

49. District XYZ has 50,000 voters; out of them, 20% are urban voters and 80% rural voters. For an election, 25% of the rural voters were shifted to the urban area. Out of the voters in both rural and urban areas, 60% are honest, 70% are hardworking, and 35% are both honest and hardworking. **(+1, -0.33)**

Two candidates, A and B, contested the election. Candidate B swept the urban vote, while Candidate A found favour with the rural voters. Voters who were both honest and hardworking voted for NOTA. How many votes were polled in favour of candidate A, candidate B and NOTA, respectively?

a. 17875, 14625 and 17500

b. 19500, 13000 and 17500

c. 19000, 13500 and 17500

d. 17000, 15500 and 17500

---

50. Determine the smallest number which when divided by 12,16, 20, 25 and 30 leaves the same remainder 3 in each case. **(+1, -0.33)**

a. 1233

b. 1023

c. 1203

d. 1303

---

51. Who coined the slogan “Jai Jawan Jai Kisan"? (+1, -0.33)

a. JP Narayan

b. Shama Prasad

c. Lal Bahadur Shastri

d. J Daulatram

---

52. The Keoladeo Ghana National Park is situated in_ _ _ _ _. (+1, -0.33)

a. Rajasthan

b. Mizoram

c. Bihar

d. Maharashtra

---

53. There is a 6-storey building with 20 rooms on each floor. Some toxic material is concealed in the building. Three groups of officers start the search operation simultaneously. The first group searches the 1st and 2nd floors. The second group handles the 3rd and 4th floors. The third group takes over the 5th and 6th floors. If it takes 1 minute to reach any nearest floor and 1 minute to search each room, how much time will it take to complete the entire search operation? (+1, -0.33)

a. 61 min

b. 40 min

c. 126 min

d. 46 min

54. If $x = \frac{\sqrt{5}+1}{\sqrt{5}-1}$ and $y = \frac{\sqrt{5}-1}{\sqrt{5}+1}$, then find the value of $x^2 + y^2 - 4$. **(+1, -0.33)**

a. 3

b. 4

c. 5

d. 2

---

55. _ _ _ _ _ _ _ is India's first female para-athlete to win a medal at the Paralympics. She won Silver at Rio 2016 Paralympic Games in the shot put event. **(+1, -0.33)**

a. Devi Jhajharia

b. Girisha Rani

c. Dipa Karmakar

d. Deepa Malik

---

56. An E-Way Bill is related with which of the following? **(+1, -0.33)**

a. Post-payment of goods and services

b. Supply of goods from one place to another

c. Making toll payments on national highways

d. Pre-payment of goods and services

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57. Which British physicist was awarded the Nobel Prize in Physics in 1906 for his work on discovery of electrons ? (+1, -0.33)

a. James Chadwick

b. Ernest Rutherford

c. J J Thomson

d. Niels Bohr

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58. An observer 1.5 m tall is standing 28.5 m away at the same level as the foot of a tower. If angle of elevation of the observer watching the top of the tower is 45 degrees then what is the height of the tower? (+1, -0.33)

a. 20 m

b. 35 m

c. 30 m

d. 25 m

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59. The persistence of sound in an auditorium is the result of repeated reflections of sound and is called _ _ _ _ _ _ _. (+1, -0.33)

a. Intensity

b. Vibration

c. Ranging

d. Reverberation

---

60. Four abbreviations have been given, out of which three are alike in some manner and one is different. Select the odd one. (+1, -0.33)

a. CRPF

b. NTPC

c. SAIL

d. BHEL

---

61. Find the greatest ratio in the following. (+1, -0.33)

a. 15 : 28

b. 5 : 18

c. 13 : 21

d. 19 : 27

---

62. If a man travels from A to B at a speed of 50 km/h and returns by increasing his speed by 40%, then find his average speed (to 2 decimal places) for both the trips. (+1, -0.33)

a. 62.35 km/h

b. 55.34 km/h

c. 47.28 km/h

d. 58.33 km/h

---

63. The acronym SONAR stands for: (+1, -0.33)

a. Sound Navigation and Ranging

b. Sound Notification and Ranging

c. Sound Navigation and Rating

d. Sound Observation Navigation and Ranging

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64. If three-fourth of a number is 50 more than its one-third, then find the number. **(+1, -0.33)**

a. 140

b. 100

c. 120

d. 130

---

65. If a positive number when decreased by 3, is equal to 28 times the reciprocal of the number, then find the number. **(+1, -0.33)**

a. 5

b. 8

c. 7

d. 6

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66. "The United Nations was not created to take mankind to heaven, but to save humanity from hell." Who said this? **(+1, -0.33)**

a. Dag Hammarskjold

b. U Thant

c. Kurt Waldheim

d. Kofi A Annan

---

67. Read the given statement and courses of action carefully. Assuming that the information given in the statement is true, even if it appears to be at variance with commonly known facts, decide which of the given courses of action logically follow(s) from the statement. **(+1, -0.33)**

Statement:

Road accidents are going to increase day by day.

Courses of Action:

I. Government should start awareness programmes that promote following traffic rules strictly.

II. Government should put a limit on registration of new vehicles.

a. Only II follows

b. Only I follows

c. Neither I nor II follows

d. Either I or II follows

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68. _ _ _ _ _ _ is the largest earthen dam in India and second largest in Asia. The dam is named after the son of Mahabali, who was the king of Kerala. **(+1, -0.33)**

a. Banasura Sagar Dam

b. Krishna Raja Sagar Dam

c. Mettur Dam

d. Nagarjuna Sagar Dam

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69. If x is the closest approximation to the product 0.3333 × 0.25 × 0.499 × 0.125 × 24, then find the value of x. **(+1, -0.33)**

a. $\frac{3}{8}$

b. $\frac{2}{5}$

c. $\frac{1}{8}$

d. $\frac{3}{4}$

---

70. Goods that are brought not for meeting the immediate need of the consumer but for producing other goods are called _ _ _ _ _ _ _. **(+1, -0.33)**

a. Consumer Goods

b. Capital Goods

c. Consumption Goods

d. Final Goods

---

71. Find the missing frequency(p) for the following distribution whose mean is 8 : **(+1, -0.33)**

x :	3	5	7	9	11	13
f :	6	8	15	p	8	4

a. 18

b. 25

c. 12

d. 10

---

72. According to the 2011 Census of India, which state has lowest population density? **(+1, -0.33)**

a. Sikkim

b. Tripura

c. Arunachal Pradesh

d. Mizoram

---

73. In which year was the first radio programme broadcast in India? **(+1, -0.33)**

a. 1936

b. 1930

c. 1957

d. 1923

74. The International Court of Justice is located in _ _ _ _ _ _ _ _. (+1, -0.33)

a. The Hague

b. Austria

c. Washington

d. New York

75. If three cubes whose edges measure 3 cm, 4 cm and 5 cm respectively, are melted to form a single cube, then find the edge of the new cube. (+1, -0.33)

a. 6 cm

b. 5 cm

c. 4 cm

d. 7 cm

76. If the sum of the squares of the zeros of quadratic polynomial $f(x) = x^2 - 8x + k$ is 40, then find the value of k. (+1, -0.33)

a. 10

b. 12

c. 11

d. 14

77. In India, the credit of successfully executing the Green Revolution goes to (+1, -0.33)

_ _ _ _ _ _ _ _ _.

a. M S Swaminathan

b. Subrahmanyan Chandrasekhar

c. Satyendra Nath Bose

d. Harishchandra

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78. If BALL is coded as OBEY COMA LORD GULF, then what code can be considered for KITE? **(+1, -0.33)**

a. SKILL ROBIN TELL GOAT

b. SKIN ORBIT TOTAL ENTER

c. SKY BRAIN TABLE GOES

d. SKIP OPTIC TOOL GET

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79. In the year _ _ _ _ _ _ _ _ the Suez Canal was opened and this further strengthened Bombay's link with the world economy. **(+1, -0.33)**

a. 1888

b. 1886

c. 1869

d. 1896

---

80. In a code language, TYPEWRITTERS is written as PETYRWTEITSR. How will BRAINSTORMER be written in that language? **(+1, -0.33)**

a. AIBRSNRMTORE

b. AIBRRMNSTORE

c. AIBRNSTOERRM

d. AIBRSNOTERRM

---

81. 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. **(+1, -0.33)**

Statements:

A. All mobiles are watches.

B. Some watches are not books.

Conclusions:

1. Some mobiles are watches.

2. All mobiles are books.

a. Either conclusion 1 or 2 follows.

b. Both the conclusions follow.

c. Only conclusion 1 follows.

d. Only conclusion 2 follows.

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82. Mahatma Gandhi's first major public appearance in India after returning from South Africa was at the opening of the _ _ _ _ _ _ _ _ in February 1916. **(+1, -0.33)**

a. University of Madras

b. University of Calcutta

c. Banaras Hindu University

d. University of Bombay

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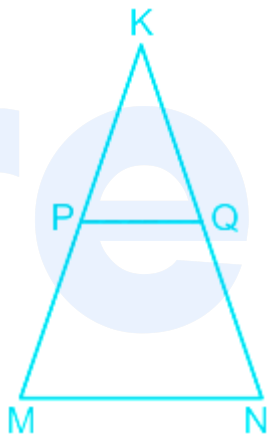
83. In the given △ KMN, PQ is parallel to MN. If $\frac{KP}{PM} = \frac{4}{13}$ and KN = 20.4 cm, find KQ **(+1, -0.33)**



a. 5.1 cm

b. 8.2 cm

c. 4.8 cm

d. 3.6 cm

---

84. Which of the following countries does **NOT** share land boundaries with India? **(+1, -0.33)**

a. Sri Lanka

b. Nepal

c. Pakistan

d. Bhutan

---

85. Astrophysicist _ _ _ _ _ _ _ _ _ _, who first theorized the existence of the solar wind in 1958, became the first living individual after which NASA named a Spacecraft. (+1, -0.33)

a. Eugene Parker

b. Elon Musk

c. Carl Sagan

d. Johannes Kepler

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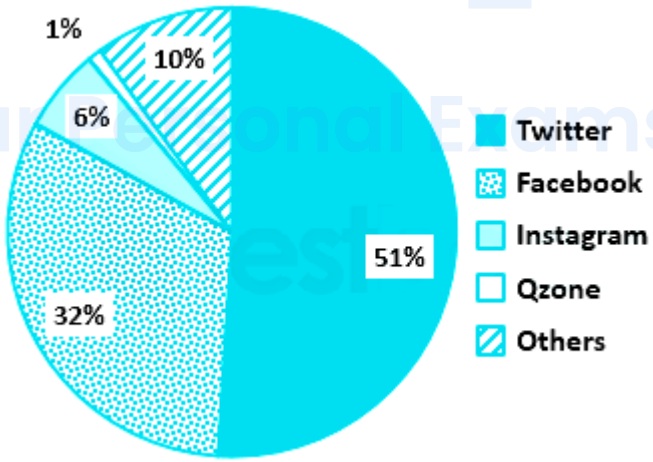
86. Study the given pie chart carefully and answer the question. (+1, -0.33)



The given pie chart represents the data of Amit's followers on various social networking sites.

If Amit has 40 crore followers in all the networking sites combined, then the number of his followers on Facebook will be:

a. 12.08 crores

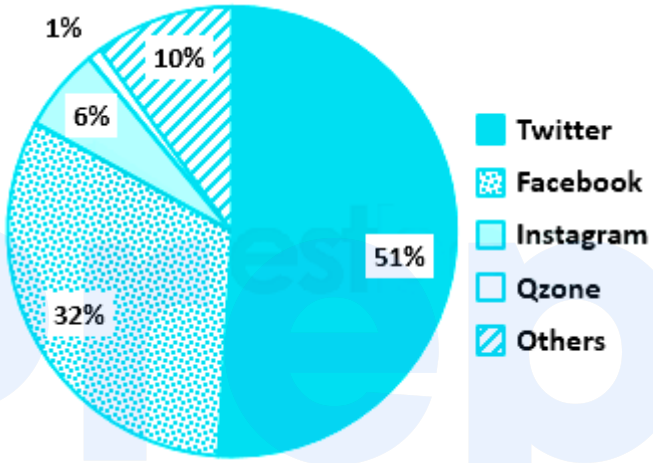
b. 1.28 crores

c. 128 crores

d. 12.8 crores

---

87. Study the given pie chart carefully and answer the question. **(+1, -0.33)**



The given pie chart represents the data of Amit's followers on various social networking sites.

If 10% of Amit's Twitter followers unfollow him, then what will be the difference between the number of his Twitter followers and the number of his followers on other networking sites?

a. 1.24 crores

b. 1.25 crores

c. 1.26 crores

d. 1.23 crores

---

88. Study the data given in the following table and answer the following question. **(+1, -0.33)**

Political Parties	Number of Votes
Party D	54
Party F	39
Party B	37
Party C	29
Others	21
NOTA	17
Total Votes	**197**

Which of the following 2 groups would NOT have been able to defeat the winning party?

a. Party C and Others

b. Party F and Party B

c. Party B and Others

d. Party F and Others

---

89. Study the data given in the following table and answer the following question. **(+1, -0.33)**

Political Parties	Number of Votes
Party D	54
Party F	39
Party B	37
Party C	29
Others	21
NOTA	17
Total Votes	197

Which party would have won if 'NOTA' and Others' votes were divided equally between party B and C? Also, what would be the winning margin?

a. Winning party: Party F; Winning margin: 4 votes

b. Winning party: Party D; Winning margin: 2 votes

c. Winning party: Party B; Winning margin: 2 votes

d. Winning party: Party C; Winning margin: 7 votes

---

90. If JRDRCEBD is coded as 14 16 20 06, then what will be the code for OZCTECHD? **(+1, -0.33)**

a. 19 18 09 04

b. 19 25 29 11

c. 19 25 08 10

d. 19 18 06 04

---

91. Four number-pairs have been given, out of which three are alike in some manner and one is different. Select the number-pair that is different from the rest. **(+1, -0.33)**

a. 31 : 33

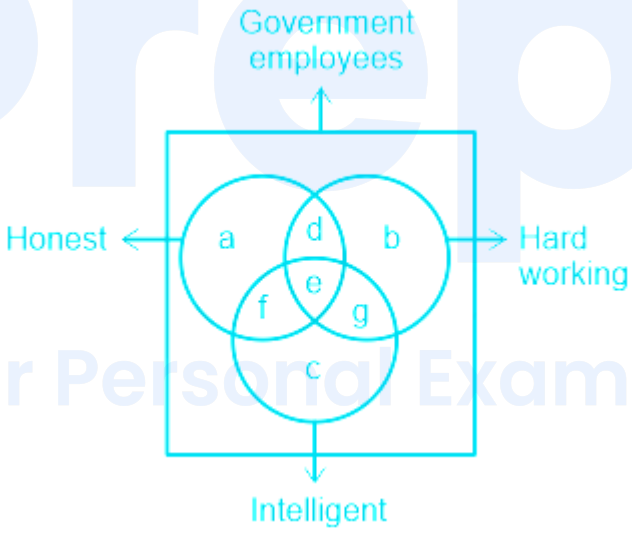
b. 41 : 43

c. 17 : 19

d. 29 : 31

---

92. Study the given Venn diagram and answer the question that follows. **(+1, -0.33)**



In the given Venn diagram, which part stands for government employees who are honest, intelligent but NOT hardworking?

a. a

b. f

c. c

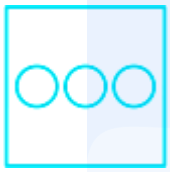
d. g

93. Select the Venn diagram that best represents the relationship between the given set of classes. (+1, -0.33)

Polygons, Quadrilaterals and Triangles

a. 

b. 

c. 

d. 

94. The given letter clusters follow a certain pattern. Select the option that gives the correct sequence of the letters that are missing from the letter clusters. (+1, -0.33)

DECAB / GJFF_ / KNJJ_ / PQOM_

a. MFJ

b. ENI

c. EIN

d. FJM

---

95. Select the Venn diagram from the given options that best represents the relationship between the given set of classes. **(+1, -0.33)**

Prose, Literature and Poetry

a. 

b. 

c. 

d. 

---

96. Select the letter from the given options that can replace the question mark (?) and complete the 4 th letter cluster in the following series. **(+1, -0.33)**

CIL, QDU, PFV, KN?

a. X

b. Y

c. W

d. Z

---

97. If 9 ÷ 5 + 3 × 7 = 22 and 4 ÷ 7 + 2 × 15 = 29, then find the value of 14 ÷ 5 + 35 × 9. **(+1, -0.33)**

a. 11

b. 15

c. 7

d. 36

---

98. Rohan is Sumit's brother. Sumit wants to marry Sujata. Sujata is the daughter of Hari Chand. Rohan wants to divorce Sunita. Sujata and Sunita are sisters. How is Hari Chand related to Rohan? **(+1, -0.33)**

a. Father

b. Father-in-law

c. Brother's father-in-law

d. Wife's paternal uncle

---

99. If by a logic 2 = 49 and 8 = 225, then which of the following CANNOT be a value of 12? **(+1, -0.33)**

a. 323

b. 352

c. 400

d. 294

---

100. There are 10 persons sitting in a circle facing each other. A and J are sitting opposite to each other, whereas F and H are sitting opposite to each other. A and I are sitting to the immediate right and immediate left of B, respectively. H is sitting in between I and D. On the basis of the given information, which of the following is correct? **(+1, -0.33)**

a. D is sitting to the immediate right of C.

b. G is sitting beside D.

c. I is sitting between H and B.

d. J is sitting between A and F.

Answers

1. **Answer: b**

Explanation:

Given:

Polynomial $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by another polynomial $3x^2 + 4x + 1$

Concept used:

In such questions, we fix non-zero value of x and then calculate and compare values of remainder and quotient and solve using options.

Calculation:

Let $x = 1$,

then dividend $6x^4 + 8x^3 + 17x^2 + 21x + 7$ $(x = 1) = 6 + 8 + 17 + 21 + 7 = 59$

and divisor $3x^2 + 4x + 1$ $(x = 1) = 3 + 4 + 1 = 8$

When $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by polynomial $3x^2 + 4x + 1$, that is, when 59 is divided by 8 then remainder comes out to be 3

$\therefore ax + b$ $(x = 1) = 3$

$\Rightarrow a + b = 3$

Only option that satisfies $a + b = 3$ is option 2)

NOTE: if more than one option satisfies then we check the satisfying options with another variable value of x.

---

2. **Answer: d**

Explanation:

1Given:

P drives during the first hour at an average speed of 40 km/h.

Q drives during the next 2 hours at an average speed of 50 km/h.

R drives for the next 3 hours at an average speed of 60km/h.

They reached their destination after exactly 6 hour

Formula used:

Speed = distance/time

Calculation:

Total distance = Distance that P covered in 1 hr. + Distance that Q covered in 2 hrs. + Distance that R covered in 3 hrs.

= 40 × 1 + 50 × 2 + 60 × 3

= 40 + 100 + 180

= 320 km

Mean speed = Total distance/total time taken

= 320/6

= 53.33 km/h

---

3. **Answer: a**

Explanation:

'The logic followed here is:

1st number × 15 = 2nd number.

- 14 : 210 → 14 × 15 = 210;

Similarly,

- **16 : ? → 16 × 15 = 240.**

Hence, 240 is the correct answer.

Note: The official question had a discrepancy. We have changed the fourth option to remove the discrepancy.

---

4. Answer: c

Explanation:

According to BODMAS rule:

B	Brackets in order (), {}, []	ब्रेकेट (), {}, [] क्रम में
O	of	का
D	Division (÷)	विभाजन (÷)
M	Multiplication (×)	गुणा (×)
A	Addition (+)	जोड़ (+)
S	Subtraction (–)	घटाव (–)

Let us analyze each option:

Given: 56 – 8 + 42 ÷ 6 × 5 = 19

i) – and ×

⇒ 56 × 8 +**42 ÷ 6**– 5 = 19

⇒ **56 × 8**+ 7 - 5 = 19

⇒**448 + 7**- 5 = 19

⇒**455 - 5**

= 450 ≠ 19

ii) + and –

⇒ 56 + 8 –**42 ÷ 6**× 5 = 19

⇒ 56 + 8 – **7 × 5**

⇒ **56 + 8** – 35

⇒ **64 – 35**

= 29 ≠ 19

iii) ÷ and –

⇒ **56 ÷ 8** + 42 – 6 × 5 = 19

⇒ 7 + 42 –**6 × 5**= 19

⇒ **7 + 42**- 30

=**49 - 30** = 19

iv) + and ÷

⇒ 56 –**8 ÷ 42**+ 6 × 5

⇒ 56 – 0.19 +**6 × 5**

⇒**56**- 0.19**+ 30**

⇒**86 - 0.19**

= 85.81 ≠ 19

Hence, '**÷ and –**' is the correct answer.

5. **Answer: c**

Explanation:

The correct answer is **Lysosomes.**

⭐ **Key Points**

- **Lysosomes** are a kind of waste disposal system of the cell.
- They help to keep the **cell clean by digesting any foreign materials as well as worn-out cell organelles.**

⭐ **Important Points**

Cell Organelles	Function
Nucleus	DNA Storage
Mitochondrion	Energy production
Ribosome	Protein synthesis
Rough ER	Protein production and modification
Smooth ER	Lipid production and Detoxification
Golgi apparatus	Protein transportation and export
Lysosome	Suicidal bag(digesting any foreign materials & worn-out cell organelles)
Cytoplasm	intracellular transportation
Cell membrane	Define the inside and outside of a cell
Cell wall	Structural support and protection Exists only in the plant cell
Chloroplast	Photosynthesis Exists only in the plant cell
Vacuole	Storage and water regulation Very large in plant cells but small in animal cell

6. **Answer: d**

Explanation:

The correct answer is **1960.**

- The **states of Maharashtra and Gujarat were created in 1960.**

⭐ **Key Points**

States	Founded Year
Andhra Pradesh	1. Nov. 1956
Arunachal Pradesh	20. Feb. 1987
Assam	26. Jan. 1950
Bihar	22 March 1912
Chhattisgarh	1. Nov. 2000
Goa	30. May. 1987
Gujarat	1. May. 1960
Haryana	1. Nov. 1966
Himachal Pradesh	25. Jan. 1971
Jharkhand	15. Nov. 2000
Karnataka	1. Nov. 1956
Kerala	1. Nov. 1956
Madhya Pradesh	1. Nov. 1956
Maharashtra	1. May. 1960
Manipur	21. Jan. 1972
Meghalaya	21. Jan. 1972
Mizoram	20. Feb. 1987
Nagaland	1. Dec. 1963
Odisha	26. Jan. 1936
Punjab	1. Nov. 1956
Rajasthan	1. Nov. 1956
Sikkim	16. May. 1975

States	Founded Year
Tamil Nadu	26. Jan. 1950
Telangana	2. Jun. 2014
Tripura	21. Jan. 1972
Uttar Pradesh	26. Jan. 1950
Uttarakhand	9. Nov. 2000
West Bengal	1. Nov. 1956

---

7. **Answer: d**

Explanation:

The statement tells that many farmers are selecting organic farming practices.

- Thus, it is safe to assume that organic farming must be ***more beneficial to the farmers compared to other types of farming since a lot of them are taking it up.*** So, assumption II is implicit.
- Because a lot of farmers are taking up organic farming, it can be said that it is beneficial, but the ***type of benefit cannot be assumed.*** Whether or not it is easy; or does organic farming gives high produce or does the crops thus produced fetch higher market price - none of this is suggested or implicit in the statement. So, assumption I is not implicit.

Hence the correct answer is **option 4** .

---

8. **Answer: b**

Explanation:

The correct answer is **South Africa.**

- In 1915 Gandhiji returned to India at the request of Gopal Krishna Gokhale , conveyed to him by **C. F. Andrews.**

⭐ **Key Points**

Gandhiji's achievements in South Africa:

- While he was **travelling by train to Pretoria** , Gandhi, despite carrying a first-class ticket, was **thrown out of the train** by the authorities because a white man complained of an Indian sharing the space with him.
- As a response, **Gandhi formed the Natal Indian Congress in 1894. This organisation led non-violent protests against the oppressive treatment of the white people** towards the native **Africans and Indians.**
- **In 1896, he came to India for a short time and gathered 800 Indians to serve along with him in South Africa.** They were welcomed by an irate mob and Gandhi was injured in the attack.
- **During the outbreak of the Boer War in 1899, Gandhi gathered around 1,100 Indians and organised the Indian Ambulance Corps for the British but the ethnic discrimination and torture continued on Indians** .
- **English artist John Ruskin's book Unto This Last inspired Gandhi and he set up Phoenix Farm near Durban. Here, Gandhi would train his cadres on non-violent Satyagraha or peaceful restraint. Phoenix Farm is considered the birthplace of Satyagraha .However, it was at the Tolstoy Farm, Gandhi's second camp in South Africa, where Satyagraha was molded into a weapon of protest.**
- I **n September 1906, Gandhi organised the first Satyagraha campaign to protest against the Transvaal Asiatic ordinance** that was constituted against the local Indians. Again in June **1907** , he held Satyagraha against the **Black Act.**
- In **1908,** he was sentenced to jail for organising non-violent movements. But, after his meeting with **General Smuts,** a British Commonwealth statesman, he was released.
- In **1909,** he was sentenced to a three-month jail term in **Volkshurst and Pretoria** . After his release, Gandhi went to England to seek the assistance of the Indian community there.
- He also **fought against the nullification of non-Christian marriages in 1913.**

- **Finally, in 1915 Gandhiji returned to India on** the request of **Gopal Krishna Gokhale**, conveyed to him by **C. F. Andrews.**

---

9. **Answer: c**

Explanation:

Given:

Principal = Rs. 15,000 , time =1 year, rate% = 4% per annum

Interest is compounded half yearly

Concept used:

When i nterest is compounded half yearly, half yearly rate = rate%/2 and half yearly time = 2 × time

For CI, Amount = Principal$(1 + \text{rate}/100)^{\text{time}}$, where CI = Amount - Principal

Calculation:

Now, half yearly rate = rate%/2 = 4/2 = 2%

and half yearly time = 2 × time = 2 × 1 = 2 years

Putting values, we get, Amount = $15000 \times (1 + 2/100)^2$

$= 15000 \times (51/50)^2$

$= 15000 \times 2601/2500$

$= 6 \times 2601$

$= 15606$

∴ CI = Amount - Principal = Rs. 15606 - Rs. 15000

= Rs. 606

10. **Answer: c**

Explanation:

Given:

Three numbers are in the ratio is 3 : 4 : 5 and their HCF is 7

Concept used:

Number = HCF × other factor

Calculation:

Let t hree numbers be in 3x, 4x and 5x

Putting values in Number = HCF × other factor, we get, the numbers to be 21x, 28x and 35x

and option 3) satisfies it with x = 1.

11. **Answer: b**

Explanation:

The correct answer is **Benjamin Franklin.**

- **In 1752, Franklin conducted his famous experiment, the kite experiment.**
- He **flew a kite** during a **thunderstorm** just for showing that the **lightning was electricity.**
- A metal key is tied to the **kite string** in this process in order to conduct the electricity.
- In this process, the electricity from the storm clouds is generally transferred to the kite and electricity flowed down to the string, giving him a shock, just as he

thought.

- **The main purpose of Franklin's kite experiment was to uncover the unknown facts of nature about lightning and electricity** .
- Franklin's experiment established the connection between lightning and electricity.
- Thus, by the **kite experiment, Benjamin Franklin** showed that **lightning and the spark** from your clothes are essentially the same phenomena

⭐ Key Points

- **Static electricity is a familiar electric phenomenon in which charged particles are transferred from one body to another** .
- For example, if **two objects are rubbed together, especially if the objects are insulators and the surrounding air is dry, the objects acquire equal and opposite charges and an attractive force develops between them.**
- The **object that loses electrons becomes positively charged** , and the object that gains electrons**becomes negatively charged** .
- **The force is simply the attraction between charges of opposite signs** .

---

12. **Answer: b**

Explanation:

Let us examine the given options:

1. 2439 → 2439 ÷ 3 = 813
2. 2336 → 2336 ÷ 3 = 777.66
3. 1236 → 1236 ÷ 3 = 412
4. 1113 → 1113 ÷ 3 = 371

- Here, all the options are divisible by 3 except 2336. Therefore, 2336 is different from the rest.

Hence, 2336 is the correct answer.

⭐ Alternate Method

The logic followed here is:

Sum of the first three digits = last digit

1. 2439 → 2 + 4 + 3 = 9
2. **2336 → 2 + 3 + 3 = 8 ≠ 6**
3. 1236 → 1 + 2 + 3 = 6
4. 1113 → 1 + 1 + 1 = 3

Hence, 2336 is the correct answer.

---

13. Answer: a

Explanation:

Given:

3 boys and 5 girls can finish a project in 6 days, while 2 boys and 7 girls can finish it in 8 days.

Concept used:

M1 × D1 = M2 × D2

Calculation:

3 boys and 5 girls can finish a project in 6 days, while 2 boys and 7 girls can finish it in 8 days ⇒ (3B + 5G) × 6 = (2B + 7G) × 8

⇒ 18B + 30G = 16B + 56G

⇒ 2 B = 2 6 G

⇒ B/G = 13/1

Now let 8 girls complete the project in D days,

then (3B + 5G) × 6 = 8G × D

⇒ (3 × 13 + 5 × 1) × 6 = 8 × 1 × D

⇒ 44 × 6 = 8 × D

⇒ D = 33 days

---

14. Answer: b

Explanation:

The correct answer is **2008.**

⭐ **Key Points**

- **ISRO launched the Chandrayaan-1 spacecraft in 2008.**
- India's first mission to the moon
- It was uniquely equipped to confirm the presence of solid ice on the moon.
- Findings indicate the presence of hematite at the lunar poles.

⭐ **Key Points**

- **Chandrayaan 1:**
  - ISRO mission designed to orbit the Moon over a two-year period with the objectives of upgrading and testing India's technological capabilities in space and returning scientific information on the lunar surface.
  - It **was based on the Kalpansat meteorological satellite** .
- **Chandrayaan 2:**
  - ISRO mission comprising an **orbiter(Pragyan)** and a **soft lander(Vikram)** carrying a rover, scheduled to launch to the Moon in **July 2019** .
  - The primary objective of Chandrayaan 2 was to demonstrate the ability to **soft-land on the lunar surface and operate a robotic rover on the surface** .
  - However, Soft landing failed.
  - **Scientific goals include studies of lunar topography, mineralogy, elemental abundance, the lunar exosphere, and signatures of hydroxyl and water ice** .

⭐ **Additional Information**

- Missions to the Moon:
  - **Chang'e 5** - **CNSA (China)** Lunar Sample Return Mission (2020)
  - **Chandrayaan 2** - ISRO (India) Lunar Orbiter, Lander and Rover Mission (2019)
  - **Beresheet** - Space IL and **Israeli** Aerospace Industries (Israel) Lunar Lander (2019)
  - **Chandrayaan-1** - ISRO (India) Lunar Orbiter Mission (2008)
  - With the Artemis program, NASA **will land the first woman and next man on the moon by 2024.**

---

15. **Answer: b**

Explanation:

Given:

A book has 250 pages.

Person A reads 6 pages in an hour.

Person B reads 8 pages in an hour.

There are two chapters of 72 pages that are difficult for person B to read in the book, so person B takes double the time to read those pages.

Calculation:

Time taken by A to finish the book = 250/6 = 41 hrs 40 mins

Time taken by B to finish the book = (250 - 72) pages at 8 pages per hour and 72 pages at 4 pages per hour (∵ double the time ⇒ half the speed)

= 178/8 + 72/4

= 89/4 + 72/4

= 161/4

= 40 hrs 15 mins

∴ Comparing time taken by A and B, we conclude that B finishes the book first and (41 hrs 40 mins - 40 hrs 15 mins) = 1 hr 25 min sooner.

---

16. **Answer: a**

Explanation:

The correct answer is **USB.**

- **USB(universal serial bus)- is atechnology** used to **connect computers with peripheral devices** .

⭐ **Key Points**

- Whether it's a gaming system or a **home PC** , the main components that make up a typical, present-day computer include:
  - **A motherboard**
  - **A Central Processing Unit (CPU).**
  - **A Graphics Processing Unit (GPU), also known as a video card.**
  - **Random Access Memory (RAM), also known as volatile memory.**
  - **Storage: Solid State Drive (SSD) or Hard Disk Drive (HDD).**

---

17. **Answer: b**

Explanation:

The correct answer is **Buland Darwaza.**

- To commemorate his **victory over Gujarat, Akbar built 'Gate of Magnificence'** the highest **gateway of India at Fatehpur Sikri** . AKA the **Buland Darwaza.**

⭐ **Key Points**

- Buland Darwaza
  - **or the loft gateway at Fatehpur Sikri was built by the great Mughal emperor, Akbar in 1573.**
  - **Akbar built the Buland Darwaza to commemorate his victory over Gujarat.**
  - It is the **highest gateway in the world** and an astounding example of Mughal architecture.
  - It is made of **red and buff sandstone** and **decorated by carving and inlaying of white and black marble.**
  - An **inscription on the central face of the Buland Darwaza throws light on Akbar's religious tolerance and broad-mindedness.**

⭐ Important Points

- Kashmiri Gate:-
  - This gate is located in **Delhi**, it is the northern gate to the **historic walled city of Delhi.**
  - It was built by the **Mughal Emperor Shah Jahan**
  - The gate is so named because it was at the start of a road that led to Kashmir.
- India Gate:-
- **The official name Delhi Memorial was originally called All-India War Memorial.**
  - The monumental sandstone arch in **New Delhi**
  - dedicated to the troops of British India who died in wars fought between 1914 and 1919.
  - India Gate, which is located at the eastern end of the Rajpath (formerly called the Kingsway)
- Gateway of India:-
  - **To commemorate the 1911 royal visit of King George Vand Queen Mary to Mumbai (erstwhile Bombay)**
  - The first structure to welcome visitors entering the city by sea, it is popularly called **'Taj Mahal of Mumbai'.**

---

18. **Answer: b**

Explanation:

The correct answer is **1945.**

- **UN** was founded as a successor to the **League of Nations on 24th October**1945.

⭐ **Important Points**

- League of Nations, an organization for international cooperation established on January 10, 1920
- was created by the Treaty of Versailles
- It was formed as **an initiative of the victorious Allied powers at the end of World War I.**
- But, it failed to prevent World War II.
- Thus, **United Nations (UN), an international organization** established on **October 24, 1945.**

⭐ **Key Points**

Principal Organs of the United Nations

Organ	Major Objective	Headquarters
General Assembly	The member states gather to discuss various issues relating to international law, security, peace, etc . All the member states of the United Nations have equal representation	New York
Security Council	The Security Council has the responsibility to maintain international peace and security whenever peace is threatened. It constitutes 15 members, having one vote each and a residency rotating and changing every month.	New York
Economic and Social Council (ECOSOC)	The ECOSOC promotes sustainable development with regard to economic, social, and environmental matters.	New York
Trusteeship Council	It was established in order to supervise the 11 Trust Territories that were placed under the administration of 7 member states .	New York
The International Court of Justice (ICJ)	The principal judicial organ of the United Nations	The Hague, Netherlands
United Nations	It carries out the day-to-day work of the UN such as preparing the report, making analysis, research, etc	New York

Secretariat	that the General Assembly and other principal organs have mandated.	

---

19. **Answer: a**

Explanation:

Given:

The total population of a village is 4,000.

The number of males and females increases by 10% and 20% respectively and consequently the population of the village becomes 4500

Concept used:

Weighted Average = $(n1A1 + n2A2)/(n1 + n2)$

Calculation:

Percentage increase in population = $(4500 - 4000)/4000 \times 100 = 12.5\%$

Putting values, we get, $12.5 = (n1 \times 10 + n2 \times 20)/(n1 + n2)$

$\Rightarrow 12.5 \times n1 + 12.5 \times n2 = 10 \times n1 + 20 \times n2$

$\Rightarrow 2.5 \times n1 = 7.5 \times n2$

$\Rightarrow$ n1/n2 = 3/1 = male/female and total population of a village is 4,000

$\therefore$ Number of males in the village prior to the new members coming in = $3/4 \times 4000 = 3000$

---

20. **Answer: b**

Explanation:

The correct answer is **Fukushima.**

- The Japanese leg began in Fukushima and ended in Tokyo's New National Stadium, the main venue of the **2020 Olympics.**

⭐ **Key Points**

- The **Japanese leg began in Fukushima and ended in Tokyo's New National Stadium,** the main venue of the **2020 Olympics.**
- Beijing **2022** will host the XXIV **Olympic** Winter Games, **4-20 Feb.**
- Beijing Olympics **2022** will be held a cross **three zones: Beijing, Yanqing, and Zhangjiakou.**
- **The current Prime minister of Japan is Mr. Fumio Kishida (As of Jan 2022).**

---

21. Answer: a

Explanation:

The correct answer is **Orion**.

- Orion is a well-known **constellation that can be seen in the evening.**
- This constellation is also known as **'the Hunter'.**

⭐ **Key Points**

- **Orion constellation** is one of the **brightest and best-known constellations in the night sky.**
- It **lies on the celestial equator.**
- **Orion** has been known since **ancient times.**
- The constellation is **also known as the Hunter, as it is associated with one in Greek mythology.**

---

22. Answer: b

Explanation:

The correct answer is **Developing rural India with the help of higher education institutions.**

- **Unnat Bharat Abhiyan** is a flagship program of the Ministry of Education.
- It is aimed at **developing rural India with the help of higher education institutions.**

⭐ **Key Points**

- **Unnat Bharat Abhiyan** is a **flagship program of the Ministry of Education.**
- It aims to **link the Higher Education Institutions with a set of at least (5) villages** so that these institutions can contribute to the economic and social betterment of these village communities using their knowledge base.
- **Main Objectives:**
  - To **engage the faculty and students of Higher Educational Institutions (HEIs) in identifying development issues in rural areas and finding sustainable solutions for the same.**
  - **Identify & select existing innovative technologies, enable customisation** of technologies
  - Devise implementation methods for innovative solutions, as required by the people.
  - **To allow HEIs to contribute to devising systems for smooth implementation of various Government programmes** .

---

23. Answer: d

Explanation:

The correct answer is **Soviet.**

- The Bokaro Steel Plant was set up in India in 1964 with **Soviet** collaboration.

⭐ **Important Points**

STEEL PLANT	STATE	COLLABORATION WITH	YEAR
Rourkela Steel plant	Orissa	Germany	1959
Bhilai Steel Plant	Chattisgarh	Russian	1959
Durgapur Steel Plant	West Bengal	United Kingdom	1962
Bokaro Steel Plant	**Jharkhand**	**Russia(Soviet)**	**1964**

---

24. Answer: c

Explanation:

Given:

5 tanα = 4

Concept used:

tanθ = P/B, sin θ = P/H and cosθ = B/H

$H^2 = P^2 + B^2$

Calculation:

5 tanα = 4 ⇒ tanα = 4/5 = P/B

⇒ H =√[P 2 + B 2] = √[4 2 + 5 2] = √41

Putting values, we get, $\frac{5\ sin\alpha - 3\ cos\alpha}{5\ sin\alpha + 2\ cos\alpha} = \frac{5 \times 4/\sqrt{41} - 3 \times 5/\sqrt{41}}{5 \times 4/\sqrt{41} + 2 \times 5/\sqrt{41}}$

= (20 - 15)/(20 + 10)

= 5/30

=1/6

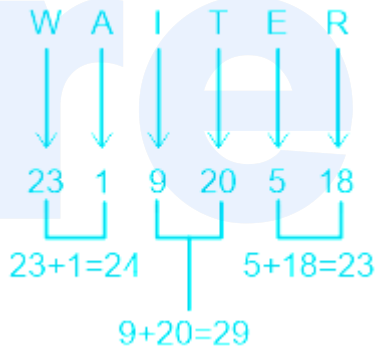
25. Answer: c

Explanation:

The logic followed here is:

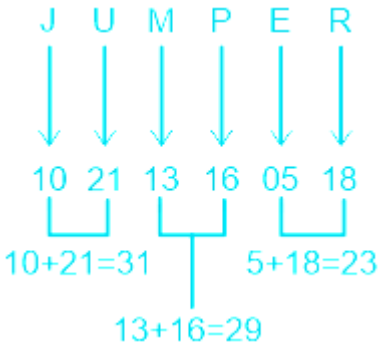
Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N

The code for WAITER is as follows:



Similarly,

The code for JUMPER will be as follows:



Hence, the code for JUMPER will be '312923'.

26. **Answer: d**

Explanation:

Given:

A man sold 20 books for Rs. 1800, gaining there by the cost price of 5 books

Concept used:

Profit = SP - CP

Calculation:

SP of 20 books = Rs.1800 ⇒ SP of 1 book = 1800/20 = Rs. 90

ATQ, Profit on 20 books = CP of 5 books

⇒ SP × 20 books - CP × 20 books = CP × 5 books

⇒ SP × 20 books = CP × 25 books

⇒ CP/SP = 4/5

⇒ CP of 1 book = 4/5 × SP of 1 book

⇒ CP of 1 book = 4/5 × Rs. 90 = Rs. 72

---

27. **Answer: c**

Explanation:

Concept used:

We work on the multiplicity rule of powers of 4 for reduction, that is, $4^{(4x + R)} = 4^{R}$

Calculation:

$(4^{61} + 4^{62} + 4^{63} + 4^{64}) = (4^{1} + 4^{2} + 4^{3} + 4^{0})$

[Dont take 4 0 as 1, 0 represents the even number in the power, and We know that even power of 4 is equal to 6]

= 4 + 16 + 64 + 6

= 90 which is divisible by 10

∴ Option 3) is right.

---

28. Answer: b

Explanation:

Given:

The difference of two numbers is 20% of the larger number and smaller number is 40

Calculation:

ATQ, Larger number - Smaller number = 20% × Larger number

⇒ Larger number - 40 = 1/5 × Larger number

⇒ (1 - 1/5) × Larger number = 40

⇒ 4/5 × Larger number = 40

⇒ Larger number = 40 × 5/4 = 50

---

29. Answer: d

Explanation:

Concept used:

SI = Principal × Rate% × Time × 1/100

Calculation:

For SI to be 3/4 of sum invested, Let sum invested = Principal be 4x then SI = 3x [# choose accordingly as per given fraction]

Putting values, we get, 3x = 4x × Rate% × 15 × 1/100

⇒ Rate% = 100 × 3 × 1/4 × 1/15

⇒ Rate% = 5%

---

30. Answer: b

Explanation:

Concept used:

We know that mean can be calculated as

Mean $\bar{x} = \frac{fixi}{fi}$

Calculation:

Putting values, we get,

Mean, $\bar{x} = \frac{fixi}{fi} = \frac{(19\times13)+(21\times15)+(23\times16)+(25\times18)+(27\times16)+(29\times15)+(31\times13)}{13+15+16+18+16+15+13} = 25$

Mean = 25

---

31. Answer: b

Explanation:

Given:

A number when divided by 280 leaves 73 as the remainder.

Concept used:

Dividend = divisor × quotient + remainder

Calculation:

Given, the number when divided by 280 leaves 73 as the remainder ⇒ The number is of the form 280x + 73

∴ When 280x + 73 is divided by 35, that is (280x + 73)/35, we get remainder = 3

---

32. Answer: a

Explanation:

The correct answer is**Optical character reader.**

⭐ Key Points

- Optical character recognition(OCR) is the electronic or mechanical conversion of images of typed, handwritten, or printed text into machine-encoded text, whether from a scanned document, a photo of a document, a scene photo, or from subtitle text superimposed on an image .

⭐ Important Points

Input device	Output device
The input device **receives data from users.**	An output device **displays data on the screen for users.**
It **works for translating user-friendly instructions into a machine friendly.**	It works for **translating the machine's instructions to user intelligible** .
It accepts data from the user as input and forwards it to the processor for further processing.	the output device takes the processed data from the processor.
Its **design is more complex.**	Its **design is less complex.**
Input device helps the computer to receive instructions from users.	The output device helps the computer to produce or display the information to the users.
Eg: **Microphone, Joystick, Keyboard, Pointing device, Image Scanner, Graphics tablet,etc**	Eg: **Speakers, Printers, Plotters, projectors, monitors, etc.**

---

33. **Answer: c**

Explanation:

The correct answer is **1911.**

- **Delhi** was officially announced as the **capital of the British Raj by the then-Emperor George V** , on December 12, 1911 .

⭐ Important Points

- The **capital was shifted from Calcutta** as **Delhi was the financial and political seat of many earlier empires** and was **located closer to the geographical center of India.**

⭐ Additional Information

Lord Hardinge-II (1910-1916):

- **Lord Hardinge** held Delh **i Durbar for the coronation** of King George V in 1911 and announced the shift of the capital.
- He shifted the **capital from Calcutta to Delhi in the year 1911.**
- In the same event, he also **annulled the partition of Bengal.**
- Mahatma Gandhireturned to India during the tenure of Lord Hardinge-II (1910-1916) .
- He returned from **South Africa to India** on the insistence of **Bala Gangadhar Tilak** in the year 1915 on Jan 9 .
- **Lord Hardinge II** was the **Governor-General of India** when World War-I(1914 - 1919) .

---

34. **Answer: c**

Explanation:

The correct answer is **Chholiya.**

- The **popular sword dance in the Kumaun region of Uttarakhand** is called **Chholiya.**

⭐ Important Points

- **Kathak-**is one of the eight major forms of Indian classical dance.
- **Lavani-** is a genre of music popular in Maharashtra, India.
- **Ghoomar-** Ghoomar or Ghumar is a traditional folk dance of Rajasthan.
  - It was the **Bhil tribe** who performed it
  - Performed to worship **Goddess Sarasvati** which was later embraced by other Rajasthani communities.
  - The da **nce is chiefly performed by veiled women who wear flowing dresses called Ghaghara.**

---

35. **Answer: c**

Explanation:

Calculation:

$7 \times 0.7 \times 0.07 \times 0.007 \times 70 = 7 \times 7/10 \times 7/100 \times 7/1000 \times 70$

$= 7 \times 7 \times 7 \times 1/100 \times 7 \times 1/1000 \times 7$

$= 16807/10000$

$= 0.16807$

---

36. **Answer: a**

Explanation:

The correct answer is **Non-metals.**

- **Non-metals** are known as **electronegative elements** because they **form negatively charged ions by the gain of electrons** .

⭐ **Important Points**

- **Metals-** The solid state of matter, in which the atoms are **very closely packed** together and have a special type of bond known as the **metallic bond** is called a metal. eg. gold, silver.
- **Non-metals-** A non-metal is an element that is **neither malleable nor ductile and does not conduct electricity. eg. Fluorine, chlorine.**

⭐ **Additional Information**

- **Mixtures-** A mixture is the physical combination of **two or more substances in which the identities are retained and are mixed in the form of solutions, suspensions, and colloids. an eg. mixture of salt and sand**

- Alloy-is **an admixture of metals or a metal combined with one or more other elements**. e.g., combining the metallic elements gold and copper produces red gold, gold and silver become white gold, and silver combined with copper produces sterling silver.
- A compound-is a chemical substance composed of **many identical molecules composed of atoms from more than one element held together by chemical bonds** . A molecule consisting of atoms of only one element is therefore not a compound.

---

37. Answer: d

Explanation:

Given:

Tony purchases two cars A and B at a total cost of Rs. 6,50,000.

He sells car A with 20% profit and car B at a loss of 25% and gets the same selling price for both the cars

Concept used:

SP = (100 + profit%)/100 × CP = (100 - loss%)/100 × CP

Calculation:

∴ For Car A, SP_1: CP_1= (100 + 20) : 100 = 120 : 100 = 6 : 5

and for Car B, SP_2 : CP_2= (100 - 25) : 100 = 75 : 100 = 3 : 4

Now, given SP 1 = SP_2 ∴ On making equal, we get, SP 1 : CP 1 = 6 : 5 and SP 2 : CP 2 = 6 : 8

⇒ CP 1 : CP 2 = 5 : 8 and total cost of car A and car B is Rs. 6,50,000

∴ Cost of car A = 5/13 × Rs. 6,50,000 = Rs. 2,50,000

and Cost of car B = 8 /13 × Rs. 6,50,000 = Rs. 4 ,00,000

---

38. Answer: d

Explanation:

Concept used:

In such questions, we directly use options to get answers in order to save time

Calculation:

As we can see that values in option 1) and option 2) are greater that 0.000327 therefore (0.000327 - these values) will give negative values ∴ option eliminated

Now 0.000327 - 0.000004 = 0.000323 which being an odd number cannot be a square

and 0.000327 - 0.000003 = 0.000324 which is a square of 0.0018

∴ Option 4) is right.

---

39. Answer: a

Explanation:

The correct answer is Jagjivan Ram.

The deputy prime minister of India (from 1977 to 1979) was Jagjivan Ram.
Jagjivan Ram was born in a small village, Chandwa in Shahabad District, now Bhojpur, in Bihar
Jagjivan Ram, popularly known as Babuji was a national leader, a freedom fighter, a crusader of social justice, a champion of depressed classes, an outstanding Parliamentarian, a true democrat, a distinguished Union Minister, an able administrator, and an exceptionally gifted orator.

He had a towering personality and played a long inning, spanning over half a century in Indian politics with commitment, dedication, and devotion.
Babuji was married to Indrani Devi in June 1935.
Indrani Devi was herself a freedom fighter and an educationist.

Important Points

The list of all the Prime Ministers of India from 1947-2021 is below:

S.N.	Name	Term of offic	Remark
1.	**Jawahar Lal Nehru**	15 August 1947 to 27 May 1964 16 years, 286 days	The **first prime minister of India and the longest-serving PM of India,** the first to die in office.
2.	**Gulzarilal Nanda (Acting)**	27 May 1964 to 9 June 1964, 13 days	First acting PM of India
3.	**Lal Bahadur Shastri**	9 June 1964 to 11 January 1966 1 year, 216 days	He has **given the slogan of 'Jai Jawan Jai Kisan' during the Indo-Pak war of 1965**
4.	Gulzari Lal Nanda (Acting)	11 January 1966 to 24 January 1966 13 days	-
5.	Indira Gandhi	24 January 1966 to 24 March 1977 11 years, 59 days	First female Prime Minister of India
6.	Morarji Desai	24 March 1977 to 28 July 1979 2 years, 126 days	Oldest to become PM (81 years old) and first to resign from office

7.	Charan Singh	28 July 1979 to 14 January 1980 170 days	Only PM who did not face the Parliament
8.	Indira Gandhi	14 January 1980 to 31 October 1984 4 years, 291 days	The first lady who served as PM for the second term
9.	Rajiv Gandhi	31 October 1984 to 2 December 1989 5 years, 32 days	Youngest to become PM (40 years old)
10.	V. P. Singh	2 December 1989 to 10 November 1990 343 days	First PM to step down after a vote of no confidence
11.	Chandra Shekhar	10 November 1990 to 21 June 1991 223 days	He belongs to Samajwadi Janata Party
12.	P. V. Narasimha Rao	21 June 1991 to 16 May 1996 4 years, 330 days	First PM from south India

13.	Atal Bihari Vajpayee	16 May 1996 to 1 June 1996 16 days	PM for shortest tenure
14.	H. D. Deve Gowda	1 June 1996 to 21 April 1997 324 days	He belongs to Janata Dal
15.	Inder Kumar Gujral	21 April 1997 to 19 March 1998 332 days	------
16.	Atal Bihari Vajpayee	19 March 1998 to 22 May 2004 6 years, 64 days	The first non-congress PM who completed a full term as PM
17.	Manmohan Singh	22 May 2004 to 26 May 2014 10 years, 4 days	First Sikh PM
18.	Narendra Modi	26 May 2014 - Present	4th Prime Minister of India who served two consecutive tenures

Remark

40. **Answer: d**

Explanation:

The correct answer is **Ruhr.**

- **Germany** is one of the **world's leading manufacturers of steel ,with production concentrated in the Ruhr region;**
- however, since the peak output of the early 1970s, a number of plants have closed

⭐ **Key Points**

- **Steel:- Ruhr region** .
- **Automobile manufacturing** :- Baden-Württemberg, Lower Saxony, Hessen, North Rhine–Westphalia, Bavaria, the Saarland, and Thuringia.
  - Leading automobile manufacturers in Germany include **Audi, BMW, Daimler AG (formerly Daimler-Benz and DaimlerChrysler), Ford, Opel, and Volkswagen.**
- Electrical and electronic production :- **East Germany(East Berlin** and **Dresden), Munich, Stuttgart**
- **Chemical industry** :- western Germany(**along the Rhine or its tributaries, notably in Ludwigshafen, Hoechst, and Leverkusen**

---

41. **Answer: b**

Explanation:

Given:

Ram has a movie in his pen drive that takes 1.75 GB of space. (1 GB = 1000 MB)

The speed of transferring the file is 2 MB/s.

Calculation:

Time taken to transfer the file = [1.75 GB]/[2 MB/s] = 1.75 × 1000 MB × 1/2MB/s = 1.75 × 500 seconds

= 1.75 × 500 × 1/60 minutes

= 875/60 minutes

= 14 minutes 35 seconds

---

42. Answer: b

Explanation:

Given:

$a\cos\theta - b\sin\theta = c$

Concept used:

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

$\sin^2\theta + \cos^2\theta = 1$

Calculation:

$a\cos\theta - b\sin\theta = c$

On squaring both sides, we get, $a^2\cos^2\theta + b^2\sin^2\theta - 2ab \times \sin\theta \times \cos\theta = c^2$

$\Rightarrow a^2(1 - \sin^2\theta) + b^2(1 - \cos^2\theta) - 2ab \times \sin\theta \times \cos\theta = c^2$

$\Rightarrow a^2 - a^2\sin^2\theta + b^2 - b^2\cos^2\theta - 2ab \times \sin\theta \times \cos\theta = c^2$

$\Rightarrow a^2 + b^2 - c^2 = a^2\sin^2\theta + b^2\cos^2\theta + 2ab \times \sin\theta \times \cos\theta$

$\Rightarrow a^2 + b^2 - c^2 = (a\sin\theta + b\cos\theta)^2$

$\Rightarrow a\sin\theta + b\cos\theta = \pm\sqrt{a^2 + b^2 - c^2}$

43. **Answer: c**

Explanation:

The logic followed here is:

Square of the first number = second number.

i) 28 : 784 ⇒ 28^2 = 784;

ii) 19 : 361 ⇒ 19^2 = 361;

iii) 23 : 539 ⇒ 23^2 = 529 ≠ 539 ;

iv) 17 : 289 ⇒ 17^2 = 289;

Hence, '23 : 539' is different from the rest.

---

44. **Answer: a**

Explanation:

The correct answer is **Vivek Express**.

⭐ **Key Points**

- The Dibrugarh- Kanyakumari Vivek Express covers the longest train route of 4286km in 82 hrs and 30 mins
- These trains were announced in the Railway Budget of 2011-12 by the then Railway Minister Mamata Banerjee .
- These trains were started to commemorate the 150 th birth anniversary of Swami Vivekananda.

⭐ **Additional Information**

India's First Train	• Red Hill Railway, which ran from Red Hills to Chintadripet bridge in 1837
Train with Longest Route	• Vivek Express, running between Dibrugarh and Kanyakumari, covers 4,286 km in around 82 hours and 30 minutes
First Railway Station in India	• Bori Bunder, located in Mumbai was the first railway station in India

---

45. **Answer: a**

Explanation:

The correct answer is **Muslim League.**

- The Lucknow Pact is an agreement between the INC and the All India Muslim League.
- The Lucknow Pact was an agreement reached between the Indian National Congress and the Muslim League (AIMLM) at a joint session of both the parties held in Lucknow in December 1916.
- Through the pact, the two parties agreed to allow representation to religious minorities in the provincial legislatures.

⭐ **Additional Information**

- Provisions of pact
  - Self Government in India.
  - Abolition of Indian Council.
  - Separation of the executive from judiciary.
  - 1/3rd representation to be given to Muslims in the Central Government.

- Separate electorates for all communities until a joint electorate is demanded by all.

---

46. Answer: b

Explanation:

The correct answer is **Microsoft Excel.**

- **Excel** is **Microsoft's spreadsheet program** that **can be used to organize, format, and calculate data.**
- You can create formulas to aggregate large amounts of data, graph and chart data, create macros, and develop pivot tables.
- Originally a neck-and-neck competitor with Lotus 1-2-3, **Excel is now the spreadshee** t.

⭐ **Key Points**

Other **major software from the MS Office Package** :-

- **Microsoft Word**
  - Word is **Microsoft's word processing app** .
  - It includes **an array of features for document creation and editing, including Spell-check, a rich text editor, and page features such as justification, paragraphs, and indentation** .
  - You also **benefit from the what-you-see-is-what-you-get (WYSIWYG) display** – as the screen displays everything in the same way as the document will look when printed.

- **Microsoft PowerPoint**
  - Microsoft PowerPoint **helps you create professional presentations.**
  - PowerPoint was first launched in 1990, using slides to display text, graphics, and multimedia.
  - Since then, it's added a **variety of features to streamline and enhance presentations, such as transition effects, timers, and software integrations.**

⭐ Additional Information

- Microsoft OneNote
  - OneNote allows you to jot down your thoughts before you forget them. Then, notes can be shared with others.
  - Much like a digital notebook, the application automatically saves and syncs notes.
  - OneNote was introduced as a standard Office application in 2013, allowing even more users to be able to share their typed notes, drawings, and screengrabs with other online users.

- Microsoft Outlook
  - Mainly used as an email application, Outlook is considered a personal information manager, coordinating your calendars, task managers, contacts, notes, journals, and browsing sessions.
  - Outlook can be used as a stand-alone app, or it can be networked to connect multiple users to shared mailboxes and calendars under a single organization, for example.

- Microsoft Access
  - Access is Microsoft's database management system that provides a graphical user interface (GUI) and software development tools that allow for stored data or imported data from other databases.
  - With Access, you can use data to create forms, tables, queries, and reports.

---

47. **Answer: c**

Explanation:

The correct answer is Kisan Kanya.

⭐ Key Points

- **Kisan Kanya** was a **1937** Hindi Cinecolor feature film which was **directed by Moti Gidwani and produced by Ardeshir Irani of Imperial Pictures.**
- **It is largely remembered by the Indian public on account of it being India's first indigenously made colour film**

⭐ Important Points

- **Dadasaheb Phalke's silent Raja Harishchandra (1913) is the first feature film made in India** .
- The **first Indian sound film, Ardeshir Irani's Alam Ara (1931)** , was commercially successful.
- By the 1930s , the industry was producing over **200 films per year.**

---

48. **Answer: c**

Explanation:

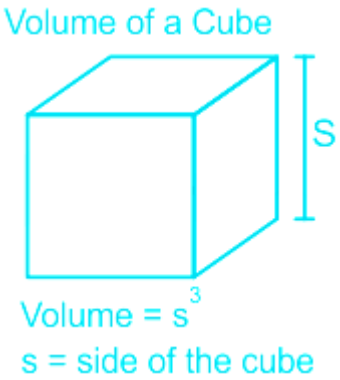
Given:

A glass cylinder with diameter 20 cm has water to a height of 9 cm. A metal cube of 8 cm edge is immersed in it completely.

Formula used:

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

Volume of cube = a^3



Calculation:

Diameter of cylinder = 20 cm

⇒ Radius of cylinder = 10 cm

Now, Volume of water displaced (because of which water will rise in cylinder) = Volume of cube

$\therefore \pi r^2 h = a^3$

$\Rightarrow 3.142 \times 10 \times 10 \times h = 8^3$

⇒ 3142 × 1/10 × h = 512

⇒ h = 5120/3142

⇒ h = 1.62 cm ~ 1.6 cm

---

49. **Answer: b**

Explanation:

Given:

District XYZ has 50,000 voters; out of them, 20% are urban voters and 80% rural voters.

Calculation:

Total votes = 50000

⇒ Urban votes originally = 20/100 × 50000 = 10000 and Rural votes originally = 80/100 × 50000 = 40000

For election, 25% of the rural voters were shifted to the urban area

⇒ 25/100 × 40000 = 10000 rural votes shifted to urban area.

⇒ Now, Urban votes = 10000 + 10000 = 20000 and Rural votes = 40000 - 10000 = 30000

Out of the voters in both rural and urban areas, 60% are honest, 70% are hardworking, and 35% are both honest and hardworking.

Voters who were both honest and hardworking voted for NOTA.

∴ Votes swept by NOTA = 35% of urban + 35% of rural = 35/100 × 20000 + 35/100 × 30000 = 17500

Candidate A found favour with the rural voters, rural voters left = 100% - 35% = 65% of rural voters

∴ Votes swept by A = 65/100 × 30000 = 19500

Candidate B found favour with the urban voters, Urban voters left = 100% - 35% = 65% of urban voters

∴ Votes swept by B = 65/100 × 20000 = 13000

⇒ Votes polled in favor of candidate A, candidate B and NOTA are 19500, 13000 and 17500 respectively

---

50. Answer: c

Explanation:

Concept used:

When smallest number asked, which when divided by a, b, c leaves the same remainder R in each case, that number is LCM[a, b, c] + R

Calculation:

∴ S mallest number which when divided by 12,16, 20.25 and 30 leaves the same remainder 3 in each case is LCM[12,16, 20.25, 30] + 3

= 1200 + 3

= 1203

---

51. Answer: c

Explanation:

The correct answer is **Lal Bahadur Shastri**.

⭐ **Important Points**

- Shastri Ji gave the famous slogan **'Jai Jawan, Jai Kisan' during the 1965 India-Pakistan war** to **boost the morale of soldiers and the farmers in the backdrop of the crucial war and food paucity.**

About Lal Bahadur Shastri:-

1. He **joined Mahatma Gandhi's non-cooperation movement** against the British when he was 16.
    - He joined the fight against colonial rule immediately after Gandhi called upon the countrymen to unite and fight for independence.
2. **As the prime minister, he stopped drawing his salary during the war between India and Pakistan in 1965, when the country was facing a food shortage** .
3. He played a **key role in the White Revolution** to make India self-reliant in milk production.
    - **Lal Bahadur Shastri** created the **National Dairy Development Board and backed the Amul milk co-operative in Gujarat's Ana** nd.
4. Shastri was **deeply concerned for the agriculture of India** and was critical of the lack of contact between the peasants and the elites, as per Gilbert Etienne's book Indian Villages.
    - He also **promoted the Green Revolution with the aim of farmers' prosperity and to make India self-reliant in foodgrain production** . Green Revolution remains the model operation in India that benefited the states of Punjab, Haryana, and Uttar Pradesh.

5. **Shastri's tenure as the prime minister was only for 19 months as he died in Tashkent on January 11, 1966** . He was succeeded by Nehru's daughter Indira Gandhi.
6. **"India will have to hang down her head in shame if even one person is left who is said in any way to be untouchable," was one among many inspirational quotes given by him.**

---

52. Answer: a

Explanation:

The correct answer is **Rajasthan**.

- **Keoladeo National Park,** located in the **State of Rajasthan** , is an **important wintering ground of Palaearctic migratory waterfowl** and is renowned for its large congregation of non-migratory resident breeding birds.

⭐ **Key Points**

- This is the **only park in India that is completely enclosed by a 2 m high boundary wall** that minimizes the possibilities of any encroachment and biotic disturbances
- **But there is no possibility of a buffer zone.**
- As the **wetlands of Keoladeo are man-made,** they are **dependent on the monsoon and on water pumped in from outside,** traditionally provided from the **"Ajan Bandh" reservoir.**

⭐ **Additional Information**

- Mukundra Hills :
  - Mukundra Hills National Park is a national park in Rajasthan, India.
  - It was established in 2004 and consists of three wildlife sanctuaries: Darrah Wildlife Sanctuary, National Chambal Sanctuary, and Jawahar Sagar Wildlife Sanctuary.
  - It is located in the Kathiawar-Gir dry deciduous forests.

- Ranthambore :
  - Ranthambore National Park is a vast wildlife reserve near the town of Sawai Madhopur in Rajasthan, northern India.
  - It is a former royal hunting ground and home to tigers, leopards, and marsh crocodiles.
- Desert National Park:
  - Desert National Park is one of the largest protected lands in the districts of Jaisalmer and Barmer in Rajasthan.
  - The park's vegetation is protected by local communities like the Bishnois.
  - The Desert National Park in Rajasthan is one of the best habitats for the Great Indian Bustard.
  - It is known as the breeding center of Great Indian Bustard.

---

53. Answer: d

Explanation:

Given:

T here is a 6-storey building with 20 rooms on each floor. Some toxic material is concealed in the building.

Three groups of officers start the search operation simultaneously.

Concept used:

Time taken to complete the entire search operation is time taken by third group to reach 5th floor from ground floor and search 5th floor + time taken by third group to reach 6th floor from 5th floor and search 6th floor [∵ time taken to search each floor is same but maximum time is taken to reach 5th floor and the 1 more minute to reach 6th floor]

Calculation:

Time taken to complete the entire search operation = time taken by third group to reach 5th floor from ground floor and search 5th floor + time taken by third group to

reach 6th floor from 5th floor and search 6th floor

= 5 min + 20 min + 1 min + 20 min [∵ it takes 1 minute to reach any nearest floor and 1 minute to search each room and there are 20 rooms on each floor]

= 46 min

---

54. Answer: a

Explanation:

Given:

$x = \frac{\sqrt{5}+1}{\sqrt{5}-1}$ and $y = \frac{\sqrt{5}-1}{\sqrt{5}+1}$

Concept used:

$(x + y)^2 = x^2 + y^2 + 2xy$

$\Rightarrow x^2 + y^2 = (x + y)^2 - 2xy$

Calculation:

$xy = \frac{\sqrt{5}+1}{\sqrt{5}-1} \times \frac{\sqrt{5}-1}{\sqrt{5}+1} = 1$

$x + y = \frac{\sqrt{5}+1}{\sqrt{5}-1} + \frac{\sqrt{5}-1}{\sqrt{5}+1} = \frac{\sqrt{5}+1}{\sqrt{5}-1} + \frac{\sqrt{5}-1}{\sqrt{5}+1}$

$= [5 + 1 + 2\sqrt{5} + 5 + 1 - 2\sqrt{5}]/[5 - 1]$

$= 12/4$

$= 3$

Putting values in $x^2 + y^2 = (x + y)^2 - 2xy$, we get $x^2 + y^2 = 3^2 - 2 \times 1 = 7$

$\therefore x^2 + y^2 - 4 = 7 - 4 = 3$

---

55. **Answer: d**

Explanation:

The correct answer is **Deepa Malik.**

- Deepa Malik is an Indian athlete.
  - She is the first Indian woman to win a medal in Paralympic Games and won a Silver medal at the 2016 Summer Paralympics in shot put.
  - She also won gold in the F-53/54 Javelin event at the para athletic Grand Prix held in Dubai in 2018.
  - She is currently the world number one in the F-53 category .

⭐ **Additional Information**

2016 Rio Paralympics Games		
Name	Sport	Medal
Mariyappan Thangavelu	Athletics	Gold
Devendra Jhajharia	Athletics	Gold
Varun Singh Bhati	Athletics	Bronze
Deepa Malik	Athletics	Silver

56. **Answer: a**

Explanation:

The correct answer is **Post-payment of goods and services.**

- **e-WAY BILL** : It is based on the idea " One Nation – One Tax – One Market – One e-Way Bill"
- **E-way bill** is related to **Post-payment of goods and services.**

⭐ Key Points

- **e-WAY BILL:** It is based on the idea " **One Nation – One Tax – One Market – One e-Way Bill"**
- The **e-Way Bill System** is a **document that gives details regarding the movement of goods and has to be carried by transporters for any consignment exceeding Rs 50,000.**
- The complete e-Way Bill System, which includes the development of web-based **IT Applications, hosting IT infrastructure (which includes network, computing, and security), and operation & management of the system is the responsibility of the National Informatics Centre (NIC).**
- **It provides multiple modes of e-way Bill generation including Web, Bulk Upload, SMS, Mobile App, and API for Large Taxpayers/ GST Suvidha Providers (GSPs).**

---

57. Answer: c

Explanation:

The correct answer is **J J Thomson.**

- **J J Thomson, a British physicist** was awarded the **Nobel Prize in Physics in 1906 for his work on the discovery of electrons.**

⭐ Key Points

Particles	Charge	Discoverer	Experiment Name
Electron	Negative	J.J. Thomson	cathode-ray tubes experiment
Proton	Positive	E. Rutherford	gold foil experiment
Neutron	Neutral	James Chadwick	bombarded Beryllium with alpha particles from the natural radioactive decay of Polonium
Nucleus	--	Rutherford, Marsden and Geiger	gold foil experiment

58. **Answer: c**

Explanation:

Given:

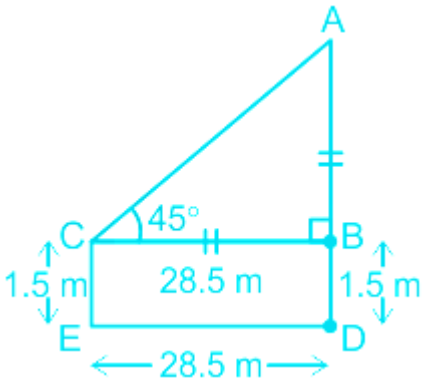
An observer 1.5 m tall is standing 28.5 m away at the same level as the foot of a tower.

Angle of elevation of the observer watching the top of the tower is 45 degrees

Concept used:

When Angle of elevation is 45° then H : P : B = √2 : 1 : 1

Calculation:



ATQ, CE = 1.5 m

and ED = 28.5 m = CB and in ΔABC, Angle of elevation is 45°⇒ AB = BC

then AD = AB + BD = 28.5 + 1.5 m

⇒ AD = 30 m

---

59. Answer: d

Explanation:

The correct answer is **Reverberation**.

- Reverberation: The persistence of sound in an enclosed or partially enclosed space after the source of sound has stopped; by extension, in some contexts, the sound that so persists.

⭐ **Additional Information**

- Intensity: It describes **how much there is of physical quantities, such as sound and light output from a source** .
  - It **refers to the magnitude, or strength, of a given physical quantity at a given location in space.**
  - **Depending on the type of physical quantity, intensity can be measured in different ways** .

- Ranging: is the **procedure by which the distance of an object like the wall, mountain, etc can be estimated** .
    - Here **the phenomena of the echo of sound from an object under study are used.**
- Vibration: A **periodic motion of the particles of an elastic body or medium in alternately opposite directions** from the position of equilibrium when that equilibrium has been disturbed (as when a stretched cord produces musical tones or molecules in the air transmit sounds to the ear)

---

60. Answer: a

Explanation:

The logic followed here is:

- **NTPC, SAIL and BHEL are Maharatna PSUs of Government of India whereas CRPF is not a Maharatna PSU.**

1. CRPF : Central Reserve Police Force
2. NTPC: National Thermal Power Corporation
3. SAIL : Steel Authority of India Limited.
4. BHEL : Bharat Heavy Electricals Limited.

Hence, CRPF is the odd one.

---

61. Answer: d

Explanation:

Concept used:

To compare ratio, we make denominator same by making each denominator equal to LCM of denominators

and then compare value of numerators to get desired results

Calculation:

Now, LCM [28, 18, 21, 27] = 7 × 2 × 2 × 3 × 3 × 3 = 756

On making denominators same , we get, [15 × 27]/[28 × 27], [5 × 42]/[18 × 42], [13 × 36]/[21 × 36], [19 × 28]/[27 × 28]

Now all denominators are same ∴ we compare value of numerators (405, 210, 468, 532) to get greatest ratio and greatest numerator is 19 × 28 = 532

∴ greatest ratio = 19 : 27

---

62. **Answer: d**

Explanation:

Given:

A man travels from A to B at a speed of 50 km/h and returns by increasing his speed by 40%

Concept used:

When distance travelled is same, Average speed = $2S_1S_2/[S_1 + S_2]$

Calculation:

S_1 = 50 km/h and S_2 = 140/100 × 50 = 70 km/h

∴ Average speed = 2 × 50 × 70 /[50 + 70]

= 7000/120

= 58.33 km/h

---

63. **Answer: a**

Explanation:

The correct answer is **Sound Navigation and Ranging.**

⭐ **Important Points**

- Sonar,technique for detecting and determining the distance and direction of underwater objects by acoustic means.
- Sound waves emitted by or reflected from the object are detected by sonar apparatus and analyzed for the information they contain.

Uses of sonar:-

⭐ **Key Points**

- In the military field are a large number of systems that detect, identify, and locate submarines.
- Sonar is also used in acoustic homing torpedoes, in acoustic mines, and in mine detection .
- Nonmilitary uses of sonar include fish finding, depth sounding, mapping of the sea bottom, Doppler navigation, and acoustic locating for divers.

---

64. **Answer: c**

Explanation:

Given:

Three-fourth of a number is 50 more than its one-third

Calculation:

Let the number be 'x'

ATQ, 3/4 × x = 50 + 1/3 × x

⇒ [3/4 - 1/3] × x = 50

⇒ 5/12 × x = 50

⇒ x = 50 × 12/5

⇒ x = 120

---

65. **Answer: c**

Explanation:

Given:

A positive number when decreased by 3, is equal to 28 times the reciprocal of the number

Calculation:

Let the number be 'x'.

ATQ, x - 3 = 28 × 1/x

⇒ x^2 - 3x - 28 = 0

⇒ x 2 - 7x + 4x - 28 = 0

⇒ x(x - 7) + 4(x - 7) = 0

⇒ (x + 4)(x - 7) = 0

⇒ x = -4, 7

Hence, option 3) is right.

---

66. **Answer: a**

Explanation:

The correct answer is **Dag Hammarskjold.**

- Dag Hammarskjold said, "The United Nations was not created to take mankind to heaven, but to save humanity from hell."

About **United Nations:-**

- UN was founded as a successor to the League of Nations on 24th October 1945.

⭐ **Important Points**

- League of Nations, an organization for international cooperation established on January 10, 1920
- was created by the Treaty of Versailles
- It was formed as an initiative of the victorious Allied powers at the end of World War I.
- But, it failed to prevent World War II.
- Thus, United Nations (UN), an international organization established on October 24, 1945.

⭐ **Key Points**

Principal Organs of the United Nations

Organ	Major Objective	Headquarters
General Assembly	The member states gather to discuss various issues relating to international law, security, peace, etc . All the member states of the United Nations have equal representation	New York
Security Council	The Security Council has the responsibility to maintain international peace and security whenever peace is threatened. It constitutes 15 members, having one vote each and a residency rotating and changing every month.	New York
Economic and Social Council (ECOSOC)	The ECOSOC promotes sustainable development with regard to economic, social, and environmental matters.	New York
Trusteeship Council	It was established in order to supervise the 11 Trust Territories that were placed under the administration of 7 member states .	New York
The International Court of Justice (ICJ)	The principal judicial organ of the United Nations	The Hague, Netherlands
United Nations	It carries out the day-to-day work of the UN such as preparing the report, making analysis, research, etc	New York

Secretariat	that the General Assembly and other principal organs have mandated.	

---

67. Answer: b

Explanation:

The statement highlights a problem that road accidents are increasing.

- Course of action I suggests that government should take steps to promote discipline and follow traffic rules through awareness programmes. This can reduce accidents since more people will be aware and will follow the rules. Thus, action I logically follows the statement.
- Restricting registration of new vehicles may reduce the number of vehicles on road but the problem is a road accident, which is not addressed by this action. Even one vehicle can cause multiple accidents when people or the driver are not following the traffic rules. Thus, action II does not logically follow the statement.

Hence the correct answer is **option 2** .

---

68. Answer: a

Explanation:

The correct answer is **Banasura Sagar Dam.**

⭐ **Key Points**

- **Banasura Sagar Dam** - located in **Wayanad District of Kerala in the Western Ghats** .
  - It is the **largest earthen dam in India and the second largest in Asia** and a starting point for hikes into the surrounding mountains.

- It is an important tourist attraction.

- **Krishna Raja Sagar Dam** - was built across river Kaveri for the Mysore and Mandya districts in Karnataka in 1932.
- **Mettur Dam** is one of the largest dams in India and also the largest in Tamil Nadu, located across the river Cauvery where it enters the plains.
- **Nagarjuna Sagar Dam** is a masonry dam across the Krishna River at Nagarjuna Sagar which straddles the border between Nalgonda district in Telangana and Guntur district in Andhra Pradesh.

---

69. **Answer: c**

Explanation:

Calculation:

x = 0.3333 × 0.25 × 0.499 × 0.125 × 24

= 3333 × 1/10000 × 25 × 1/100 × 499 × 1/1000 × 125 × 1/1000 × 24

= 3333 × 1/10000 × 1/4 × 499 × 1/1000 × 1/8 × 24

= 3333 × 1/10000 × 1/4 × 499 × 1/1000 × 3

= 9999 × 1/10000 × 1/4 × 499 × 1/1000

~ 10000 × 1/10000 × 1/4 × 500 × 1/1000

~ 1 × 1/4 × 1/2

= 1/8

---

70. **Answer: b**

Explanation:

The correct answer is **Capital Goods.**

- Capital goods:- Goods that are bought not for meeting the immediate need of the consumer but for producing other goods

⭐ **Key Points**

- Capital goods:- Goods that are **bought not for meeting the immediate need of the consumer but for producing other goods**
- **Final goods :-** These are those which are used for:
  - **Personal consumption (like bread purchased by consumer household)** , or
  - **Investment or capital formation (like building, machinery purchased by a firm)**
- **Intermediate goods**:- These are those, which are used for:
  - Further processing (like sugar used for making sweets), or
  - **Resale in the same year** (If car purchased by a car dealer for resale).
- **Consumption goods**:- Those goods **which satisfy the wants of consumers directly.**

---

71. **Answer: b**

Explanation:

Concept used:

Mean = ∑x if i/ ∑f i

Calculation:

x_i	f_i	$f_i x_i$
3	6	18
5	8	40
7	15	105
9	p	9p
11	8	88
13	4	52

$\sum x_i f_i = 303 + 9P$

$\sum f_i = 41 + p$

Mean = $\sum x_i f_i / \sum f_i$

Putting values, we get

$\Rightarrow 8 = [303 + 9p]/(41 + p)$

$\Rightarrow 328 + 8p = [303 + 9p]$

$\Rightarrow 328 - 303 = 9p - 8p$

$\Rightarrow p = 25$

$\Rightarrow p = 25$

---

72. Answer: c

Explanation:

The correct answer is **Arunachal Pradesh.**

- The **minimum population density works out in Arunachal Pradesh for both the 2001 and 2011 Census.**

⭐ Key Points

- The **Indian Census 2011 can be referred to as the seventh census** operation after Indian independence.
- As Per Census 2011:-

1. The **most populated state in India is Uttar Pradesh** .
2. The **least populated state in the country is Sikkim. (NOTE:** Difference between population and population density).
3. **Kerala** is the highest literate state in the country.
4. **Bihar is the least literate state.**
5. **Kerala represents the highest sex ratio.**
6. **Haryana features the lowest sex ratio in India.**

---

73. Answer: d

Explanation:

The correct answer is **1923**.

- In June 1923 the Radio Club of Bombay made the first-ever broadcast in the country.

⭐ Important Points

- In **June 1923 the Radio Club of Bombay made the first-ever broadcast in the country.**
- **13 years later AIR (All India Radio)** then known as the Indian Broadcasting Service came into existence.
- **In April 1930, the Indian Broadcasting Service, under the Department of Industries and Labour, commenced its operations on an experimental basis** .
- **Lionel Fielden** was appointed the **first Controller of Broadcasting in August 1935.**
- In the following month **Akashvani Mysore** , a private radio station was set up.

- On June 8, 1936, the Indian State Broadcasting Service became All India Radio .

---

74. Answer: a

Explanation:

The correct answer is **The Hague**.

- The International Court of Justice, which has its seat in **The Hague, Netherlands** is the **principal judicial organ of the United Nations.**

Organ	Major Objective	Headquarters
General Assembly	The member states gather to **discuss various issues relating to international law, security, peace, etc** . All the member states of the United Nations have **equal representation**	New York
Security Council	The Security Council has the responsibility to **maintain international peace and security** whenever peace is threatened. **It constitutes 15 members, having one vote each and a residency rotating and changing every month.**	New York
Economic and Social Council (ECOSOC)	The ECOSOC **promotes sustainable development** with regard to economic, social and environmental matters.	New York
Trusteeship Council	It was **established in order to supervise the 11 Trust Territories that were placed under the administration of 7 member states** .	New York
The International Court of Justice (ICJ)	The **principal judicial organ of the United Nations**	The Hague, Netherlands
United Nations	It **carries out the day-to-day work of the UN such as preparing the report, making analysis, research, etc**	New York

Secretariat	**that the General Assembly and other principal organs have mandated.**	

75. **Answer: a**

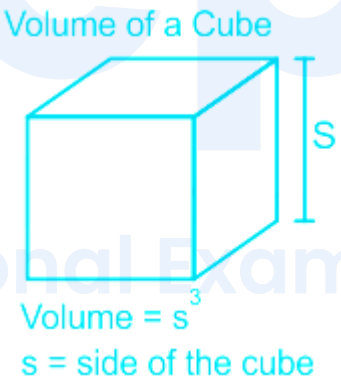
Explanation:

Given:

Three cubes whose edges measure 3 cm, 4 cm and 5 cm respectively, are melted to form a single cube

Formula used:

Volume of cube = a^3



Calculation:

Sum of volume of three cubes whose edges measure 3 cm, 4 cm and 5 cm = Volume of new cube

$\Rightarrow 3^3 + 4^3 + 5^3 = a^3$

$\Rightarrow 27 + 64 + 125 = a^3$

$\Rightarrow a^3 = 216$

$\Rightarrow a = 6$ cm

76. **Answer: b**

Explanation:

Given:

Sum of the squares of zeros of quadratic polynomial $f(x) = x^2 - 8x + k$ is 40

Concept used:

Sum of the zeros of quadratic polynomial $f(x) = p^2 + qx + r$ is $-q/p$

Product of the zeros of quadratic polynomial $f(x) = p^2 + qx + r$ is r/p

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

Calculation:

Let a and b be two zeroes of f(x)

then, Sum of the zeros of quadratic polynomial $f(x) = a + b = -(-8)/1 = 8$

and, Product of the zeros of quadratic polynomial $f(x) = ab = k/1 = k$

given, Sum of the squares of zeros of quadratic polynomial $f(x) = 40$

$\Rightarrow a^2 + b^2 = 40$

Now, $(a + b)^2 - 2ab = a^2 + b^2$

$\Rightarrow 8^2 - 2 \times k = 40$

$\Rightarrow 64 - 2 \times k = 40$

$\Rightarrow k = [64 - 40]/2$

$\Rightarrow k = 12$

77. **Answer: a**

Explanation:

The correct answer is **M S Swaminathan**.

- In India, the credit for successfully executing the Green Revolution goes to M S Swaminathan.
- **About M S Swaminathan**:-
  - Indian geneticist and international administrator.
  - He is renowned for his leading role in India's **"Green Revolution,"**
  - A program under which high-yield varieties of wheat and rice seedlings were planted in the fields of poor farmers.

⭐ **Key Points**

- **Subrahmanyan Chandrasekhar**:-
  - Subrahmanyan Chandrasekhar was an astrophysicist.
  - He discovered that massive stars can collapse under their own gravity to reach enormous or even infinite densities.
  - Today we call these collapsed stars **neutron stars and black holes** .
  - Traveling by ship in 1930 to begin his Ph.D. at Cambridge, **he calculated a number.**
  - **In his honor this number is now called The Chandrasekhar Limit. Its value is 1.4(This number determines the fate of stars) .**
  - In several billion years, our Sun will become a white dwarf.
- **Satyendra Nath Bose**
  - Satyendra Nath Bose FRS was an Indian mathematician and physicist specialising in theoretical physics.
  - He is best known for his **work on quantum mechanics in the early 1920s**
  - He collaborated with Albert Einstein in developing the foundation for Bose-Einstein statistics and the theory of the **Bose-Einstein condensate.**
- **Harish-Chandra FRS**
  - Harishchandra was an Indian American mathematician and physicist
  - He did fundamental work in **representation theory, especially harmonic analysis on semisimple Lie groups**

78. **Answer: c**

Explanation:

The logic followed here is:

Let us analyze the position of letters of BALL in the given codes.

B A L L

1 2 3 4

Let us examine the options for the code of KITE:

Now check option (3)

K I T E

1 2 3 4

Hence, the code for KITE in the given code language will be **'SKY BRAIN TABLE GOES'.**

⭐ **Alternate Method**

Let us analyze the position of letters of BALL in the given codes.

- BALL → O BEY (2) COM A(4)L ORD (1) GU LF (3)

Let us examine the options for the code of KITE

1. KITE → SK ILL (2) ROB IN (4)T ELL (1) GOAT (No E in GOAT)
2. KITE → SK IN (2) ORB IT (4) TO TAL (1 and 3) ENTER (1 and 4)
3. KITE → S KY (2) BRA IN (4)T ABLE (1) GO ES (3)
4. KITE → S KIP (2) OPT IC (4)T OOL (1) G ET (2)

Hence, the code for KITE in the given code language will be 'SKY BRAIN TABLE GOES'.

---

79. Answer: c

Explanation:

The correct answer is **1869.**

- In the year **1869,** the **Suez Canal was opened and this further strengthened Bombay's link with the world economy.**
- Suez Canal is an artificial sea-level waterway located in Egypt and connects the Mediterranean Sea with the Gulf of Suez , a northern branch of the Red Sea.

⭐ **Key Points**

- The **193.30 km (120 miles)-long Suez Canal is an artificial sea-level waterway located in Egypt and connects the Mediterranean Sea with the Gulf of Suez** , a northern branch of the Red Sea.
- **Officially opened in November 1869** , the Suez Canal is **one of the most heavily used shipping routes in the world** , witnessing the passage of thousands of vessels every year.
- **The canal, which separates Asia from the African continent, offers the shortest maritime route between Europe and the regions that share a border with the Indian Ocean and the Western Pacific Ocean.**

⭐ **Additional Information**

- **Connecting the Red Sea and the Mediterranean, the canal accounts for roughly 10 percent of global maritime trade**
- It is a source of much-needed foreign currency for Egypt(**It is controlled and managed by Egypt)** .

- In March 2021, the **Ever Given supertanker** -- a behemoth with a deadweight tonnage of 199,000 -- got stuck diagonally across the canal during a sandstorm.

---

80. Answer: a

Explanation:

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N

The logic followed here is:

Similarly,

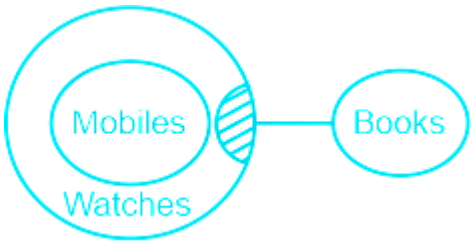
Hence, the code for ' BRAINSTORMER' will be AIBRSNRMTORE'.

---

81. Answer: c

Explanation:

The least possible Venn Diagram is as follows:



Conclusions:

1. Some mobiles are watches. → True (as all mobiles are watches)

2. All mobiles are books. → False (as it is possible but not definite)

Hence, only conclusion I follows.

---

82. Answer: c

Explanation:

The correct answer is **Banaras Hindu University**.

- **Mahatma Gandhi's first major public appearance in India** after returning **from South Africa** was at the opening of the **BHU(Banaras Hindu University) in February 1916.**

⭐ **Key Points**

- **Gopal Krishna Gokhale was Gandhiji's acknowledged political mentor.**
- On Gokhale's advice, Gandhiji spent a year travelling around British India, getting to know the land and its peoples.
- On **4 February 1916**, Gandhiji made his first public appearance after returning from South Africa in BHU.
- He addressed the audience in BHU, mostly consisting of impressionable youths, princes, bedecked and bejeweled, etc.

⭐ **Important Points**

About Gandhiji:

- 1916 - 1st public appearance --> Banaras Hindu University(BHU)
- 1917 - 1st Civil Disobedience Movement --> Champaran, Bihar
- 1918 - 1st Hunger Strike --> Ahmedabad Mill Strike
- 1918 - 1st Non Cooperation Movement(NCM) --> Kheda Satyagraha
- 1919 - 1st mass strike --> Rowlatt Satyagraha
- 1919–1922 - Khilafat Movement & NCM

---

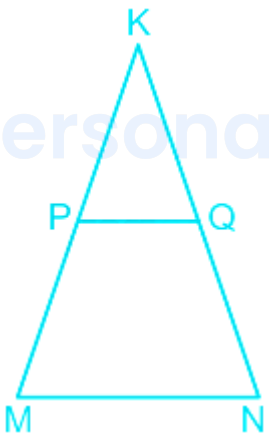
83. Answer: c

Explanation:

Given:

$\frac{KP}{PM} = \frac{4}{13}$ and KN = 20.4 cm

Concept used:



In a triangle ΔKMN, when PQ is parallel to MN then $\frac{KP}{PM} = \frac{KQ}{QN}$

Calculation:

Now, $\frac{KP}{PM} = \frac{4}{13}$ and $\frac{KP}{PM} = \frac{KQ}{QN}$

$\Rightarrow \frac{KQ}{QN} = \frac{4}{13}$

Let KQ = 4x and QN = 13x

Given KN = 20.4 cm and KN = KQ + QN

⇒ KQ + QN = 4x + 13x = 20.4 cm

⇒ 17x = 20.4

⇒ x = 1.2

∴ KQ = 4x = 4 × 1.2 = 4.8 cm

---

84. Answer: a

Explanation:

The correct answer is **Sri Lanka**.

- **India shares borders with 7 sovereign countrie** s
  - India shares **land borders with China, Bhutan, Nepal, Pakistan, Bangladesh, Afghanistan, and Myanmar**.
  - **Bangladesh and Pakistan** share both **land borders as well as maritime borders.**
  - **While Sri Lanka shares only a maritime border.**

⭐ **Key Points**

Figure 1.5 : India and Adjacent Countries

- **India has 15,106.7 Km of land border and a coastline of 7,516.6 Km including island territories .**
- The length of our land borders with neighbouring countries is as under:

Name of the country	Length of the border (in Km)
Bangladesh	4,096.7
China	3,488
Pakistan	3,323
Nepal	1,751
Myanmar	1,643
Bhutan	699
Afghanistan	106
Total	**15,106.7**

- **Across the sea to the south, lie our island neighbours(i.e. separated by water)— Sri Lanka and the Maldive** s.
- **Sri Lanka is separated from India by the Palk Strait** .

---

85. Answer: a

Explanation:

The correct answer is**Eugene Parker**.

- AstrophysicistEugene Parker first theorized the existence of **solar wind in 1958.**
- Eugene Parker became the first living individual after which NASA named a Spacecraft **"Parker Solar Probe"**

⭐ Key Points

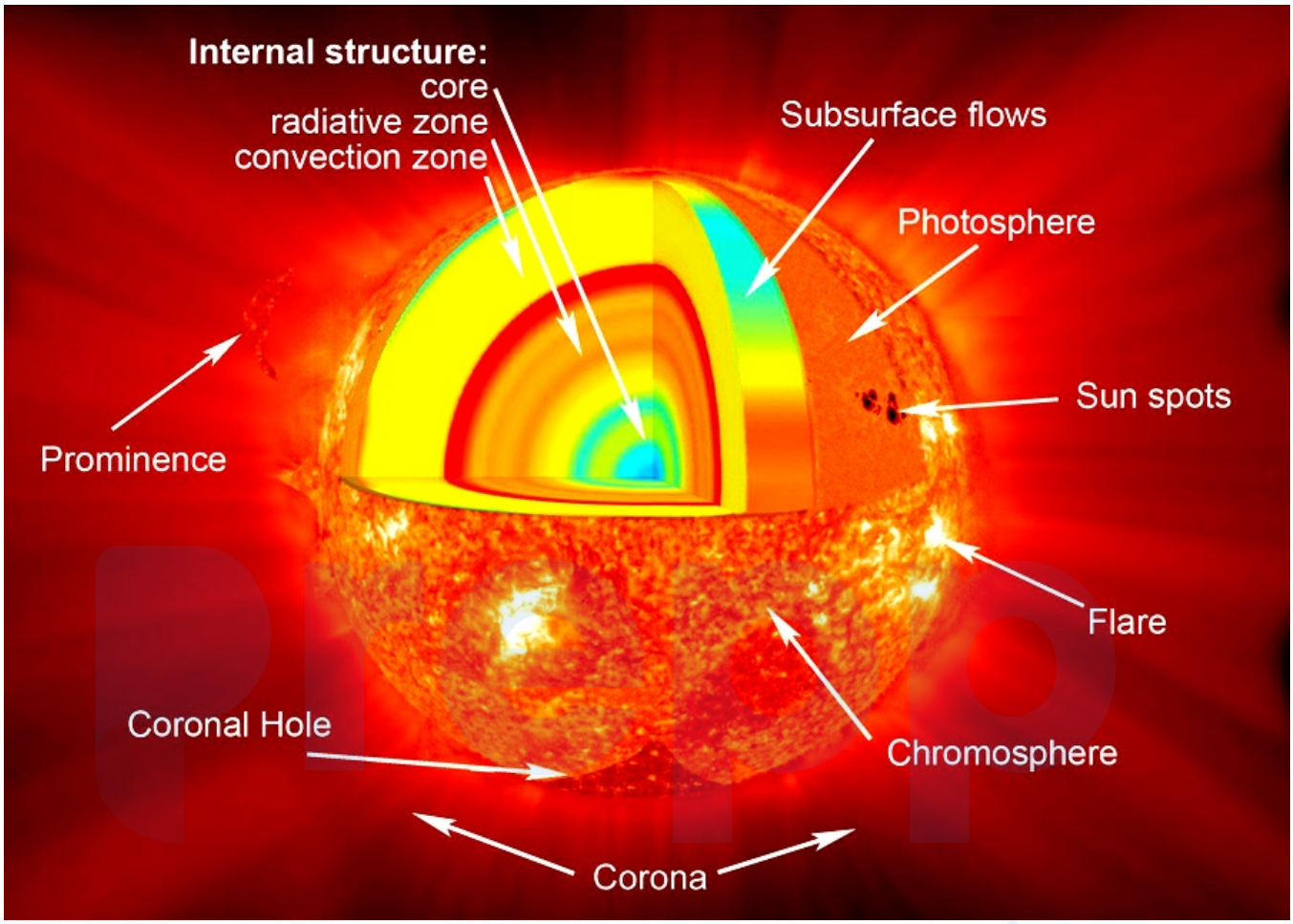
About Eugene Parker

- In the mid-1950s, Eugene Parker proposed a number of concepts about how stars — including our Sun — give off energy.
- **He called this cascade of energy the solar wind, and he described an entire complex system of plasmas, magnetic fields and energetic particles that make up this phenomenon** .
- Parker also theorized an explanation for the **superheated solar corona, which is — contrary to what was expected by then-known physics laws — hotter than the surface of the Sun itself.**
- His theory suggested that regular, but small, solar explosions called nanoflares could, in enough abundance, cause this heating.

About Parker Solar Probe mission:-

- **Parker Solar Probe is the 1st spacecraft to touch the sun**
- It provides key observations on Parker's groundbreaking theories and ideas
- It gives **crucial information about solar physics and the magnetic fields around stars** .

About The Sun:



⭐ Additional Information

About Elon Musk:-

- Cofounded the electronic-payment firm PayPal
- Formed SpaceX, maker of launch satellite vehicles and spacecraft .
- He was also one of the first significant investors in, as well as chief executive officer of, the electric car manufacturer Tesla .

About Carl Sagan:-

- Astronomer Carl Sagan, called " **America's most effective salesman of science** " by Time magazine
- He spent much of his career translating technical scientific explanations into something easily digestible by the general public.

- As a natural teacher, Sagan educated people not only through classroom lectures but also through interviews and television shows.

About Johannes Kepler:-

- German astronomer who **discovered laws of planetary motion**
- He provided a n **ew and correct account of how vision occurs;**
- He developed a n **ovel explanation for the behaviour of light in the newly invented telescope** ;
- He **discovered several new, semiregular polyhedrons** ;
- He offered a **new theoretical foundation for astrology while at the same time restricting the domain in which its predictions could be considered reliable.**

---

86. **Answer: d**

Explanation:

Given:

Amit has 40 crore followers in all the networking sites combined

Calculation:

Number of Amit's followers on Facebook = 32/100 × 40 crores

= 32/5 × 2 crores

= 64/5 crores

= 12.8 crores

---

87. **Answer: a**

Explanation:

Given:

Amit has 40 crore followers in all the networking sites combined

Calculation:

Number of Amit's followers on Twitter if 10% of twitter followers unfollow him = 90 /100 × 51/100 × 40 crores = 18.36 crores

Difference between the number of his Twitter followers and the number of his followers on other networking sites = 49/100 × 40 crores - 18.36 crores

= 19.6 crores - 18.36 crores

= 1.24 crores

---

88. **Answer: a**

Explanation:

Calculation:

Clearly, winning party is Party D with 54 votes

Now to find groups that would NOT have been able to defeat the winning party, we check the sum of votes for party groups given in options.

Sum of votes for Party C and Others = 29 + 17 = 46 < 54

Sum of votes for Party F and Party B = 39 + 37 = 76 > 54

Sum of votes for Party B and Others = 37 + 17 = 54 = 54

Sum of votes for Party F and Others = 39 + 17 = 66 > 54

Clearly, the group that would NOT have been able to defeat the winning party is Party C and Others.

---

89. **Answer: c**

Explanation:

Given:

'NOTA' and Others' votes were divided equally between party B and C

Calculation:

Sum of votes of 'NOTA' and Others' = 17 + 21 = 38 , these 38 votes were divided equally between party B and C

∴ Current number of votes for B = 37 + 38/2 =37 + 19 = 56

and Current n umber of votes for C = 29 + 38/2 =29 + 19 = 48

Since, now party B has maximum number of votes = 56

⇒ Party B wins and with a margin of 56 - 54 = 2 votes [∵ second highest party is Party D with 54 votes]

---

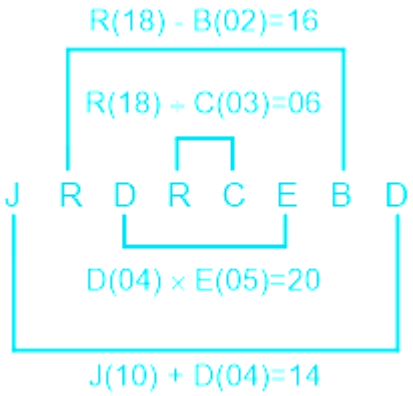
90. **Answer: a**

Explanation:

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N

The logic followed here is:

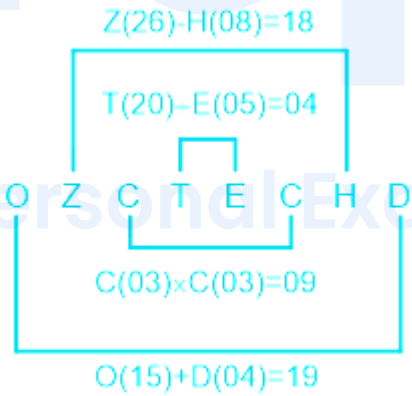
- J R D R C E B D → J(10) R(18) D(04) R(18) C(03) E(05) B(02) D(05)



- J(10) + D(04) →10 + 4 = 14
- R(18) - B (02) → 18 - 2 = 16
- D(04) × E(05) → 4 × 5 = 20
- R(18) ÷ C(03) → 18 ÷ 3 = 06
- Here, the code for J R D R C E B D is 14 16 20 06

Similarly,

- O Z C T E C H D → O(15) Z(26) C(03) T(20) E(05) C(04) H(08) D(04)



- O(15) + D(04) → 15 + 4 = 19
- Z(26) - H (08) → 26 - 8 = 18
- C(03) × C(03) → 3 × 3 = 09
- T(20) ÷ E(05) → 20 ÷ 5 = 04
- Here, the code for O Z C T E C H D will be 19 18 09 04.

Hence, the correct answer is '19 18 09 04'.

91. Answer: a

Explanation:

The logic followed here is:

- **41 : 43, 17 : 19, and 29 : 31** are pairs of twin primes.

Whereas,

- 31 : 33 is not a pair of twin primes. because 33 is not a prime number.

So, "31 : 33" is different from the rest.

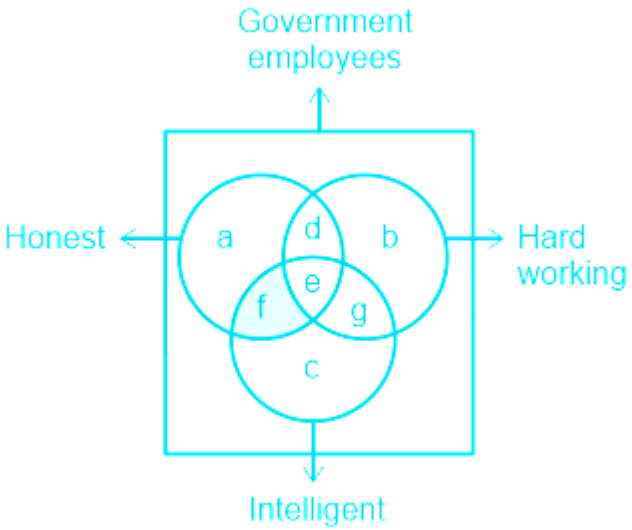
Hence, the correct answer is **"31 : 33"** .

---

92. Answer: b

Explanation:

- In the given Venn diagram, the Government Employees who are, Honest and Intelligent but not hardworking is represented by the shaded region given below:



- Here, the given area is represented by only f.

Hence, 'f' is the correct answer.

---

93. **Answer: b**

Explanation:

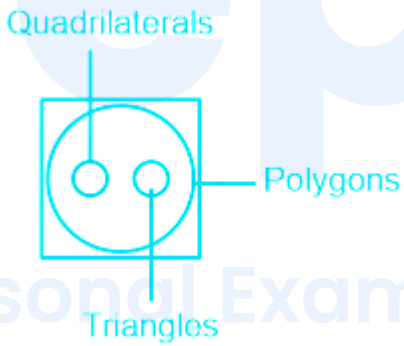
- The relationship between Polygons, Quadrilaterals and Triangles is as follows:

i) All triangles are polygon

ii) All quadrilaterals are polygon

iii) No Quadrilateral is triangle.

- Here, the possible Venn diagram will be as follows:



Hence, the correct answer is the figure given in option 2.

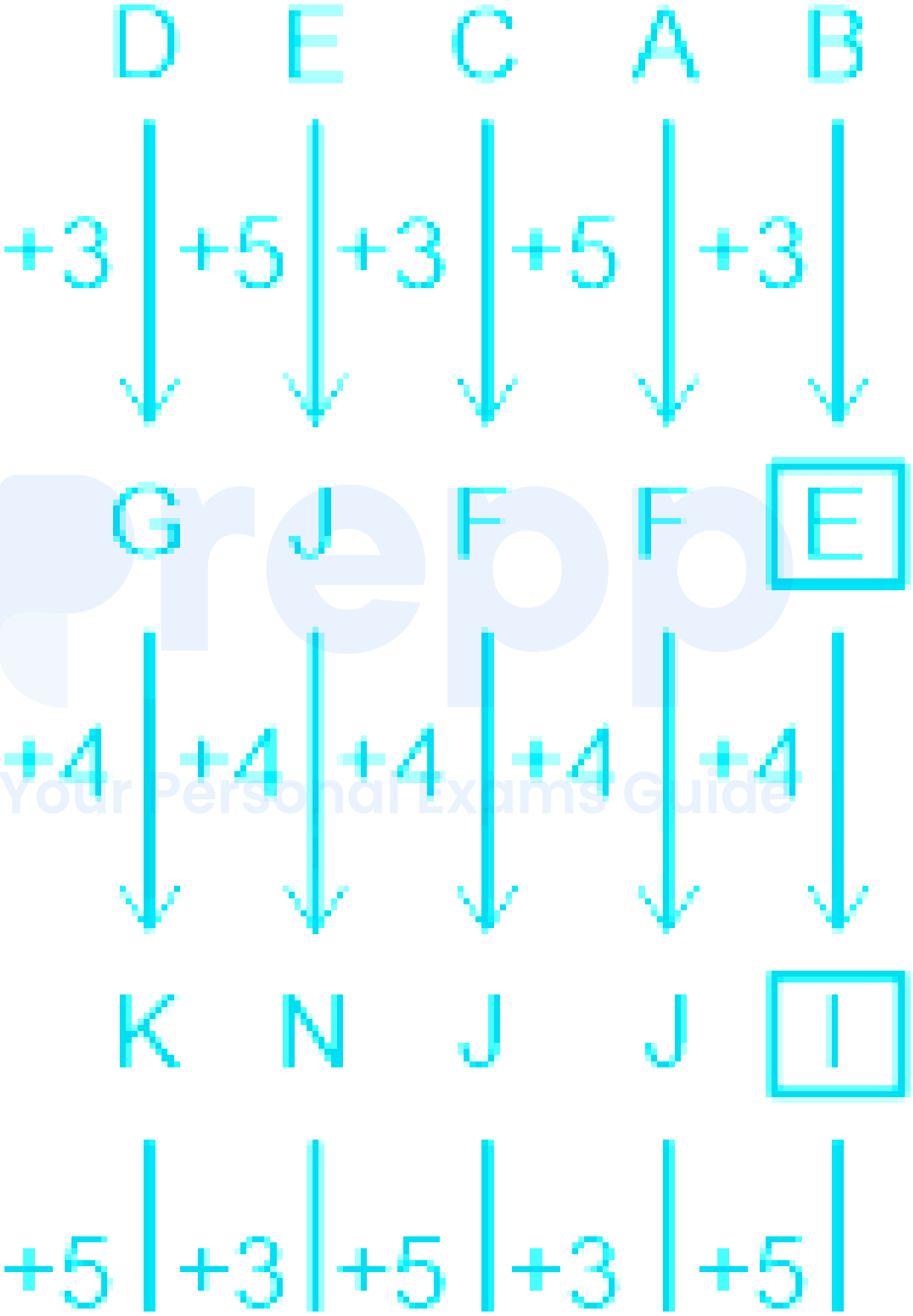
---

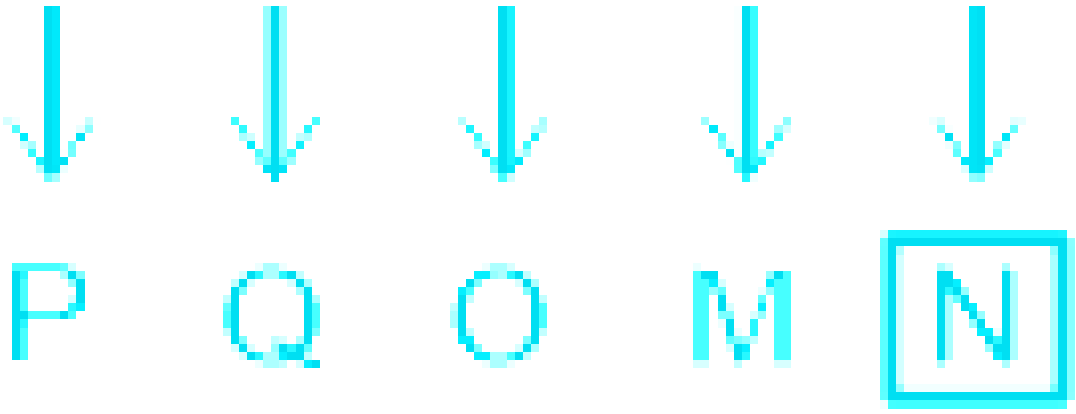
94. **Answer: c**

Explanation:

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N

- The pattern followed here is:
-





- Here, 'EIN' gives the correct sequence of the letters that are missing from the letter clusters.

Hence, EIN is the correct answer.

---

95. Answer: d

Explanation:

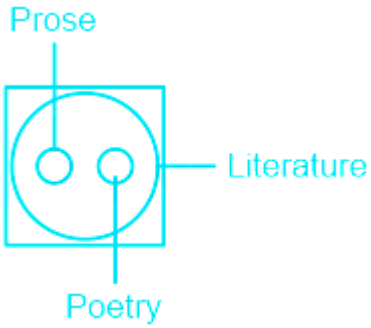
- The relationship between Prose, Literature and Poetry is as follows.

i) All Prose are Literature.

ii) All Poetry are Literature.

iii) No Poetry is Prose.

- The Venn diagram from the given options that best represents the relationship between the given set of classes is as follows:



Hence, the figure given in option 4 is the correct answer.

---

96. Answer: b

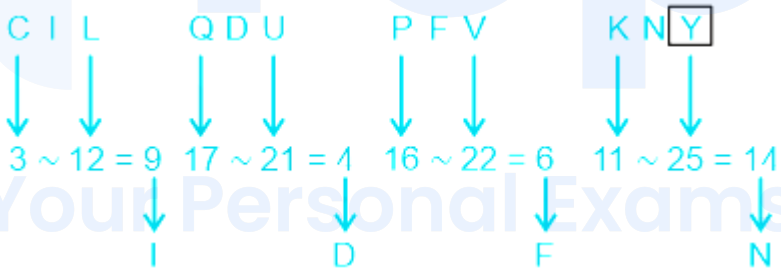
Explanation:

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N

The logic followed here is :

(Third letter - first letter) = Second letter.

Given series- CIL, QDU, PFV, KN?



⭐ <u>Alternate Method</u>

The logic followed here is :

1st letter + 2nd letter = 3rd letter.

i) CIL

$$C(3) + I(9) = (12)$$

ii) QDU

$$Q(17) + D(4) = U(21)$$

iii)

$$P(16) + F(6) = V(22)$$

Similarly,

KN? will be

$$K(11) + N(14) = Y(25)$$

Here, question mark (?) will be replaced by **'Y'.**

---

97. Answer: a

Explanation:

The logic followed here is

Symbol	÷	+	×
Code	×	÷	+

i) 9 ÷ 5 + 3 × 7 = 22

- On decoding, 9 × 5 ÷ 3 + 7 = 15 + 7 = 22 (Here, 5 ÷ 3 will give us decimal values, so we will do 9 × 5 first and then divided by 3 to get 15.)

ii) 4 ÷ 7 + 2 × 15 = 29

- On decoding, 4 × 7 ÷ 2 + 15 = 14 + 15 = 29

Similarly,14 ÷ 5 + 35 × 9.

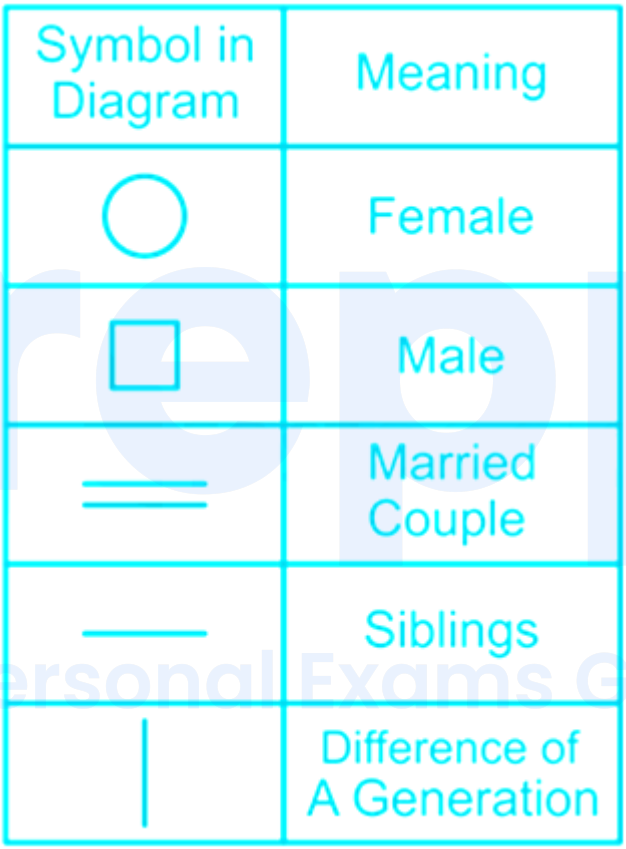
- On decoding 14 × 5 ÷ 35 + 9 = 2 + 9 = 11

Hence, '11' is the correct answer.

98. **Answer: b**

Explanation:

- Preparing the family tree using the following symbols:



1) Rohan is Sumit's brother.

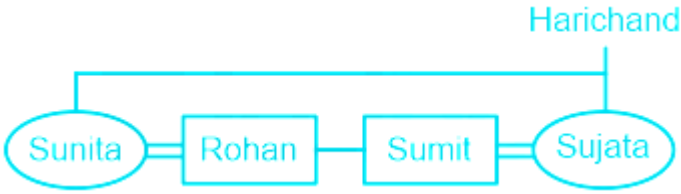
2) Sumit wants to marry Sujata.

3) Sujata is the daughter of Hari Chand.

4) Rohan wants to divorce Sunita.

4) Sujata and Sunita are sisters.

- The family tree will be as follows:



- Here, Harichand is either mother-in-law or father-in-law of Rohan.
- Because mother-in-law is not given in the options, Harichand is the father-in-law of Rohan.

Hence, 'father-in-law' is the correct answer.

---

99. Answer: c

Explanation:

The logic followed here is:

$(2 + 5)^2 = 7^2 = 49$;

$(8 + 7)^2 = 15\ 2 = 225$;

Applying both the logic here:

$(12 + 5)\ 2 = 17\ 2 = 289$;

$(12 + 7)\ 2 = 19\ 2 = 361$;So, the value of 12 can be between 289 and 361. Here, 400 is out of this range.

Hence, 400 is the correct answer.

---

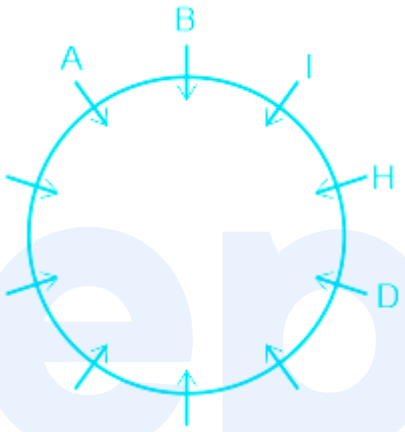
100. **Answer: c**

Explanation:

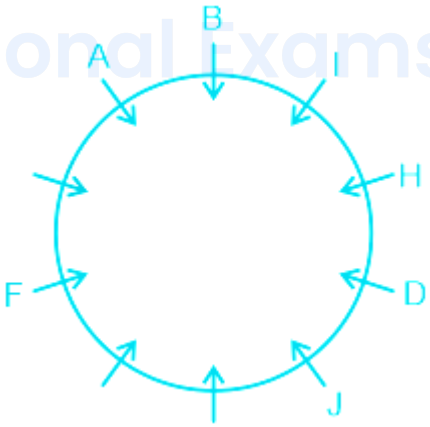
Persons: 10

i) A and I are sitting to the immediate right and immediate left of B, respectively.

ii) H is sitting in between I and D.



iii) A and J are sitting opposite to each other, whereas F and H are sitting opposite to each other.



Now let us analyze the options:

i) D is sitting to the immediate right of C. → False(as D is sitting to the immediate right of J)

ii) G is sitting beside D. → False (as J and H are sitting beside D)

iii) I is sitting between H and B. → True

iv) J is sitting between A and F. → False (as J sits opposite A).

Hence, 'I is sitting between H and B.' is the correct answer.