Prepp

Your Personal Exams Guide

- NDA
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- SSC CGL
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- CTET
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- CSIR UDC NET
- IBPS PO
- UP POLICE
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- SBI PO
- BPSC
- UPTET
- IBPS RRB
- IBPS CLERK
- IES
- UPSC CAPF
- SSC Stenogr..
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RRB NTPC 2021 (CBT 1) Previous Year Paper (8 Jan 2021) Shift 2

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 $\cos x = \frac{-1}{2}$ and $\pi < x < \frac{3\pi}{2}$, find the value of 4 tan ^{2}x - 3 cosec ^{2}x. **(+1, -0.33)**

   a. 16

   b. 10

   c. 12

   d. 8

---

2. Which place was called the “nursery of the Bengal army"? **(+1, -0.33)**

   a. Awadh

   b. Bengal

   c. Eastern Uttar Pradesh

   d. Punjab

---

3. If , 6(sec 2 59° - cot 2 31°] + 2/3 × sin 90° - 3 × tan 2 56° × y × tan 2 34° = y/3 then the value of y is: **(+1, -0.33)**

   a. 2

   b. 3

   c. 1

   d. 4

---

4. Which gas is needed for photosynthesis? **(+1, -0.33)**

a. Carbon dioxide

b. Oxygen

c. Hydrogen

d. Carbon mono oxide

---

5. A alone can complete a work in 10 days and B can complete it in 15 days. A and B undertake the work for Rs. 4,800. With the help of C, they complete the work in 5 days. What amount is to be paid to C? **(+1, -0.33)**

a. Rs. 700

b. Rs. 1200

c. Rs. 800

d. Rs. 600

---

6. Find the area of a rhombus whose side is 10 cm and the longest diagonal is 16 cm. **(+1, -0.33)**

a. 88 cm^2

b. 96 cm^2

c. 86 cm^2

d. 94 cm^2

---

7. The compound interest on a certain sum of money at the rate of 11% p.a. for **(+1, -0.33)**

2 years is Rs. 4642. Find its simple interest at the same rate and for the same period.

a. Rs. 4400

b. Rs. 3500

c. Rs. 4500

d. Rs. 4200

---

8. Which function key in Excel helps to switch to edit mode? **(+1, -0.33)**

a. F2

b. F5

c. F3

d. F7

---

9. The 2020, UNESCO/Guillermo Cano Press Freedom Prize has been awarded to _ _ _ _ _ _ **(+1, -0.33)**

a. Jineth Bedoya Lima

b. Cheng Yizhong

c. Mahmud Abu Zeid

d. Reeyot Alemu

---

10. Name the Buddhist text that comprises rules for monks. **(+1, -0.33)**

a. Tipitaka

b. Vinaya Pitaka

c. Sutta Pitaka

d. Abhidhamma Pitaka

---

11. Name the cyclone that hit Odisha and West Bengal in May 2020. **(+1, -0.33)**

a. Fani

b. Bulbul

c. Amphan

d. Hudhud

---

12. Which one of the following was a measure taken under the Rowlatt Act? **(+1, -0.33)**

a. Restriction on traveling abroad.

b. Restriction on wearing Khadi.

c. Forced to buy foreign goods.

d. Imprisonment without trial.

---

13. The mean of a, b, c, d, e and f is 36. If the mean of b, d and f is 28, find the mean of a, c and e. **(+1, -0.33)**

a. 44

b. 30

c. 32

d. 42

---

14. Which Indian female shooter had won the gold medal in individual 10 m air rifle women event at the 2019 ISSF World Cup in New Delhi? **(+1, -0.33)**

a. Anjum Moudgil

b. Apurvi Chandela

c. Heena Sidhu

d. Manu Bhaker

---

15. Select the number from among the given options that will come next in the following series. **(+1, -0.33)**

4, 16, 40, ?

a. 88

b. 98

c. 68

d. 48

---

16. In an election the votes cast for two candidates were in the ratio 2 : 9. If the successful candidate received 984321 votes, find the total voters polled. **(+1, -0.33)**

a. 1230059

b. 1203059

c. 1302059

d. 1320059

---

17. The length of a rectangle is $\frac{3}{5}$ of the radius of a circle. The radius of a circle is equal to the side of a square whose area is 4900 m^2. What is the area of the rectangle if its breadth is 20 m. **(+1, -0.33)**

a. 840 m^2

b. 860 m^2

c. 480 m^2

d. 880 m^2

---

18. Rahul is the brother of Raj. Radha is the sister of Raman. Raj is the son of Radha. Then how is Rahul related to Radha? **(+1, -0.33)**

a. Son

b. Nephew

c. Uncle

d. Brother

---

19. If the length of side of a square is increased by 10%, what is the percentage increase in its area? **(+1, -0.33)**

a. 10%

b. 21%

c. 20%

d. 15%

---

20. Which of the following has been written by Munshi Premchand? **(+1, -0.33)**

a. Chidambara

b. Kamayani

c. Sevasadan

d. Yama

---

21. 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)**

paper : stapler :: clothes : ?

a. Washing machine

b. Dryer

c. Detergent

d. Hanger

---

22. If the sum of squares of two positive numbers is 2437 and square root of one number is 7, find the other number. **(+1, -0.33)**

a. 6

b. 12

c. 8

d. 16

---

23. Ramesh Sharma borrows Rs. 8,000 for 3 years at 5% p.a. simple interest. He lends it to Manohar at 7% p.a. for 3 years. Find his gain. **(+1, -0.33)**

a. Rs. 580

b. Rs. 480

c. Rs. 450

d. Rs. 460

---

24. A train covers 400 km at a uniform speed. If the speed had been 10 km/h more, it would have taken 2 h less for the same journey. Find the speed of the train. **(+1, -0.33)**

a. 40 km/h

b. 50 km/h

c. 55 km/h

d. 45 km/h

---

25. Nobel Laureate, Kailash Satyarthi is associated with which of the following organization? **(+1, -0.33)**

a. Beti Bachao, Beti Padhao

b. SOS village

c. Child Relief and You

d. Bachpan Bachao Andolan

---

26. Name the recently added 17 th zone of the Indian Railway. **(+1, -0.33)**

a. East Central Railway

b. Delhi Metro

c. Kolkata Metro

d. Konkan Railway

---

27. Which of the following is a cause for Migration of unskilled workers? **(+1, -0.33)**

a. Population

b. Poverty

c. Pollution

d. Ambience

---

28. In a firm the ratio of male and female members was 4 : 5. The firm decided to increase the number of males by 80% and the number of females by 60%. What will be the new ratio of male members to female members in the firm? **(+1, -0.33)**

a. 8 : 10

b. 15 : 16

c. 18 : 15

d. 9 : 10

---

29. A is 5 times as good as workman as B and therefore is able to complete a job in 60 days less than B. In how many days will they finish it working together? **(+1, -0.33)**

a. $12\frac{1}{2}$ days

b. 12 days

c. $14\frac{1}{2}$ days

d. 14 days

---

30. What was India's Rank in Human Development Index, 2019? **(+1, -0.33)**

a. 147

b. 139

c. 152

d. 129

---

31. Name the youngest-ever UNICEF Goodwill Ambassador. **(+1, -0.33)**

a. Millie Bobby Brown

b. Lily singh

c. Lionel Messi

d. Priyanka Chopra

---

32. In the following question, four letter pairs are given. The letters on left side of (-) is related to the letters on the right side of (-) with some Logic/Rule/Relation. Three are similar on basis of same Logic/Rule/Relation. Select the odd one out from the given alternatives. **(+1, -0.33)**

a. PSD - KYU

b. ZBN - EHU

c. SJF - MPX

d. NRB - IXS

---

33. Which of the following Heritage sites has the Dravidian style of architecture? **(+1, -0.33)**

a. Hampi

b. Ellora

c. Khajuraho

d. Konark

---

34. The smallest six-digit number which is completely divisible by 4, 8, 12 and 16 is: **(+1, -0.33)**

a. 100032

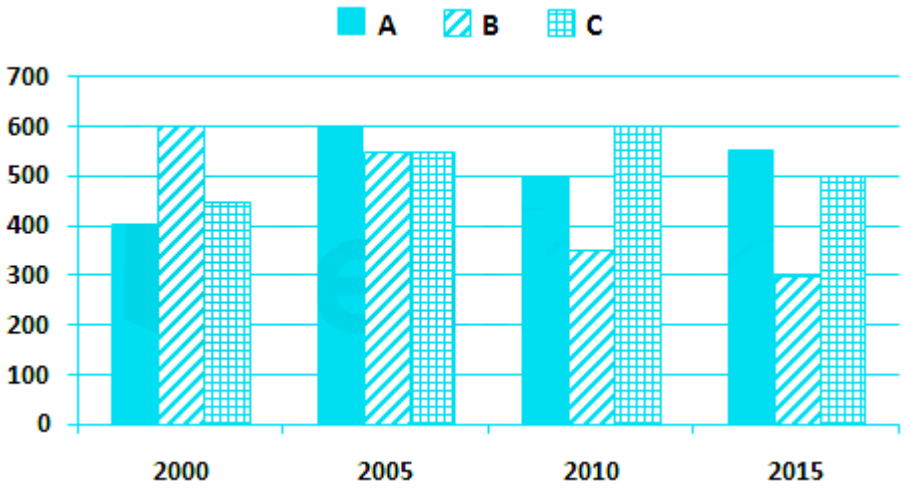
b. 100900

c. 100800

d. 100700

---

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



A, B and C are different cities and the given data is of the number of accidents that took place in the respective years 2000, 2005, 2010 and 2015.

On the basis of given data, which city can be said to have controlled accidents most effectively?

a. A

b. B

c. A and C both

d. C

---

36. If $\sqrt{2116 \times \sqrt{48 \div x}} = 92$, find the value of x. **(+1, -0.33)**

a. 12

b. 3

c. 2

d. 6

---

37. Which state in India has the biggest consumption of fertliser(in Kg Per hectare)? **(+1, -0.33)**

a. Haryana

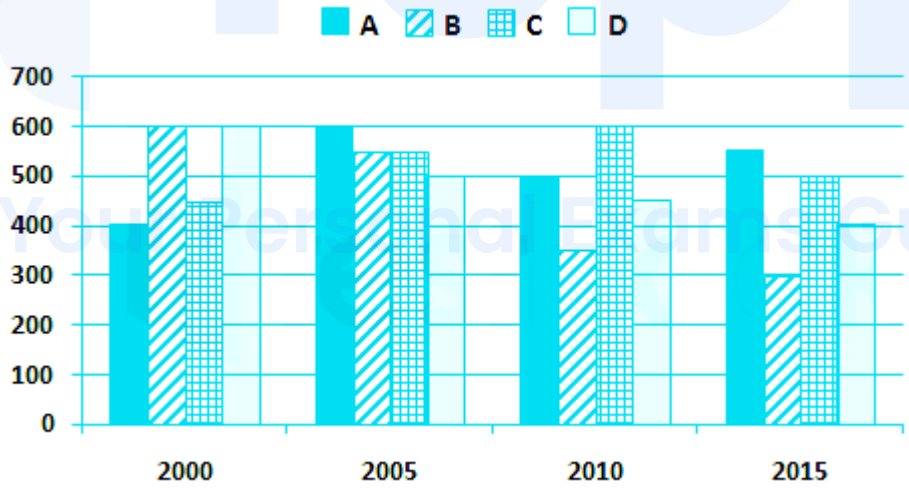
b. West Bengal

c. Andhra Pradesh

d. Punjab

---

38. Study the given diagram and answer the question that follow. **(+1, -0.33)**



A, B, C and D are different cities, and the given data is of the number of accidents that took place in the respective years 2000, 2005, 2010 and 2015.

If the data for 2020 follows the trend similar to that of 2015, which city is most likely to have a higher number of accidents?

a. B

b. A

c. C

d. D

---

39. If $x^{4} + x^{-4} = 1154$ then the value of $x + x^{-1}$ is: **(+1, -0.33)**

a. 5

b. 12

c. 6

d. 8

---

40. Which famous revolutionary set up base near Satar river in Jhansi in the 1920's using the alias, Pandit Harishankar Brahmachari? **(+1, -0.33)**

a. Bhagat singh

b. Udham singh

c. Khudiram Bose

d. Chandrashekhar Azad

---

41. In May 2019, the last captive White tiger of Mumbai died. What was the name of the tiger? **(+1, -0.33)**

a. Balaji

b. Shivaji

c. Vishwanath

d. Bajirao

---

42. CSIR scientists have conducted a genetic study for the first time in India. Where has the study been conducted? (+1, -0.33)

a. Hyderabad

b. Lakshwadeep

c. Kochi

d. Andaman

---

43. Which other movement was combined with the non-cooperation movement in 1920? (+1, -0.33)

a. Swadeshi Movement

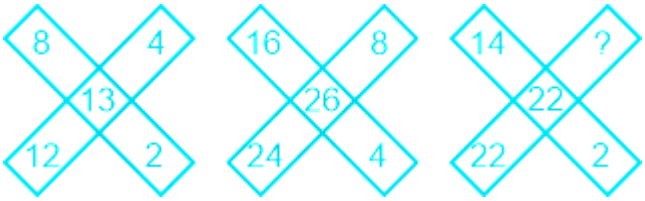
b. Khilafat Movement

c. Home Rule Movement

d. August Kranti

---

44. Study the given pattern carefully and select the number that can replace the question mark (?) in it. (+1, -0.33)



a. 8

b. 12

c. 6

d. 10

---

45. Find the sum of the numbers between 400 and 600 such that when they are divided by 6, 12 and 16, there will be no remainder. **(+1, -0.33)**

a. 2620

b. 2016

c. 2026

d. 2610

---

46. Who said in the Constituent assembly debate on 27 August 1947, “I believe separate electorates will be suicidal to the minorities." **(+1, -0.33)**

a. R V dhulekar

b. 'Govind Bhallabh Pant

c. B. Pocker Bahadur

d. Sardar Vallabhbhai Patel

---

47. Find the least number of five digits, which is exactly divisible by 472. (+1, -0.33)

a. 10284

b. 10472

c. 10184

d. 10384

---

48. Due to 25% reduction in the price of wheat per kg, John is able to buy 5 kg more for Rs.600. What is the original price of wheat per kg? (+1, -0.33)

a. Rs. 60

b. Rs. 45

c. Rs. 40

d. Rs. 50

---

49. On being criticized for borrowing features from other countries for the constitution, who said the following- "Nobody holds any patent rights in the fundamental ideas of a constitution. (+1, -0.33)

a. Sardar Vallabhbhai Patel

b. Dr. BR Ambedkar

c. C. Rajgopalachari

d. Jawahar Lal Nehru

---

50. As per Public affair Index 2020 (PAI-2020), which of the following state (+1, -0.33)

emerged as the best governed state in the country?

a. Kerala

b. Maharashtra

c. Gujrat

d. Punjab

---

51. As per flag code of India 2002, What should be the position of the Indian flag when it is displayed along with flags of other countries in a straight line? **(+1, -0.33)**

a. Anywhere in the row

b. Extreme left

c. Extreme right

d. In the middle

---

52. From an external point P, tangents PA and PB are drawn to a circle with centre O. If ∠PAB= 55°, find ∠AOB. **(+1, -0.33)**

a. 110°

b. 100°

c. 35°

d. 125°

---

53. The three laws of motion were proposed by: **(+1, -0.33)**

a. Galileo

b. Aristole

c. Edison

d. Newton

---

54. The average weight of A, B, C, and D is 56 kg. If the average weight of A, B, and C is 52 kg and that of C and D is 48 kg. then the weight of C is: **(+1, -0.33)**

a. 36 kg

b. 28 kg

c. 30 kg

d. 34 kg

---

55. Name the first student satellite built by Indian high school student team and launched by NASA. **(+1, -0.33)**

a. Kalamsat

b. SRMsat

c. Anusat

d. Pratham

---

56. The least number which should be added to 4707 so that the sum is exactly divisible by 4, 5, 6 and 8 is: **(+1, -0.33)**

a. 83

b. 73

c. 63

d. 93

---

57. Name the Kalvari class submarine launched in Mumbai in Nov 2020. **(+1, -0.33)**

a. INS Khanderi

b. INS Vagir

c. INS Arighat

d. INS Karanj

---

58. What is the full form of COBOL? **(+1, -0.33)**

a. Common Business Organised Language

b. Computer Business Oriented Language

c. Computer Basic Operation Language

d. Common Business Oriented Language

---

59. Study the given pattern carefully and select the number that can replace the question mark (?) in it. **(+1, -0.33)**

9	5	5
5	7	?
3	4	5
135	140	150

a. 6

b. 4

c. 8

d. 10

---

60. Simplify. **(+1, -0.33)**

$$\frac{6.25+\frac{5}{7}\times 28-5}{\frac{3}{4}\times(15.8-3.4)+5\times 2.39}$$

a. 4

b. 1

c. 3

d. 5

---

61. What is the code name of India's first successful Nuclear test? **(+1, -0.33)**

a. Laughing Buddha

b. Operation Shakti

c. Smilling Buddha

d. Operation Vijay

---

62. Whom did Mahatma Gandhi consider his mentor in politics? (+1, -0.33)

a. Gopal Krishna Gokhale

b. Raychandbhai

c. Lala Lajpat Rai

d. Bal Gangadhar Tilak

---

63. Which is the longest railway line in the world? (+1, -0.33)

a. The Union- Pacific railway

b. The Australian Trans-Continental Railway

c. Trans-Canadian Railway

d. Trans-Siberian Railway

---

64. Litmus solution is derived from _ _ _ _ _ _ (+1, -0.33)

a. Hydrangea

b. Petunia

c. Cabbage leaves

d. Lichen

---

65. The region where farmers specialise in vegetables only, this type of (+1, -0.33)

farming is known as :

a. Cooperative farming

b. Mixed farming

c. Truck farming

d. Collective farming

---

66. Which of the following state has the highest wind energy production in India? (+1, -0.33)

a. Odisha

b. Karnataka

c. Maharashtra

d. Tamil Nadu

---

67. Which city has bagged the second spot in the Swacch Sarvekshan award for 2020? (+1, -0.33)

a. Chandigarh

b. Bhopal

c. New Delhi

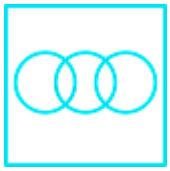
d. Surat

---

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

Students, Interns and Research scholars

a. 

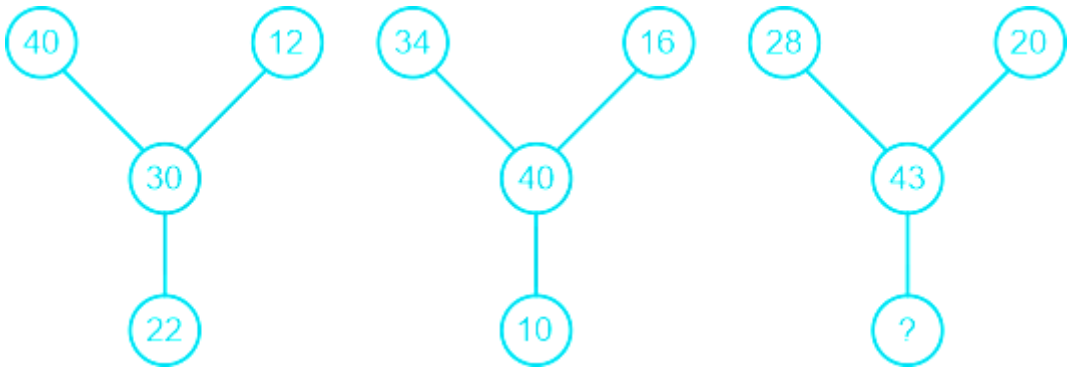
b. 

c. 

d. 

---

69. Study the given pattern carefully and select the number that can replace the question mark (?) in it. **(+1, -0.33)**



a. 5

b. 11

c. 7

d. 9

---

70. $3^{71} + 3^{72} + 3^{73} + 3^{74} + 3^{75}$ is divisible by: **(+1, -0.33)**

a. 8

b. 11

c. 7

d. 5

---

71. Study the given pattern carefully and select the number that can replace the question mark (7) in it. **(+1, -0.33)**

4	3	8
9	7	2
8	6	4
44	27	?

a. 20

b. 84

c. 14

d. 64

---

72. The full form of BHEL is _ _ _ _ _ _ **(+1, -0.33)**

a. Bharat Heavy Electricals Limited

b. Bharat Heavy Electronics Limited

c. Bureau of Heavy Electronics Limited

d. Bureau of Heavy Electricals Limited

---

73. Simplify. **(+1, -0.33)**

$17 \times 8 - 6 + [(27 - 3) \div 6 - 4]$

a. 130

b. 142

c. 150

d. 136

---

74. The perimeter of a right triangle is 60 cm and its hypotenuse is 26 cm. Find the area of the triangle. **(+1, -0.33)**

a. 240 cm^2

b. 180 cm^2

c. 160 cm^2

d. 120 cm^2

---

75. If $a^2 + b^2 = 82$ and $ab = 9$, Find the value of $a^3 + b^3$. **(+1, -0.33)**

a. 720

b. 830

c. 730

d. 750

---

76. Where was the first oil well discovered in Assam? (+1, -0.33)

a. Digboi

b. Rudrasagar

c. Naharkatiya

d. Moran Hugrijan

---

77. Select the pattern that will come next in the following series. (+1, -0.33)

CKV, DLW, EMX, ?

a. FNY

b. FLP

c. HNZ

d. BOI

---

78. Who is considered the father of computers? (+1, -0.33)

a. Charles Babbage

b. John Atanasoff

c. Charles Bachman

d. Alan turing

---

79. If A is equal to 1, M is equal to 13 and R is equal 18, how would you spell MISSION? **(+1, -0.33)**

a. 139191991314

b. 149191991314

c. 139191991514

d. 129191991314

---

80. What is the momentum of an object having mass of 14 kg and velocity 28 m/s? **(+1, -0.33)**

a. 1/392 kg-m/s

b. 2 kg-m/s

c. 0.5 kg-m/s

d. 392 kg-m/s

---

81. A man bought 2 articles for Rs. 3,000 each. He sold one article at 10% profit and another at 5% profit. Find the total percentage profit he earned. **(+1, -0.33)**

a. 15%

b. 6.5%

c. 7.5%

d. 8.5%

---

82. Simplify. **(+1, -0.33)**

$\frac{46+\frac{3}{4}\times32-6}{37-\frac{3}{4}\times(34-6)}$

a. 10

b. 6

c. 4

d. 8

---

83. 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)**

BILR : EFOO :: CJPT : ?

a. FGSQ

b. QWNT

c. MIEB

d. NGDE

---

84. Ina code language, if KARAN is written as 45, then how will ARUN be written as in that language? **(+1, -0.33)**

a. 56

b. 54

c. 41

d. 42

---

85. Which sector is the biggest emitter of greenhouse gases? **(+1, -0.33)**

a. Agriculture

b. Waste

c. Energy

d. Land use change

---

86. Select the number that will come next in the following series. **(+1, -0.33)**

2, 7, 14, 23, ?

a. 33

b. 34

c. 30

d. 13

---

87. If A is taller than B and B is taller than C. D is shorter than B but taller than C, then D is: **(+1, -0.33)**

a. taller than B

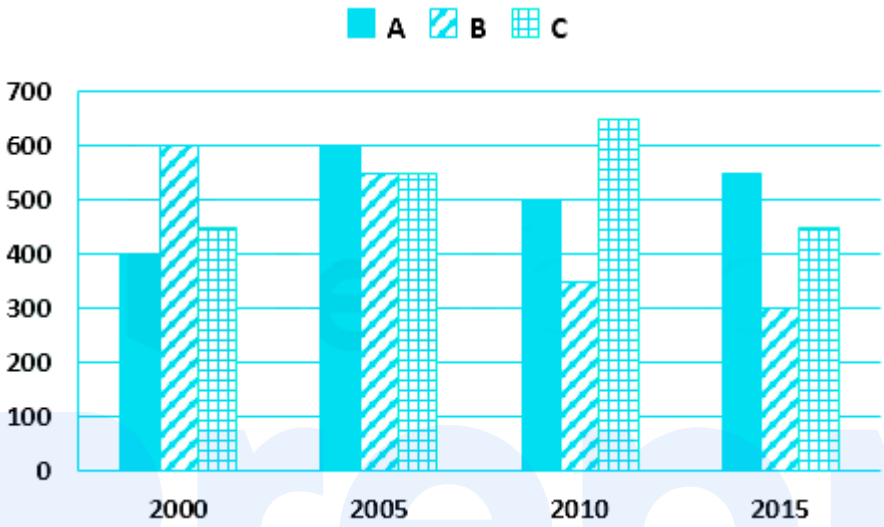
b. the shortest

c. taller than A and B

d. taller than C

---

88. Study the given diagram and answer the question that follow. **(+1, -0.33)**



A, B and C are different cities and the given data is of the number of accidents that took place in the respective years 2000, 2005, 2010 and 2015.

Which city has the highest number of accidents on an average?

a. A and C both

b. C

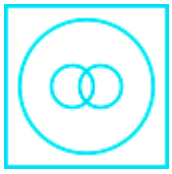
c. B

d. A

---

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

Short women, White-haired people, Indians

a. 

b. 

c. 

d. 

---

90. A question is given followed by two arguments. Decide which of the arguments is/are strong with respect to the question. **(+1, -0.33)**

Question:

Should elections be conducted for student unions in educational institutions?

Arguments:

1. Yes, it is important to conduct elections so that the rights and complaints of the students can be heard by authorities.

2. No, it disrupts the educational environment and leads to chaos and violence in institutes which does not solve any problems but creates more issues.

a. Neither 1 nor 2 is strong.

b. Both, 1 and 2 are strong.

c. Only 1 is strong

d. Only 2 is strong

---

91. In a code language, if RAMAN is written as 47, then how will ARJUN be written as in that language? **(+1, -0.33)**

a. 44

b. 74

c. 54

d. 64

---

92. Reading the English alphabet from left to right, what is the 5 th letter to the right of the 14 th letter? **(+1, -0.33)**

a. S

b. T

c. R

d. U

---

93. In a code language, if FORWARD is written as 1234536 and WATER is written as 45783, how will RETARD be written as in that language? **(+1, -0.33)**

a. 386536

b. 387536

c. 387546

d. 386546

---

94. In a code language, if LAST is written as 1234 and BOOK is written as 5667, how will TOAST be written as in that language? **(+1, -0.33)**

a. 45234

b. 46234

c. 46324

d. 47234

---

95. Select the number that will come next in the following series. **(+1, -0.33)**

9, 81, 6561, ?

a. 43046621

b. 43046221

c. 43046721

d. 42046721

---

96. How many 3s are there in the given series that are followed by 9 and preceded by 8? **(+1, -0.33)**

183979399763498397458396830077 5368265969

a. 1

b. 3

c. 4

d. 5

---

97. Select the number from among the given options that will come next in the following series. **(+1, -0.33)**

3, 27, 243, ?

a. 2900

b. 2187

c. 2493

d. 2100

---

98. If the south-east direction moves two places and becomes north-east; and north-west moves two places to become south-west, what would be the direction that west would become, assuming all other directions make similar movements? **(+1, -0.33)**

a. South

b. North-west

c. East

d. North-east

---

99. 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)**

Hand : Thumb :: pen : ?

a. paper

b. Nib

c. Finger

d. Holder

---

100. After starting from a point, Naveen walks 3 km towards the east. Then turning to his left he moves 3 km. After this he again tums his left and moves 4 km. In which direction is he standing from his starting point? **(+1, -0.33)**

a. South-east

b. South

c. North

d. North-west

Answers

1. Answer: d

Explanation:

Given:

$\cos x = \frac{-1}{2}$ where $\pi < x < \frac{3\pi}{2}$

Formula used:

cos(π + x) = - cos x $\because [\ \pi < x < \frac{3\pi}{2}\ ]$

Calculation:

cos x = - 1/2

⇒ cos x = cos(π + π/3)

⇒ x = 4π/3

4 tan 2x - 3 cosec 2x

⇒ 4 × $(\sqrt{3})^2$ - 3 × $(-2/\sqrt{3})^2$

⇒ 4 × 3 - 3 × 4/3

⇒ 12 - 4

⇒ 8

∴ The required value is 8.

⭐ Mistake Points

The value of tan and cot is positive in the third quadrant.

---

2. Answer: a

Explanation:

The correct answer is **Awadh**.

⭐ **Key Points**

- **Awadh** was called the “nursery of the Bengal army".
- **Awadh** known in British historical texts as **Avadh or Oudh** is a region and proposed state in the modern Indian state of **Uttar Pradesh** .
- **The changes that the families of the sepoys saw around them and the threats they perceived were quickly transmitted to the sepoy lines** .
- The large majority of the sepoys of the Bengal Army were recruited from the villages of **Awadh and eastern Uttar Pradesh** . Many of them were Brahmins or from the “upper” castes. **Awadh was, in fact, called the “nursery of the Bengal Army”** .

⭐ **Additional Information**

- Some following facts, **Awadh** was called **“nursery of the Bengal army"** :-
- The Bengal Army of the **East India Company** was mainly recruited from high castes living in **Bengal, Bihar, and the Awadh** .
- The sepoys were Indian soldiers who were recruited into the Company's army just before the **rebellion of 1857** .
- **The Bengal Army** recruited higher castes, such as Brahmins, Rajputs, and Bhumihar, **mostly from the Awadh and Bihar regions** , and even restricted the enlistment of lower castes in **1855** . A practice that continued for the **next 75 years** .

---

3. **Answer: a**

Explanation:

Given:

$6(\sec 2\ 59° - \cot 2\ 31°] + 2/3 \times \sin 90° - 3 \times \tan 2\ 56° \times\ y \times \tan 2\ 34° = y/3$

Formulas used:

$\text{cosec}(90^\circ - A) = \sec A$

$\tan(90^\circ - A) = \cot A$

$\text{cosec}\ 2A - \cot 2A = 1$

Calculation:

$6(\sec 2\ 59^\circ - \cot 2\ 31^\circ] + 2/3 \times \sin 90^\circ - 3 \times \tan 2\ 56^\circ \times y \times \tan 2\ 34^\circ = y/3$

$\Rightarrow 6[\sec^2(90^\circ - 31^\circ) - \cot^2 31^\circ] + 2/3 \times 1 - 3 \times \tan^2(90^\circ - 34^\circ) \times y \times \tan 234^\circ = y/3$

$\Rightarrow 6[\text{cosec}^2 31^\circ - \cot 2\ 31^\circ] + 2/3 - 3 \times \cot^2 34^\circ \times y \times \tan 234^\circ = y/3$

$\Rightarrow 6 \times 1 + 2/3 - 3 \times 1/\tan 234^\circ \times \tan 234^\circ \times y = y/3$

$\Rightarrow 6 + 2/3 - 3y = y/3$

$\Rightarrow 20/3 = y/3 + 3y$

$\Rightarrow 20/3 = 10y/3$

$\Rightarrow 20 = 10y$

$\therefore y = 2$

---

4. Answer: a

Explanation:

The correct answer is **Carbon dioxide**.

⭐ **Key Points**

- **Carbon dioxide** gas is needed for photosynthesis.
- The raw materials required for **photosynthesis** are **carbon dioxide, water, and sunlight** primarily.

- Plants take in **carbon dioxide (CO2)** and water (H2O) from the air and soil during **photosynthesis** .
- During **photosynthesis** in the plant cell, the **water is oxidized** , meaning it loses electrons, while the **carbon dioxide is reduced** , meaning it gains electrons.
- This transforms the **water into oxygen** and the **carbon dioxide into glucose** . The plant then releases the oxygen back into the air, and stores energy within the glucose molecules.

⭐ Additional Information

Gas	Use in photosynthesis
Oxygen	**Oxygen** is evolved during photosynthetic electron transport when water is split by the oxygen-evolving complex to provide protons and electrons to the chloroplastic electron chain, thereby generating **ATP and NADPH** . the energy source and reducing power for plant metabolism.
Hydrogen	During photosynthesis, **Hydrogen ions** are vital in both aiding proton gradients to help drive the electron transport chain, and for plant respiration. **Hydrogen is necessary for building sugars and other molecules to produce glucose for plant energy** .
Carbon mono oxide	**Carbon monoxide** does not poison plants since it is rapidly oxidized to form carbon dioxide which is **used for photosynthesis** .

---

5. **Answer: c**

Explanation:

Given:

Time taken by A to do a work = 10 days

Time taken by B to do the same work = 15 days

Time taken by A, B and C do the same work = 5 days

Amount of earning = Rs.4800

Formula used:

Ratio of shares of A, B and C = Ratio of their Efficiency

Calculation:

Let total work be = 1 unit

One day work done by A = 1/10

One day work done by B = 1/15

One day work done by A, B and C = 1/5

⇒ One day work done by C = 1/5 - (1/10 - 1/15)

⇒ 1/30

Ratio of shares of A, B and C = Ratio of their one-day work efficiency

⇒ A : B : C = 1/10 : 1/15 : 1: 30

⇒ A : B : C = 3 : 2 : 1

∴ C's share in earning = Rs.4800 × 1/6

⇒ Rs.800

---

6. **Answer: b**

Explanation:

Given:

Side of a rhombus = 10 cm

Length of longest diagonal = 16 cm

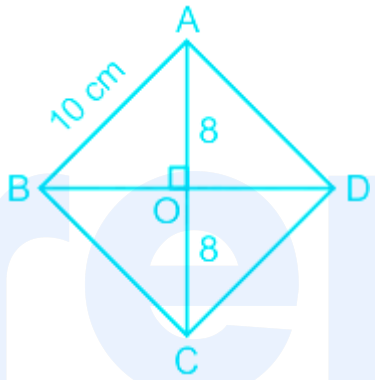
Concept:

A rhombus has equal sides and its diagonals are perpendicular bisectors.

Formulas used:

Area of a rhombus = 1/2 × D1 × D2 [D1 and D2 are diagonals]

Calculation:



By Pythagoras Theorem

In triangle ABO, $AB^2 = AO^2 + BO^2$

$\Rightarrow 10^2 = 8^2 + BO^2$

$\Rightarrow BO = \sqrt{(100 - 64)} = \sqrt{36}$

$\Rightarrow BO = 6$

$BD = 2 \times BO = 2 \times 6 = 12$ cm

∴ The area of rhombus = 1/2 × 16 cm × 12 cm

$\Rightarrow 96\ cm^2$

---

7. Answer: a

Explanation:

Given:

Compound Interest on a sum for 2 years at 11% p.a. = Rs.4642

Formulas used:

Compound Interest + Principal = Amount

⇒ Amount = Principal × $(1 + R/100)^{n}$

Simple Interest = Principal × Rate/100 × Time

Calculation:

$4642 + P = P \times (1 + 11/100)^{2}$

⇒ $4642 = P \times 111/100 \times 111/100 - P$

⇒ $4642 = P(111/100 \times 111/100 - 1)$

⇒ $4642 = P(12321 - 10000)/10000$

⇒ $4642 = P \times 2321/10000$

⇒ $P = 4642 \times 10000/2321$

⇒ P = Rs.20000

∴ Simple Interest = 20000 × 11/100 × 2 = Rs.4400

⭐ **Alternate Method**

Percentage Method Compound interest and simple interest both are calculated on Principal. Effective rate percent of compound interest for 2 years = R + R + (R × R)/100

⇒ 11 + 11 + (11 × 11)/100

⇒ 22 + 1.21 = 23.21%

Simple interest rate percent for 2 years = Rate % × Time = 11% × 2 = 22%

23.21% of Principal = Rs.4642

⇒ 22% of Principal = Rs.4642 × 22%/23.21% = Rs.4400

∴ The simple interest is Rs.4400.

---

8. **Answer: a**

Explanation:

The correct answer is**F2**.

⭐ **Key Points**

- The function key in Excel helps to switch to edit mode, that is **F2** .
- The function key **F2** allows to quickly and easily edit the data of a cell by activating **Excel's edit mode** and placing the insertion point at the end of the active cell's existing contents.
- Pressing the **F2 key** puts the cell in Excel's edit mode. If the cell contains a formula, We will see the formula in the cell and be able to edit it.
- Use the **mouse to click the formula bar** at the top of the window. The cell activates, and it switches to **editing mode** . We also double-click **the cell** to activate **editing mode** , or we can press the **"F2"** key.

⭐ **Additional Information**

Function key	Description
F5	The **"F5" key** displays the **"Go-To" dialogue box** . The "Go-To" box will list down the valid "named range" available in the opened Excel workbook.
F3	The **"F3" key** helps in Excel to **paste the name or paste the list into the selected cell as displayed in the below image** . This function key will not work until and unless the list that you have created is having a "named range".
F7	The **"F7" key** opens the **"Spelling"** option in excel using which you can check the spellings in your workbook. It provides the same output as you get by navigating to the **"Review"** Tab on the top of the excel ribbon and then clicking on the **"Spelling"** button.

9. **Answer: a**

Explanation:

The correct answer is **Jineth Bedoya Lima**.

⭐ **Key Points**

- 2020, UNESCO/Guillermo Cano Press Freedom Prize has been awarded to **Jineth Bedoya Lima** .
- **Colombian investigative journalist Jineth Bedoya Lima** has been named as the laureate of the 2020 UNESCO/Guillermo Cano World Press Freedom Prize on the recommendation of an **independent international jury of media professionals** .
- Jineth Bedoya Lima was **born in 1974.**
- Lima's reporting has focused on the **armed conflict and peace process in Colombia and on sexual violence against women** . Ms Bedoya Lima was herself a victim of sexual violence in 2000.
- The **UNESCO/Guillermo Cano World Press Freedom Prize** is awarded annually on the occasion of World Press Freedom Day, **celebrated on 3 May** .

- The **$25,000 Prize recognizes a person** , organization, or institution that has made an outstanding contribution to the defence or promotion of press freedom, especially in the face of danger.
- Bedoya's work, activism, and bravery have seen her receive many awards, including the **CJFE International Press Freedom Award in 2000 ,the Courage in Journalism Award of the International Women's Media Foundation in 2001, and the International Women of Courage Award in 2012** .

⭐ Additional Information

Person	Description
Cheng Yizhong	**Chinese journalist Cheng Yizhong** was named as the laureate of the **2005** UNESCO/Guillermo Cano World Press Freedom Prize by UNESCO Director-General Koichiro Matsuura, on the recommendation of an **independent jury of media professionals from all over the world** .
Mahmud Abu Zeid	**Mahmoud Abu Zeid** , also known as Shawkan is an **Egyptian photojournalist** . He won UNESCO/Guillermo Cano World Press Freedom Prize in **2018** for his **contributions and marked its detention as Human Rights abuse** .
Reeyot Alemu	**Reeyot Alemu won the UNESCO/Guillermo Cano World Press Freedom Prize in 2013** . She is an Ethiopian journalist who served a 5-year prison sentence following an unfair trial in which **anti-terrorism laws were used to silence her writing** .

---

10. **Answer: b**

Explanation:

The correct answer is **Vinaya Pitaka**.

⭐ Key Points

- The Buddhist text that comprises rules for monks is **Vinaya Pitaka** .
- **Vinaya Pitaka** is the oldest and smallest of the **three sections** of the Buddhist canonical **Tipitaka ("Triple Basket")** and the one that regulates monastic life and the daily affairs of **monks and nuns** according to rules attributed to the Buddha.
- **Vinaya Pitaka is the first of the Tripitaka** and it contains all the disciplinary rules of ecclesiastical acts and duties formulated by the Buddha himself for the conduct and **guidance of monks and nuns** .
- It consists of five books: **Parajika, Pachittiya, Mahavagga, Chullavagga, and Parivara** .
- **Vinaya Pitaka** tells that there were separate wings for both men and women in **Buddhist Sangha** . It tells how to behave with each other and within the society. **In Vinaya Pitaka, all the rules for Buddhist Sangha were written down** .

⭐ Additional Information

Buddhist text	Description
Tipitaka	It **is the collection of primary Pali language texts** which form the doctrinal foundation of **Theravada Buddhism** . Together with the ancient commentaries, they constitute the complete body of classical Theravada texts.
Sutta Pitaka	Sutta Pitaka is an extensive body of texts constituting the **basic doctrinal section of the Buddhist canon.**
Abhidhamma Pitaka	**The Abhidhamma Pitaka** is a collection of canonical texts in the **Theravada Buddhist tradition** . Together with the Vinaya Pitaka and the Sutta Pitaka, it comprises the Tipitaka, the "Three Baskets" of canonical Theravada Buddhist texts.

11. **Answer: c**

Explanation:

The correct answer is **Amphan**.

⭐ **Key Points**

- The cyclone that hit Odisha and West Bengal in May 2020 is **"Amphan"** .
- The super cyclonic storm **Amphan** got this name from **Thailand** , The word 'Amphan' is pronounced as **'Um-pun' which means sky** .
- **Amphan** originated from a low-pressure area persisting a couple of hundred miles (300 km) east of Colombo, Sri Lanka, on 13 May 2020.
- On 20 May 2020, **Cyclone Amphan** cut a swathe through the northern part of the Indian state of **Odisha** , before bearing down on the state of **West Bengal** , with a wind speed of **185 kilometres per hour** .
- **Coastal areas in West Bengal** comprising East Midnapore, North 24 Parganas, South 24 Parganas, Kolkata, Hooghly, and Howrah as well as **Odisha** were affected by the cyclone. It also caused significant destruction in **Bangladesh** .

⭐ **Additional Information**

Cyclone Name	Description
Fani	Extremely Severe Cyclonic Storm **Fani** was the worst tropical cyclone to strike the Indian state of Odisha since **26 April 1999.** The highest **wind speed was 250 Km/h** . Affected areas: East India, Odisha, Bangladesh, Andhra Pradesh, Sri Lanka, and Bhutan.
Bulbul	The cyclone **Bulbul** hit the coastal districts of **West Bengal and Odisha** on **5 November 2019** . It made landfall between the Sagar Islands of West Bengal and Khepupara in Bangladesh. The highest wind speed was 155 Km/h .
Hudhud	**Hudhud** was a strong tropical cyclone that caused widespread damage to the state of **Andhra Pradesh in India on 8 October 2014** . The most affected region was **Visakhapatnam** along with districts of Vizianagaram and Srikakulam of the state. The highest wind speed was 215 Km/h . The word **Hudhud comes from Arabic** and refers to the Hoopoe bird.

12. **Answer: d**

Explanation:

The correct answer is**Imprisonment without trial.**

⭐ **Key Points**

- **Imprisonment without trial** was one of the measures taken by the British government under the Rowlatt Act.
- This law was passed in **March 1919** by the Imperial Legislative Council.
- The Rowlatt Act is also known as the **Anarchical and Revolutionary Crimes Act of 1919** .
- **Rowlatt Satyagraha** was started by **Mahatma Gandhi** in response to the British government enacting the **Rowlatt Act** .

⭐ **Important Points**

- **The Rowlatt Commission** was appointed by the British Government in **1918.**
- It caused a wave of anger in all sections spreading a country-wide agitation by Gandhiji and marking the foundation of the **Non-Cooperation Movement** .
- **Lord Chelmsford** was the Viceroy when the Rowlatt Act was passed.

---

13. **Answer: a**

Explanation:

Given:

Mean of a, b, c, d, e and f = 36

Mean b, d and f = 28

Formula used:

Mean = Sum of observations/No of observations

Calculation:

Sum of a, b, c, d, e and f = 36 × 6 = 216

Sum of b, d and f = 28 × 3 = 84

Sum of a, c and e = Sum(a, b, c, d, e, f) - Sum(b, d, f)

⇒ 216 - 84 = 132

∴ Mean of a, c and e = 132/3 = 44

---

14. Answer: b

Explanation:

The correct answer is **Apurvi Chandela.**

⭐ **Key Points**

- **Apurvi Chandela** became the world number one in women's 10m Air Rifle category in the 2019 ISSF World Cup.
- She is an Indian athlete who competes in the event of 10-metre air rifle sport shooting.
- She belongs to Rajasthan state.
- She was awarded the Arjuna awards 2016.
- Her Achievements:
  - **2019 ISSF World Cup - Gold**
  - 2014 Commonwealth Games - Gold
  - 2015 World Cup Final - Silver
  - She will be representing India again at the 2021 Tokyo Olympics.

⭐ **Additional Information**

- Shooting:
  - It is an important Olympic sport in India.
  - Some of the most prominent Indian shooters include Abhinav Bindra, Jitu Rai, Rajyavardhan Singh Rathore, Vijay Kumar, Apurvi Chandela, Anjali Bhagwat, and many others.

- Chandro Tomar and Prakashi Tomar are the oldest and second oldest most acclaimed international female veteran shooters from India.

---

15. **Answer: a**

Explanation:

The logic is:

4 × 2 + 8 = 8 + 8 = 16

16 × 2 + 8 = 32 + 8 = 40

40 × 2 + 8 = 80 + 8 = 88

Hence, ' **88** ' is the correct answer.

---

16. **Answer: b**

Explanation:

Given:

Ratio of the votes cast for two candidates = 2 : 9

The successful candidate received 984321 votes

Calculation:

The successful candidate gets more votes than the loser candidates.

⇒ Let the votes cast for two candidates were 2a and 9a respectively

9a = 984321 [∵ 2a < 2b]

⇒ a = 984321/9 = 109369

∴ Total votes polled = 2a + 9a = 11a

⇒ 11a = 11 × 109369 = 1203059

⭐ Shortcut Trick

9 = 984321

⇒ 1 = 109369

∴ 2 + 9 = 11 = 1×11 = 109369 × 11 = 1203059

---

17. **Answer: a**

Explanation:

Given:

Area of a square = 4900 m 2

The radius of a circle = Side of the square

Length of rectangle = 3/5 of the radius of the circle

Breadth of rectangle = 20 m

Formulas used:

Area of square = (Side) ^{2}

Area of rectangle = Length × Breadth

Calculation:

Area of square = (Side) ^{2}

⇒ 4900 = (Side) 2

⇒ Side = √4900

⇒ Side = 70 m

Radius of the cirlce = Side of the square = 70 m

Length of rectangle = 3/5 × 70 m

⇒ Length of rectangle = 42 m

∴ Area of the rectangle = 42 m × 20 m

⇒ 840 m^2

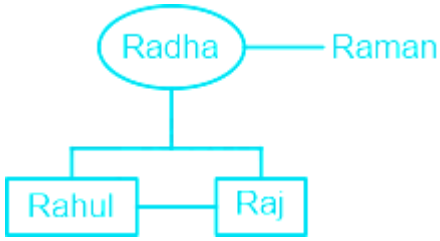
---

18. Answer: a

Explanation:

By using the symbols in the table given below, we can draw the following family tree:

Symbol in Diagram	Meaning
○	Female
□	Male
=	Married Couple
—	Siblings
|	Difference of a Generation



Clearly, Rahul is Son of Radha.

Hence, ' **Son** ' is the correct answer.

---

19. **Answer: b**

Explanation:

Given:

Length of side of a square increases by 10%

Formula used:

Area of square = $(\text{Side})^2$

Calculation:

Let the side of square be = 10 units

Area of the old square = 10 × 10 = 100 sq. units

⇒ Increased side of the square = 10 × 110/100 = 11 units

Area of the new square = 11 × 11 = 121 sq. units

Percentage increase of area = (New Area - Old Area)/Old Area × 100

∴ The required increase in the area = (121 - 100)/100 = 21/100 × 100 = 21%

⭐ Alternate Method

Effective rate of increase = 10% + 10% + (10% × 10%)/100

⇒ 20% + 1% = 21%

---

20. **Answer: c**

Explanation:

The correct answer is **Sevasadan**.

⭐ **Key Points**

- **Seva Sadan** has been written by **Munshi Premchand**.
- **In 1919, Premchand's first major novel Seva Sadan was published in Hindi**.
- **The novel was originally written in Urdu under the title Bazaar-e-Husn** but was published in Hindi first by the name **Sevasadan** a Calcutta-based publisher.
- An English translation of this book was released by **Oxford University Press, India in New Delhi in 2005**.
- **Sewasadan** deals with **poor conditions of women in society, child marriage, and dowry**. It tells us about the Indian upper class and the opportunities they got from the British government. The novel was a shift from fantasy to a serious reflection of life.
- **Dhanpat Rai** was born on **31 July 1880** near Varanasi (Benares), his pen name is **Premchand**.
- He is one of the most celebrated writers of the Indian subcontinent, His works include more than a dozen novels, around 300 short stories, several essays, and translations of a number of foreign literary works into Hindi.

⭐ **Additional Information**

Book	Description
Chidambara	**Chidambara** is a collection of poems written by **Sumitranandan Pant** . Which was awarded the Jnanpith in **1968** .
Kamayani	**Kamayani is a Hindi epic poem by Jaishankar Prasad** . It is considered one of the greatest literary works written in modern times in Hindi literature.
Yama	**Yama** has been written by **Mahadevi Verma** . In 1930, Nihar, in 1932, Rashmi, in 1933, Neerja were composed by her. In 1935, her collection of poems called Sandhyageet was published. In **1939, four poetic collections were published with their artworks under the title Yama** .

---

21. Answer: d

Explanation:

The logic is:

paper : stapler → A **stapler** is a mechanical device used for joining **papers** together.

Similarly,

clothes : ? → **Hanger** is a shaped piece of wood, plastic, or metal with a hook at the top, from which **clothes** may be hung in order to keep them in shape.

Hence, ' **Hanger** ' is the correct answer.

---

22. **Answer: a**

Explanation:

Given:

Sum of square of two positive numbers = 2437

Square root of one number = 7

Formula used:

$\sqrt{a} = b$

$\Rightarrow a = b^2$

Calculation:

Let the two numbers be a and b respectively.

$a^2 + b^2 = 2437$

$\sqrt{a} = 7$

$\Rightarrow a = 7^2 = 49$

$49^2 + b^2 = 2437$

$\Rightarrow b^2 = 2437 - 2401 = 36$

$\Rightarrow b = \sqrt{36} = \pm 6$

∴ The other number is + 6.

---

23. **Answer: b**

Explanation:

Given:

Principal of Rs.8000 borrowed for 3 years at 5% p.a. and the same sum was lent at 7% p.a. for the same time.

Formula used:

Simple Interest = (P × R × T) /100

Calculation:

Simple Interest paid by Ramesh = 8000 × (5/100) × 3 = Rs.1200

Simple Interest earned by Ramesh = 8000 × (7/100) × 3 = Rs.1680

∴ Gain earned by Ramesh = Interest earned - Interest paid

⇒ 1680 - 1200 = Rs.480

⭐ Alternate Method

Total interest percent = R% × T

Total interest percent to be paid = 5% × 3 = 15%

Total interest percent to be earned = 7% × 3 = 21%

Ramesh's gain = 21% - 15% = 6%

∴ Gain in Rs. = 8000 × 6/100 = Rs.480

---

24. Answer: a

Explanation:

Given:

Distance covered = 400 km

Formula used:

Time = Distance/Speed

Calculation:

Let the speed of the train be = a km/h

As per the question;

$400/a - 400/(a + 10) = 2$

$\Rightarrow 1/a - 1/(a + 10) = 2/400$

$\Rightarrow (a + 10 - a)/a(a + 10) = 1/200$

$\Rightarrow 10/a(a + 10) = 1/200$

$\Rightarrow a^2 + 10a = 2000$

$\Rightarrow a\ 2 + 10a - 2000 = 0$

$\Rightarrow a\ 2 + 50a - 40a - 2000 = 0$

$\Rightarrow a(a + 50) - 40(a + 50) = 0$

$\Rightarrow (a - 40)(a + 50) = 0$

$\Rightarrow a = 40, a \neq -50$

∴ The speed of the train is 40 km/h.

⭐ **Alternate Method**

By Value Putting Method;

By using the following equation.

$\Rightarrow 400/a - 400/(a + 10) = 2$

Option 1: For a = 40, 400/40 - 400/(40 + 10) = 2

Option 2: For a = 50, 400/50 - 400/(50 + 10) ≠ 2

Option 3: For a = 55, 400/55 - 400/(55 + 10) ≠ 2

Option 4: For a = 45, 400/45 - 400/(45 + 10) ≠ 2

---

25. Answer: d

Explanation:

The correct answer is**Bachpan Bachao Andolan**.

⭐ Key Points

- Nobel Laureate, **Kailash Satyarthi** is associated with the **"Bachpan Bachao Andolan"** organization.
- **Kailash Satyarthi** was born in the **Vidisha district of Madhya Pradesh** in India. After completing an **electrical engineering** degree, he worked as a teacher in the area. In **1980** , he left teaching and founded the organization **Bachpan Bachao Andolan** .
- He has **freed thousands of children** from slave-like conditions. He has also been active in a wide range of other organizations working against **child labor and for children's rights to education** .
- He is the founder of multiple social activist organizations, including **Bachpan Bachao Andolan, Global March Against Child Labour, Global Campaign for Education, and Kailash Satyarthi Children's Foundation** .
- He has also contributed to the development of **international conventions on the rights of children.**

⭐ Additional Information

Organization	Description
Beti Bachao, Beti Padhao	**Beti Bachao, Beti Padhao** is a campaign of the **Government of India.** **It** aims to generate awareness and improve the efficiency of welfare services intended for girls in India. **The Economic Survey 2019** has proposed a change in the **Beti Bachao Beti Padhao (BBBP) scheme.** The campaign, to be labelled **BADLAV (Beti Aapki Dhan Lakshmi Aur Vijay Lakshmi).**
SOS village	**SOS Children's Villages is the world's largest non-governmental organization** . SOS village independent, non-governmental, nonprofit international development organization and is headquartered in **Innsbruck, Austria** . It focuses on **supporting children without parental care and families at risk.**
Child Relief and You	**Child Rights and You (CRY)** is an Indian **non-governmental organization (NGO)** that works towards ensuring **children's rights** . The organization focuses on changing behaviours and practices at the grassroots level and influencing public policy at a systemic level, **to create an environment where children are a priority** .

26. **Answer: c**

Explanation:

The correct answer is **Kolkata Metro**.

⭐ Key Points

- The recently added **17 th zone** of the Indian Railway is **Kolkata Metro** .
- The Metro Railway of Kolkata, the country's oldest, Kolkata Metro has given **December 29, 2010** ,became the **17th independent zone** of the Indian Railways.
- "The making of Kolkata Metro as an independent zone was notified by the Railway Board on December 29, 2010.
- Railway Minister Mamata Banerje e announced that a Rs 10,000 crore project has been taken up for its expansion and infrastructure development.

⭐ Additional Information

Zone	Description
East Central Railway	The **East Central Railway** (ECR) is one of the 18 railway zones in India. It is **headquartered at Hajipur** and comprises Sonpur, Samastipur, Danapur, Mughalsarai, and Dhanbad divisions.
Delhi Metro	Delhi Metro Rail Corporation Limited (DMRC), is a company with equal equity participation from the **Government of India and the Government of Delhi** , built and operates the Delhi Metro.
Konkan Railway	**The Konkan Railway is a subsidiary zone of the Indian Railways.** It is one of the 17 zones of the Indian Railways but without any divisional structure unlike other railways zones in India. Its **headquartered at CBD Belapur in Navi Mumbai, Maharashtra.**

27. **Answer: b**

Explanation:

The correct answer is **Poverty**.

⭐ **Key Points**

- A cause for the Migration of unskilled workers in **poverty** .
- The unskilled workers migrate searching for ways to provide for their families and to **escape unemployment, war, or poverty in their countries of origin.**
- **The Indian Census (2011)** data calculated the total number of internal migrants accounting for inter and intra-state movement to be **450 million** , an increase of **45%** since the **Census 2001 (De, 2019)** .
- **Uttar Pradesh (UP), Bihar, Madhya Pradesh (MP), Rajasthan** are among the major origin states of migration in India.
- **Delhi, Kerala, Maharashtra, Gujarat, and Tamil Nadu** are among the important destination states for these migrant workers.

⭐ **Additional Information**

- **International Labour Organization** brings together governments, employers and workers of 187 member States, to **set labour standards, develop policies** and devise programmes promoting decent work for all women and men.
- ILO was established in **1919** by the **Treaty of Versailles** as an affiliated agency of the **League of Nations** .
- Its headquarters are in **Geneva, Switzerland** .
- The President/ Director-General of ILO as of October 2021 is **Mr Guy Ryder.**

---

28. **Answer: d**

Explanation:

Given:

The ratio of male and female members = 4 : 5

Increase the percentage of males = 80%

Increase the percentage of females = 60%

Calculation:

Let the number of males and females be 40 and 50 respectively.

New number of males = 40 × 180/100 = 72

New number of females = 50 × 160/100 = 80

∴ The new ratio of males to females = 72 : 80 = 9 : 10

---

29. Answer: a

Explanation:

Given:

A is 5 times as good as B and A completes a job in 60 days less than B.

Formula used:

Work = Efficiency × Time

Calculation:

Ratio of the efficiencies of A to B = 5 : 1

⇒ The ratio of the time taken by A and B = 1 : 5

As per the question;

B - A = 60 days

⇒ 5 - 1 = 4 = 60 days

⇒ 1 = 15 days

Work = Efficiency × Time

⇒ 5 × 15 = 75 units

∴ The time taken by A and B to work together = 75/(1 + 5)

⇒ **12 $\frac{1}{2}$ days**

---

30. Answer: d

Explanation:

The correct answer is**129**.

⭐ **Key Points**

- India's Rank in Human Development Index, 2019 is **129** .
- Human Development Index, 2019 report said- **India, Bhutan (129)** , Bangladesh (133), Nepal (142), and Pakistan (154) were ranked among countries with medium human development.
- **Norway** topped the index, while **Niger** is ranked **last at 189** .
- India's HDI value for 2019 is **0.645** which puts it in the **medium human development category** .
- India's Human Development Index or HDI position has marginally dropped after improving last year (2019). In the latest HDI ranking in 2020 , India stands at 131 . Last year India's ranking was 129 .
- The life expectancy of **Indians at birth in 2019 was 69.7 years** while Bangladesh has a life expectancy of **72.6 years** and Pakistan **67.3 years** ,

⭐ **Additional Information**

- **Human Development Index** is the measure of a nation's health, education, and standards of living.

- Countries ranked from **1 to 66 in the year 2019 are considered to be of very high HDI** , ranked **67 to 119 are considered to be of high HDI** , ranked **120 to 156 are considered to be of medium HDI** and ranked **157 to 189 are considered to be of low HDI** .
- The Human Development Report also reports the **HDI for various groups of countries** . These include regional groupings based on the **UNDP** regional classifications, HDI groups including the countries currently falling into a given HDI bracket, **OECD** members, and various other **UN groupings** .
- **In 2020, the UNDP introduced another index, the planetary pressures–adjusted HDI (PHDI)** , which decreases the scores of countries with a higher ecological footprint.

---

31. Answer: a

Explanation:

The correct answer is **Millie Bobby Brown**.

⭐ **Key Points**

- The youngest-ever UNICEF Goodwill Ambassador is **Millie Bobby Brown** .
- Emmy Award-nominated **actress Millie Bobby Brown** has been announced as UNICEF's newest Goodwill Ambassador on **20 November 2018 in New York** .
- The appointment marked on **World Children's Day** at United Nations Headquarters and the Empire State Building in New York makes the **14-year-old** UNICEF's youngest-ever **Goodwill Ambassador** .
- The **British star** will use her global platform to help **raise awareness of children's rights** and issues affecting youth, such as lack of education, safe places to play and learn, and the impact of violence, bullying, and poverty.
- Millie Bobby Brown was born in Marbella, Spain, on 19 February 2004, She is a British actress and model.

⭐ **Additional Information**

Personality	Description
Lily singh	Lilly Singh is a Canadian comedian, former talk show host, and a famous Youtuber.
Lionel Messi	He is a professional soccer player hailing from **Argentina**. Messi has claimed **FIFA's player of the year** award and the **European Golden Shoe** for top scorer on the continent six times, a record for each award.
Priyanka Chopra	She is a famous Indian actress and **Miss World 2000** winner.

32. **Answer: b**

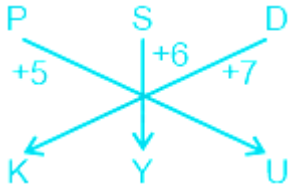
Explanation:

The pattern 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

According to the alphabetical positions of the letters,

1.



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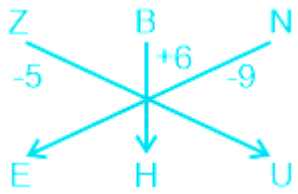

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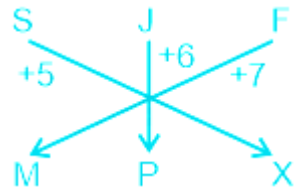
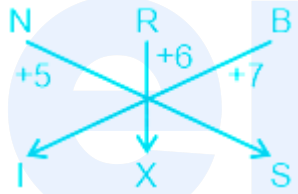


4.



Hence, ' **ZBN – EHU** ' is the odd one out.

---

33. Answer: a

Explanation:

The correct answer is **Hampi**.

⭐ **Key Points**

- The Heritage site that has the Dravidian style of architecture is **Hampi**.
- **Hampi** also referred to as the Group of Monuments at Hampi, is a **UNESCO World Heritage Site located in Karnataka**.
- The **ruins at Hampi** are a collection of heritage sites depicting the fine Dravidian style of art and architecture.

- The Virupaksha Temple is the most important heritage monument on this site, which continues to be a **very important religious center for the Hindus** .
- The Dravida style of architecture is an architectural idiom that emerged in the **southern part of the Indian subcontinent or South India** ,
- The temples under the **Dravida style** were constructed in **five different shapes** such as square-shaped, rectangular-shaped, major circular, circular, and octagonal-shaped.
- **Brihadishvara Temple** , also called **Rajarajesvaram or Peruvudaiyar Koyil** , is dedicated to Shiva located in Thanjavur, Tamil Nadu, It is one of the largest South Indian temples and the **Chennakesava Temple in Belur, Hoysaleswara temple in Halebidu, and the Kesava Temple in Somanathapura,etc** an exemplary example of a fully realized Dravidian architecture .

Additional Information

Heritage site	Description
Ellora	**Ellora** , considered amongst the finest examples of **rock-cut architecture** , dates back to the **Rashtrakuta dynasty** , about 1,500 years ago. Maintained by the Archaeological Survey of India (ASI), The Ellora Caves were declared a World Heritage Site in **1983** .
Khajuraho	**The Khajuraho** temples feature **Nagara-style architectural symbols** . They are best known for the erotic sculptures that adorn the temple walls. Built upon granite foundations, these temples are made using sandstone. Like most Hindu temples, the shrines at **Khajuraho follow the Vastu-Purusha-Mandala design plan.**
Konark	**The Sun Temple in Konark** exhibits the traditional Odisha style of architecture, also known as **Kalinga architecture** , on a grand scale.

34. **Answer: a**

Explanation:

Given:

Smallest six-digit number which is divisible by 4, 8, 12 and 16.

Concept:

LCM (Lowest Common Multiple)

Dividend = Divisor × Quotient + Remainder

Calculation:

LCM of 4, 8, 12 & 16 will be calculated by writing them as the product of their prime factors.

$4 = 2^2$

$8 = 2^3$

$12 = 2^2 \times 3$

$16 = 2^4$

So, LCM (4, 8, 12, 16) = $2^4 \times 3 = 48$

The smallest six-digit number is 100000.

$$
\begin{array}{r}
2083 \\
48\overline{)100000} \\
96 \\
\hline
400 \\
384 \\
\hline
160 \\
144 \\
\hline
\text{R} \rightarrow \quad 16
\end{array}
$$

By dividing 100000 by 48, we get the remainder 16.

So, we need to add the difference between the Divisor and Remainder to 100000 (Dividend) in order to get the smallest six-digit number divisible by 48.

⇒ 100000 + (48 - 16) = 48 × 2083 + 16 + (48 - 16)

⇒ 100032 = 48 × 2083 + 16 + 32

⇒ 100032 = 48 × 2083 + 48

⇒ 100032 = 48 × 2083 + 48

∴ The smallest six-digit number which is completely divisible by 4, 8, 12 and 16 is 100032.

---

35. Answer: b

Explanation:

Given:

Data related to accidents took place from 2000 to 2015 has been given in city A, B and C.

Calculation:

Number of accidents took place in city A from the year 2000 to 2015 = 400 + 600 + 500 + 550 = 2050

Number of accidents took place in city B from the year 2000 to 2015 = 600 + 550 + 350 + 300 = 1800

Number of accidents took place in city C from the year 2000 to 2015 = 450 + 550 + 650 + 450 = 2100

City B has the lowest number of accidents from 2000 to 2015.

∴ City B can be said to have controlled accidents most effectively.

---

36. **Answer: b**

Explanation:

Given:

$\sqrt{2116 \times \sqrt{48 \div x}} = 92$

Formula used:

√a = b

⇒ a = b^2

Calculation:

$\sqrt{2116 \times \sqrt{48 \div x}} = 92$

By squaring both sides;

⇒ 2116 × √(48 ÷ x) = 92^2

⇒ 2116 × √(48 ÷ x) = 8464

⇒√48 ÷ x = 8464/2116

⇒ √(48 ÷ x) = 4

⇒ 48/x = 4^2

⇒ 48/x = 16

⇒ x = 48/16

∴ x = 3

⭐ Alternate Method

By Value Putting Method

Option 1: For x = 12; $\sqrt{(2116 \times \sqrt{48} \div 12)} \neq 92$

Option 2: For x = 3; $\sqrt{(2116 \times \sqrt{48} \div 3)} = 92$

Option 3: For x = 2; $\sqrt{(2116 \times \sqrt{48} \div 2)} \neq 92$

Option 4: For x = 6; $\sqrt{(2116 \times \sqrt{48} \div 6)} \neq 92$

---

37. Answer: d

Explanation:

The correct answer is**Punjab**.

⭐ **Key Points**

- In India, **Punjab** has the biggest consumption of fertilizer (in Kg Per hectare).
- **Punjab** state alone consumes about **9 per cent of the total fertilizers in India** and the use is the highest on a per unit area basis at **190.1 kg/ha** of the gross cropped area against **88.2 kg/ha** in all India.
- The per-hectare consumption is more than 100 kg in **Punjab (190 kg)** , Haryana (167 kg), Andhra Pradesh (138 kg), Uttar Pradesh, and Uttaranchal (127 kg), West Bengal (122 kg), and Tamil Nadu (112 kg).
- In the remaining states, the consumption per hectare is lower than the all-India average.
- The uses of major nutrients (N+P+K) went up from just **65.3 thousand tonnes** in triennium ending (TE) 1968 to **1463.7 thousand tonnes** in TE 2004. The use of K in **Punjab soils is not high** because soils are rich in K-illicit minerals.

⭐ **Additional Information**

State	Description
Haryana	Fertilizer per-hectare consumption in **Haryana** is **167 kg**. **Haryana** ranks 11th in total fertilizer consumption.
West Bengal	Fertilizer per-hectare consumption in **West Bengal** is **122 Kg**.
Andhra Pradesh	Fertilizer per-hectare consumption in Andhra Pradesh is **138 kg**. Andhra Pradesh and Maharashtra account for the consumption of more than **3000 thousand tonnes** of fertilizer per year each.

38. **Answer: b**

Explanation:

Given:

The data for 2020 follows the trend similar to that of 2015

Calculation:

No of accidents in city A in 2020 = 550

No of accidents in city B in 2020 = 300

No of accidents in city C in 2020 = 500

No of accidents in city D in 2020 = 400

∴ City A is most likely to have a higher number of accidents.

39. **Answer: c**

Explanation:

Given:

$x^4 + x^{-4} = 1154$

Formula used:

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

Calculation:

$x^4 + x^{-4} = 1154$

or

$x^4 + 1/x^4 = 1154$ (1)

By adding 2 on both sides in equation (1)

$\Rightarrow x^4 + 1/x^4 + 2 = 1154 + 2$

$\Rightarrow (x^2 + 1/x^2)^2 = 1156$

$\Rightarrow (x^2 + 1/x^2) = \sqrt{1156} = 34$ (2)

By adding 2 on both sides in equation (2)

$\Rightarrow (x^2 + 1/x^2 + 2) = 34 + 2$

$\Rightarrow (x + 1/x)^2 = 36$

$\Rightarrow (x + 1/x) = \sqrt{36} = 6$

$\therefore x + x^{-1} = 6$

---

40. **Answer: d**

Explanation:

The correct answer is **Chandrashekhar Azad**.

⭐ **Key Points**

- Indian revolutionary **Chandrashekhar Azad** set up a base near Satar river in Jhansi in the 1920s using the alias, Pandit Harishankar Brahmachari.
- Chandrashekhar Azad was born at **Bhabra village** in Madhya Pradesh on **23 rd July 1906.**
- **Bhabra** is close to Orchha in **Tikamgarh district** , where Azad reportedly lived incognito in the guise of a Sanyasi.
- Azad was involved in the 1925 **Kakori Conspiracy** wherein a train was robbed by **Hindustan Republican Association (HRA).**
- On **27 February 1931** , Azad was killed in a gun battle with two police officers at **Allahabad's Alfred Park.**

⭐ **Additional Information**

Freedom Fighter	Important Points
Bhagat Singh	In 1928, he established the **Hindustan Socialist Republican Association** (HSRA) along with Sukhdev, Chandrashekhar Azad, and others. Bhagat Singh was also involved in the **Central Assembly Bombing Case** . He was hanged on **23rd March 1931** . The day is observed as **'Martyrs' Day** ' or ' **Shaheed Diwas'** or ' **Sarvodaya Day** .'
Udham Singh	Udham Singh was a political activist who got associated with the **Ghadar Party** while in the US. He killed **Michael O'Dwyer** , former lieutenant governor of the Punjab, India in London to avenge the Jallianwala Bagh massacre. He was hanged to death on **July 31, 1940,** for committing a murder.
Khudiram Bose	Khudiram Bose was involved in the **Muzaffar bombing** to murder the Magistrate of Muzaffarpur, Kingsford. On **11 August 1908** , one of India's youngest revolutionary freedom fighters, Khudiram Bose was hanged by the British government (18 years of age).

---

41. Answer: d

Explanation:

The correct answer is **Bajirao**.

⭐ **Key Points**

- In May 2019, the last captive White tiger of Mumbai died. The name of the tiger is **Bajirao** .
- The last captive white tiger inside **Sanjay Gandhi National Park (SGNP)** died of age-related complications. The animal was **18 years old** .
- **Bajirao** was the eldest male in their enclosure.
- Bajirao's carcass was burnt after the autopsy as per National Tiger Conservation Authority guidelines. There are **six remaining Royal Bengal tigers at the park** – four female and two male, all above 10 years of age.

⭐ Additional Information

- Bajirao was born in SGNP in 2001 to tigress **Renuka and tiger Siddharth** , both white tigers brought from **Aurangabad Zoo in 1999** .
- An expert advisory committee, comprising of senior veterinarians, both current and retired from SGNP and the Bombay Veterinary College (BVC), had been **monitoring Bajirao's health** over the past four years.
- The tiger's autopsy carried out by the pathology department of BVC indicated **multiple organ failures along with old age as the probable cause of death** . "The post mortem findings were suggestive of lesions (rotting or putrefied tissues) in visceral organs such as the kidney, heart, and liver,"

---

42. Answer: b

Explanation:

The correct answer is **Lakshwadeep**.

⭐ Key Points

- CSIR scientists have conducted a genetic study for the first time in **Lakshwadeep** , India.
- A team of researchers led by **K Thangaraj** at the **Council of Scientific and Industrial Research (CSIR)** -Centre for Cellular and Molecular Biology, Hyderabad have performed a genetic study on the **Lakshadweep islanders** .

- The genetic study on the **Lakshadweep islanders** for the first time and the results have been published in scientific reports on **6 May 2019** .
- **Centre for Cellular and Molecular Biology (CCMB), Hyderabad** the first time has shown that a majority of human ancestry in **Lakshadweep** is largely derived from South Asia with minor influences from East and West Eurasia. And, there was no evidence of early human migration through the **Lakshadweep islands** .
- The authors have studied the major islands of Agatti, Andorth, Bitra, Chetlat, Kadmat, Kalpeni, Kiltan, and Minicoy of Lakshadweep and demonstrated a close genetic link of Lakshadweep islanders with people from the Maldives, Sri Lanka, and India .

⭐ Additional Information

- **Lakshadweep is an archipelago of 36 islands** , scattered over approximately **78,000 square km** of the Arabian Sea, **200-440 km** off the south-western coast of India, with a **population** of approximately **65,000** .
- 'Lakshadweep' in Malayalam language and in Sanskrit means " **Hundred Thousand Islands"** .
- DNA samples of **557 individuals** from eight major islands for mitochondrial DNA and 166 individuals for Y chromosome markers were analyzed.
- The authors found a **close genetic link of Lakshadweep islanders with people from the Maldives, Sri Lanka, and India** . However, **it did not find any evidence of early human migration through the Lakshadweep islands** .

---

43. Answer: b

Explanation:

The correct answer is **Khilafat Movement**.

⭐ Key Points

- Another movement that was combined with the non-cooperation movement in **1920** was **Khilafat Movement** .
- **The Khilafat Movement** was launched by **Muhammad Ali and Shaukat Ali.**

- The movement finally collapsed when **Ataturk** abolished the caliphate altogether in **1924.**
- Two mass movements that were organized in **1919-1922** to oppose the British rule in India were the **Khilafat movement and Non-Cooperation Movement** .
- The movements, despite having different issues, **adopted a unified plan of action** of non-violence and non-cooperation.
- In **September 1920** , at a special session in Calcutta, Congress approved a non-cooperation program till the Punjab and Khilafat wrongs were removed and swaraj was established.
- In **December 1920** , at the Nagpur session of the Indian National Congress, the program of **non-cooperation was endorsed** .

⭐ **Additional Information**

Movement	Description
Swadeshi Movement	Indian National Congress initiated the **Swadeshi movemen** t in Bengal against the announcement of the partition of Bengal in **July 1905** by Lord Curzon. The Swadeshi movement was part of the Indian independence movement and contributed to the development of Indian nationalism.
Home Rule Movement	Indian independence movement witnessed the growth and spread of the **home rule movement** spearheaded by leaders like **Bal Gangadhar Tilak and Annie Besant.** Tilak launched the Indian Home Rule League in **April 1916 at Belgaum** . Annie Besant launched the Home Rule League in **September 1916 at Madras** .
August Kranti	**The Quit India Movement** was an important milestone in the Indian freedom struggle and is celebrated as **August Kranti** Day every year. On **August 08, 1942.** Mahatma Gandhi gave the clarion call of **"Do or Die** " to all Indians to drive away from British colonizers from the country.

---

44. Answer: c

Explanation:

The logic is:

Figure 1: (8 + 4 + 2 + 12) ÷ 2 = 26 ÷ 2 = 13

Figure 2: (16 + 8 + 4 + 24) = 52 ÷ 2 = 26

Similarly,

Let the missing number be a.

Figure 3: (14 + a + 2 + 22) ÷ 2 = 22

⇒ 38 + a = 22 × 2

⇒ 38 + a = 44

⇒ a = 44 - 38

⇒ a = 6

Hence, ' **6**' is the correct answer.

---

45. Answer: b

Explanation:

Given:

We need to find the sum of numbers in the range of 400 - 600 such that they are divisible by each 6, 12 and 16.

Concept:

LCM (Lowest Common Multiple)

Calculation:

LCM (6, 12, 16) = 48

The required numbers will be in the form of 48k, where k is a natural number.

For k = 9, 48k = 48 × 9 = 432

For k = 10, 48k = 48 × 10 = 480

For k = 11, 48k = 48 × 11 = 528

For k = 12. 48k = 48 × 12 = 576

∴ The sum of these 4 numbers that is, 432, 480, 528, and 576 is 2016.

---

46. Answer: b

Explanation:

The correct answer is **Govind Bhallabh Pant**.

⭐ **Key Points**

- In the Constituent Assembly debate on 27 August 1947, **Govind Bhallabh Pant** said **"I believe separate electorates will be suicidal to the minorities."**
- Govind Ballabh Pant opposed the **demand for separate electorates** in the Constituent Assembly because:-

1. Govind Ballabh Pant was of the view that **separate electorates would isolate the minorities permanently** .
2. Minorities would become **vulnerable** .
3. The ruling government will not give them an opportunity to have a **voice in the government** .
4. It was also against the concept of a **unified nation-state** .

⭐ **Additional Information**

Person	Description
R V dhulekar	In 1946, Dhulekar was elected as a member of the Constituent Assembly of India. From 1920 to 1925, he published the Hindi newspapers **Swaraja Prapti** and **Free India.**
B. Pocker Bahadur	Sahib Bahadur was an Indian politician and social worker from Tellicherry, north Kerala, Madras Presidency.
Sardar Vallabhbhai Patel	He served as the First Deputy Prime Minister of India. He organized peasants from Kheda, Borsad, and Bardoli in Gujarat in non-violent civil disobedience against the British Raj. He was appointed as the 49th President of the Indian National Congress, organizing the party for elections in 1934 and 1937 while promoting the Quit India Movement.

47. **Answer: d**

Explanation:

Given:

The least number of five digits, which is exactly divisible by 472.

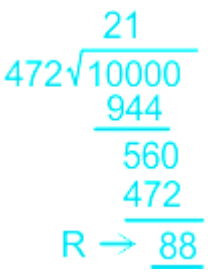
Concept:

Dividend = Divisor × Quotient + Remainder

Calculation:

Least five-digit number = 10000

By dividing 10000 by 472;



⇒ 10000 = 472 × 21 + 88 (1)

By adding the difference of divisior and remainder that is, (472 - 88) 384 to both the sides in the above equation (1)

⇒ 10000 + 384 = 472 × 21 + 88 + 384

⇒ 10384 = 472 × 21 + 472

∴ 10384 is the least five-digit number that is exactly divisible by 472.

---

48. Answer: c

Explanation:

Given:

Reduction percent in the price of wheat = 25%

Expenses on wheat = Rs.600

Formula used:

Expense = Price × Quantity

⇒ Quantity = Expense/Price

Calculation:

Let the original price = Rs.100a per kg

⇒ The reduced price of wheat = 100a × 75/100 = Rs.75a per kg

600/75a - 600/100a = 5

⇒ 104/3a - 26/a = 5

⇒ 8/a - 6/a = 5

⇒ 2/a = 5

⇒ a = 2/5

∴ The original price per kg = 100a = 100 × 2/5 = Rs.40

Alternate Method

By Ratio Method

25% = 25/100 = 1/4

Original Quantity = 3 × 5 = 15 kg

Expense = Rs.600

∴ Original price of wheat per kg = Rs.600/15 = Rs.40

---

49. Answer: b

Explanation:

The correct answer is Dr. BR Ambedkar.

Key Points

- On being criticized for borrowing features from other countries for the constitution, **Dr. BR Ambedkar** said the following- “Nobody holds any patent rights in the fundamental ideas of a constitution".
- The Indian Constitution is known as a bag of borrowings and draws its features from the Constitutions of many countries. **Dr. BR Ambedkar rightly said that it was created after ransacking the known Constitutions across the world** .
- With **448 articles in 25 parts, 12 schedules, 5 appendices, and 98 amendments** , the Constitution of India is the longest written constitution of any independent country in the world.
- It was adopted on **November 26, 1949** , while it came into force on **January 26, 1950,** when all the members of the Constituent Assembly signed the documents.

⭐ **Additional Information**

Person	Description
Dr. BR Ambedkar	He was the **chairman** of the Constitution drafting committee. He is also known as the **'Father of Constitution'.** He was independent India's **first law minister.**
Sardar Vallabhbhai Patel	He served as the **First Deputy Prime Minister** of India. He organized peasants from Kheda, Borsad, and **Bardoli** in Gujarat in non-violent civil disobedience against the British Raj. He was appointed as the **49th President** of the Indian National Congress, organizing the party for elections in **1934 and 1937** while promoting the Quit India Movement.
C. Rajgopalachari	He was also the first Indian Governor-General of the country. He founded the Swatantra Party in 1959, which favored classical liberal principles and free enterprise. He was the first one who received India's highest civilian award the Bharat Ratna.
Jawahar Lal Nehru	Jawaharlal Nehru (14 November 1889 – 27 May 1964) was the **first Prime Minister of India**. As Congress President in **1929**, Nehru called for **complete independence** from the British Raj.

50. Answer: a

Explanation:

The correct answer is**Kerala**.

⭐ Key Points

- As per Public affair Index 2020 (PAI-2020), **Kerala** state emerged as the best-governed state in the country.
- The rankings were released by the **Public Affairs Centre (PAC)** in Bengaluru. **Uttar Pradesh** ended at the **bottom** in the large states category in the **PAC ranking 2020** .
- Four southern states - **Kerala, Tamil Nadu, Andhra Pradesh, and Karnataka** topped the list of 18 large states with a population of more than two crores. Uttar Pradesh, Odisha and Bihar were at the bottom of the ranking, scoring negative points in the category.
- The governance performance has been analyzed in the context of sustainable development defined by three pillars of equity, growth, and sustainability . The analysis used data from Central government sources.

⭐ Additional Information

- Four southern States **Kerala 1.388 PAI Index point** , Tamil Nadu 0.912 PAI Index point, Andhra Pradesh 0.531 PAI Index point, and Karnataka 0.468 PAI Index point stood in the first four ranks in the large State category in terms of governance.
- At the **bottom, Uttar Pradesh (-1.461) PAI Index point** , Odisha (-1.201) PAI Index point, and Bihar (-1.158) PAI Index point were at the bottom of the ranking.
- In the **small State category ,Goa ranked first** with 1.745 PAI Index points, followed by Meghalaya (0.797,) and Himachal Pradesh (0.725). The worst performers with negative points were Manipur (-0.363), Delhi (-0.289), and Uttarakhand (-0.277).
- **Chandigarh emerged at the top in the category of Union Territories** with 1.05 PAI points, followed by Puducherry (0.52) and Lakshadweep (0.003). Dadar and Nagar Haveli (-0.69), Andaman, Jammu, and Kashmir (-0.50), and Nicobar (-0.30) were the worst performers.

51. Answer: c

Explanation:

The correct answer is **Extreme right**.

⭐ **Key Points**

- As per **the flag code of India 2002**, the position of the Indian flag when it is displayed along with flags of other countries in a straight line is **Extreme right**.
- According to the flag code of India 2002, the general rule is that the Indian flag should be the starting point of all flags. When flags are placed in a **straight line**, the **rightmost flag is the Indian flag**, followed by other national flags in alphabetical order.
- When placed in a **circle**, the Indian flag is the **first point and is followed by other flags alphabetically**.
- When placed on **crossed poles**, the Indian flag should be in **front of the other flag**, and to the **right** (observer's left) of the other flag.
- The only exception to the preceding rule is when it is flown along with the flag of the **United Nations**, which may be placed to the **right of the Indian flag**.

⭐ **Additional Information**

- The Flag Code of India, 2002, took **effect from 26 January 2002** and superseded the **"Flag Code-India"** as it existed earlier.
- The Flag Code of India has been divided into **three parts**:-

1. **First Part:** General Description of the National Flag.
2. **Second Part:** Display of the National Flag by members of the public, private Organisations & educational institutions, etc.
3. **Third Part:** Display of National Flag by Union or State Governments and their organisations and agencies.

- As per the flag code of India, 2002 all other flags should be of approximately the same size with no other flag being larger than the Indian flag.

52. **Answer: a**

Explanation:

Given:

PA and PB are the tangents to the circle with centre O.

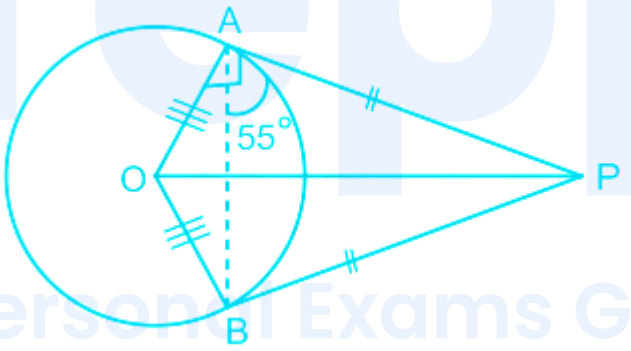
∠PAB= 55°

Concept:

Tangents drawn from the same external point are equal in length.

A tangent perpendicular to the radius at the point of tangency.

Calculation:



∵ ∠PAB = 55°

∴ ∠PBA = 55° (PA = PB)

In triangle PAB,

∠APB + ∠PAB + ∠PBA = 180° (Angle Sum Property)

⇒ ∠P + 55° + 55° = 180°

⇒ ∠P = 70°

Also, ∠AOB + ∠APB = 180° (Sum of all the angles of a quadrilateral is 360° & ∠P = 70° ∠B = 90°)

⇒ ∠AOB = 180° - 70° = 110

∴ The measure of ∠AOB = 110°

---

53. Answer: d

Explanation:

The correct answer is **Newton.**

⭐ **Key Points**

- The three laws of motion were proposed by **Sir IsaacNewton** .
- Newton was **born on January 4, 1643, in Woolsthorpe, Lincolnshire, England.**
- Newton's three laws of motion are **Law of Inertia, Law of Mass and Acceleration, and the Third Law of Motion** .
- In developing his three laws **Newton** simplified objects, reducing them to mathematical points without size or rotation to let him ignore factors such as friction, air resistance, temperature, and material properties, and focus on outcomes that can be illustrated wholly with reference to mass, length and time.
- In **1687** ,**Newton published Philosophiae Naturalis Principia Mathematica** , most often known as Principia. Principia offers an exact quantitative description of bodies in motion, with three basic but important **laws of motion** :-

1. **First Law** A stationary body will stay stationary unless an external force is applied to it.
2. **Second Law** Force is equal to mass times acceleration, and a change in motion (i.e., change in speed) is proportional to the force applied.
3. **Third Law** For every action, there is an equal and opposite reaction.

⭐ **Additional Information**

Scientist	Description
Galileo	Galileo Galilei was Born on **15 February 1564, Pisa, Italy** , and died on **8 January 1642, Arcetri, Italy** . He is considered the father of modern science and made major contributions to the fields of **physics, astronomy, cosmology, mathematics, and philosophy** . Galileo invented the **thermoscope** and **various military compasses** and used the telescope for scientific observations of celestial objects.
Aristotle	**Aristotle** was born in **384 BCE, Stagira, Chalcidice, Greece,** anddied **322, Chalcis, Euboea** , He was an ancient **Greek philosopher and scientist** , one of the greatest intellectual figures of Western history. **In metaphysics or the theory of the ultimate nature of reality** , Aristotelianism involves belief in the primacy of the individual in the realm of existence, in the applicability to the reality of a certain set of explanatory concepts.
Edison	**Edison** was born on **February 11, 1847, in Milan, Ohio, and died** on October 18, 1931. He was an American inventor, scientist, and businessman whose inventions included the **phonograph, the motion picture camera, and the light bulb** . He held over **1,000 patents** for his inventions.

54. **Answer: b**

Explanation:

Given:

The average weight of A, B, C, and D = 56 kg

The average weight of A, B, and C = 52 kg

The average weight of C and D = 48 kg

Formula used:

Average weight = Total weight/No of persons

Calculation:

Total weight of A, B, C, & D = 56 kg × 4 = 224 kg (1)

Total weight of A, B, & C = 52 kg × 3 = 156 kg (2)

Total weight of C and D = 48 kg × 2 = 96 kg (3)

By (2) + (3) - (1)

⇒ (A + B + C) + (C + D) - (A + B + C + D) = 156 kg + 96 kg - 224 kg

⇒ A + B + 2C + D - A - B - C - D = 28 kg

⇒ C = 28 kg

∴ The weight of C is 28 kg.

---

55. Answer: a

Explanation:

The correct answer is Kalamsat.

⭐ Key Points

- The first student satellite was built by an Indian high school student team and launched by NASA is **Kalamsat** .
- The satellite is named after former President and nuclear scientist Dr APJ Abdul Kalam and is called 'KalamSat' . It was flown into space in a **NASA** rocket.
- **US space agency NASA** has successfully launched the **world's smallest and lightest satellite (Weighing just 64 grams.).**
- The satellite was designed by 18-year-old **Rifath Sharook along with six other teammates** .
- The main role of the satellite is to demonstrate the performance of 3D-printed carbon fibre. It's a **3D-printed satellite** . It is for the first time that 3D printing technology is being used in space.

⭐ Additional Information

Satellite	Description
SRMsat	**SRMsat** is a **Nanosatellite** built by students at **Sri Ramaswamy Memorial University** (SRM Technology, Chennai) in India. The satellite is an **Indian Technology demonstration and Earth observation satellite** which is operated by the SRM Institute of Science and Technology.
Anusat	**ANUsat** (Anna University Satellite) is the **first satellite built by an Indian University** under the overall guidance of **ISRO.** It will demonstrate the technologies related to message store and forward operations.
Pratham	**Pratham** is an Indian ionospheric research satellite that will be operated by the **Indian Institute of Technology Bombay** as part of the Student Satellite. It was conceptualized by a team of students under the supervision of **Professor K. Sudhakar** . **Pratham was successfully launched on 26 September 2016 from Satish Dhawan Space Centre, Sriharikota, Andhra Pradesh** along with 7 other satellites on PSLV C-35.

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56. Answer: d

Explanation:

Given:

Number = 4707

Concept:

Dividend = Divisor × Quotient + Remainder

LCM = Lowest Common Multiple

It is the smallest positive number that is divisible by two or more numbers.

Calculation:

To find the least number which can be added to 4707 that is exactly divisible by 4, 5, 6 and 8, we need to find the LCM of these 4 numbers.

LCM of 4, 5, 6 and 8 can be calculated by prime factorization;

$4 = 2^2$

$5 = 5$

$6 = 2 \times 3$

$8 = 2^3$

$\Rightarrow$ LCM $(4, 5, 6, 8) = 2^3 \times 3 \times 5 = 120$

When divided 4707 by 120, we get

$\Rightarrow 4707 = 120 \times 39 + 27$

By adding the difference of Divisor and remainder $(120 - 27) = 93$

$\Rightarrow 4707 + 93 = 120 \times 39 + 27 + 93$

$\Rightarrow 4800 = 120 \times 39 + 120$

$\Rightarrow 4800 = 120\ (39 + 1)$

$\Rightarrow 4800 = 120 \times 40$

∴ The least number that should be added to 4707 so that the sum is exactly divisible by 4, 5, 6 and 8 is 93.

---

57. **Answer: b**

Explanation:

The correct answer is **INS Vagir**.

⭐ **Key Points**

- The **Kalvari class submarine** launched in Mumbai in Nov 2020 is **INS Vagir.**
- **Indian Navy's** fifth Kalvari-class Diesel Electric attack submarine **INS Vagir** was launched at **Mazgaon Dock in Mumbai**, The ship was launched on **12 November 2020**.
- The submarine inherits its name from **INS Vagir** which served in the **Navy from 1973–2001** and was **named after a species of sandfish**.
- It is the **fifth among the six Kalvari-class submarines** being constructed by the public sector shipbuilder **Mazagon Dock Ltd (MDL) in Mumbai**.
- The other vessels in the class are **INS Kalvari, INS Khanderi, INS Karanj, INS Vela, and INS Vagsheer**.

⭐ **Additional Information**

Submarine	Description
INS Khanderi	INS Khanderi is the **second** submarine of the first batch of six Kalvari-class submarines for the **Indian Navy** . The ship was launched in Mumbai on **12** January 2017 . his named after **Maratha King Shivaji Maharaj's island fort of Khander** i.
INS Arighat	**INS Arighat** with a more efficient nuclear engine and potent long-range missiles is all set to be commissioned into India's strategic forces next year with **INS Vikrant** to be commissioned by **August 15, 2022** . It is the second **nuclear-powered ballistic missile submarine** being built by India under the Advanced Technology Vessel (ATV) project to build nuclear submarines at the **Ship Building Centre in Visakhapatnam** .
INS Karanj	**INS Karanj** is the **third submarine** of the first batch of six Kalvari-class submarines for the **Indian Navy** . The ship was launched in Mumbai on **31 January 2018** . his named after **Karanja island** .

---

58. Answer: d

Explanation:

The correct answer is Common Business Oriented Language.

⭐ Key Points

- The full form of COBOL is **Common Business Oriented Language** .

- **COBOL (Common Business-Oriented Language)** is a **high-level programming language** for business applications.
- **COBOL** was the first popular language designed to be operating system-agnostic and is still in use in many financial and business applications today.
- COBOL is primarily used in **business, finance, and administrative systems** for companies and governments.
- Today many federal government agencies local banks, **COBOL** is still in use. For example, an estimated 43% of banking systems and 95% of ATM swipes utilize **COBOL code** .

⭐ Additional Information

- **COBOL** was designed in **1959 by CODASYL** and was partly based on the programming language FLOW-MATIC designed by **Grace Hopper** .
- It was standardized in **1968** and has since been revised four times. **The current standard is ISO/IEC 1989:2014** .
- **COBOL** is a great candidate because it uses **fixed-point decimal calculations** as opposed to floating-point. A lot of modern languages like Java use floating-point, which means that their calculations are only accurate out to a certain "point".
- Corporations use mainframes for applications that depend on scalability and reliability. For example, a banking institution could use a mainframe to **host the database of its customer accounts** , for which transactions can be submitted from any of **thousands of ATM locations worldwide** .

---

59. Answer: a

Explanation:

The logic is:

Column 1: 9 × 5 × 3 = 135

Column 2: 5 × 7 × 4 = 140

Similarly,

Let the missing number in column 3 be 'a'.

So, 5 × a × 5 = 150

⇒ 25 × a = 150

⇒ a = 150 ÷ 25

⇒ a = 6

Hence, ' **6**' is the correct answer.

---

60. Answer: b

Explanation:

Follow BODMAS rule to solve this question, as per the order given below,

B	Brackets in order (), {}, []
O	of
D	Division (÷)
M	Multiplication (×)
A	Addition (+)
S	Subtraction (–)

Given:

$\frac{6.25+\frac{5}{7}\times28-5}{\frac{3}{4}\times(15.8-3.4)+5\times2.39}$

Calculation:

$\frac{6.25+\frac{5}{7}\times28-5}{\frac{3}{4}\times(15.8-3.4)+5\times2.39}$

⇒ (6.25 + 5 × 4 - 5)/(3/4 × (12.4) + 11.95)

⇒ (6.25 + 20 - 5)/(3 × 3.1 + 11.95)

⇒ (6.25 + 20 - 5)/(3 × 3.1 + 11.95)

⇒ 21.25/21.25

⇒ 1

∴ The required result = 1

---

61. **Answer: c**

Explanation:

The correct answer is **Smiling Buddha**.

⭐ **Key Points**

- The code name of India's first successful Nuclear test was **Smiling Buddha** .
- India on **May 18, 1974** ,conducted its first nuclear test, codenamed **'Smiling Buddha'** , in Rajasthan's **Pokhran** , becoming a nuclear power.
- The bomb was detonated on the army base Pokhran Test Range, in Rajasthan, **by the Indian Army** under the supervision of several key Indian generals.
- At the time of Indian Prime minister **Indira Gandhi** . The Indian Ministry of External Affairs (MEA) characterized this test as a **"peaceful nuclear explosion"** .
- In May **1998** , India again conducted a series of nuclear tests at the **same location** , it was called **Pokhran-2** tests.

⭐ **Additional Information**

Code Name	Description
Laughing Buddha	The Laughing Buddha is a symbol of happiness, contentment, and prosperity . but **Smiling Buddha** was the assigned code name of India's first successful nuclear bomb test on 18 May 1974.
Operation Shakti	In May 1998 , India again conducted a series of nuclear tests at the **Pokhran,** in Rajasthan, it was called **Operation Shakti** . These tests are also called **Shakti–98, Shakti-I, Shakti-V, and Pokhran-2.**
Operation Vijay	**Operation Vijay (1961**) was the operation by the Military of India that led to the capture of Goa, Daman, and Diu, and the Anjediva Islands. **Operation Vijay (1999)** , which was the name of the Indian military operation to clear out the Kargil sector.

62. **Answer: a**

Explanation:

The correct answer is **Gopal Krishna Gokhale**.

⭐ **Key Points**

- **Mahatma Gandhi** considers Gopal Krishna Gokhale his mentor in politics.
- **Gopal Krishna Gokhale** was the senior leader of the Indian National Congress and the founder of **Servants of Indian Society** . He is known to be a **mentor to Mahatma Gandhi** .
- **Gopal Krishna Gokhale is** known as **"The Political Guru of Gandhi"** . He was the one who guided Mahatma Gandhi to travel around India in order to fight against the British.

- He was one of the social and political leaders during the **Indian Independence Movement against the British Empire in India**.
- He guided **Mahatma Gandhi** after he came back from **South Africa**. Gopal Krishna Gokhale had immense **knowledge in the field of Indian politics**.

⭐ Additional Information

- **Gopal Krishna Gokhale** was born on **May 09, 1866, in Kotluk**, in a Brahmin family of Maharashtra. He died on **February 19, 1915**, at the early age of 49.
- **Gopal Krishna Gokhale was a mentor to both Mohammed Jinnah and Mahatma Gandhi**.
- **Gopal Krishna Gokhale** was also a social reformer whose goals were to promote non-violence and reform within existing **government institutions**.

Person	Description
Raychandbhai	**Raychandbhai**, also known as **Shrimad Rajachandra**, was born on 11th November 1867 at Vavania, a small town of Saurashtra, situated in the state of Morvi. He was the spiritual guru of Gandhiji.
Lala Lajpat Rai	Lajpat Rai is remembered for his role during the Swadeshi movement and for his advocacy of education. He was also called **'Punjab Kesari'** and **'Lion of Punjab'.**
Bal Gangadhar Tilak	He was one of the **founders** of the Fergusson College in Pune. He gave the slogan, " **Swaraj is my birthright and I shall have it** ."

63. **Answer: d**

Explanation:

The correct answer is **Trans-Siberian Railway**.

⭐ Key Points

- The longest railway line in the world is **Trans-Siberian Railway** .
- The **Trans–Siberian Railway** connects **Moscow with the Russian** far east. Its running distance is **9,259 kilometres or 5,753 miles** . The journey takes (167 hours) 6 days to complete.
- The Trans-Siberian railway line has connected **Moscow to Vladivostok since 1916** , and it is still being expanded. There are also branch lines into **Mongolia, China, and North Korea** .
- **Tsar Alexander III and his son** personally appointed ministers to build this railway line from **1891 to 1916** .
- **Trans- Siberian Railway** played an important role in **World War II** in supplying the powers fighting in Europe. It also transported Soviet troops west from the Far East to take part in the Soviet counteroffensive.

⭐ Additional Information

Railway line	Description
The Union-Pacific railway	**Union Pacific Railroad is a U.S. Class I railroad** owned by Union Pacific Corporation operating 3 **1,800 route miles of track and covering 23 states** in the western two-thirds of the United States.
The Australian Trans-Continental Railway	**This is the longest route of Australia,** connecting Sydney in the east to Perth in the west. Major junctions on this route are **Broken Hill, Kalgoorlie, and Coolgardie** . The route includes the **longest length of straight track in the world- 478.193 kilometers** (297.135 miles).
Trans-Canadian Railway	**The longest trans-continental railway of North America is Trans-Canadian Railway** . It has **7,000 kilometers** long rail line. It runs between Halifax city of Nova Scotia and Prince Rupert of British Columbia. this line is the economic artery of Canada.

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64. **Answer: d**

Explanation:

The correct answer is**Lichen**.

⭐ **Key Points**

- **Litmus solution** is derived from **Lichen** .
- Lichen is used to determine the solution is neutral/acidic/basic. It has a **mauve (purple)** colour in **distilled water** .

- When added to an **acidic solution**, it turns **red**. When added to a **basic solution**, it turns **blue**.
- **Lichens** are **plants** that belong to the **Thallophyta group**. To obtain a litmus solution, the crushing and grinding of lichens are done. The dyes are then added to neutral water to get the required litmus solution.
- **Litmus solution** is obtained from **lichens**. A natural **dye extracted** from lichens is dissolved in distilled water to obtain a **litmus solution**. For example, It is used as an **indicator to distinguish between acids and bases**.

⭐ Additional Information

- **Litmus solution is a purple dye**, which is extracted from **lichen**, a plant belonging to the division Thallophyta, and is commonly used as an indicator.
- There are many other natural materials like **red cabbage leaves, turmeric, coloured petals** of some flowers such as **Hydrangea, Petunia, and Geranium**, which indicate the presence of acid or base in a solution. These are called **acid-base indicators** or sometimes simply indicators.
- Most of the acid-base indicators that are commonly used are synthetic but nature has its own indicators. **Hydrangea, petunia, and Geranium** have the ability to act as indicators.

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65. **Answer: c**

Explanation:

The correct answer is **Truck farming**.

⭐ Key Points

- The farmers specialize in vegetables only, this type of farming is known as **Truck farming**.
- In the regions where farmers specialize in vegetables only, the farming is known as **Truck farming**, and the distance of truck farms from the market is governed by the distance that a truck can cover overnight, hence the **name truck farming**.

- Vegetable farms are in some regions known as **truck farms: "truck"** is a noun for which its more common meaning overshadows its historically separate use as a term for **"vegetables are grown for the market"** .
- The production of **crops of some vegetables** on an extensive scale in regions especially suited to their culture primarily for shipment to distant markets known as **Truck farming** .
- The major **truck-farming areas are in California, Texas, Florida, along the Atlantic Coastal Plain, and in the Great Lakes area** .
- Centres for specific crops vary with the season. Among the most important **truck crops** are tomatoes, lettuce, melons, beets, broccoli, celery, radishes, onions, cabbage, and strawberries.

⭐ Additional Information

Farming type	Description
Cooperative farming	**Cooperative farming** mainly refers to farming practices where farming operations are conducted cooperatively. **These agricultural practices are conducted by individuals on their holdings jointly with certain common agencies** .
Mixed farming	**Mixed farming is a type of farming that involves both the growing of crops and the raising of livestock** . For example, a mixed farm may grow cereal crops such as wheat or rye and also keep cattle, sheep, pigs, or poultry.
Collective farming	**Collective farming is a farm or a group of farms** that is organized as a unit and managed and worked cooperatively by a group of labourers under state supervision, especially in a communist country.

66. **Answer: d**

Explanation:

The correct answer is **Tamil Nadu**.

⭐ **Key Points**

- The **highest wind energy** production in India is in **Tamil Nadu** state.
- The south Indian state of **Tamil Nadu** tops the list, with an **annual wind power output of around 9,000 MW per annum** - recording **8,631 megawatts** (MW) at the end of 2018 and **9,075 MW** in 2019.
- Out of the state's total installed capacity for electricity generation (which was 30,447 MW by the end of 2018), **the wind sector contributed 28.34%** .
- The Government of **Tamil Nadu** realized the importance and need for renewable energy, and set up a separate Agency, as a registered society, called the **Tamil Nadu Energy Development Agency (TEDA)** as early as **1985** .
- **Boasting India's largest** installed wind power generation capacity, Tamil Nadu has located in the district of **Kanyakumari** , it features several wind turbines varying from 200KW to 1,650KW.

⭐ **Additional Information**

State	Description
Odisha	The current installed capacity stands at **2.0 MW** . Odisha has a wind power potential of **1700 MW** .
Karnataka	The state of **Karnataka** is rich in wind farms compared with others in India. The state's present installed capacity as of March 2019 is nearly **4938 MW** .
Maharashtra	**Maharashtra** is one of the prominent states that installed wind power projects **second** to Tamil Nadu in India. As of the end of March 2016, the installed wind power capacity is **4655.25 MW** .

67. **Answer: d**

Explanation:

The correct answer is**Surat**.

⭐ Key Points

- The second spot in the Swacch Sarvekshan award for 2020 is **Surat** city, Gujrat.
- **In the fifth edition** of the annual cleanliness survey (Swacch Sarvekshan) of the country in 2020, **Madhya Pradesh's Indore** was placed on the first spot, Gujarat's **Surat on the second spot** , and Maharashtra's **Navi Mumbai** on third.
- The title of the **second cleanest city** in India is held by **Surat** . This commercial city known for t **extiles and diamonds** has undergone rapid development over

the years.

- **Municipal Corporation** has ensured that the dynamic changes included maintaining cleanliness. **Surat now attracts local and international tourists to visit** its popular attractions such as Ambaji Temple, Swaminarayan Temple, Sarthana Nature Park, Vansda National Park. Sardar Patel Museum, Dutch Garden, and Dumas Beach.

⭐ Additional Information

- Swachh Survekshan is a ranking exercise taken up by the **Government of India** to assess rural and urban areas for their levels of cleanliness and active implementation of Swachhata mission initiatives in a timely and innovative manner.
- The objective of the survey is to encourage large-scale citizen participation and create awareness amongst all sections of society about the importance of working together towards making towns and cities a better place to live. the survey also intends to foster a spirit of healthy competition among towns and cities to improve their service delivery to citizens, towards creating cleaner cities and towns.
- **Swachh Survekshan 2020** is the fifth edition of the annual cleanliness urban survey **conducted by the Ministry of Housing and Urban Affairs (MoHUA), Government of India** .
- Swachh Survekshan 2020 surveyed a total of **4242 cities** , 62 Cantonment Boards, and 97 Ganga Towns and saw unprecedented participation of 1.87 crore citizens.

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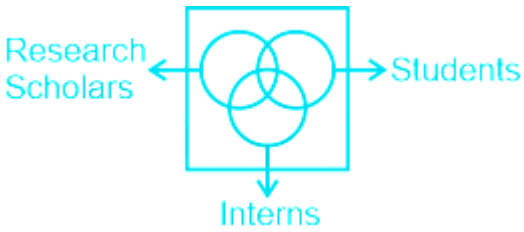
68. Answer: c

Explanation:

The Venn diagram that best represents the relationship between Students, Interns and Research scholars is shown below:



Some Research scholars are Students and Interns, some Interns are Research scholars and Students and some Students are Interns and Research scholars as well.

A research scholar is typically a college or graduate student who works under an advisor works on projects in a specific field of study, seeking to analyze and uncover new information that can be presented in academic or trade journals.

Hence, ' **option 3** ' is the correct answer.

---

69. **Answer: a**

Explanation:

The logic is:

1st figure: (40 + 12) - 30 = 52 - 30 = 22

2nd figure: (34 + 16) - 40 = 50 - 40 = 10

Similarly,

3rd figure: (28 + 20) - 43 = 48 - 43 = 5

Hence, ' **5**' is the correct answer.

---

70. **Answer: b**

Explanation:

Given:

$3^{71} + 3^{72} + 3^{73} + 3^{74} + 3^{75}$

Formula used:

$a^n + a^{n+1} = a^n(1 + a)$

Calculation:

$3^{71} + 3^{72} + 3^{73} + 3^{74} + 3^{75}$

$\Rightarrow 3^{71}(1 + 3 + 3^2 + 3^3 + 3^4)$

$\Rightarrow 3^{71}(1 + 3 + 9 + 27 + 81)$

$\Rightarrow 3^{71}(1 + 3 + 9 + 27 + 81)$

$\Rightarrow 3^{71} \times 121$

$\Rightarrow 3^{71} \times 11 \times 11$

$\therefore$ The expression $3^{71} \times 11 \times 11$ has 11 as its factor.

$\therefore$ It is divisible by 11.

---

71. Answer: a

Explanation:

The logic is:

Column 1 : $4 \times 9 + 8 = 36 + 8 = 44$

Column 2 : $3 \times 7 + 6 = 21 + 6 = 27$

Similarly,

Column 3 : $8 \times 2 + 4 = 16 + 4 = 20$

Hence, ' **20** ' is the correct answer.

---

72. Answer: a

Explanation:

The correct answer is **Bharat Heavy Electricals Limited**.

⭐ **Key Points**

- The full form of BHEL is **Bharat Heavy Electricals Limited**.
- **BHEL** is founded and owned by the **Government of India**, is a manufacturing and engineering company based in New Delhi, India.
- It was established in **1964** and it is the largest and oldest power generation equipment manufacturer in India. **In 1974 Heavy Electricals Limited merged with BHEL**.
- **BHEL** alone generates around **20,000 MW** per annum out of the available **35,000 MW** power generated in the country.
- **BHEL** is also one of the largest exporters of engineering products and services. It exports in more than 60 countries globally.

⭐ **Additional Information**

- BHEL is founded and owned by the Government of India. **Mr. Atul Sobti** is **Chairman & Managing Director** of Bharat Heavy Electricals Limited (BHEL), and the current **CEO** of BHEL is **Nalin Singhal** since **08, July 2019**.
- **BHEL** is involved in engineering, manufacturing, construction, servicing, and transmission in addition to power plant service, and evaluation of various products from key economic sectors such as transportation like Railways, energy, water, oil and gas, defence.
- **BHEL** also offered thousands of electric locomotives and defence equipment to **Indian Railways** including the **Super Rapid Gun Mount (SRGM) naval guns** produced to the **Indian Army** in collaboration with the Indian Ordnance Factories and Defense Simulators.

73. **Answer: a**

Explanation:

Follow BODMAS rule to solve this question, as per the order given below,

B	Brackets in order (), {}, []
O	of
D	Division (÷)
M	Multiplication (×)
A	Addition (+)
S	Subtraction (–)

Given:

17 × 8 - 6 + [(27 - 3) ÷ 6 - 4]

Calculation:

17 × 8 - 6 + [(27 - 3) ÷ 6 - 4]

⇒136 - 6 + [24 ÷ 6 - 4]

⇒130 + [4 - 4]

⇒ 130 + 0

⇒ 130

∴ The required result = 130

74. **Answer: d**

Explanation:

Given:

Perimeter of a right triangle = 60 cm

Hypotenuse = 26 cm

Formulas used:

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

Perimeter of the right-angle triangle = Base + Height + Hypotenuse

Pythagoras Theorem:

Base ^{2} + Height ^{2} = Hypotenuse ^{2}

Area of right-angle triangle = 1/2 × Base × Height

Calculation:

Let the base and height be x and y respectively

Sum of base and height $(x + y) = 60 - 26 = 34$ cm (1)

Also, $x^2 + y^2 = 26^2$

$\Rightarrow x 2 + y 2 = 676$ (2)

From (1)

$(x + y) = 34$

By squaring both sides;

$\Rightarrow x 2 + y 2 + 2xy = 1156$

⇒ 676 + 2xy = 1156 ∵ [x 2 + y 2 = 676]

⇒xy = (1156 - 676)/2

⇒ xy = 240 (3)

∴ Area of right-angle triangle = 1/2 × 240 = 120 cm ^{2}

---

75. Answer: c

Explanation:

Given:

a 2 + b 2 = 82

ab = 9

Formulas used:

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

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

Calculation:

(a + b) 2 = 82 + 2 × 9

⇒(a + b) 2 = 100

⇒ (a + b) = √100 = 10 (1)

(a + b) 3 = a 3 + b 3 + 3ab(a + b)

⇒ 10^3 = a 3 + b 3 + 3 × 9 × 10

⇒ 1000 = a 3 + b 3 + 270

⇒ a 3 + b 3 = 1000 - 270

$\therefore a^3 + b^3 = 730$

⭐ Alternate Method

By using formula $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$\Rightarrow a^3 + b^3 = 10 \times (82 - 9) = 10 \times 73$

$\therefore a^3 + b^3 = 730$

---

76. **Answer: a**

Explanation:

The correct answer is **Digboi**.

⭐ Key Points

- The first oil well was discovered in Assam in **Digboi**.
- Crude oil was discovered in Digboi in the late 19th century and the first oil well was dug in 1866.
- **Digboi is known as the Oil City of Assam** where the first oil well in **Asia** was drilled. **The Assam Oil Company was established in 1899** to oversee production.
- In **1901**, Digboi Refinery was commissioned supplanting the earlier refinery at **Margharita**.
- **The Indian Oil Corporation Ltd (IOC)** took over the refinery and marketing management of Assam Oil Company Ltd. with effect from **1981** and created a separate division. This division has both refinery and marketing operations.
- The refinery at **Digboi** had an installed capacity of **0.50 million tonnes per year**.
- **Assam has 4 refineries** -**Noonmati Refinery, Namuligarh Refinery, Bongaigaon Refinery,** and **Digboi Refinery**.

⭐ Additional Information

Place	Description
Rudrasagar	**Rudrasagar** oil fields are located about 4 **0 km and 20 km southwest of Moran** respectively in the Sibsagar district. **Rudrasagar** field of North Assam shelf is one of the oldest fields of India and the first discovered field in Eastern India. The Field was discovered in **1960** and put on production in **1966** from 12 wells. The annual production of oil is **10 lakh tonnes** from Rudrasagar.
Naharkatiya	Naharkatiya is one of the two famous oil fields of Assam. The Naharkatiya field is located at a distance of **32 km southwest of Digboi** at the left bank of the Burhi Dibing river. The oil was discovered in **1953** and production started in **1954** . The annual production is **2.5 million tonnes of oil and one million cubic meters of natural gas** .
Moran Hugrijan	**Moran Hugrijan** is located about **40 km southwest of Naharkatiya, Assam** . Oil at Moran Hugrijan field was discovered in **1953** and production started in **1956** . Moran s potential may be estimated at one million tonnes per annum. As many as **20 wells** have been drilled which yield oil as well as gas.

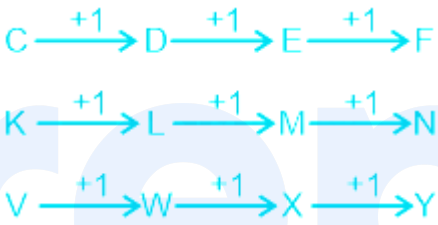
77. **Answer: a**

Explanation:

The pattern 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

According to the alphabetical positions of the letters,



Hence, ' **FNY** ' is the correct answer.

---

78. Answer: a

Explanation:

The correct answer is **Charles Babbage** .

⭐ **Key Points**

- **Charles Babbage** is considered the **father of computers.**
- **Charles Babbage** invented the machine called the **Analytical Engine** , which is a model of today's computers. Since he was the **first person who gave us the basic idea of computers** , he is known as the **'father of computers** .
- In **1837** the Analytical Engine contained an ALU (arithmetic logic unit), basic flow control, and integrated memory, hailed as the first general-purpose computer concept.

- **Because of funding issues, this computer was not built while Charles Babbage was alive** . However, in **1910** Henry Babbage, Charles Babbage's youngest son was able to complete a portion of the machine that could perform basic calculations.
- Although Babbage never completed his invention in his lifetime, **his radical ideas and concepts of the computer are what make him the father of computing** .

⭐ Additional Information

Person	Description
John Atanasoff	**Atanasoff** invented the **first electronic digital computer in the 1930s** . His special-purpose machine has come to be called the **Atanasoff–Berry Computer** .
Charles Bachman	**Charles William Bachman** was an American computer scientist, he was particularly known for his work in the early development of **database management systems** .
Alan Turing	**Alan Turing was a Computer scientist** . Turing was highly influential in the development of theoretical computer science. Turing is widely considered to be the **father of theoretical computer science a** nd artificial intelligence.

---

79. **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 logic followed here is:

The positional value of the letter is given as their code.

As "A" is equal to 1, "M" is equal to 13 and "R" is equal 18.

A = 1 which means A positional value is given

M = 13 which means A positional value is given

R = 18 which means A positional value is given

Letter	Given code
A	1
M	13
R	18

Similarly,

MISSION → ?

Letter	Given code
M	13
I	9
S	19
S	19
I	9
O	15
N	14

Thus MISSION → 139191991514

Hence, the correct answer is **"139191991514".**

---

80. Answer: d

Explanation:

The correct answer is **392 kg-m/s.**

⭐ **Key Points**

- **The momentum** of a particle is a measure of the time required for a constant force to bring it to rest.
- In terms of an equation, **the momentum** of an object is equal to the mass of the object times the velocity of the object.
  - **Momentum** = Mass * Velocity
- In physics, the symbol for the quantity momentum is the lower case **p**. Thus, the above equation can be rewritten as **p = m • v.**
- Momentum is a **vector quantity** ; i.e., it has both magnitude and direction.

⭐ **Additional Information**

- **Isaac Newton's second law of motion** states that the time rate of change of momentum is equal to the force acting on the particle.
- Conservation of momentum can be described by P1 (before) + P2 (before) = P1 (after) + P2 (after).
- Some of the examples of momentum include -
    - A train moving at 100 km/h.
    - A bullet fired from a gun.
    - A baseball flying through the air.

---

81. Answer: c

Explanation:

Given:

Cost Price of two articles = Rs.3000 each

Profit on one article = 10%

Profit on another article = 5%

Formulas used:

Selling Price = Cost Price × (100 + Profit)/100%

Profit = Selling Price - Cost Price

Profit percent = Profit/Cost Price × 100

Calculation:

Selling Price of one article at 10% profit = 3000 × 110/100 = Rs.3300

Selling Price of another article at 5% profit = 3000 × 105/100 = Rs.3150

Total Selling Price of both articles = 3300 + 3150 = Rs.6450

Total Cost Price of both articles = Rs.3000 + Rs.3000 = Rs.6000

Profit on both articles = Rs.6450 - Rs.6000 = 450

∴ Profit Percent on both articles = 450/6000 × 100

⇒ 7.5%

⭐ **Alternate Method**

By Average MethodWhen the Cost Price of both the articles is equal;

Average or aggregate profit on two articles = (Profit1 + Profit2)/2

⇒ (10% + 5%)/2 = 15%/2

⇒ 7.5%

---

82. Answer: c

Explanation:

Follow BODMAS rule to solve this question, as per the order given below,

B	Brackets in order (), {}, []
O	of
D	Division (÷)
M	Multiplication (×)
A	Addition (+)
S	Subtraction (–)

Given:

$\frac{46+\frac{3}{4}\times32-6}{37-\frac{3}{4}\times(34-6)}$

Calculation:

$\frac{46+\frac{3}{4}\times32-6}{37-\frac{3}{4}\times(34-6)}$

⇒ (46 + 3 × 8 - 6)/(37 - 3/4 × (28)

⇒ (46 + 24 - 6)/(37 - 3/4 × 7)

⇒ (46 + 24 - 6)/(37 - 3 × 7)

⇒ 64/16

⇒ 4

∴ The required result = 4

---

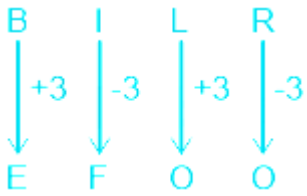
83. Answer: a

Explanation:

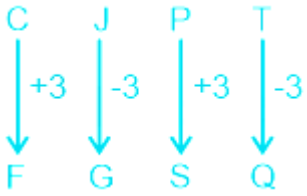
The pattern followed here is:

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

According to the alphabetical positions of the letters,



Similarly,



Hence, ' **FGSQ** ' is the correct answer.

---

84. Answer: b

Explanation:

The pattern 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

According to the alphabetical positions of the letters,

KARAN → K (11) + A (1) + R (18) + A (1) + N (14) = 11 + 1 + 18 + 1 + 14 = 45

Similarly,

ARUN → A (1) + R (18) + U (21) + N (14) = 1 + 18 + 21 + 14 = 54

Hence, ' **54** ' is the correct answer.

---

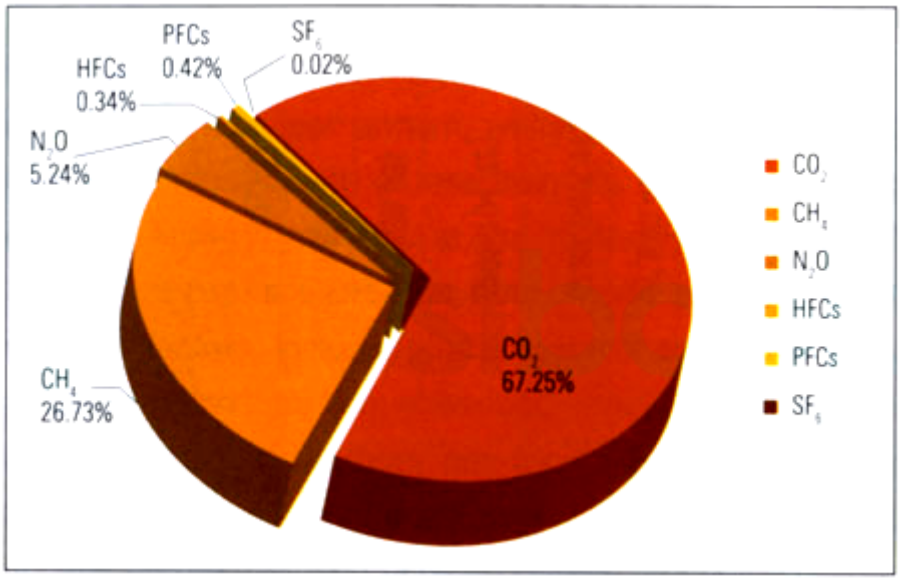
85. **Answer: c**

Explanation:

The correct answer is Energy.

⭐ Key Points

- The energy sector is the largest contributor of greenhouse gases , accounting for two-thirds of the total emissions.
- It is followed by the Agriculture sector which accounts for around 20% of the greenhouse gases emission.
- **Greenhouse gases** absorb infrared energy (heat energy) emitted from the earth's surface and reradiate it back to the earth's surface.
- The greenhouse gases trap heat in the earth's atmosphere and warm the planet.
- The **Primary GHGs** are:
  - Water Vapour.
  - Carbon dioxide.
  - Methane.
  - Nitrous oxide.
  - Ozone
- Distribution of Greenhouse Gases



86. **Answer: b**

Explanation:

The logic is:

2 + 5 = 7

7 + 7 = 14

14 + 9 = 23

23 + 11 = 34

Hence, ' **34** ' is the correct answer.

87. **Answer: d**

Explanation:

1. A is taller than B and B is taller than C.

A > B > C

2. D is shorter than B but taller than C.

B > D > C

From 1 and 2, we get:

A > B > D > C

Then D is:

1. taller than B → False (B is taller than D)

2. the shortest → False (C is the shortest)

3. taller than A and B → False (Both A and B is taller than D)

4. taller than C → True

Hence, ' **taller than C** ' is the correct answer.

---

88. Answer: b

Explanation:

Given:

Number of accidents took place from the year 2000 to 2015 in city A = 400 + 600 + 500 + 550 = 2050

Number of accidents took place from the year 2000 to 2015 in city B = 600 + 550 + 350 + 300 = 1800

Number of accidents took place from the year 2000 to 2015 in city C = 450 + 550 + 650 + 450 = 2100

Formula used:

Average = Sum of observations over the years/ No of years

Calculation:

Average no of accidents in city A = 2050/4 = 512.5

Average no of accidents in city B = 1800/4 = 450

Average no of accidents in city C = 2100/4 = 525

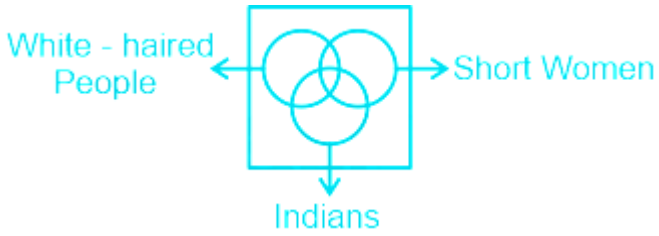
∴ City C has the highest number of accidents on an average.

---

89. Answer: c

Explanation:

The Venn diagram that best represents the relationship between Short women, White-haired people, and Indians is shown below:



Some Indian women are short. Some short women have white hair. Some Indian people have white hair.

Hence, ' option 3 ' is the correct answer.

---

90. Answer: b

Explanation:

Arguments:

1. Yes, it is important to conduct elections so that the rights and complaints of the students can be heard by authorities → Strong (as it gives a proper reason to conduct elections in educational institutions)

2. No, it disrupts the educational environment and leads to chaos and violence in institutes which does not solve any problems but creates more issues → Strong (as it gives a proper reason to why elections should not be conducted in educational institutions)

Hence, **both 1 and 2 are strong.**

⭐ Additional Information

1. The agreement which is the reconstruing part of the statement is a strong agreement.

2. **The argument should not be imagined.**
3. The relationship of the agreement should be direct from the statement.
4. The argument should be simple and clear.
5. **The agreement should be based on scientific facts.**
6. The statement in the argument should receive a logical answer.

---

91. Answer: d

Explanation:

The pattern 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

According to the alphabetical positions of the letters,

RAMAN → R (18) + A (1) + M (13) + A (1) + N (14) = 18 + 1 + 13 + 1 + 14 = 47

Similarly,

ARJUN → A (1) + R (18) + J (10) + U (21) + N (14) = 1 + 18 + 10 + 21 + 14 = 64

Hence, ' **64** ' is the correct answer.

---

92. Answer: a

Explanation:

The pattern 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

According to the alphabetical positions of the letters,

14th letter is N

5 th letter to the right of the 14 th letter = N + 5 = S

S is the 5 th letter to the right of the 14 th letter.

Hence, ' **S**' is the correct answer.

---

93. Answer: b

Explanation:

The logic is:

F	O	R	W	A	R	D
1	2	3	4	5	3	6

W	A	T	E	R
4	5	7	8	3

Similarly,

R	E	T	A	R	D
3	8	7	5	3	6

Hence, ' **387536** ' is the correct answer.

---

94. Answer: b

Explanation:

The logic is:

L	A	S	T
1	2	3	4

B	O	O	K
5	6	6	7

Similarly,

T	O	A	S	T
4	6	2	3	4

Hence, ' **46234** ' is the correct answer.

---

95. Answer: c

Explanation:

The logic is:

9 × 9 = 81

81 × 81 = 6561

6561 × 6561 = 43046721

Hence, ' **43046721** ' is the correct answer.

---

96. Answer: b

Explanation:

Required Pattern: 8 3 9

Given series: 1 **839** 7939976349 **839** 745 **839** 68300775368265969

Clearly, three 3s are there in the given series that are followed by 9 and preceded by 8.

Hence, ' **3**' is the correct answer.

---

97. Answer: b

Explanation:

The logic is:

$3 \times 9 = 27$

$27 \times 9 = 243$

$243 \times 9 = 2187$

Hence, ' **2187** ' is the correct answer.

---

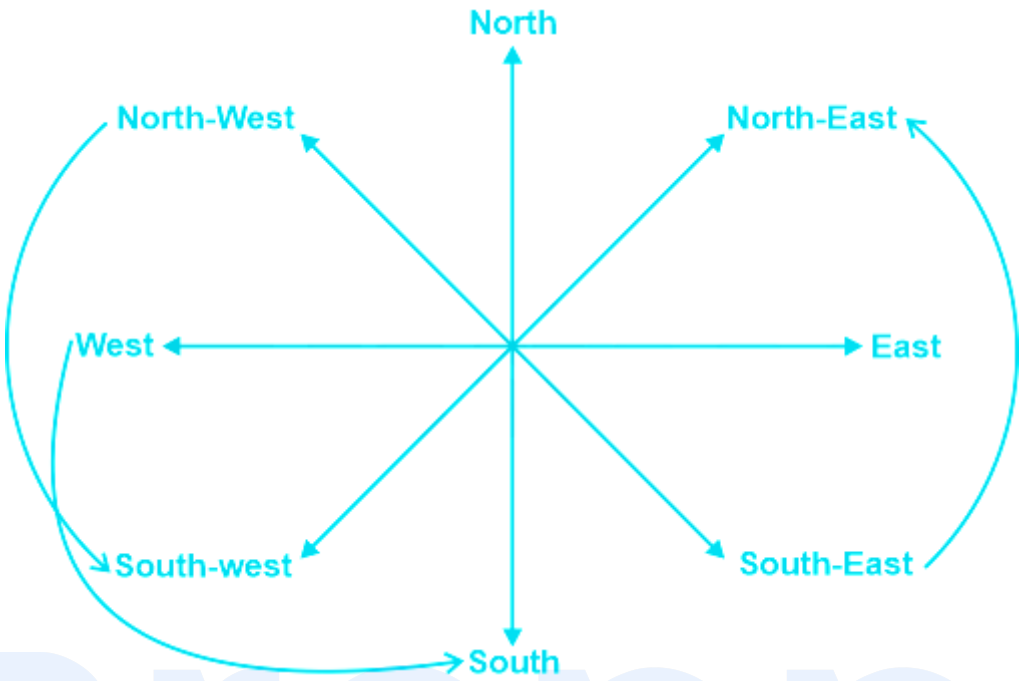
98. Answer: a

Explanation:

If the south-east direction moves two places and becomes north-east; and north-west moves two places to become south-west.

The above condition is true when each direction shifts its position by rotating 90° anti-clockwise.

So, the direction west would become South, assuming all other directions make similar movements.



Hence, ' **South** ' is the correct answer.

---

99. Answer: b

Explanation:

The logic is:

Hand : Thumb → **Thumb** is the initial part that is attached to the human **hand**.

Similarly,

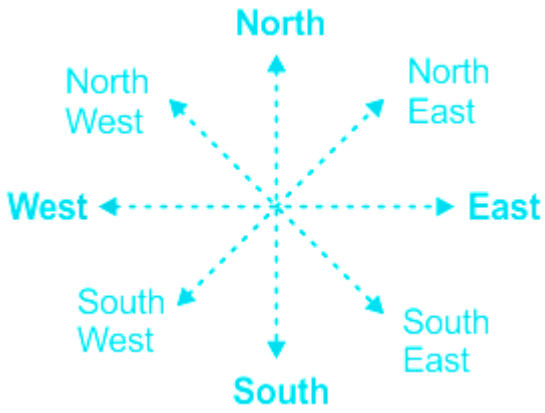
Pen : ? → A **nib** is the initial part of a **pen,** through which we write.

Hence, ' **Nib** ' is the correct answer.

---

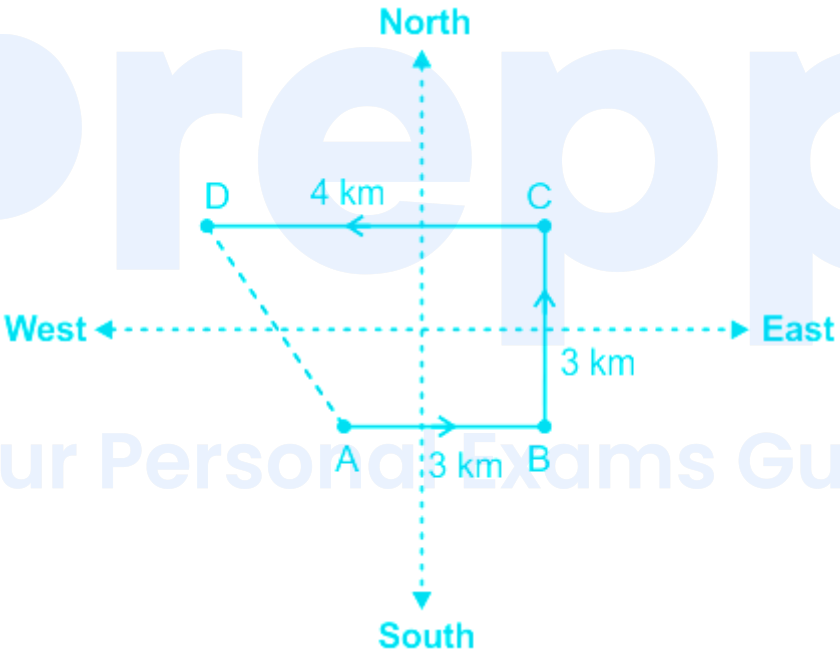
100. Answer: d

Explanation:



We have drawn the figure according to the information given in the question,

(Let the turning points as shown in the figure)



Hence, Naveen is standing in the **north-west** direction from its starting point.