



Your Personal Exams Guide



NDA



CDS



SSC CGL



CBSE UGC NET



IAS



SSC CHSL



CTET



MPSC



AFCAT



CSIR UDC NET



IBPS PO



UP POLICE



SSC MTS



SBI PO



BPSC



UP TET



IBPS RRB



IBPS CLERK



IES



UPSC CAPF



SSC Stenogr..



RRB NTPC



SSC GD



RBI GRADE B



RBI Assistant



DSSSB

RRB Group D 2018 Previous Year Paper (22-Oct-2018) (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	CBT	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.

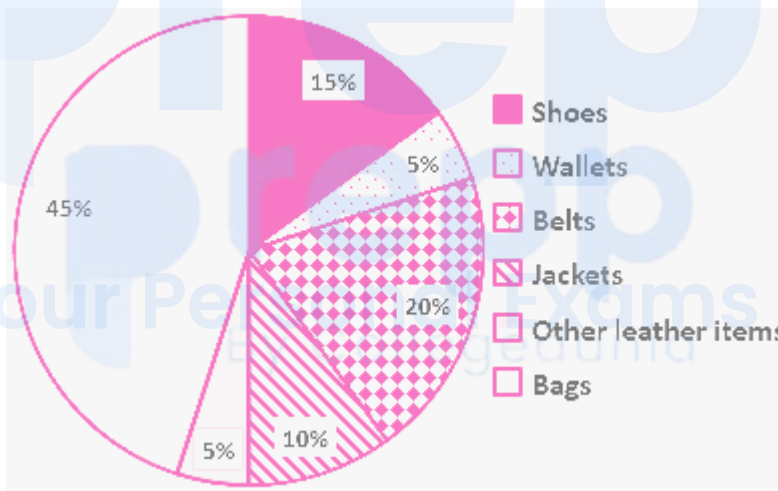
Your Personal Exams Guide

CBT

1. Molecular mass of CO is _____. (+1, -0.33)

- a. 16
- b. 44
- c. 32
- d. 28

2. The following pie diagram shows the revenue of the company ABC, which manufactures leather products. The total revenue of the company for the year 2015 was Rs. 36,28,000 (+1, -0.33)



Among the products, which product gave the major source of revenue (largest revenue making product) to the company?

- a. Belts
- b. Wallets
- c. Shoes

d. Bags

3. Keerthana says, 'Jyothi's father Revanth is the only son of my father-in-law Mohan. Brunda is Jyothi's sister". Brunda related to Mohan? (+1, -0.33)

- a. Daughter
- b. Daughter-in-law
- c. Grand daughter
- d. Niece

4. 1 Newton = ? (+1, -0.33)

- a. 1 kg m s^1
- b. 1 kg m s^{-1}
- c. 1 kg m s^{-2}
- d. kg m s^2

5. Find the rotated image of the given figure. (+1, -0.33)





6. Which of the following states won the best tableau prize in the 2018 Indian Republic Day parade ? (+1, -0.33)

- a. Maharashtra
- b. Assam
- c. Kerala
- d. Punjab

7. $35 - 7.892 + 0.005 - 10.345 = ?$ (+1, -0.33)

- a. 26.768
- b. 29.768
- c. 16.768
- d. 19.768

8. Choose the person who does NOT belong to the group. (+1, -0.33)

- a. Rukmini Arundale
- b. Sania Mirza
- c. Birjumaharaj
- d. Mrinalini Sarabhai

9. The difference between two fractions is $\frac{5}{6}$. The smaller one is $\frac{3}{4}$. What is the other fraction? (+1, -0.33)

- a. $\frac{1}{12}$
- b. $\frac{19}{24}$
- c. $\frac{8}{10}$
- d. $\frac{19}{12}$

10. _____ is the most metallic element in the fifth period (+1, -0.33)

- a. Rubidium
- b. Calcium
- c. Gold
- d. Platinum

11. The ideas of introducing Liberty and Fraternity in the Constitution of India were inspired by which country? (+1, -0.33)

- a. France
- b. Germany
- c. USA
- d. Russia

12. Read the given statement(s) and conclusions carefully and select which of the conclusions logically follow(s) from the statements(S). (+1, -0.33)

Statements:

World is neither fair nor unfair. It's just the people's state of mind.

Conclusions:

- 1. Some people find world to be fair.
- 2. Some people find world to be unfair.

- a. Neither 1 nor 2 follows.
- b. Only conclusion 2 follows.
- c. Both 1 and 2 follow.
- d. Only conclusion 1 follows.

13. In each question below is given a statement followed by two assumptions numbered I and II. You have to consider the statement and the following assumptions and decide which of the assumptions is implicit in the statement. (+1, -0.33)

Statement: 'I would like to do 500 numbers sampling to check the reliability of this test.' X says to Y.

Assumptions:

- I. The sampling on 500 numbers is possible.
 - II. X possess skills and competencies to do such sampling.
- a. Both I and II are implicit
 - b. Neither I nor II is implicit
 - c. Only assumption I is implicit
 - d. Only assumption II is implicit
-

14. Which of the following statements is/are true about the speed of sound in different media at 25°C (+1, -0.33)
- A. In steel, the speed of sound is 5960 m/s
 - B. In nickel, speed of sound is 6240 m/s
- a. Only A is true
 - b. Both A and B are true
 - c. Neither A nor B is true
 - d. Only B is true
-

15. Find the angle formed by the hour and minute hand when the time is 3:25 (+1, -0.33)
- a. 32°
 - b. 65°
 - c. 47.5°

d. 54°

16. Which 2017 book is a standalone fantasy about a young princess, Gauri, who has to work with her sworn enemy. Vikram, to win back her kingdom ? (+1, -0.33)

a. 'A Crown of Wishes'

b. 'The Fated Encounter'

c. 'The Star-Touched Queen'

d. 'The Solitary Insurgence of a Princess'

17. Sandhya and Vanita are facing East direction Sandhya turns 45° Anticlockwise and then in 135° Clockwise direction. With how much turn or rotation Sandhya will be facing in opposite direction to Vanita. (+1, -0.33)

a. 180° CW

b. 180° ACW

c. 270° ACW

d. 270° CW

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

Statement: Should LED lamps be banned?

Arguments:

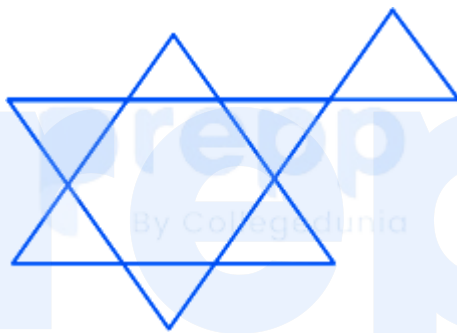
I. Yes, they emit blue light which is hazardous to the environment as well as human beings.

II. No, they are economical and better light than CFL's.

- a. Both I and II are strong
- b. Only argument I is strong
- c. Only argument II is strong
- d. Neither I nor II is strong and

19. Find the number of triangles in the given figure:

(+1, -0.33)



- a. 6
- b. 7
- c. 8
- d. 9

20. The work done across two points having a potential difference of 20 V is 60 J. Then the electric charge flowing between the two points is:

(+1, -0.33)

- a. 30 C
- b. 3 C
- c. 1200 C

d. 120 C

21. Find the next (?) number in the series.

(+1, -0.33)

1200, 600, 200, ?, 10

a. 180-

b. 150

c. 100

d. 50

22. Pradhan Mantri Krishi Sinchayee Yojana is launched by the Indian Government recently for which purpose ?

(+1, -0.33)

a. Coal & renewable energy

b. Animal husbandry

c. Electricity

d. Agriculture & irrigation

23. When a body is taken from the equator to the North and South poles then its weight:

(+1, -0.33)

a. remains the same

b. increases at south pole and decreases at north pole

c. decreases

d. increases

24. The vas deferens unites with a tube coming from the _____ to form a common passage called the urethra. (+1, -0.33)

- a. prostate gland
 - b. testis
 - c. scrotum
 - d. urinary bladder
-

25. The fumes of NO_2 are _____ in colour. (+1, -0.33)

- a. yellow
 - b. brown
 - c. pale yellow
 - d. red
-

26. Aditya is the son of Dinesh. Dinesh is the brother of Avani. Lata is the daughter of Avani. Lata and Aditya are _____. (+1, -0.33)

- a. nephew
 - b. brothers
 - c. cousins
 - d. niece
-

27. $\text{Pb} + \text{CuCl}_2 \rightarrow \text{PbCl}_2 + \text{Cu}$. The given reaction is an example of a _____ reaction. (+1, -0.33)

- a. decomposition
- b. double displacement
- c. combination
- d. displacement

28. Two pipes X and Y can fill a tank in 60 minutes and 75 minutes respectively. There is also an outlet Z. If all the three pipes are used together, the tank is full in 50 minutes. How much time will be taken by Z to empty the full tank? (+1, -0.33)

- a. 90 minutes
- b. 100 minutes
- c. 50 minutes
- d. 75 minutes

29. How many Isomers does C_6H_{14} have? (+1, -0.33)

- a. 3
- b. 6
- c. 4
- d. 5

30. Which cricket team won the 2017 Ranji Trophy tournament ? (+1, -0.33)

- a. Tripura
- b. Assam
- c. Saurashtra
- d. Vidarbha

31. Choose the one which does not belong to the group. (+1, -0.33)



- a. B
- b. A
- c. D
- d. C

32. Covalently bonded molecules have low melting and boiling points because: (+1, -0.33)

- a. Intermolecular forces are medium
- b. Intermolecular forces are strong
- c. Intermolecular forces are very strong
- d. Intermolecular forces are weak

33. In the Mendeleev periodic table, gaps were left for the undiscovered elements. Which of the following elements found a place in the periodic table later ? (+1, -0.33)

- a. F
- b. Mg
- c. Ge
- d. Ca

34. The interest earned on a sum of money invested for six years at the rate of 9.5% simple interest per annum was Rs. 456. What was the sum invested? (+1, -0.33)

- a. Rs. 775
- b. Rs. 850
- c. Rs. 750
- d. Rs. 800

35. India-born Vikas Sathaye recently won an Oscar award. In which category did he win the Oscar ? (+1, -0.33)

- a. Sound recording
- b. Film Editing
- c. Best Supporting Actor in the film 'Newton'
- d. Invention of an innovative movie camera

36. The protuberances that extend from the lower epidermal cells of Bryophytes are called_____. (+1, -0.33)

- a. Thallus
- b. Seta
- c. Rhizoids
- d. Capsule

37. Consider the given questions and decide which of the following statements is sufficient to answer the question. (+1, -0.33)

How much was the sale of the company ABC?

Statements:

- 1. The company ABC sold 75000 units of soaps each at Rs. 70/-
- 2. ABC has no other products in the production line.

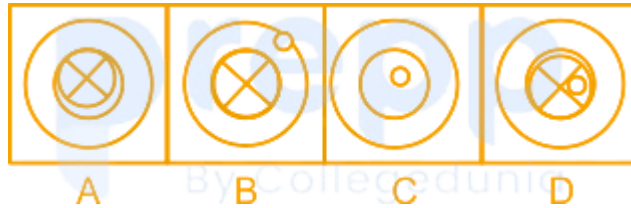
- a. 1 alone is sufficient while 2 alone is not sufficient to answer the question.
- b. Both 1 and 2 are sufficient to answer the questions.
- c. Neither 1 nor 2 is sufficient to answer the question.
- d. 2 alone is sufficient while 1 alone is not sufficient to answer the question.

38. Which of the option figures bears the closest resemblance to the question figure? (+1, -0.33)

Question Figure:



Option Figures:



- a. D
- b. A
- c. B
- d. C

39. $91 \div [-4 + (-3) \text{ of } \{27 \div (-18 \div -2)\}] = ?$ (+1, -0.33)

- a. -13
- b. -7
- c. 13
- d. 7

40. A car starting from rest move with uniform acceleration of 1 ms^{-2} for 2 minutes. Find the speed acquired by the car. (+1, -0.33)

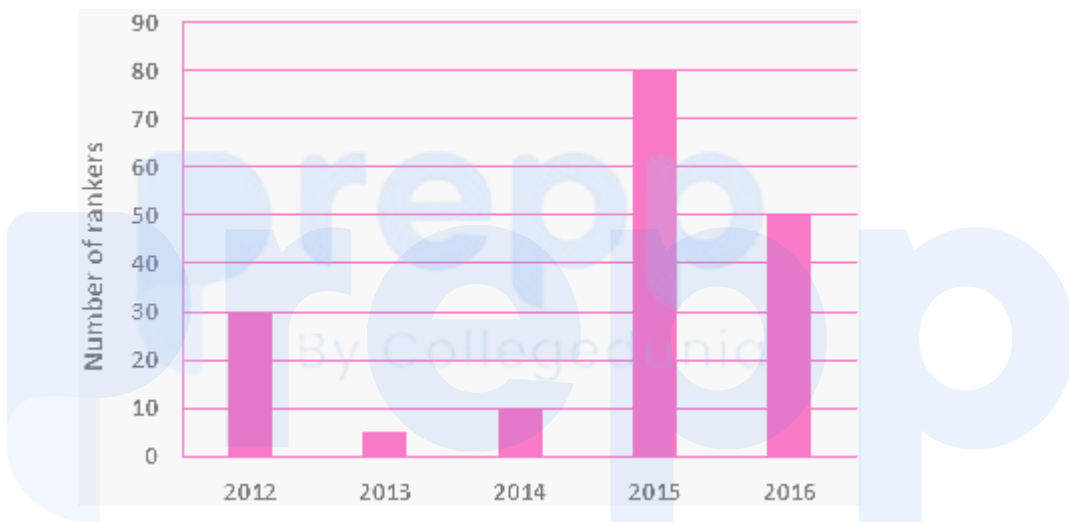
- a. 120 ms^1

b. 120 ms^{-2}

c. 120 ms^{-1}

d. 120 ms^2

41. The following Bar graph shows information of the results in the national level entrance exam by the institute "ABC" for the last 5 years. (+1, -0.33)



In which year institute ABC scored least number of ranks?

- a. 2011
b. 2014
c. 2013
d. 2012

42. Find the value of 'A' when the polynomial $P(x) = x^3 + 3x^2 - 2Ax + 3$, where 'A' is a constant, is divided by $x^2 + 1$ has a remainder equal to $-5x$: (+1, -0.33)

- a. -2

- b. 2
- c. -3
- d. 3

43. If in a triangle $\angle B = 90^\circ$ and $\angle A = 30^\circ$, then $2\sin 2A - \cos 2A - \tan 2A = ?$ (+1, -0.33)

- a. $1/6$
- b. $-1/2$
- c. 1
- d. $-1/3$

44. P 2 R I M J 3 Q % W @ / N \$ E 5 X Y 1 # 8 (+1, -0.33)

Using the above series, find the term **DOES NOT** belong to the group below:

P I 3, W N 5, % / 5, M Q @

- a. W N 5
- b. M Q @
- c. P I 3
- d. % / 5

45. Suresh bought two books for Rs. 1,200. He sold one at a profit of 20% and the other at a loss of 16%. If the selling prices of both the books are the same, then find the approximate cost price of each book. (+1, -0.33)

- a. Rs. 550 and Rs. 650
 - b. Rs. 500 and Rs. 700
 - c. Rs. 600 and Rs. 600
 - d. Rs. 400 and Rs. 800
-

46. What is the weight of the human brain in grams ? (+1, -0.33)

- a. 120 - 140
 - b. 250 - 300
 - c. 1800 - 2000
 - d. 1200 - 1400
-

47. Which of the following sets of atomic numbers belong to that of alkali metal ? (+1, -0.33)

- a. 12, 20, 88, 56
 - b. 9, 17, 35, 53
 - c. 37, 19, 3, 55
 - d. 1, 3, 5, 45
-

48. Which of the below is such a largest number that leaves a remainder of 9 when it divides 105 and leaves a remainder of 20 when dividing 164? (+1, -0.33)

- a. 48

b. 36

c. 96

d. 24

49. Moorti Devi Award is given for excellence in the field of - (+1, -0.33)

a. Literature

b. Drama

c. Dance

d. Music

50. Chandra Shekhar Azad was born in which state? (+1, -0.33)

a. West Bengal

b. Uttar Pradesh

c. Bihar

d. Madhya Pradesh

51. Evaluate the following expression: (+1, -0.33)

$$36 - 2(20 + 12 \div 4 \times 3 - 2 \times 2) + 12 = ?$$

a. -4

b. 2

c. -2

d. 4

52. 37.5% of an alloy was silver. If in the quantity of alloy there was 117 gm of silver, what was the quantity of the other elements in the alloy? (+1, -0.33)

a. 273 gm

b. 195 gm

c. 312 gm

d. 156 gm

53. Read the given statement(s) and conclusions carefully and select which of the conclusions logically follow(s) from the statement(s). (+1, -0.33)

Statement:

The quote says, "It's better to be a lion for a day than a sheep all your life."

Conclusions:

I. Lion is majestic, whereas a sheep follows its herd

II. Like sheep, we shouldn't blindly and meekly follow others

a. Both the conclusions follow

b. No conclusion follows

c. Only conclusion I follows

d. Only conclusion II follows

54. X, Y and Z bought a field on an annual rent of Rs. 415. If X grazed 25 cows for 6 months, Y grazed 40 cows for 8 months and Z grazed 30 cows for a complete year, what was the share of the rent given by Y? (+1, -0.33)

- a. Rs. 154
- b. Rs. 120
- c. Rs. 160
- d. Rs. 150

55. Identify the diagram that best represents the relationship among the given classes. (+1, -0.33)

Bat, Hockey Stick, Wood



56. Identify the unisexual flower.

(+1, -0.33)

- a. Petunia
- b. Corn
- c. Rose
- d. Mustard

57. Find the odd one out:

(+1, -0.33)



- a. D
- b. B
- c. C
- d. A

58. Who has taken over charge as the new IGP of Armed Police Kashmir Range ?

(+1, -0.33)

- a. Munir Ahmad Khan
- b. G S Mailk
- c. Shivanand Jha

d. Swayam Prakash Pani

59. A tank is filled up in 6 hours by three pipes X, Y and Z together. If Z is thrice as fast as Y and Y is twice as fast as X then find the time required in hours to fill up the tank by pipe X alone? (+1, -0.33)

a. 30 hours

b. 54 hours

c. 27 hours

d. 45 hours

60. The value of $5 \div 3 + 3 \div 5$ is: (+1, -0.33)

a. $8/15$

b. $8/8$

c. $15/8$

d. $2\frac{4}{15}$

61. If P means $\times$, R mean $+$, T means $\div$ and S means $-$, then what is the value of $35T5P6S4R3 = ?$ (+1, -0.33)

a. 25

b. 40

c. 32

d. 41

62. The chemical formula of sodium sulphate is: (+1, -0.33)

- a. Na_2SO_4
- b. NaSO_3
- c. NaSO_4
- d. $\text{Na}(\text{SO}_4)_2$

63. The value of two adjacent angles of a quadrilateral are 125° and 35° and the other two angles are equal. Find out the value of equal angles. (+1, -0.33)

- a. 135°
- b. 80°
- c. 100°
- d. 90°

64. If in a certain language ANGRY is coded as BOHSZ, how is ASSIGN coded in that language? (+1, -0.33)

- a. TJOBTH
 - b. JTTHOB
 - c. BTJOHT
 - d. BTTJHO
-

65. A football team scored the following number of goals over 6 matches. (+1, -0.33)
Based on the following table, what is their average score in a game?

Games	Number of goals
Game 1	2
Game 2	1
Game 3	0
Game 4	4
Game 5	3
Game 6	2

- a. 3
- b. 2
- c. 1
- d. 4

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66. Four words have been given below of which three are alike in some way (+1, -0.33)
and one is different. Choose the **odd one out**.

- a. HDFC Bank
- b. Yes Bank
- c. AXIS Bank
- d. SBI Bank

67. Who is the chairman of NABARD as of July 2018 ? (+1, -0.33)

- a. Raghuram Rajan
- b. Dr. Harsh Kumar Bhanwala
- c. Bibek Debroy
- d. Subramanian Swamy

68. Who among the following won the Best Actor award at the Indian Film Festival of Melbourne (IFFM), 2017 ? (+1, -0.33)

- a. Sushant Singh Rajput
- b. Shahid Kapoor
- c. Varun Dhawan
- d. Aamir Khan

69. A certain household has consumed 9×10^8 joules of energy in a month. Find the energy in units? (+1, -0.33)

- a. 250 units
- b. 2500 units
- c. 25 units
- d. 0.25 units

70. Who was the first captain of the Indian women's cricket team ? (+1, -0.33)

- a. Harmanpreet Kaur
 - b. Shantha Rangaswamy
 - c. Jhulan Goswami
 - d. Mithali Raj
-

71. In triangle ABC, find the value of $\tan^2 \frac{A}{2} + \tan^2 \frac{B}{2} + \tan^2 \frac{C}{2}$. (+1, -0.33)

- a. ≤ 1
 - b. > 1
 - c. ≥ 1
 - d. < 1
-

72. Which of these is the softest mineral ? (+1, -0.33)

- a. Diamond
 - b. Talc
 - c. Toothpaste
 - d. Marble
-

73. Which of the following is an example of connective tissue ? (+1, -0.33)

- a. Vascular bundles
- b. Bark of tissue

c. Bone

d. Skin

74. Relative density is equals to:

(+1, -0.33)

a. density of a substance / density of oil.

b. density of a substance / density of water.

c. density of a component of the substance / density of total substance.

d. density of a water / density of a substance.

75. The correct picture that fits the blank space is:

(+1, -0.33)



a.



b.



c.



d.

76. What is the second capital of Himachal Pradesh?

(+1, -0.33)

a. Dharamshala

b. Mandi

c. Solan

d. Chamba

77. Find half the value of 'S':

(+1, -0.33)

$$\text{If } S = 6 + [(16 - 4) \div (2^2 + 2)] - 2$$

a. 6

b. 4

c. 8

d. 3

78. Out of 60 customers, 10 chose service 1 and 2, 15 chose service 2 and 3 and 5 chose service 1 and 3, 15 chose only service 2. 20 chose service 1, 35 chose service 2, and 30 chose service 3. How many chose all the three services?

(+1, -0.33)

a. 2

- b. 5
 - c. 4
 - d. 3
-

79. The demonetised currency in India accounted for how much percentage of the country's total cash value ? (+1, -0.33)

- a. 95%
 - b. 79%
 - c. 86%
 - d. 78%
-

80. In 2017, what was the best world ranking secured by India according to the FIFA world ranking ? (+1, -0.33)

- a. 90th
 - b. 99th
 - c. 95th
 - d. 96th
-

81. The gravitational potential energy of an object at a point above the ground is defined as the work done in _____.

- a. keeping it at the centre
- b. applying gravitational force on it

- c. raising it from the ground to that point against gravity
- d. allowing it to stand on the ground against gravity

82. Evaluate

(+1, -0.33)

$$\frac{(469+174)^2 - (469-174)^2}{(469 \times 174)}$$

- a. 2
- b. -1
- c. 1
- d. 4

83. Find the energy possessed by an object of mass 11 kg when it is at a height of 7 m above the ground. Given $g = 9.8 \text{ ms}^{-2}$.

(+1, -0.33)

- a. 528 J
- b. 754.6 J
- c. 588 J
- d. 520 J

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

(+1, -0.33)

Statements:

- I. No metals are red.
- II. Some red are danger

Conclusions:

1. Some danger are metals.
 2. Some red are metals.
- a. Conclusion 2 alone follows.
 - b. Conclusion 1 alone follows.
 - c. Neither 1 nor 2 follows.
 - d. Both 1 and 2 follows.

85. A tank can be filled by two taps, A and B in 12 hours and 16 hours, respectively. The full tank can be emptied by a third tap C in 8 hours. If all the taps are turned on at the same time, then how much time I needed to fill the empty tank completely? (+1, -0.33)
- a. 16 hours
 - b. 40 hours
 - c. 48 hours
 - d. 24 hours

86. Identify the figure that will complete the given series. (+1, -0.33)

Problem figures:



Answer figures:



- a. C
- b. D
- c. B
- d. A

87. I-tsing, a Chinese traveller, stayed at _____ for three years and learned Sanskrit. (+1, -0.33)

- a. Patliputra
- b. Tamralipti
- c. Bodh Gaya
- d. Nalanda

88. The ratio of the length and breadth of a rectangular farm is 4 : 3. If the area of the farm is 1452 m^2 , find the cost of fencing the boundary of the farm at the rate of Rs. 12 per meter. (+1, -0.33)

- a. Rs. 1,868
- b. Rs. 1,845
- c. Rs. 1,858
- d. Rs. 1,848

89. At 9 am, a train starts from Station A towards Station B at 70 km per hour. (+1, -0.33)
After 2 hours, another train starts from Station B towards Station A at 20 km per hour. If the distance between the two stations is 320 km, then at what time do the trains meet?

- a. 11 am
- b. 1 pm
- c. 3 am
- d. 2 pm

90. Who was the first king of the Pala Dynasty? (+1, -0.33)

- a. Nandlala
- b. Devapala
- c. Madanapala
- d. Gopala

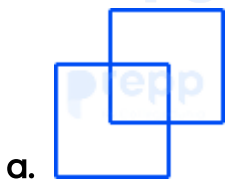
91. Which of the following statements is/are true/false? (+1, -0.33)

- A. An ion is a charged particle and can be negatively or positively charged. A negatively charged ion is called an anion and a positively charged ion, a cation
- B. An ion is a charged particle and can be negative or positively charged. A negatively charged ion is called a cation. And a positively charged ion, an anion.
- a. A and B are both false

- b. Only A is true
- c. A and B are both true
- d. Only B is true

92. The distance between two stations is 380 km. Two trains start simultaneously from these stations on parallel tracks to cross each other. The speed of one of them is greater than the other by 7 km / h. If the distance between the two trains after 2 hours of their start is 126 km, find the speed of each train. (+1, -0.33)
- a. 75 km / h, 82 km / h
 - b. 58 km / h, 65 km / h
 - c. 67 km / h, 60 km / h
 - d. 55 km / h, 62 km / h

93. Identify the odd one from the given group of figures. (+1, -0.33)





c.



d.

94. The mean of three numbers was 15, the range of the data was 9. The difference between the largest and the middle number was twice that between that middle number and the least one. The largest of the three numbers was (+1, -0.33)

- a. 19
- b. 22
- c. 21
- d. 20

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95. Which of the following Indian State Political parties is led by N. Chandra Babu Naidu ? (+1, -0.33)

- a. All India Forward Bloc
- b. Telugu Desam Party
- c. Aam Aadmi Party
- d. Asom Gana Parishad

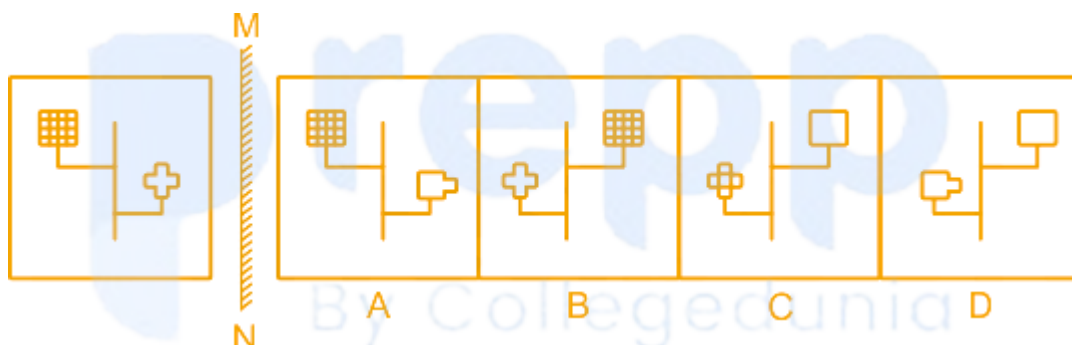
96. The relation between the focal length and radius of curvature of a mirror is: (+1, -0.33)

- a. $F=2$
- b. $R = f$
- c. $R = 2f$
- d. $R = f/2$

97. A 300 m long train crosses a platform in 39 seconds while it crosses a single pole in 18 seconds. What is the length of the platform? (+1, -0.33)

- a. 680 m
- b. 320 m
- c. 350 m
- d. 650 m

98. Choose the mirror image for the following figure: (+1, -0.33)



- a. D
- b. A

c. B

d. C

99. _____ is the capital of Jharkhand (+1, -0.33)

a. Simdega

b. Ranchi

c. Hattiya

d. Patna

100. At the time of marriage, a man was 6 years older than his wife, but after 12 years of marriage, his age is 1.2 times that of his wife. What were their ages at the time of their marriage? (+1, -0.33)

a. 24 years, 18 years

b. 27 years, 18 years

c. 21 years, 18 years

d. 23 years, 19 years

Answers

1. Answer: d

Explanation:

The correct answer is 28.

★ Key Points

- The molecular mass of CO is 28. CO is called **Carbon monoxide**. Carbon monoxide is a colourless and tasteless flammable gas that is slightly less dense than air.
- The density of Carbon monoxide is 1.14 kg/m^3 . Its melting point is -205°C and boiling point is -191.5°C .
- The molar mass is the mass of a given chemical element or chemical compound (g) divided by the amount of substance (mol).
- The unit of molar mass is **Kilogram per mole**.

★ Additional Information

- The molecular mass of CO_2 is 44. **Carbon dioxide** is a colourless gas with a density of about 53% higher than that of dry air. Its boiling point is -78.46°C .
- The molecular mass of CH_4 is 16. **Methane** is a chemical compound with the chemical formula CH_4 . It is a group-14 hydride and the simplest alkane. Its boiling point is -161.6°C .

2. Answer: d

Explanation:

Given:

From the given graph we can say that,

Revenue earn by shoes = 15%

Revenue earn by wallet = 5%

Revenue earn by belts = 20%

Revenue earn by jackets = 10%

Revenue earn by other items = 5%

Revenue earn by bag = 45%

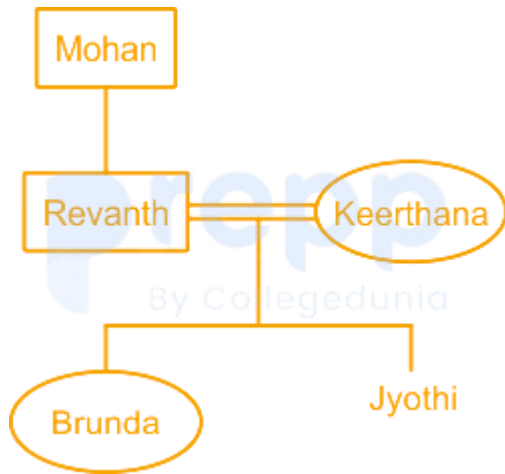
$\therefore$ Maximum revenue earned by bag

3. Answer: c

Explanation:

According to given conditions,

Symbol in Diagram	Meaning
○	Female
□	Male
==	Married couple
—	Siblings
	Difference of a generation



Hence, Brunda is 'granddaughter' of Mohan.

4. Answer: c

Explanation:

The correct answer is 1 kg m s^{-2}

★ Key Points

- Newton is the SI unit of force. And force equals the product of mass and acceleration.
- SI unit of force = Newton
- SI unit of mass = kg
- SI unit of acceleration = $\text{m} \cdot \text{sec}^{-2}$.
- Hence, **1 Newton is equals** to, $\text{kg m} \cdot \text{sec}^{-2}$ · the other units do not satisfy the unit of Newton.

5. Answer: d

Explanation:

Option 1: Same as question figure.

Option 2: Not a rotated image.

Option 3: Not a rotated image.

Option 4: It is a rotated image.

The rotated image of the given figure is shown below:



Hence, 'option 4' is the correct answer.

6. Answer: a

Explanation:

The correct answer is Maharashtra.

★ Key Points

- **Maharashtra won best tableau prize in the 2018 Indian Republic Day Parade.** Tableau represents mystical event Heritage culture development program and environment.
- **The first Republic Day Parade** was held on **2 January 1950**. Defence Minister Nirmala Sitharaman presented the award to the winner state. The tableau from Maharashtra won the first price, depicting the coronation Chhatrapati Shivaji Maharaj at the Republic Day parade at the Rajpath in New Delhi.

★ Additional Information

- **Assam state won the best tableau prize in the 2020 Indian Republic Day Parade.** Defence Minister Rajnath Singh gave the best value award for Republic Day parade in New Delhi. The tableau of Assam was based on the **theme land of unique craftsmen ship and culture**. Assam was the best-named tableau among

all the **16 states and union territory participating** in the Republic Day parade 2020.

- After Maharashtra and West Bengal Kerala's proposal has been denied permission for Republic Day Parade on 26 January 2018. Kerala proposed a team comprising the traditional art from Satyam and Kala Mandalam art and architecture of the Kerala state.
- **Punjab has won the third tableau prize** on the theme of **Jallianwala Bagh massacre**. Punjab proposed a float highlighting Jallianwala Bagh massacre that took place on April 13, 1919.

7. Answer: c

Explanation:

Considering the given equation,

$$35 - 7.892 + 0.005 - 10.345 = ?$$

$$\Rightarrow 35.005 - 18.237 = ?$$

$$\Rightarrow 16.768$$

$$\therefore ? = 16.768$$

8. Answer: b

Explanation:

All persons except 'Sania Mirza' are Indian dancers, while 'Sania Mirza' is Indian Tennis player.

Hence, 'Sania Mirza' is the odd one out.

1) Rukmini Arundale → Rukmini Devi Arundale was an Indian theosophist, dancer and choreographer of the Indian classical dance form of Bharatanatyam.

- 2) Sania Mirza → Sania Mirza is an Indian professional tennis player.
- 3) Birjumaharaj → Brijmohan Mishra, popularly known as PanditBirjuMaharaj, is an exponent of the Handia, Allahabad Kalka-Bindadingharana of Kathak dance in India.
- 4) Mrinalini Sarabhai → MrinaliniVikram Sarabhai was an Indian classical dancer, choreographer and instructor.
-

9. Answer: d

Explanation:

Given:

First fraction = $3 / 4$

Difference between two fraction = $5 / 6$

Calculation:

Let the other fraction be x

According to question:

$$\Rightarrow x - 3 / 4 = 5 / 6$$

$$\Rightarrow x = 5 / 6 + 3 / 4$$

$$\Rightarrow \text{LCM of } 4, 6 = 12$$

$$\Rightarrow x = (10 + 9) / 12$$

$$\Rightarrow x = 19 / 12$$

∴ Other fraction is $19 / 12$

10. Answer: a

Explanation:

The correct answer is Rubidium.

★ Key Points

- **Rubidium** is a metallic character that **decreases across a period**. Rubidium is the **first element of V group** of most metallic. It is an alkali metal. It is the most reactive group in the periodic table.

★ Additional Information

- **Calcium is a soft and silvery-white metal.** Calcium metal is used as a reducing agent for preparing other metal such as sodium Uranium. Calcium atomic number is **20**. Calcium melting point is **842 degree Celsius**. Calcium is harder than sodium but softer than aluminium.
 - **Gold is a chemical element.** Gold is a bright, slightly, reddish-yellow, soft malleable and ductile metal. An atomic number of gold is **79**. Gold supersedes other metal because of its none oxidation property, unlike iron and copper. Gold is a metallic with the yellow colour when in a mass but when finely divided it may be black, Ruby or purple.
- **Platinum is a chemical element.** It is dense malleable, ductile, highly uncreative precious silverfish-white transition metal. The atomic number of Platinum is 78. Platinum is an attractive silvery-white metal. The melting point of platinum is **1772 degree Celsius** and boiling point of **3827 degree**.

11. Answer: a

Explanation:

The correct answer is France.

★ Key Points

- The **ideas of introducing Liberty and Fraternity** in the Constitution of India were inspired by **France**. The French Revolution which **started in 1789** gave the world

the ideas of Liberty, Equality, and fraternity.

- The people of France were oppressed by the cruel king, heavy taxes and slavery so they started the revolution on 5 May 1789 which **ended on 9 Nov 1799**.
- Ideas of equality and democracy spread from France to other European countries and feudalism was abolished during the revolution.
- At the time of the French Revolution, "Liberty, Equality, Fraternity" was **one of the many mottos in use**. these three ideals have become social movements throughout history.

★ Additional Information

- **LIBERTY** of thought, expression, belief, faith, and worship.
- **EQUALITY** of status and of opportunity and to promote among them all.
- **FRATERNITY** assuring the dignity of the individual and the unity and integrity of the Nation.

12. **Answer: c**

Explanation:

1. Some people find world to be fair. → True (As the meaning of the statement is that some people find the world to be fair while some others find the world unfair.)
2. Some people find world to be unfair → True (As the meaning of the statement is that some people find the world to be fair while some others find the world unfair.)

Hence, both 1 and 2 follow.

13. **Answer: a**

Explanation:

(Implicit – suggested though not directly expressed)

- I. The sampling on 500 numbers is possible.

It is implicit in the statement as "I would like to do 500 numbers sampling" suggests that sampling on 500 numbers will be done.

II. X possess skills and competencies to do such sampling. →

It is implicit in the statement as X said to Y would like to do 500 numbers sampling to check the reliability of this test. So, by statement it is suggested that X possess skills and competencies to do such sampling.

Hence, both I and II are implicit.

14. Answer: a

Explanation:

The correct answer is Only A is true.

- The speed of sound depends on the **type** and **properties of the medium** through which it is travelling.
- The speed of sound in a particular medium depends on the **temperature and pressure** of that medium.

★ Important Points

- The speeds of sound in different media at 25°C:

Substance	Speed in m/s
Aluminium	6420
Nickel	6040
Steel	5960
Glass	3980
Sea Water	1531
Distilled Water	1498
Sulfur Dioxide	213

★ Key Points

- The speed of sound **decreases** when it passes from the **solid** to the **gaseous** state of a given medium.
- In any medium, if the **temperature increases**, the **speed of sound also increases**, and **vice versa**.
- the speed of sound in air at **0°C** is **331 m/s** and at **22°C** it is **344 m/s**.

15. Answer: c

Explanation:

Time = 3:25

$$\text{Angle} = \theta = \left| \frac{60 \times \text{hour} - 11 \times \text{minute}}{2} \right|$$

And another angle = $(360 - \theta)^\circ$

$$\therefore \theta = \left| \frac{60 \times 3 - 11 \times 25}{2} \right|$$

$$= \left| \frac{180 - 275}{2} \right|$$

$$= \left(\frac{95}{2} \right)$$

$$= 47.5^\circ$$

$$\text{And another angle} = (360 - \theta)^\circ = (360 - 47.5)^\circ = 312.5$$

In the option, 47.5° is given.

Hence, ' 47.5° ' is the correct answer.

16. Answer: a

Explanation:

The correct answer is 'A Crown of Wishes'.

★ Key Points

- **A Crown of Wishes**, 2017 book is a standalone fantasy about a young princess, **Gauri**, who has to work with her sworn enemy, **Vikram**, to win back her kingdom.
- **The Crown of wishes** composed by **Roshani Chouksey**. She has been taken a Prisoner Of War by her kingdom's enemies. It is published on 28th March 2017. Roshani Chouksey as the author of the **Star-Touched Queen** come to a beautiful lush fantasy.

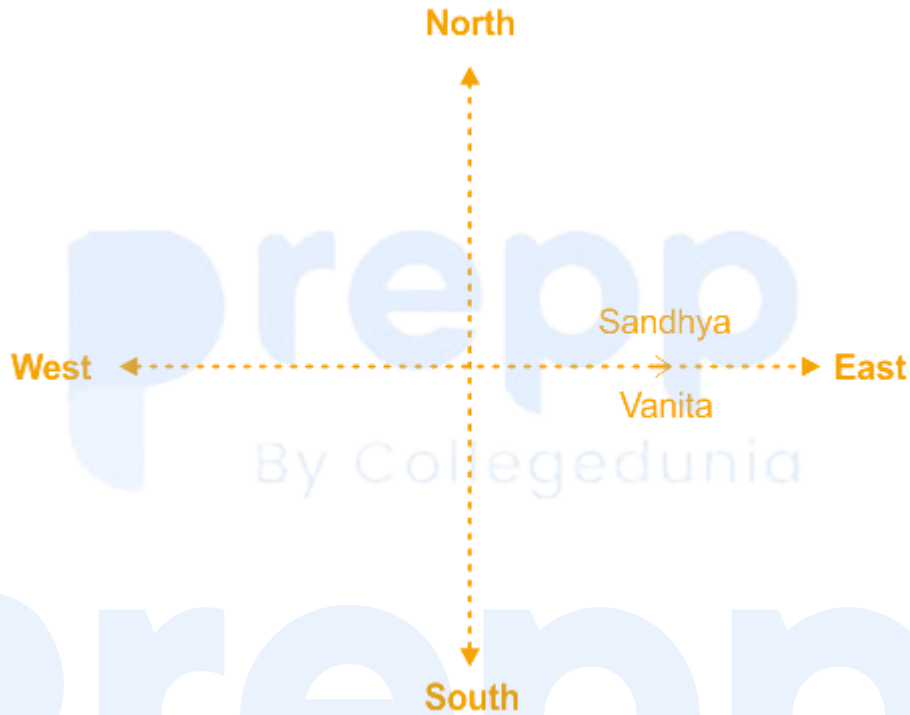
★ Additional Information

- **The Feted encounter** is composed by **Andrew J Wilson**. It is published on 27 March 2014 in the English language.
- **The Star-Touched Queen** is composed by **Roshani Chokshi**. Maya is the main character in this story. All Vivid story steeped in Indian Mythology. The **Star-Touched Queen** published on 26th April 2016.

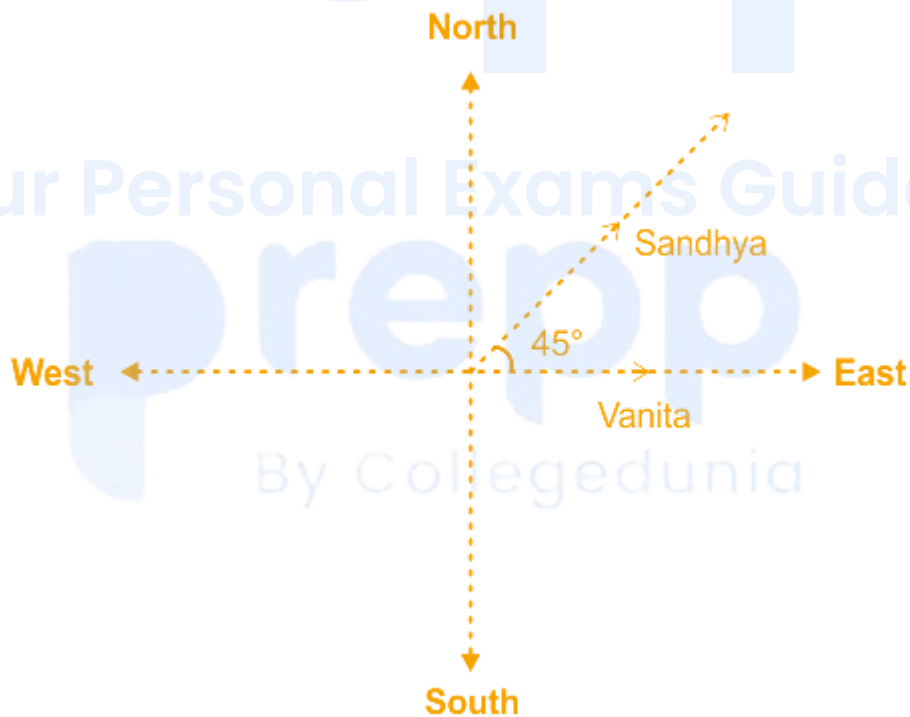
17. Answer: c

Explanation:

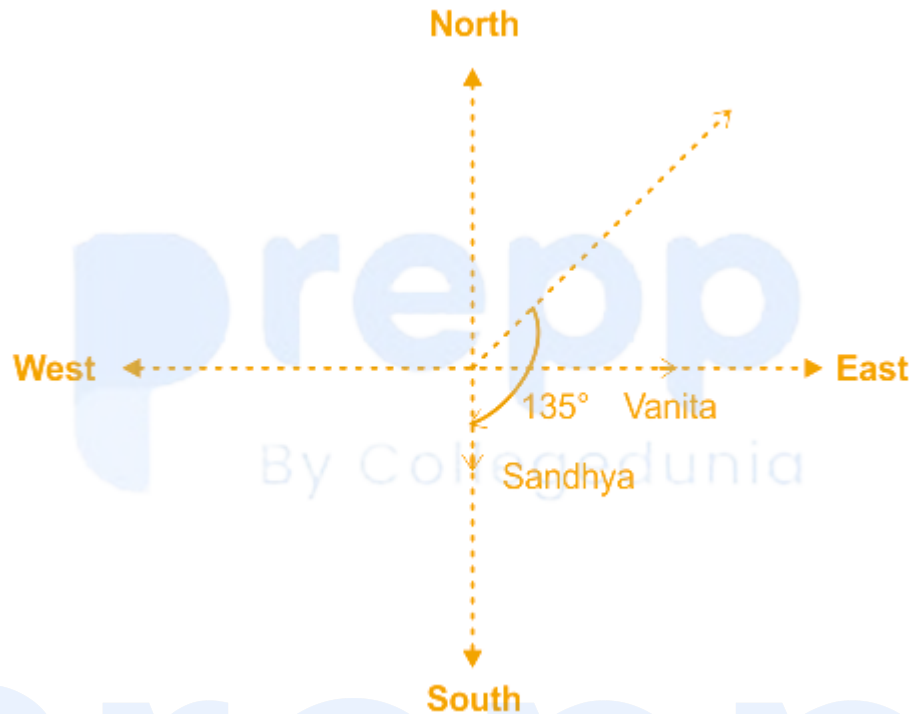
Sandhya and Vanita are facing East direction



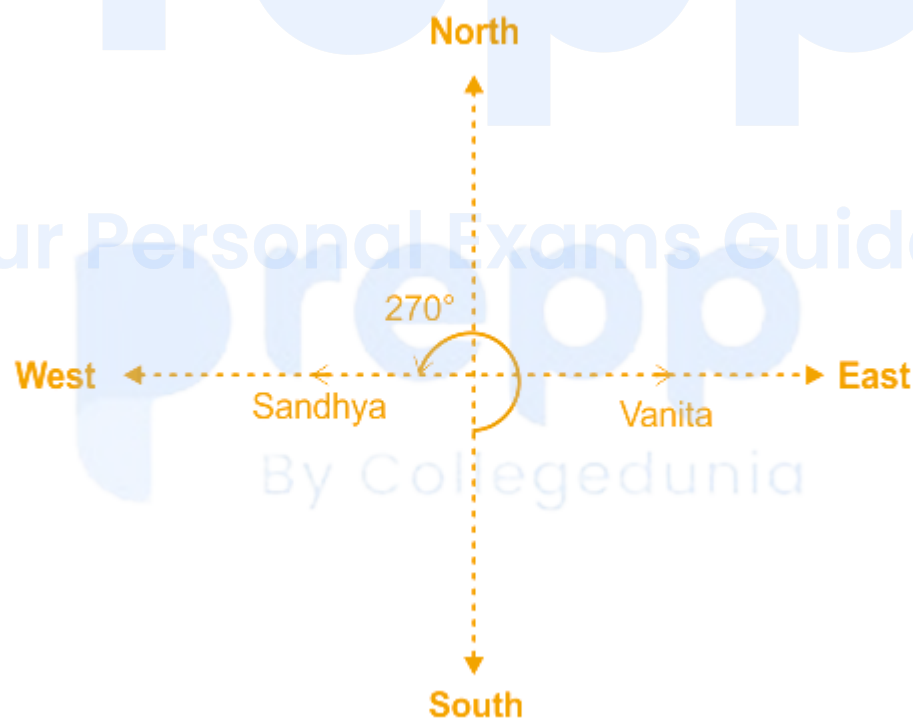
Sandhya turns 45° Anticlockwise



Sandhya turns 45° Anticlockwise and then in 135° Clockwise direction.



Sandhya will be facing in opposite direction to Vanita on rotation in 270° Anticlockwise direction.



Hence 270° ACW is the correct answer.

18. Answer: c

Explanation:

I. Yes, they emit blue light which is hazardous to the environment as well as human beings.

LED lamps emit blue light which is hazardous to the environment as well as human beings but the risks and concerns are specific to overexposure to blue light during evening hours, and can be effectively managed and controlled.

So, the argument is not strong to be considered.

II. No, they are economical and better light than CFL's.

Yes LED bulbs are the real winner in energy efficiency and are economical and better light than CFL's.

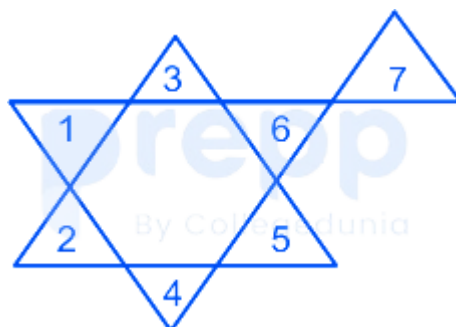
So, the argument is strong enough to be considered.

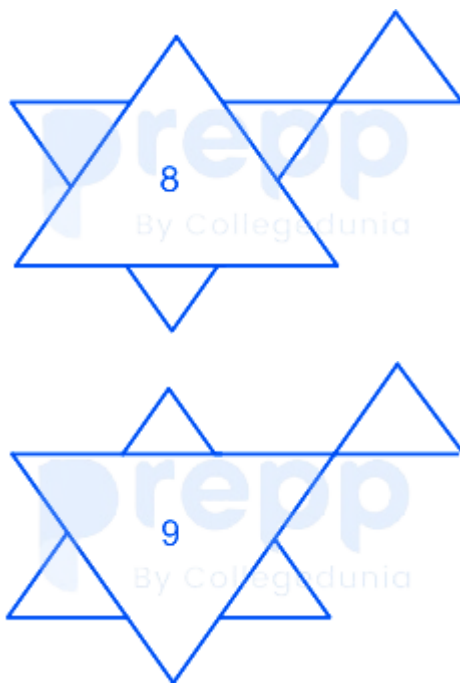
Hence, only argument II is strong.

19. Answer: d

Explanation:

The number of triangles in the given figure is shown below:





Hence, '9' is the correct answer.

20. Answer: b

Explanation:

The correct answer is 3 C.

- Electric potential difference is known as voltage, which is equal to the work done per unit charge to move the charge between two points against a static electric field.
- Therefore, $Voltage = \frac{WorkDone}{Charge}$
- Here, Given Voltage = 20 V and Work done = 60 J
Then electric charge = $\frac{WorkDone}{Voltage} = \frac{60}{20} = 3 \text{ C}$.

21. Answer: d

Explanation:

The logic is:



Hence, '50' is the correct answer.

22. Answer: d

Explanation:

The correct answer is **Agriculture & irrigation**.

★ Key Points

- **Pradhan Mantri Krishi Sinchayee Yojana** is launched by **the Indian Government** recently for agriculture & irrigation. Pradhan Mantri Krishi Sinchai Yojana (PMKSY) is launched on **1st July 2015**.
- PMKSY is implemented to expand the cultivated area for irrigation. Its main logo is '**Har Khet Ko Pani**'.
- Pradhanmantri Krishan Sinchai Yojana is constituted under the **chairmanship of vice-chairman, NITI Aayog**. The broad objectives of Pradhan Mantri Kisan Sinchai Yojana are to include irrigation at the field level '**more crop per drop**'.
- The Government of India has launched the Pradhan Mantri Kisan Sinchai Yojana aimed to the development of irrigation sources for providing a **permanent solution from drought**.
- PMKSY promotes extension activities relating to **water harvesting, water management** and **crop alignment** for farmers and grass root level field functionaries.
- Krishi Sinchayee Yojana with an **outlay of Rs.50,000** crores for a period of 5 years (**2015-16 to 2019-20**) is to achieve convergence of investments in irrigation at the field level.

23. Answer: d

Explanation:

The correct answer is Increases.

★ Key Points

- When a body is taken from equator to poles **its weight increases** because of the acceleration **due to gravity increases**.
- **The rotation of the earth** about its own axis also **produces a force on the body**. This effect will further reduce the weight of the body. So due to both these affects the weight of the body.
- If the earth suddenly **stops rotating about its axis**, there is no effect of centrifugal force on the gravitational acceleration. So, the value of gravitational will be the same in all places.

24. Answer: d

Explanation:

The correct answer is Urinary bladder.

★ Key Points

- The vas deferens unites with a tube coming from the **urinary bladder** to form a common passage called the **urethra**.
- The urinary bladder is called **simply bladder**. The urinary bladder is a hollow muscular organ in the humans and other vertebrates that stores urine from the kidney before disposal by urination.
- The urinary bladder is **a triangle-shaped hollow organ** is located in the lower abdomen. It is held in place by ligaments that attach to other organ and the pelvic bones.

★ Additional Information

- **The prostate gland** is a **walnut-sized gland** which is located between the bladder and penis. The urethra runs through the centre of the prostate. The

balance of hormones in your body changes as you get older and this make uses your prostate gland to grow.

- The testis is **the male reproductive gland** in all animals including humans. The testis is responsible **for making Testosterone, the primary male sex hormone and for producing sperm.**
- The scrotum is **a sac of skin** that hangs from the body at the front of the pelvis between the legs. The testis is **oval-shaped glands** responsible for **producing and storing sperm.**

25. Answer: b

Explanation:

The correct answer is Brown.

★ Key Points

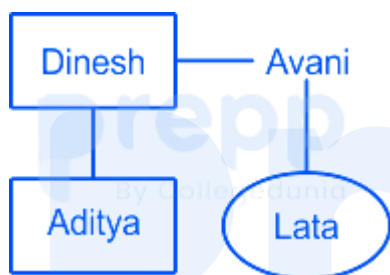
- **The fumes of NO₂ are brown in colour.** Nitrogen dioxide or NO₂ is a **deep red-orange gas**. It is poisonous.
- Nitric oxide is a colourless, flammable gas with a slight odour. Nitrogen dioxide is a deep red-orange gas that is **poisonous but not flammable**.
- NO₂ is responsible for the reddish-**brown colour** of smog.
- At high concentrations, NO₂ is highly toxic and can cause serious lung damage.
- The following **health effects** may occur immediately or shortly after exposure to Nitrogen Dioxide like it can burn the skin and eye with possible eye damage.
- **Nitrogen oxides** include **nitrous acid and nitric acid**.

26. Answer: c

Explanation:

According to given conditions,

Symbol in Diagram	Meaning
○	Female
□	Male
==	Married couple
—	Siblings
	Difference of a generation



Lata and Aditya are cousins.

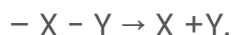
27. Answer: d

Explanation:

The correct answer is displacement.

★ Key Points

- $\text{Pb} + \text{CuCl}_2 \rightarrow \text{PbCl}_2 + \text{Cu}$.
- The given reaction is an example of a **displacement reaction**. A reaction in which **one element is replaced by another element** of the compound is known as displacement reaction.
- For example – $\text{X} + \text{Y} - \text{Z} \rightarrow \text{X} - \text{Z} + \text{Y}$.
- A reaction in which **a compound is broken down into two or more elements** and the heat is evolved out is known as a **decomposition reaction**. For example



- A reaction in which **the exchange of ions of compounds takes place** i.e. ions get displaced is known as **double displacement reaction**. For example – $AB + BC \rightarrow AD + BC$.
- A reaction in which **elements combine to form a new compound** is known as **a combination reaction**.
- For example – $X + Y \rightarrow X + Y$.

28. Answer: b

Explanation:

Given:

Tap X can fill the tank in 60 minutes

Tap Y can fill the tank in 75 minutes

There is an outlet tap Z in 50 minutes

Calculation:

Let the total capacity be LCM of (60, 75 and 50) = 300 units

Efficiency of Tap X = $300/60 = 5$ units

Efficiency of Tap Y = $300/75 = 4$ units

Efficiency of Tap X, Y and Z = 6

Let the efficiency of Tap Z = x units

$\therefore$ Effective efficiency when all three pipes are opened together = $(5 + 4 - x) = 6$

$\Rightarrow 9 - x = 6$

$\Rightarrow x = 3$ units

$\therefore$ Time taken to empty the tank by Tap Z = $300/3 = 100$ minutes

29. Answer: d

Explanation:

The correct answer is 5.

- C_6H_{14} is **hexane**. It has **5 structural isomers** like n-hexane, 2-methyl pentane, 3-methyl pentane, 2,2-dimethyl butane, 2,3-dimethyl butane.

★ Important Points

- Compounds with different physical properties were found to have the **same elemental composition and molecular weight**. Such compounds were called isomers.
- The below table shows the number of constitutional isomers for each of the **acyclic alkanes C_nH_{2n+2}** , where $n=1-10$.
- If the **number of carbon atoms increases**, the **number of possible constitutional isomers increases rapidly**.

Your Personal Exams Guide

Acyclic Alkane	Number of Carbons	Number of Isomers
methane	1	1
ethane	2	1
propane	3	1
butane	4	2
pentane	5	3
hexane	6	5
heptane	7	9
octane	8	18
nonane	9	35
decane	10	75

30. Answer: d

Explanation:

The correct answer is Vidarbha.

★ Key Points

- **Vidarbha cricket team** won the 2017 Ranji Trophy tournament. Vidarbha won the tournament by defeating **Delhi** by **9 wickets** in the final and won their first Ranji Trophy title.
- The Vidarbha Trophy is an internal **first-class ticketing championship** in India. After scoring 252 in the first innings, Delhi were bowled out for 280 in their second innings.

★ Additional Information

- The **Tripura cricket team** is an internal cricket team that represents the Indian state of Tripura. Tripura Cricket Association was started in 1968. Tiruppur entered the Ranji Trophy along with **Goa and Himachal Pradesh**. Tripura achieved its first-class victory in 6 seasons in 2005.
- The **Assam cricket team** is an internal cricket team that represents the Indian state of Assam. Assam played its **first-class match** in the **49th Ranji Trophy** since **1948**. It was Assam's first win in the Ranji Trophy from 1951 to 1952 when they defeated Orissa by 103 runs.
- **Saurashtra cricket team** is 1 or 3 cricket team based in Gujarat. Saurashtra is a top sports team. It is a full member of the ICC. They won the Ranji Trophy in **2019– 2020** when they defeated Bengal in the final at Rajkot.

31. Answer: d

Explanation:

In all the image except 'C', the outer image shows in dotted lines.

Hence option 4 is the correct answer.

32. Answer: d

Explanation:

The correct answer is Intermolecular forces are weak.

★ Key Points

- **Covalently bonded molecules** have low melting and boiling points because intermolecular forces are weak and little amount of energy is required to break the forces.
- if the compounds having **high melting and boiling point** then they have **very strong or strong** intermolecular forces.

- If compounds having **medium melting and boiling point** then they have **medium intermolecular forces**.
- The intermolecular forces between water molecules are stronger than those between oxygen molecules.
- Covalent bonds are formed by **mutual sharing of electrons**. Hence the covalent bonded molecules have strong bonds within the molecule.

33. Answer: c

Explanation:

The correct answer is Ge.

★ Key Points

- **Germanium (Ge)** was discovered later which fit into the empty spaces left by **Mendeleev PT** and matched to the most properties
- **Clemens Winkler** discovers Germanium.
- Germanium belongs to **Group 14** and **Period 4**.
- It is a **P-Block** element, and the **atomic number** is **32**.

★ Important Points

ELEMENT	ATOMIC NO.	GROUP	PERIOD
F (Fluorine)	9	17	2
Mg (Magnesium)	12	2	3
Ca (Calcium)	20	2	4

★ Additional Information

- **Germanium** was used in **transistors and electronics components**.
 - Germanium is a semiconductor. The pure element was commonly **doped with arsenic, gallium** in other elements and used as a transistor in thousands of electronic applications.

- Germanium ores are very rare. They are found in small quantities as the minerals **germanite and argyrodite**.

34. Answer: d

Explanation:

Time = 6 years

Rate = 9.5%

Simple Interest = Rs. 456

Formula used:

Simple interest = $(\text{principle} \times \text{time} \times \text{rate})/100$

Calculation:

$$456 = (\text{Principal} \times 6 \times 9.5)/100$$

$$\Rightarrow (45600)/(6 \times 9.5) = \text{Principle}$$

$$\Rightarrow \text{Principle} = \text{Rs. } 800$$

$\therefore$ Required principal is Rs. 800

35. Answer: d

Explanation:

The correct answer is Invention of an innovative movie camera.

★ Key Points

- Vikas Sathaya was honored at the Oscar Scientific and Technical award 2018 for creating the shot over the K1 camera system. The four-member team was

honored at the 'Beverly Heels' ceremony for the connect design.

- Vikas Sathaya, 50 years old engineer and was born in 1967.

★ Additional Information

- **Sound recording** and reproduction is an electrical electronic mechanical or digital inscription and recreation of sound waves.
- Film editing is a creative and technical part of the post-production process of filmmaking.

36. Answer: c

Explanation:

The correct answer is Rhizoids.

★ Key Points

- The protuberances that extend from the lower epidermal cells of Bryophytes are called **Rhizoids**. Rhizoids are the simple hair-like protuberances that extend **from the lower epidermal cells of bryophytes**.
- **Rhizoids and P rotuberances** are similar in structure.
- In **fungi**, the rhizoid is found in the thallus and resembles a root.

★ Additional Information

- **The thallus** is a plant body that is not differentiated i.e. into stem and leaves. It lacks true roots and xylem and phloem. It is found in the algae, fungi, mosses, and liverworts and in the gametophyte generation of clubmosses, horsetails, and ferns.
- **Seta refers to the stalk supporting the capsule**.
- **The capsule** is a layer that lies outside the cell envelope in a bacterial cell. It is a polysaccharide **layer** that **lies outside the cell envelope** and is thus deemed part of the **outer envelope** of a **bacterial cell**.

37. Answer: b

Explanation:

Statement 1:

Company sold 75000 units of soaps each at Rs. 70

Statement 2:

Company has no other products in production line.

$$\Rightarrow \text{Sale} = 75000 \times 70 = \text{Rs. } 5,250,000$$

$\therefore$ Both statements are required to answer the question.

38. Answer: a

Explanation:

Option figure:

A – Small circle inside the big circle is missing.

B – Small circle is present, but it is not inside the inner circle.

C – Small circle is present but the inside circle is not divided into four parts.

D – Small circle is present in the figure exactly in the similar way as given in question figure.

Hence, 'option 1' figure bears the closest resemblance to the question figure.

39. Answer: b

Explanation:

Considering the given equation

$$91 \div [-4 + (-3) \text{ of } \{27 \div (-18 \div -2)\}] = ?$$

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

Step-1: Parts of an equation enclosed in 'Brackets' must be solved first, and in the bracket,

Step-2: Any mathematical 'Of' or 'Exponent' must be solved next,

Step-3: Next, the parts of the equation that contain 'Division' and 'Multiplication' are calculated,

Step-4: Last but not least, the parts of the equation that contain 'Addition' and 'Subtraction'

should be calculated.

Now,

$$91 \div [-4 + (-3) \text{ of } \{27 \div (-18 \div -2)\}] = ?$$

$$\Rightarrow 91 \div [-4 + (-3) \text{ of } \{27 \div 9\}]$$

$$\Rightarrow 91 \div [-4 - 3 \times 3]$$

$$\Rightarrow 91 \div (-13)$$

$$\Rightarrow -7$$

40. Answer: c

Explanation:

The correct answer is 120 ms⁻¹

★ Key Points

- Given that, acceleration = 1ms^{-2} , time = 2 min = 120 seconds.

Change in velocity = $v-u$, v (final) = ?, $u = 0$ as it starts from rest (initial).

As we know, Acceleration = change in velocity/time.

Change in velocity = acceleration X time

$$v - 0 = 1 \times 120$$

$$v = 120 \text{ m/s}$$

41. Answer: c

Explanation:

From the graph we can say that,

Ranks in 2012 = 30

Ranks in 2013 = 5

Ranks in 2014 = 10

Ranks in 2015 = 80

Ranks in 2016 = 50

$\therefore$ Ranks in 2013 is least

42. Answer: b

Explanation:

Given:

$$P(x) = x^3 + 3x^2 = 2Ax - 3$$

Calculation:

$$2\sin 2A - \cos 2A - \tan 2A$$

$$\Rightarrow 2\sin 60^\circ - \cos 60^\circ - \tan 60^\circ$$

$$\Rightarrow 2 \times \frac{\sqrt{3}}{2} - \frac{1}{2} - \sqrt{3}$$

$$\Rightarrow \sqrt{3} - \frac{1}{2} - \sqrt{3}$$

$$\Rightarrow -\frac{1}{2}$$

$$\therefore 2\sin 2A - \cos 2A - \tan 2A = -\frac{1}{2}$$

44. Answer: d

Explanation:

Given: P 2 R I M J 3 Q % W @ / N \$ E 5 X Y 1 # 8

The group is formed

P I 3 → P 2 R I M J 3 Q % W @ / N \$ E 5 X Y 1 # 8 – gap of two terms between the given group of terms.

W N 5 → P 2 R I M J 3 Q % W @ / N \$ E 5 X Y 1 # 8 – gap of two terms between the given group of terms.

% / 5 → P 2 R I M J 3 Q % W @ / N \$ E 5 X Y 1 # 8 – gap of two terms between % and / and gap of three terms between / and 5.

M Q @ → P 2 R I M J 3 Q % W @ / N \$ E 5 X Y 1 # 8 – gap of two terms between the given group of terms.

Hence, '% / 5' is the odd one out.

45. Answer: b

Explanation:

Given:

One book is sold at 20% profit

Another book sold at 16% loss

Selling price of both the books is same

Calculation:

Let the cost price of 1st book be x

Cost price of 2nd book be y

According to question,

$$\Rightarrow x + (20 / 100) \times x = y - (16 / 100) \times y$$

$$\Rightarrow 1.2x = 0.84y$$

$$\Rightarrow x / y = 7 / 10$$

Total cost of both books according to question = $7 + 10 = 17$ units

$$\Rightarrow 17 \text{ units} = 1200$$

$$\Rightarrow 1 \text{ unit} = 70.58$$

$$\therefore \text{Cost price of 1}^{\text{st}} \text{ book} = 70.58 \times 7 = 494.11 \approx 500$$

$$\therefore \text{Cost price of 2}^{\text{nd}} \text{ book} = 70.58 \times 10 = 705.8 \approx 700$$

46. Answer: d

Explanation:

The correct answer is 1200 – 1400.

★ Key Points

- The average brain weight of the adult man is **1336 gram** and for the Adult female is **1198 gram**.
- At age 20, the average weight of the male brain is approximately **1400g** and at the age of 65, brain weight is approximately **1300 g**. Brain weight for females follows a similar pattern.
- The adult human brain weighs about 3 pounds (**1,300–1,400 g**). The adult human brain is about 2 % of the total body weight.
- **A newborn** human baby brain weight approximately **350 to 400 grams**.
- Human Brain Facts:
 1. The brain is much more active at night than during the day.
 2. Our Brain has over **100 billion nerve cells**.
 3. The human brain can read up to **1,000 words per minute**.
 4. The Human brain stops **growing at the age of 18**.
 5. The weight of the human cerebellum is **150g**.
 6. The width of an average human brain is **140 mm**.

47. Answer: c

Explanation:

The correct answer is 37, 19, 3, 55.

- The magic number of an element is **2, 8, 8, 18, 18, 32**.
So, the below table shows the atomic number according to periods with the use of the above magic number:

PERIOD	ATOMIC NUMBER	ELEMENT
2	3	Li
3	11 (3+8)	Na
4	19 (11+8)	K
5	37 (19+18)	Rb
6	55 (37+18)	Cs
7	87 (55+32)	Fr

- So, the sets of atomic numbers that belong to that of alkali metal are **37, 19, 3, 55**.

48. Answer: a

Explanation:

Let the number be x

9 is remainder when x divide 105

20 is remainder when x divide 164

$$105 - 9 = 96$$

$$164 - 20 = 144$$

$$\text{HCF of } 96, 144 = 48$$

$$\therefore x = 48$$

49. Answer: a

Explanation:

The correct answer is Literature.

★ Key Points

- 'Moorti Devi Award' is given every year for excellence in the field of **Literature**. The Moorti Devi award is an Indian literary award and **presented by the Bharatiya Jnanpith**.
- The award is given only two Indian writing in Indian language including in English schedule to the constitution of India. **C K Nagaraja Rao** was a writer who won Murti Devi award in 1983 for his Novel.
- **The last winner** of Moorti Devi Award is **Vishwanath Prasad Tiwari**.

★ Additional Information

- The **three** general **categories** that **dance** can be divided into when discussing function and intention are: **religious, social and theatrical**. There are many dance awards. Dance the movement of the body in the rhythmic we usually to music and within a given space for the purpose of expressing an idea or emotion taking delight in the movement itself.
- **The Nobel Prize is widely considered the world's most prestigious award**. It is awarded for achievements in physics, chemistry, physiology or medicine, literature, peace and economics. Music is our cultural activity and art form which is performed by a sound.
- Written work that tells a story through action and speech it is called **drama**.

50. Answer: d

Explanation:

The correct answer is Madhya Pradesh.

★ Key Points

- Chandra Shekhar Azad was born in Jhabua, Madhya Pradesh on 23 July 1906, he died on 27 February 1931 in Allahabad.

- He was an Indian revolutionary who reorganised the Hindustan Republican Association under its new name of Hindustan Socialist Republican Association (HSRA) after the death of its founder, Ram Prasad Bismil, and three other prominent party leaders, Roshan Singh, Rajendra Nath Lahiri and Ashfaqulla Khan.

51. Answer: c

Explanation:

Considering the given equation

$$36 - 2(20 + 12 \div 4 \times 3 - 2 \times 2) + 12 = ?$$

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

Step-1: Parts of an equation enclosed in 'Brackets' must be solved first, and in the bracket,

Step-2: Any mathematical 'Of' or 'Exponent' must be solved next,

Step-3: Next, the parts of the equation that contain 'Division' and 'Multiplication' are calculated,

Step-4: Last but not least, the parts of the equation that contain 'Addition' and 'Subtraction'

should be calculated.

Now,

$$\Rightarrow 36 - 2(20 + 3 \times 3 - 2 \times 2) + 12$$

$$\Rightarrow 36 - 2(20 + 9 - 4) + 12$$

$$\Rightarrow 36 - 2(25) + 12$$

$$\Rightarrow 36 - 50 + 12$$

$$\Rightarrow 48 - 50$$

$$\Rightarrow - 2$$

52. Answer: b

Explanation:

Given:

Silver in an alloy = 37.5%

Silver in an alloy = 117 gm

Concept:

To convert percentage into fraction divide it by 100

$$37.5\% = 37.5/100 = 3/8$$

It means 3 part of the alloy is silver out of 8 part

Calculation:

According to question:

$$3 \text{ units} = 117 \text{ gm}$$

$$\Rightarrow 1 \text{ unit} = 39$$

$$\Rightarrow 8 \text{ units} = 39 \times 8 = 312 \text{ gm}$$

$$\therefore \text{Other elements in an alloy} = 312 - 117 = 195 \text{ gms}$$

53. Answer: d

Explanation:

Statement implies that it is better to be the ruler of your life than to be ruled. it encourages us to lead, not follow blindly.

From the information above we can conclude that we shouldn't blindly and meekly follow others like a sheep.

Therefore, Conclusion II follows.

But the information above is not sufficient for us to conclude that Lion is majestic, whereas a sheep follows its herd.

Therefore, Conclusion I does not follow.

Hence, Only Conclusion II follows

54. Answer: c

Explanation:

Given:

Total annual rent = Rs. 415

X grazed 25 cows for 6 months

Y grazes 40 cows for 8 months

Z grazed 30 cows for 12 months

Calculation:

According to question:

$25 \text{ cows} \times 6 \text{ months} : 40 \text{ cows} \times 8 \text{ months} : 30 \text{ cows} \times 12 \text{ months}$

$\Rightarrow 15 : 32 : 36$

$\Rightarrow 83$

$\Rightarrow 83 \text{ units} = 415$

$$\Rightarrow 1 \text{ units} = 415 / 83 = \text{Rs. } 5$$

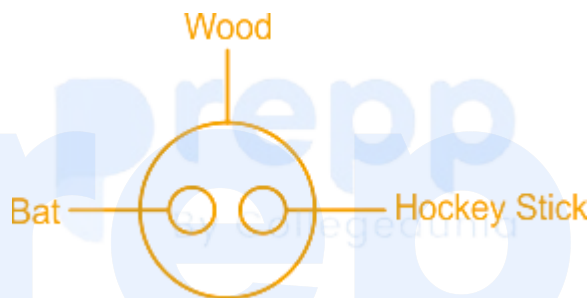
$$\Rightarrow 5 \times 32 = 160$$

$\therefore$ Y paid Rs. 160

55. Answer: c

Explanation:

The best suitable Venn diagram for Bat, Hockey Stick, and Wood is shown below:



Bat and Hockey Stick are made from wood.

Hence, 'option 3' is the correct answer.

56. Answer: b

Explanation:

The correct answer is Corn.

★ Key Points

- **Unisexual Flower:**
 - The flowers which include only the male or female reproductive organs are called unisexual flowers.
 - They are called incomplete flowers.
 - To reproduce they undergo cross-pollination.

- Examples: Papaya, White mulberry, Corn, and Watermelon .

★ Additional Information

- **Bisexual Flowers:**

- The flowers which contain both male and female reproductive organs are known as full or bisexual flowers.
- They will self-pollinate themselves.
- Examples: Tulip, Sunflower, and Lily.

57. Answer: a

Explanation:

We have to check the each Figure:

Image A:



In this i mage polygon have a smiling emoji i nside it.

Image B:



In this i mage polygon have a smiling emoji i nside it.

Image C:



In this image polygon have a smiling emoji inside it.

Image D:



In this image polygon have a **sad emoji** inside it.

So, the Image D is different from all.

Hence, the correct answer is "D".

58. Answer: d

Explanation:

The correct answer is Swayam Prakash Pani.

★ Key Points

- **Swayam Prakash Pani** is the new Inspector General of Police Kashmir range. He replaced **Muneer Ahmed Khan** who was holding the charge of the IGP Kashmir range. Swayam Prakash Pani is the youngest officer. Swayam Prakash Pani is a 2000-batch IPS officer.

★ Additional Information

- **Muneer Ahmad Khan** was a **Pakistani physicist**. Muneer Ahmad Khan was born on 20 May 1926 in Islamabad then it was a part of British India. Munir Khan studied at Government College in Lahore. He went to the United States Hona Fullbright scholarship in 1951.
- **G S Malik** was the **joint police commissioner of Vadodara city** in 2010 When he was invited to take part in the Kanya relevant and Shala Praveshotsav a drive initiated by the Gujarat government.

- **Shivanand Jha** is an **IPS officer of the 1983 batch** and he was retired on April 30 but will now serve in July as its Director General of Police Gujarat. He was appointed a committee of the cabinet headed by Prime Minister Narendra Modi.

59. Answer: b

Explanation:

Given:

Tank is filled up in 6 hours

Z is thrice as fast as Y and Y is twice as fast as X

Calculation:

According to the question

Ratio of efficiency of X and Y = 1 : 2

Ratio of efficiency of Y and Z = 1 : 3

Ratio of efficiency of X, Y and Z = 1 : 2 : 6

⇒ Total quantity of tank = $6 \times (1 + 2 + 6) = 54$ units

∴ X alone can fill the tank in $54 / 1 = 54$ minutes

60. Answer: d

Explanation:

$5 / 3 + 3 / 5$

⇒ LCM of 3, 5 = 15

$$\Rightarrow (25 + 9) / 15 = 34 / 15$$

$$\therefore \frac{5}{3} + \frac{3}{5} = 2\frac{4}{15}$$

61. Answer: d

Explanation:

Letter	P	R	T	S
Meaning	×	+	÷	-

Given expression: 35T5P6S4R3 = ?

$$\text{L.H.S} = 35 \div 5 \times 6 - 4 + 3$$

$$= 7 \times 6 - 4 + 3$$

$$= 42 - 4 + 3$$

$$= 45 - 4$$

$$= 41$$

Hence, '41' is the correct answer.

62. Answer: a

Explanation:

The correct answer is Na 2SO 4.

★ Key Points

- The formula for sodium is Na^+ , and Sulphate is SO_4^{2-} . So, the formula for **Sodium Sulphate** is Na_2SO_4 .
- **Sodium sulfate** is used to dry organic liquids. As a filler in powdered home laundry detergents. Na_2SO_4 is used in manufactured paper, glass, dyes, and pharmaceuticals. It is often used in its decahydrate form, which is also known as Glauber's salt. It is also called salt cake.

★ Additional Information

- NaSO_3 is a chemical formula for sodium sulfite.
- **Sodium sulfite** is an inorganic sodium salt having sulfite as the counterion. It has a role as a food preservative and a reducing agent.
- NaSO_4 – It does not exist as sulphate is having -2 valency.
- **Sodium sulfate** is a typical electrostatically bonded ionic sulfate.
- $\text{Na}(\text{SO}_4)_2$ – It is not possible as sodium is having a valency of $+1$.

63. Answer: c

Explanation:

Concept:

Sum of all the angle is quadrilateral = 360°

Given:

Two angles of quadrilateral are 125° and 35°

Sum of these two quadrilateral = $125^\circ + 35^\circ = 160^\circ$

$\Rightarrow 360^\circ - 160^\circ = 200^\circ$

$\therefore$ Value of each equal angle is $200^\circ / 2 = 100^\circ$

64. Answer: d

Explanation:

The logic 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

$\begin{array}{c} A \\ | \\ +1 \\ | \\ B \end{array}$
 $\begin{array}{c} N \\ | \\ +1 \\ | \\ O \end{array}$
 $\begin{array}{c} G \\ | \\ +1 \\ | \\ H \end{array}$
 $\begin{array}{c} R \\ | \\ +1 \\ | \\ S \end{array}$
 $\begin{array}{c} Y \\ | \\ +1 \\ | \\ Z \end{array}$

Similarly,

$\begin{array}{c} A \\ | \\ +1 \\ | \\ B \end{array}$
 $\begin{array}{c} S \\ | \\ +1 \\ | \\ T \end{array}$
 $\begin{array}{c} S \\ | \\ +1 \\ | \\ T \end{array}$
 $\begin{array}{c} I \\ | \\ +1 \\ | \\ J \end{array}$
 $\begin{array}{c} G \\ | \\ +1 \\ | \\ H \end{array}$
 $\begin{array}{c} N \\ | \\ +1 \\ | \\ O \end{array}$

Hence, 'BTTJHO' is the correct answer.

65. Answer: b

Explanation:

From the table we can say that,

Game 1 score = 2

Game 2 score = 1

Game 3 score = 0

Game 4 score = 4

Game 5 score = 3

Game 6 score = 2

⇒ Total goals scored = $(2 + 1 + 0 + 4 + 3 + 2) = 12$

∴ Average goal scored in all the 6 matches = $12 / 6 = 2$

66. Answer: d

Explanation:

All options except 'SBI Bank' are name of private banks, while 'SBI Bank' is a public sector bank.

Hence, 'SBI Bank' is the odd one out.

- 1) HDFC Bank → HDFC Bank is India's largest private sector bank.
 - 2) Yes Bank → ICICI Bank is a leading private sector bank in India.
 - 3) AXIS Bank → Axis Bank is the third largest private sector bank in India.
 - 4) SBI Bank → State Bank of India (SBI) is an Indian multinational, public sector bank.
-

67. Answer: b

Explanation:

The correct answer is Dr. Harsh Kumar Bhanwala.

★ Key Points

- Dr Harsh Kumar Bhanwala is the current chairman of NABARD of July 2018. Capital India Finance Limited has appointed doctor Harsh Kumar Bhansali and the executive director of India infrastructure Finance Company Limited. He

has post-graduate in management from IIM Ahmedabad and he is a PhD degree holder.

- Govinda Rajulu Chintala is the current chairman of the National Bank for Agriculture and Rural Development (NABARD).

★ Additional Information

- **Raghuram Rajan** is an Indian economist. He was chief economist and director of research at the **International Monetary Fund from 2003 to 2006**. He was born on 3rd February 1963 in Bhopal.
- **Vivek Debroy** is a chairman of **PM economic Council**. He is an Indian author. Vivek Debroy contributions to Game Theory, economics theory income and social inequalities law reforms, railway reforms poverty and ideology except. He is born on 25th January 1955 in Shillong.
- **Subramanian Swamy** is an Indian politician and economics who became a **member of parliament in Rajya Sabha**. Subramanyam Swami is born in 15 September in 1939 in Mylapore Chennai. Subramanyam Swami was one of the founding members of Janata Party.

68. Answer: a

Explanation:

The correct answer is Sushant Singh Rajput.

★ Key Points

- **Sushant Singh Rajput** won the best actor award **at the Indian film festival of Melbourne 2017**. The eighth edition of the Indian film festival of Melbourne kick-started **on August 10 August**. Sushant Singh Rajput got this award **for his performance in MS Dhoni**.
- Sushant Singh Rajput was born in 21st January 1986 Patna in Bihar. Sushant Singh Rajput was dead 14 June 2020 in Mumbai Maharashtra.

★ Additional Information

- **Shahid Kapoor** is an Indian actor. He was born February 25th February in 1981 in New Delhi. He has since taken parts in action films and thrillers and is the recipient of several awards, including **three Filmfare Awards**.
- **Varun Dhawan** is an Indian actor who worked in Hindi films. Varun Dhawan is born on 24th April 1987 in Mumbai. He is the son of the famous Bollywood film director David Dhawan. He is one of the country's highest-paid celebrities, he has featured in **Forbes India's Celebrity 100 list since 2014**.
- The full name of Aamir Khan is **Mohammed Aamir Hussain Khan** is an Indian actor, director, filmmaker and television Talk Show host. Aamir Khan won many awards in his life. He won **IIFA awards for Best Actor 2002** for Lagaan, **film Screen Award** for Best supporting actor in 2008 for Taare Zameen Par, **Screen Award for Best Actor in 1997** Raja Hindustani etc.

69. Answer: a

Explanation:

The correct answer is 250 units.

- 1 unit of energy is equal to a 1-kilowatt hour (kWh).

$$1 \text{ kWh} = 3.6 \times 10^6 \text{ J.}$$

$$\text{So, } 1 \text{ unit} = 3.6 \times 10^6 \text{ J.}$$

Here, given $9 \times 10^8 \text{ J}$ energy, that means $(9 \times 10^8) / (3.6 \times 10^6) = 250 \text{ units}$.
250 unit energy is consumed.

70. Answer: b

Explanation:

The correct answer is Shantha Rangaswamy.

★ Key Points

- Shantha Rangaswamy was the **first captain of the Indian women's cricket team in 1976**.
- She played **616 matches** from 1976 to 1991 in India. She was born on 1st January 1954 in Chennai.
- She won **Arjuna Award for cricket**.
- The Arjuna award is one of the highest honours in India given for outstanding achievements in the field of sports.
- Rangaswamy was **one of the pioneers of women's cricket in India**. She finished her career as the **second-highest run-getter** for India in Tests.

★ Additional Information

- **Harmanpreet Kaur:**
 - She is an Indian cricketer.
 - She played **all-rounder in play in the Indian women's cricket team**.
 - She is born on the 8th of March 1989 in Moga, Punjab.
 - She is also the **first woman to score a century in women's 20 – 20 international matches**.
- **Jhulan Goswami:**
 - She is an Indian international women cricketer.
 - Jhulan Goswami was born on 25th November 1982 in Chakdaha, West Bengal in India.
 - Jhulan Goswami has been an inspiration to a generation of cricketers from Bengal who lead India in **25 ODI from 2008 to 2011**.
 - She is leading the Wicket taker in women's ODI in the world.
- **Mithali Raj:**
 - She is an Indian cricketer.
 - She is the **test and ODI captain of the women's National Cricket Team**.
 - Mithali Raj was born on 3 December 1982 in Jodhpur.
 - Mithali started playing at the age of 10.
 - Mithali was picked up for the Indian team when she was 17 years old.
 - She is also known as '**lady Sachin**' due to her commandable performance.
 - She is the highest run-scorer in women's international cricket.

71. Answer: c

Explanation:

Given:

$$\tan^2 \frac{A}{2} + \tan^2 \frac{B}{2} + \tan^2 \frac{C}{2}$$

Formula used:

$$\tan(A + B) = (\tan A + \tan B) / (1 - \tan A \tan B)$$

Concept:

If any three numbers, So

$$a^2 + b^2 + c^2 \geq ab + bc + ca$$

Calculation:

We know that sum of angles of a triangle is 180° (i.e. π)

Now,

$$(\tan A / 2 - \tan B / 2)^2 + (\tan B / 2 - \tan C / 2)^2 + (\tan C / 2 - \tan A / 2)^2 \geq 0$$

$$\Rightarrow \tan^2 A / 2 + \tan^2 B / 2 - 2 \tan A / 2 \tan B / 2 + \tan^2 B / 2 + \tan^2 C / 2 - 2 \tan B / 2 \tan C / 2 + \tan^2 C / 2 + \tan^2 A / 2 - 2 \tan C / 2 \tan A / 2 \geq 0$$

$$\Rightarrow 2 (\tan^2 A / 2 + \tan^2 B / 2 + \tan^2 C / 2) - 2 (\tan A / 2 \tan B / 2 + \tan B / 2 \tan C / 2 + \tan C / 2 \tan A / 2) \geq 0 \quad \dots i)$$

Now,

$$\Rightarrow \tan A / 2 \tan B / 2 + \tan B / 2 \tan C / 2 + \tan C / 2 \tan A / 2$$

$$\Rightarrow \tan A / 2 (\tan B / 2 + \tan C / 2) + \tan B / 2 \tan C / 2$$

$$\Rightarrow \tan A / 2 [\tan (B / 2 + C / 2)(1 - \tan B / 2 \tan C / 2)] + \tan B / 2 \tan C / 2$$

Now,

$$A + B + C = \pi$$

$$\Rightarrow A/2 + B/2 + C/2 = \pi/2$$

$$\Rightarrow B/2 + C/2 = \pi/2 - A/2$$

$$\Rightarrow \tan A/2 \cot A/2 (1 - \tan B/2 \tan C/2) + \tan B/2 \tan C/2$$

$$\Rightarrow 1 (1 - \tan B/2 \tan C/2) + \tan B/2 \tan C/2$$

$$\Rightarrow 1 - \tan B/2 \tan C/2 + \tan C/2$$

$$\Rightarrow 1$$

Now,

From equation 1

$$2(\tan^2 A/2 + \tan^2 B/2 + \tan^2 C/2) - 2(\tan A/2 \tan B/2 + \tan B/2 \tan C/2 + \tan C/2 \tan A/2) \geq 0$$

$$\Rightarrow 2(\tan^2 A/2 + \tan^2 B/2 + \tan^2 C/2) - 2(1) \geq 0$$

$$\Rightarrow 2(\tan^2 A/2 + \tan^2 B/2 + \tan^2 C/2) \geq 2$$

$$\therefore (\tan^2 A/2 + \tan^2 B/2 + \tan^2 C/2) \geq 1$$

★ Alternate Method

In triangle ABC,

$$\Rightarrow A + B + C = \pi$$

$$\Rightarrow \frac{C}{2} = \frac{\pi}{2} - \frac{(A+B)}{2}$$

$$\Rightarrow \tan \frac{C}{2} = \tan \left\{ \frac{\pi}{2} - \frac{(A+B)}{2} \right\}$$

$$\Rightarrow \tan \frac{C}{2} = \cot \frac{(A+B)}{2} = \frac{1}{\tan(\frac{A}{2} + \frac{B}{2})}$$

$$\Rightarrow \tan \frac{C}{2} = \frac{1 - \tan \frac{A}{2} \tan \frac{B}{2}}{\tan \frac{A}{2} + \tan \frac{B}{2}}$$

$$\text{Let, } a = \tan \frac{A}{2}, b = \tan \frac{B}{2}, \text{ and } c = \tan \frac{C}{2}$$

$$\Rightarrow c = \frac{1-ab}{a+b}$$

$$\Rightarrow ab + bc + ca = 1$$

$$a^2 + b^2 + c^2 \geq ab + bc + ca = 1$$

$$\therefore \tan^2 \frac{A}{2} + \tan^2 \frac{B}{2} + \tan^2 \frac{C}{2} \geq 1$$

72. Answer: b

Explanation:

The correct answer is Talc.

★ Key Points

- **Talc** is the softest mineral. Talc is a **silicate and contains magnesium and a bit of water along with silica and oxygen**. Talc is a clay mineral composed by hydrated magnesium silicate.
- Talc is a colourless like light to dark Green, Brown, white and grey.

★ Additional Information

- **Diamond** is a rare naturally occurring mineral composed of carbon. Each carbon atom in a diamond is **surrounded by four other carbon atoms** and connected to them. Diamond is **the hardest mineral**. Diamond is one of the best-known and most sought after gemstones. They have been used as decorative items like jewellery.
- **Toothpaste is a gel dentifrice** used with a toothbrush to clean and maintain the teeth and healthy. Toothpaste is used **to promote oral hygiene**. It is an abrasive that removing dental plaque and food from the teeth.
- **Marble is a metamorphic rock**. Marble forms when pre-existing limestone rock is **heated to such extreme temperature** that the minerals grow larger. Marble is used for its beauty **in architecture and scripture**. It is used for chemical properties in agriculture. It is used **for in cosmetics paint and paper**.

73. Answer: c

Explanation:

The Correct Answer is Bone.

- The **bone** is a **connective tissue** that includes **cells, fibres and substances from the earth**.
- In the body in which the bone participates, there are many functions, such as storing minerals, providing internal support, protecting vital organs, allowing movement, and providing muscles and tendons with attachment sites. Its extracellular components are mineralized, unlike other connective tissues, giving it significant strength and rigidity.
- This makes the bone ideally suited to perform its most recognised mechanical support function within the body.
- About 80 per cent of the mass of skeletal tissue is made up of cortical (or compact) bone.

★ Important Points

- In vascular plants, the vascular **bundle** is a part of the transport system.
- The vascular cambium provides the inner soft **bark** or bast; it is composed of secondary phloem tissue whose innermost layer transmits food to the rest of the plant from the leaves.

74. Answer: b

Explanation:

The Correct Answer is density of a substance/density of water.

★ Key Points

- **Relative density** is equal to the **density of a substance/density of water**.

- For liquids, the specific gravity is almost always determined with respect to the densest water (at 4 °C or 39.2 °F); for gases, air at room temperature (20 °C or 68 °F) is the reference.
- If the relative density of the material is less than one (Relative Density < 1), it is less dense than the reference; if it is greater than 1 (Relative Density > 1), it is denser than the reference.
- The densities are equal if the relative density is exactly 1; that is, the same amounts of the two substances have the same mass.
- If water is the reference material, then a substance with less than 1 relative density (or specific gravity) can float in water.

75. Answer: b

Explanation:

The logic is:



The dotted lines of the square become a continuous line in the second figure and the continuous line of the circle becomes dotted lines in the second figure.

Similarly,



Hence, 'option 2' is the correct answer.

76. Answer: a

Explanation:

The Correct Answer is Dharamshala.

- Dharamshala is the **second capital of Himachal Pradesh**.
- **Dharamshala** is the district headquarters of Himachal Pradesh's Kangra district.
- Kangra district is part of the British province of Punjab.
- The administrative headquarters of the district were initially at Kangra, but were transferred in 1855 to Dharamshala. Under the flagship Smart Cities Mission of PM Narendra Modi, Dharamshala was selected as one of the hundred Indian cities to be built as a smart city.
- Former Chief Minister Virbhadra Singh proclaimed Dharamshala the second capital of the state of Himachal Pradesh on 19 January 2017, making Himachal Pradesh, after Jammu and Kashmir and Maharashtra, the third state of India with two capitals.

★ Important Points

- **Shimla** is the summer capital of Himachal Pradesh.
- **Himachal Pradesh Formation – 25 January 1971**
- **Chief Minister of Himachal Pradesh – Jai Ram Thakur (Sept 2021)**
- **Governor of Himachal Pradesh – Rajendra Vishwanath Arlekar**
- **Official Language – Hindi**

77. Answer: d

Explanation:

Considering the given equation

$$S = 6 + [(16 - 4) \div (2^2 + 2)] - 2$$

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

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

Now,

$$\Rightarrow S = 6 + [(16 - 4) \div (6)] - 2$$

$$\Rightarrow S = 6 + 12 \div 6 - 2$$

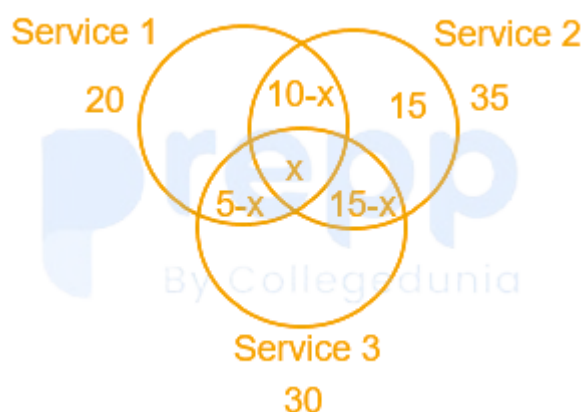
$$\Rightarrow S = 6 + 2 - 2$$

$$\Rightarrow S = 6$$

$$\Rightarrow S/2 = 3$$

78. Answer: b

Explanation:

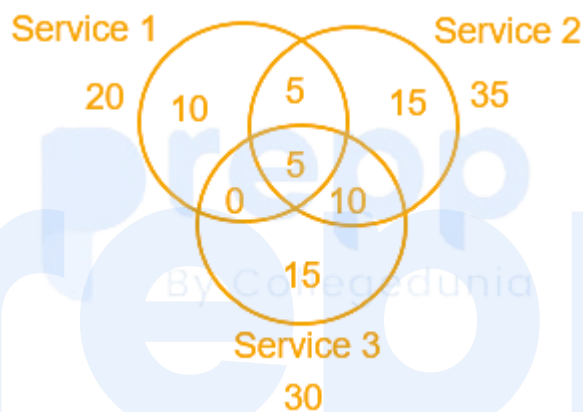


Number of customers who chose service2 = (Number of customers who chose only service 1 and service 2) + (Number of customers who chose only service 2 and service 3) + (Number of customers who chose only service 2) + (Number of customers chose all the three services)

$$35 = \{(10 - x) + (15 - x) + (15) + (x)\}$$

$$35 = 40 - x$$

$$x = 5$$



Hence 5 customers chose all the three services.

79. Answer: c

Explanation:

The Correct Answer is **86%**.

★ **Key Points**

- On 28 October 2016, India's total banknotes in circulation were estimated at about 17.77 lakh crore; it was unclear what proportion of this originated from between 500 and 1,000 banknotes.
- The Reserve Bank of India (RBI) reported in its March 2016 annual report that total banknotes in circulation were valued at 16.42 lakh crore, of which nearly 86% (about 14.18 lakh crore) were derived from 500 and 1,000 banknotes.

- In terms of volume, the report stated that ₹500 and ₹1,000 banknotes were 24 per cent of the total 9026.6 crore banknotes in circulation.
- Until demonetisation (November 2016), the industry had banknotes priced at 17.97 lakh crore.
- The demonetised banknotes made up 86.4% of that amount. In March 2018, the banknotes in circulation hit the amount prior to demonetisation. There were banknotes worth 18.03 lakh crore in the market by March 2018; a rise of 9.9 per cent.
- **80.6 per cent** of it is made up of new banknotes of 2,000 and 500. So there was just a 5.8 per cent rise in small banknotes for supremacy.

80. Answer: d

Explanation:

The Correct Answer is 96th.

★ Key Points

- In 2017, The best world ranking secured by India according to the **FIFA world ranking was 96th**.
- **Indian national football has managed to capture the 96th spot**, moving up four positions, according to the revised FIFA world football rankings. India had earlier been put in 100th spot.
- This is the highest ranking India has earned in 21 years. India was ranked **101st in April's FIFA rankings**. In March 2015, the new ranking is much better off than the 173rd rank secured.
- India has been ranked **134th on average** since the beginning of the world ranking system. India managed to secure 94th place in 1996. It remains the country's best ever FIFA ranking to date.
- **Germany** tops the rankings at present. In the rankings, Germany is followed by Brazil, Argentina, Portugal, and Switzerland.

81. Answer: c

Explanation:

The Correct Answer is raising it from the ground to that point against gravity.

★ Key Points

- The **gravitational potential energy** of an object at a point above the ground is defined as the work done in raising it from the ground to that point against gravity.
- **Gravitational energy**, such as elevating objects against the gravity of the Earth, is the potential energy correlated with gravitational force.
- If an object falls within a gravitational field from one point to another point, the gravity force will do positive work on the object, and the gravitational potential energy will decrease by the same amount.
- Near the surface of the Earth, the product mgh is the work performed in raising an object through a height h , so **$U = mgh$**
- **The Newton's law of gravitation:** This law states that every point mass in the universe attracts every other point mass with a force that is directly proportional to the product of its masses and inversely proportional to the distance between them in the square.

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82. Answer: d

Explanation:

Given:

$$\frac{(469+174)^2 - (469-174)^2}{(469 \times 174)}$$

Concept:

$$(a + b)^2 - (a - b)^2 = 4ab$$

According to question,

$$a = 469$$

$$b = 174$$

Calculation:

$$\{(a + b)^2 - (a - b)^2\} / (a \times b)$$

$$\Rightarrow 4ab / ab = 4$$

$$\therefore \frac{(469+174)^2 - (469-174)^2}{(469 \times 174)} = 4$$

83. Answer: b

Explanation:

The Correct Answer is 754.6 J.

- Given,

Mass of object $m = 11\text{kg}$

Height $h = 7\text{ m}$

Acceleration due to gravity $g = 9.8\text{ m/s}^2$

Potential Energy of object $P.E = m \times g \times h$

$$mgh = 11 \times 9.8 \times 7 = 754.6\text{ Joule}$$

- Energy possessed by the object is 754.6 Joule.

84. Answer: c

Explanation:

The least possible venn diagram is:



1. Some danger are metals. → False (It can be possible, but it is not definite)

2. Some red are metals. → False (As, No metals are red)

Hence, neither 1 nor 2 follows.

85. Answer: c

Explanation:

Given:

Tap A fill the tank in 12 hours

Tap B fill the tank in 16 hours

Tap C empty the tank in 8 hours

LCM of 12, 16, 8 = 48

Formula used:

Time = Work/Efficiency

Calculation:

Total capacity of tank = 48 units

Efficiency of Tap A = $48 / 12\text{hrs} = 4$ units

Efficiency of Tap B = $48 / 16 = 3$ units

Efficiency of Tap C = $48 / 8 = 6$ units

Effective of these three tanks together = $(4 + 3 - 6) = 1$ unit

$\therefore$ Time taken to fill the tank when they all opened simultaneously = $48 / 1 = 48$ hours

★ Alternate Method

Efficiency of 1st tap = $1 / 12$ units

Efficiency of 2nd tap = $1 / 16$ units

Efficiency of 3rd tap = $1 / 8$ units

Time taken to fill the tank when they all opened simultaneously = $1 / (1/12 + 1/16 + 1/8)$
 $= 1 / \{(4 + 3 - 6)/48\} = 1 / (1/48) = 48$ hours

$\therefore$ Time taken to fill the tank when they all opened simultaneously = 48 hours.

86. Answer: c

Explanation:

The figure that will complete the given series is shown below:



In 2nd figure as compared to 1st figure, the circle comes out of the open box and is bigger in shape, while the open box is now above the circle and is smaller in shape.

Similarly,

In 4th figure circle will come out and will be bigger in shape, while the arrow face will be above the circle, as shown in answer figure B.

Hence, 'option 3' is the correct answer.

87. Answer: b

Explanation:

The correct answer is Tamralipti.

★ Key Points

- **I-tsing, a Chinese traveller**, stayed at Tamralipti for three years and learned Sanskrit.
- Formerly recognized as I-tsing, Yijing was a Chinese Buddhist monk of the Tang-era who was regarded as a traveller and translator.
- An important source for the history of the mediaeval kingdoms along the sea route between China and India, especially Srivijaya in Indonesia, is his account of his travels.

★ Confusion Points

- Fa-Hein was the first traveller who visited India from China.
- He studied the Sanskrit language for about three years in the city of **Patliputra**.

★ Additional Information

- Born in 635 AD in Fan-Yang (modern Cho-Chou) near present-day Beijing, he began a secular education at the age of seven.
- In 654, **I-tsing spent five years in the study of the rules of discipline (Vinayapitaka)** which remained his main interest and formed the main topic of his writing.
- The pilgrim was aware of fa-hien's travels and also of the immediate example of hiuen-tsang, - he was in Changan when Hiuen-tsang's funeral took place there in 664 AD - and was inspired by them to go to India.
- **I-tsing left for India from Canton by sea in 671, arriving in India in 673.**
- After visiting the sacred Buddhist sites in Magadha, **he resided at the great Nalanda monastery for ten years (676-685), devoting himself to the study of the Vinya .**

- He left India in 685 for the city of Shri Bhoja (or Sri Boja, known as Shri Vijaya, ie Palembang in Sumatra), which at that time was very much under the cultural influence of India. Here he devoted himself to the translation of Buddhist Sanskrit texts.
- In 689 I-tsing returned to China to obtain assistance for his translations. He then returned to Sri Vijaya, and remained there for five more years, returning to China in 695 during the reign of the well-known patron of Buddhism, the Empress Wu Zetian.
- Thus, I-tsing's stay abroad roughly covers a period of twenty-five years (671-695). He received much acclaim on his return, but like his predecessor Hiuen-tsang, I-tsing devoted the remaining years of his life to the translation of Buddhist works.
- He died in 713 AD at the age of 79, during the reign of the Chinese Emperor Zhongzong.

88. Answer: d

Explanation:

Given:

Length and breadth are in the ratio = 4 : 3

Area of the farm is 1452 m^2

Rate of fencing the farm is Rs. 12 per meter

Formula used:

Area of rectangle = length $\times$ breath

Perimeter of rectangle = 2 (length + breath)

Calculation:

Let length be $4x$ and breath be $3x$

According to question:

$$\text{Area of rectangle} = (4x \times 3x) = 12x^2$$

$$\Rightarrow 12x^2 = 1452$$

$$\Rightarrow x^2 = 121$$

$$\Rightarrow x = 11$$

$$\Rightarrow \text{Length of rectangle} = 4 \times 11 = 44 \text{ m}$$

$$\Rightarrow \text{Breath of rectangle} = 3 \times 11 = 33 \text{ m}$$

$$\Rightarrow \text{Perimeter of rectangle field} = 2(44 + 33) = 154 \text{ m}$$

Rate of fencing = Rs. 12 per meter

$$\therefore 154 \times 12 = \text{Rs. } 1848$$

89. Answer: b

Explanation:

Given:

Train A starts at 9 am at speed 70 km / hr

Train B starts at 11 am at speed 20 km / hr

Distance between two stations 320 km

Formula Used:

When the two objects travel in the same direction their relative speed = $(a - b)$ km / hr

When the two objects travel in the opposite direction their relative speed = $(a + b)$ km / hr

Where a and b are speeds of two objects in km / hr and $(a > b)$

Speed = Distance / Time

Calculation:

Distance covered by train A in 1st two hours = Speed $\times$ time

$\Rightarrow 70 \text{ km} / \text{hr} \times 2 = 140 \text{ kms}$

Remaining Distance = $320 \text{ km} - 140 \text{ km} = 180 \text{ km}$

From 11 am train B also start running at speed of $20 \text{ km} / \text{hr}$

$\therefore$ Relative speed of both the trains = $(70 \text{ km} / \text{hr} + 20 \text{ km} / \text{hr}) = 90 \text{ km} / \text{hr}$

Time taken = Distance / speed

$\Rightarrow 180 / 90 = 2 \text{ hrs}$

$\therefore$ Both the trains meet at 1 pm

90. Answer: d

Explanation:

The Correct Answer is Gopala.

- **Gopala** was the **first king of the Pala Dynasty**.
- **Gopala** was the founder of the Pala Dynasty of the Indian Subcontinent's Bengal region (ruled c. 750s–770s CE). About 750 CE in Gaur, he came to power after being elected by a coalition of regional chieftains.
- During the post-classical era of the Indian subcontinent, which emerged in the area of Bengal, the Pala Empire was an imperial power.
- It is named after its ruling family, whose rulers had names that ended with the Pala suffix.

★ Important Points

- The most powerful ruler of the Pala Empire of the area of Bengal in the Indian Subcontinent was **Devapala (9th century)** . He was the third king in the line, succeeding his Dharamapala father.
- In the Bengal region of the Indian subcontinent, **Madanapala (ruled 1144-1162 CE)** was the successor to Pala king Gopala III and the eighteenth and final ruler of the Pala lineage for 18 years.

91. Answer: b

Explanation:

The Correct Answer is Only A is true.

★ Key Points

- **An ion** is an atom or a group of atoms that does not equal the number of electrons to the number of protons.
- **Electrons** have a negative charge, whereas there is a positive charge for protons.
- This results in a negative charge when an atom gains electrons. An anion is called this form of ion.
- This results in a positive charge when an atom loses electrons. A cation is considered a positively-charged ion.
- Usually, positive ions are metals or behave like metals.
- Just like atoms may lose electrons to become cations, others can absorb electrons and become anions that are negatively charged.

92. Answer: c

Explanation:

Given:

The distance between two stations is 380 km

The speed of one of them is greater than the other by 7 km / h

Formula:

Distance = speed $\times$ time

Calculation:

Let the speed of first train be x km / hr

$\Rightarrow$ The speed of other train be $(x + 7)$ km / hr

After 2 hours distance between two trains = 126 km

$\therefore$ Distance covered by both the trains in 2 hours = $(380 - 126) = 254$ kms

$\Rightarrow (x) \times 2 + (x + 7) \times 2 = 254$

$\Rightarrow x + x + 7 = 127$

$\Rightarrow 2x + 7 = 127$

$\Rightarrow 2x = 120$

$\Rightarrow x = 60$

$\therefore$ speed of both train are 60 km / h and 67 km / hr

93. Answer: c

Explanation:

In all the options except '3', there is a common region shared by the two figures or generally we can say that there is an intersection between the two figures, while in option '3', there is no such intersection or common region.

Hence, 'option 3' is the odd one out.

94. Answer: d

Explanation:

Let the three numbers be x , y and z

$\Rightarrow x$ is the largest number

$\Rightarrow y$ is middle number

$\Rightarrow z$ is the smallest number

According to question,

$$\Rightarrow (x + y + z) / 3 = 15$$

$$\Rightarrow x + y + z = 45 \quad \dots i)$$

Range of the data = 9

$$\text{i.e. } x - z = 9 \quad \dots ii)$$

Difference between largest and the middle was twice that between middle number and least one

$$x - y = 2(y - z)$$

$$\Rightarrow x - y = 2y - 2z$$

$$\Rightarrow x + 2z = 3y$$

$$\Rightarrow (x + 2z) / 3 = y \quad \dots iii)$$

From equation (ii)

$$\Rightarrow x = 9 + z \quad \dots iv)$$

Putting the value of x in equation (iii)

$$\Rightarrow (9 + 3z) / 3 = y$$

$$\Rightarrow 3 + z = y \quad \dots v)$$

Put the value of y and x in equation (i)

$$\Rightarrow (9 + z) + (z + 3) + z = 45$$

$$\Rightarrow 3z + 12 = 45$$

$$\Rightarrow z + 4 = 15$$

$$\Rightarrow z = 11$$

$\therefore$ Largest number is x

$$x = 9 + z$$

$$\Rightarrow x = 20$$

95. Answer: b

Explanation:

The Correct Answer is Telugu Desam Party.

- **Telugu Desam Party** is an Indian State Political Party is led by **N. Chandra Babu Naidu**.
- In Andhra Pradesh and Telangana, the Telugu Desam Party is a regional Indian political party active in the southern states.
- The party was founded on 29 March 1982 by N. T. Rama Rao. Since 1995, the party has been led by the former Chief Minister of Andhra Pradesh, Chandrababu Naidu.
- The headquarters for the party is situated at NTR Bhavan in Hyderabad.
- In 1983, within nine months of the party's founding, Rama Rao became Andhra Pradesh's 10th Chief Minister, thus establishing the first non-Indian National Congress (INC) government in Andhra Pradesh. From 1984 to 1989, the TDP was the first regional party to become the largest opposition party at the 8th Lok Sabha.

- The TDP left the National Democratic Alliance of Prime Minister Narendra Modi on 16 March 2018 (NDA).

★ Important Points

- The founder of All India Forward Bloc was **Subhas Chandra Bose**.
- In India Against Corruption movement organised by **Anna Hazare and Arvind Kejriwal**, the AAP(Aam Aadmi Party) has its roots.
- Asom Gana Parishad(AGP) was the result of the six-year Assam Agitation led by the All Assam Students' Union against illegal infiltration into Assam by foreigners from Bangladesh.

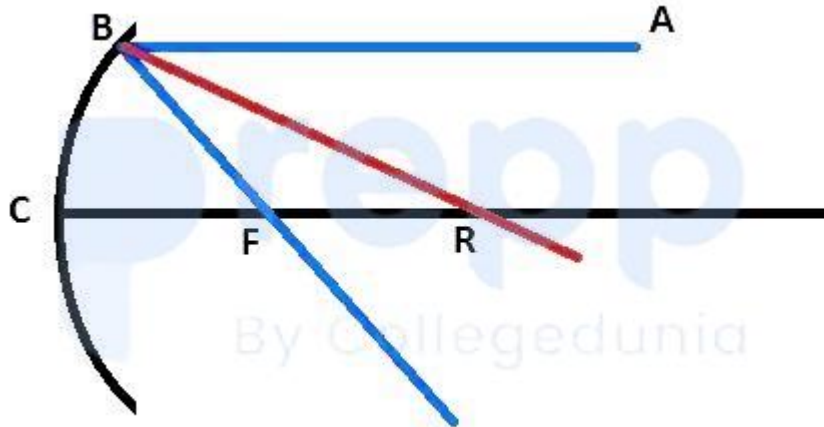
96. Answer: c

Explanation:

The Correct Answer is $R = 2f$.

- **The lens focal length (f)** is the distance between the centre of the lens and the point at which the reflected light meets the centre line of a beam of light moving parallel to the centre line (principal axis).
- The curvature radius (r) is the radius of a full sphere that forms the lens.
- The red line reflects the light that enters lens (AB) and that reflects off the lens (BF).
- We know that the green line, RB, which reflects the circle's radius line, bisects the ABF angle since the lens is always at the right angle.
- The angles of ABR and RBF are therefore equivalent. Because of the law of alternate angles, we also know that $\angle ABR$ is equal to $\angle BRF$. Therefore the triangle BRF is a triangle of isosceles. The BF and RF lines are therefore equivalent.
- We also know that for lenses that are thin, BF and FC are about equal.
- Therefore:
- $RF=BF=FC$
- $RC=RF+FC=FC+FC=2FC$
- $R=2f$

- Therefore, the radius(R) of curvature is twice the focal length(f).



97. Answer: c

Explanation:

Length of the train = 300 m

Let length of the platform be x

As we know,

Speed = Distance/time

According to the question,

Speed of train = $300/18$ m/s ...i)

Again,

Speed of train = $(300 + x)/39$ m/s ...ii)

From equation (i) and equation (ii)

$$300/18 = (300 + x)/39$$

$$\Rightarrow 50/3 \times 39 = (300 + x)$$

$$\Rightarrow 650 = 300 + x$$

$$\Rightarrow x = 650 - 300$$

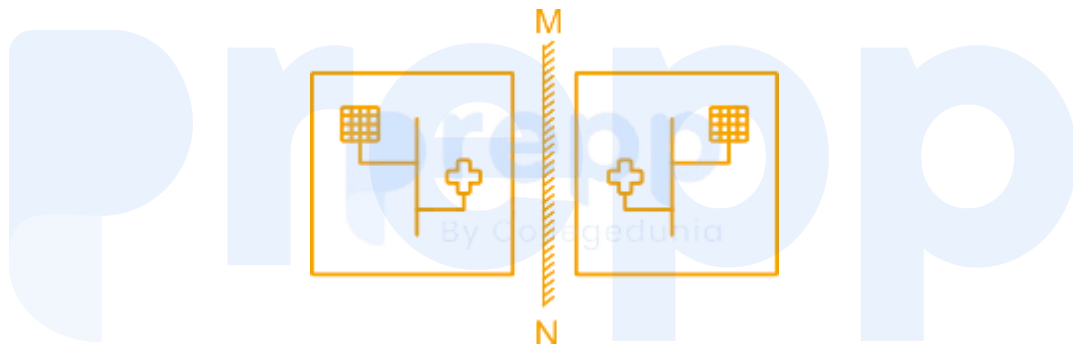
$$\Rightarrow x = 350 \text{ m}$$

$\therefore$ Length of the platform is 350 m.

98. Answer: c

Explanation:

The mirror image of the given figure with respect to the line AB is shown below:



Hence, 'option 3' is the correct answer.

99. Answer: b

Explanation:

The Correct Answer is Ranchi.

- **Ranchi** is the capital of Jharkhand.
- The center of the Jharkhand movement was Ranchi, which called for a separate state for the tribal areas of western West Bengal, South Bihar, northern Orissa, and the eastern part of what is now Chhattisgarh.
- By dividing the **Bihar divisions of Santhal Parganas and Chota Nagpur**, the Jharkhand state was created on 15 November 2000.

- Ranchi has been selected as one of the hundred Indian cities to be constructed as a **smart city under PM Narendra Modi's flagship Smart Cities Mission**.

★ Important Points

- **The Jharkhand state shares** its boundaries with the northern states of Bihar, northwest of Uttar Pradesh, west of Chhattisgarh, south of Odisha, and east of West Bengal.
- It has 79,710 km² of surface area. It is by area the 15th largest state and by population the 14th largest. **Hindi is the state's official language.**

★ Additional Information

- **Patna** is Bihar's largest and capital city.
- Patna is an ancient city in Bihar, northeast India, that spreads along the south bank of the Ganges River.

100. Answer: a

Explanation:

Let the age of the man be a .

At the time of marriage, a man was 6 years older than his wife.

Age of man's wife = $a - 6$

But after 12 years of marriage, his age is 1.2 times that of his wife.

According to question:

$$(a + 12) = 1.2(a - 6 + 12)$$

$$a + 12 = 1.2(a + 6)$$

$$a + 12 = 1.2a + 7.2$$

$$a - 1.2a = 7.2 - 12$$

$$0.2a = 4.8a$$

$$a = 24$$

So, the man's age was 24 years and his wife's age was $(24 - 6) = 18$ years.

Hence, '24 years, 18 years' is the correct answer.

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