Prepp.in

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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
- UPTET
- IBPS RRB
- IBPS CLERK
- IES
- UPSC CAPF
- SSC Stenogr..
- RRB NTPC
- SSC GD
- RBI GRADE B
- RBI Assistant
- DSSSB

RRB Group D 2018 Prev. Yr. Paper (17 Dec 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.

CBT

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

   Flowerpot : Mud :: Candle : _____

   a. Light

   b. Stand

   c. Wax

   d. Wick

---

2. With which sport is the Begum Hazrat Mahal Cup associated? **(+1, -0.33)**

   a. Hockey

   b. Cricket

   c. Kabaddi

   d. Football

---

3. An item is sold for ₹ 649 with a profit of 18%, what will be the loss percentage if that item is sold for ₹ 418? **(+1, -0.33)**

   a. 24.5

   b. 24

   c. 25

   d. 22.5

4. If a force (F) is acting in the direction of displacement (s) on an object, what will be the equation of work (W)? **(+1, -0.33)**

   a. F - s

   b. F × s

   c. F / s

   d. s /F

5. At a function, Mahi meets Vijaya, who is her mother's father's second daughter's daughter. Whom did Mahi meet? **(+1, -0.33)**

   a. Her paternal aunt

   b. Her maternal aunt

   c. Her cousin

   d. Her sibling

6. The two people traveled a similar distance, but at different speeds. During this time Ghanshyam traveled at fixed speed which ran between 35 km/h and 40 km/h, similarly Sutirtha traveled at fixed speed, which was between 40 km/h and 45 km/h. While Ghanshyam took 7 hours to complete this journey, Sutirth took 6 hours. **(+1, -0.33)**

   Which distance can be traveled by each in the distance given below?

   a. 272 km

   b. 242 km

c. 276 km

d. 252 km

---

7. The chemical formula of Ammonium Sulphate is ____ (+1, -0.33)

a. $(NH_4)_3SO_4$

b. $NH_4(SO_4)$

c. $(NH_4)_2SO_4$

d. $NH_4(SO_2)_3$

---

8. During rusting of iron, _____ on iron. (+1, -0.33)

a. Brown blue powder is coated.

b. Black is coated.

c. Green is coated.

d. Red brown powder is coated.

---

9. The sum of $\frac{7}{11}$ and $\frac{11}{7}$ is _____. (+1, -0.33)

a. $\frac{170}{77}$

b. $\frac{18}{77}$

c. $\frac{18}{18}$

d. $\frac{77}{18}$

10. Mahi went to her relative's house to meet the only brother of her husband's father. Whom did Mahi meet ? (+1, -0.33)

a. Her paternal uncle

b. Her father-in-law's daughter

c. Her maternal uncle

d. Her husband's uncle

11. In which of the following games, the terms 'Ace' and 'Advantage' are used? (+1, -0.33)

a. Volleyball

b. Hockey

c. Football

d. Tennis

12. Ananya walks east for a distance of 3 km, then turns to the right and walks for 1 km. Now in which direction is she from her initial position? (+1, -0.33)

a. South East

b. North East

c. South West

d. North West

13. The Ministry of Shipping laid the foundation stone for the formation of the National Center for Technology for Ports, Waterways, and Coasts (NTCPWC) in which city? **(+1, -0.33)**

a. Chennai

b. Ahmedabad

c. Kanpur

d. Varanasi

---

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

Hear : Listen :: sense : ?

a. Understand

b. Vision

c. Perceive

d. Dark

---

15. A question is given followed by two statements. Identify which statement (s) is sufficient to answer the question. **(+1, -0.33)**

Question:

A, B, P, O and D are standing in a circle. Who stands between O and P?

Statement:

1. P stands ahead of D.

2. A stands to the right of D.

a. Statement 1 alone is sufficient.

b. Statements 1 and 2 together are sufficient.

c. Statements 1 and 2 together are insufficient.

d. Statement 2 alone is sufficient.

---

16. Read the given statements and conclusions carefully and decide which of the given conclusions logically follows from the given statements. **(+1, -0.33)**

Statement:

I. All wings are multicolored.

II. Some bags are multicolored.

Conclusions:

1. Some multicolored are wings.

2. Some bags are wings.

a. Neither conclusion 1 nor 2 follows.

b. Both conclusions 1 and 2 follow.

c. Only conclusion 1 follows.

d. Only conclusion 2 follows.

---

17. A club house also has a private swimming bridge. The following table shows the number of visitors here, in which both members and non-members are shown. **(+1, -0.33)**

Based on the given data, on average, how many visitors are members of the swimming pool and how many are non-members?

Days	Swimming Pool Users Members	Swimming Pool Users Non-Members
Monday	10	3
Tuesday	15	3
Wednesday	10	1
Thursday	Closed	Closed
Friday	10	2
Saturday	5	1
Sunday	30	10

a. Members: 12, Non-Members: 2

b. Members: 20, Non-Members: 3

c. Members: 13, Non-Members: 2

d. Members: 13, Non-Members: 3

18. Which of the following statement is **NOT Correct?** **(+1, -0.33)**

If an object sinks in water, it means that:

a. The upper thrust of water on the object is less than the weight of the object.

b. The density of object is less than the density of the water.

c. The density of an object is greater than the density of water.

d. The overhead of water on an object is greater than the weight of the object.

---

19. In which state was the Solar Energy Park, Shakti Sthala inaugurated in March 2018? **(+1, -0.33)**

a. Karnataka

b. Odisha

c. Assam

d. Chhattisgarh

---

20. $56 \div 7 \times (35 - 45 \div 3) \div 4 = ?$ **(+1, -0.33)**

a. 1.6

b. 48

c. 40

d. 8

---

21. _____ won the Best Film Friendly State Award at the National Film Awards, 2017. **(+1, -0.33)**

a. Andhra Pradesh

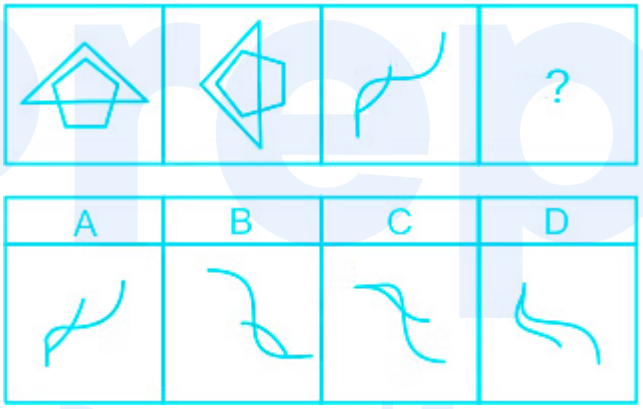
b. Karnataka

c. Uttar Pradesh

d. Tamil Nadu

---

22. Find the next figure in the following series. **(+1, -0.33)**



a. A

b. B

c. C

d. D

---

23. Which country was visited by Indian President Ram Nath Kovind in March 2018? **(+1, -0.33)**

a. Pakistan

b. Nepal

c. Mauritius

d. Iran

---

24. The sum of kinetic energy and potential energy will be: **(+1, -0.33)**

a. Geothermal Energy

b. Thermal Energy

c. Nuclear Power

d. Mechanical Energy

---

25. The amount of time that B takes to fill the tank, pipe A fills it in its one fourth time. Pipe C takes 3 times the time taken by pipe A. If all three pipes are opened simultaneously, it takes 33 hours to fill the tank. If pipe C is not switched on, how many hours will it take to fill the tank? **(+1, -0.33)**

a. 42.4

b. 41.5

c. 42.1

d. 41.8

---

26. Who is the Minister of Women and Child Welfare (November 2018)? **(+1, -0.33)**

a. JP Nadda

b. Piyush Goyal

c. Nirmala Sitharaman

d. Maneka Gandhi

---

27. Who among the following was awarded Bharat Ratna by the Government of India in 2015? **(+1, -0.33)**

a. Madan Mohan Malviya

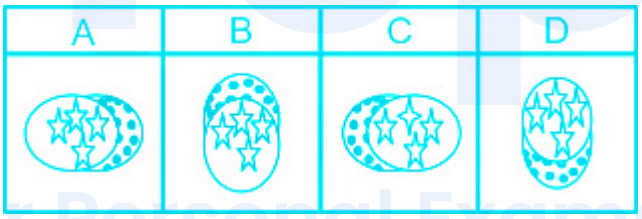
b. Kailash Satyarthi

c. Rahul Gandhi

d. MS Dhoni

---

28. Find the odd figure. **(+1, -0.33)**



a. D

b. C

c. B

d. A

---

29. Indira Pradhan Trophy is related to which of the following sports? **(+1, -0.33)**

a. Football

b. Cricket

c. Volleyball

d. Hockey

---

30. In which of the following sports, the words 'crawl', 'breaststroke', and 'butterfly' are used? **(+1, -0.33)**

a. Swimming

b. Shooting

c. Tennis

d. Badminton

---

31. A concave mirror creates a virtual, straight, and enlarged image when the object is placed _____. **(+1, -0.33)**

a. Between F and P

b. At infinity

c. Between C and F

d. Beyond or away from C

---

32. An event was organized by an event management company and the entry fee per person was fixed at Rs 250/-. On average, 2 persons from each family participated in the program and there were 300 families participating in the event. 50% of the total amount received by the company from the entry fee was spent on the arrangement. What was the amount spent on the arrangement? **(+1, -0.33)**

a. Rs. 1,50,000

b. Rs. 1,20,000

c. Rs. 1,0,5000

d. Rs. 75,000

---

33. Which of the following languages was NOT given the Classical Language status by the Government of India in 2017? **(+1, -0.33)**

a. Malayalam

b. Kannada

c. Prakrit

d. Sanskrit

---

34. Which element has three shells which are completely filled with electrons? **(+1, -0.33)**

a. Argon

b. Neon

c. Krypton

d. Aluminum

---

35. If $22x^2 - ax + 2 = ax^2 + 18x - 7$ has only one (repeated) solution, then the positive integral solution of a is **(+1, -0.33)**

a. 3

b. 6

c. 4

d. 5

---

36. If the edge of a cube is increased by 4 cm, the surface area will increase by 432 cm^2. Then the original length of each edge of the cube is _____. **(+1, -0.33)**

a. 8 cm

b. 7 cm

c. 6 cm

d. 9 cm

---

37. 703 ÷ 37 = 19 then 7.03 ÷ 0.0037 = ? **(+1, -0.33)**

a. 1.9

b. 1900

c. 0.19

d. 190

---

38. Which of the following is not an involuntary action? **(+1, -0.33)**

a. Saliva Secretion

b. Bicycling

c. Digestion

d. Respiration

---

39. How many triangles are there in the following figure ? **(+1, -0.33)**

a. 15

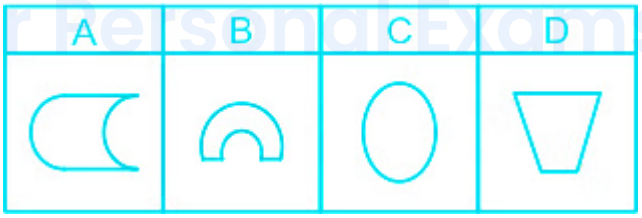
b. 20

c. 10

d. 18

---

40. Find the odd figure. **(+1, -0.33)**



a. D

b. B

c. C

d. A

---

41. Which Indian city is known as 'The City of Palaces' ? **(+1, -0.33)**

a. Kolkata

b. Hyderabad

c. Mumbai

d. Chennai

---

42. When $x^2 + kx - 6$ can be completely divided by x + 3, the value of k is _____. **(+1, -0.33)**

a. 3

b. -1

c. 1

d. -3

---

43. What is the mode of the given numbers: **(+1, -0.33)**

4, 5, 5, 6, 4, 3, 2, 2, 5, 1?

a. 5

b. 2

c. 4

d. 6

---

44. Which of the following government schemes has been launched by the Indian Prime Minister to combat malnutrition and stunting (dwarfness) among children? **(+1, -0.33)**

a. AMRUT Scheme

b. HRIDAY Mission

c. POSHAN Abhiyan

d. Deen Dayal Upadhyay Gram Jyoti Abhiyan

---

45. Who is the Minister of Road Transport and Highways (November 2018) ? **(+1, -0.33)**

a. Arun Jaitley

b. Sushma Swaraj

c. Nitin Gadkari

d. JP Nadda

---

46. The length of the arc in front of an angle at the center of a circle of radius 14 cm is 11 cm. What is the measure of that perceived centroid angle? [Use π = 22/7] **(+1, -0.33)**

a. 60°

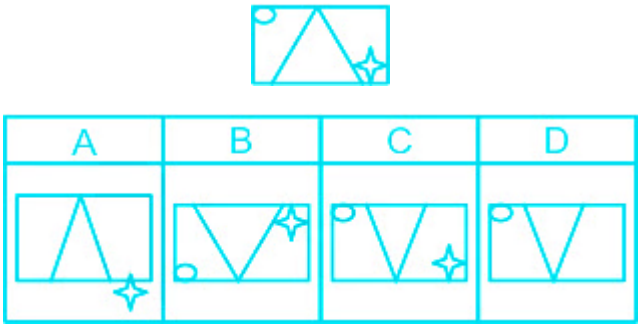
b. 45°

c. 75°

d. 30°

---

47. Which of the following forms is closest to which of the following? **(+1, -0.33)**



a. C

b. B

c. D

d. A

---

48. In 2017, the Assamese film 'Dixon Banat Palash' received the Nargis Dutt Award for Best _____ at the 64th National Film Awards. **(+1, -0.33)**

a. Feature film

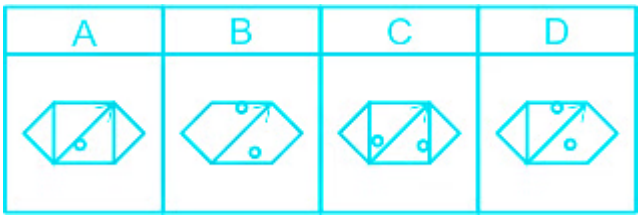
b. Animated Film

c. Social issues

d. Feature film on national integration

---

49. Which of the following forms is closest to which of the following? **(+1, -0.33)**



a. B

b. A

c. C

d. D

---

50. If $\tan\alpha = \sqrt{15} + 4$, then the value of $\tan\alpha - \cot\alpha$ is _____. **(+1, -0.33)**

a. $4 - \sqrt{15}$

b. $\sqrt{15} - 4$

c. $2\sqrt{15}$

d. 8

---

51. Find the next term in the following series. **(+1, -0.33)**

DG, GJ, JM, ____

a. MP

b. MQ

c. MO

d. MM

---

52. In a code or code language, ANGEL is written as 1147512. What would be the code for DEVIL in that language? **(+1, -0.33)**

a. 4622912

b. 4523912

c. 4522912

d. 4522812

---

53. A question is given followed by two arguments. Decide which arguments are stronger in relation to the question. **(+1, -0.33)**

Question:

Do people who work late at night have higher levels of toxins than people of normal working hours?

Argument:

1. Yes, our health improves when we respect our natural body time and sleep early.

2. No, nowadays, working till late at night is unavoidable because we work in many time zones.

a. Only argument 1 is strong.

b. Only argument 2 is strong.

c. Neither argument 1 nor 2 is strong.

d. Both 1 and 2 arguments are strong.

---

54. What is the energy contained in the body of 20 kg mass at a height of 8 m from the ground? (Given that 'g' = 10 ms^{-2}) **(+1, -0.33)**

a. 16 J

b. 16000 J

c. 1600 J

d. 160 J

---

55. A number is divided in the ratio 2 : 1. The larger of these two is 52, so that number is _____. **(+1, -0.33)**

a. 72

b. 84

c. 66

d. 78

---

56. What is the value of x in the following equation? **(+1, -0.33)**

(16 - 4) × (13 - 6) ÷ x = 12

a. 4

b. 12

c. 7

d. 1

---

57. Read the given statements and conclusions carefully and decide which of the given conclusions logically follows from the given statements. (+1, -0.33)

Statement:

X tells Y, "Our society's septic tank is full and gutter water is coming out; the Society Association is not taking the necessary steps to clean the septic tank."

Conclusions:

1. The septic tank can be full and needs to be cleaned or emptied.

2. The septic tank of the X's Society is not yet connected to the main gutter line of the municipality.

a. Only conclusion 2 follows.

b. Both conclusions follow.

c. No conclusions follow.

d. Only conclusion 1 follows.

---

58. Which of the following is used as a catalyst in the hydrogenation of vegetable oil? (+1, -0.33)

a. Palladium

b. Carbon

c. Manganese

d. Nickel

---

59. The lens formula is _____ (+1, -0.33)

a. $\frac{1}{u} - \frac{1}{v} = \frac{1}{f}$

b. $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

c. $\frac{1}{f} - \frac{1}{u} = \frac{1}{v}$

d. $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$

---

60. A question is given followed by two arguments. Decide which arguments are stronger in relation to the question. (+1, -0.33)

Question:

Do dogs love selflessly?

Arguments:

1. Yes, dogs are very loyal and loving; Having a pet dog at home creates a very friendly atmosphere.

2. No, this is just a human thinking; Rather, dogs need the freedom to live a life without human intervention.

a. Only argument 1 is strong.

b. Only argument 2 is strong.

c. Neither argument 1 nor 2 is strong.

d. Both 1 and 2 are strong arguments.

---

61. Which of the following sodium compounds is used to normalize hard water? (+1, -0.33)

a. Sodium Chloride

b. Sodium Hydroxide

c. Sodium Carbonate

d. Sodium Hydrogen Carbonate

---

62. How many triangles are there in the following figure? **(+1, -0.33)**

a. 19

b. 16

c. 12

d. 18

---

63. The molecular mass of H_2SO_4 is ____. **(+1, -0.33)**

(H = 1, S = 32, O = 16)

a. 98 u

b. 49 u

c. 96 u

d. 97 u

64. Which of the following gases was not present in the atmosphere at the time of origin of life? **(+1, -0.33)**

a. O_2

b. CO

c. NH_3

d. CH_4

---

65. Which of the following is not based on Archimedes' theory? **(+1, -0.33)**

a. Lactometer

b. Hygrometer

c. Hydrometer

d. Submarine

---

66. What will be the momentum of a body of mass 'm' moving with 'v' velocity? **(+1, -0.33)**

a. mv

b. mv^2

c. $1/2\ mv^2$

d. m/v

---

67. Mrinalini and Samyukta can work together to paint half of a wall in 14 days. Working separately, Mrinalini would need four times the time taken by the Samyukta to complete it. In how many days can the Samyukta paint the entire wall alone? **(+1, -0.33)**

a. 30

b. 28

c. 42

d. 35

---

68. Find the next number in the following series. **(+1, -0.33)**

22, 76, 31, 101, __

a. 90

b. 40

c. 67

d. 41

---

69. Investing a money for 6 years yields ₹ 5600. If the simple rate of interest was increased by 2% per annum and then the yield became ₹ 6020. The original investment was _____. **(+1, -0.33)**

a. ₹ 4000

b. ₹ 3500

c. ₹ 3250

d. ₹ 3750

---

70. Priyam is 9 years younger than Pritam. Five years ago Priyam's four times age was equal to Pritam's three times age. Find the present age of Priyam. **(+1, -0.33)**

a. 30 years

b. 32 years

c. 28 years

d. 33 years

---

71. Sitesh drove 12 hours at a speed of @ 75 km/hr. At present, how long should he drive at a speed of @ 90 km/hr so that the overall average speed will be 81 km/hr? **(+1, -0.33)**

a. 9

b. 7.5

c. 8

d. 6

---

72. Which is the smallest natural number that divides 2736 and makes the quotient a perfect square? **(+1, -0.33)**

a. 171

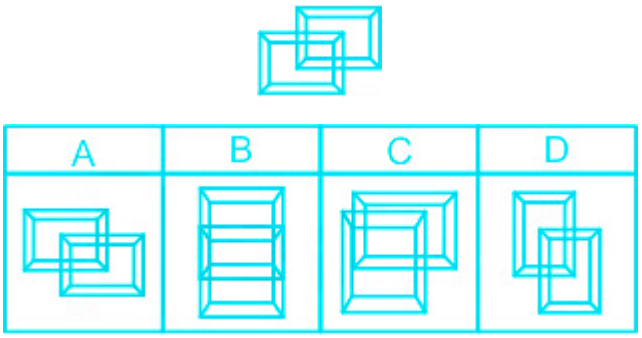
b. 18

c. 19

d. 9

---

73. Which of the following figure will look like the given figure when it is rotated 90° clockwise? **(+1, -0.33)**



a. A

b. D

c. C

d. B

---

74. Oxides of carbon, nitrogen, and sulfur released while burning fossil fuels are _____ oxides. **(+1, -0.33)**

a. Amphoteric

b. Acidic

c. Alkaline

d. Neutral

---

75. Find the HCF of 144, 288 and 396. **(+1, -0.33)**

a. 18

b. 72

c. 36

d. 48

---

76. Which of the following numbers, when multiplied by $\sqrt[9]{64}$ will give a rational number? **(+1, -0.33)**

a. $\sqrt[9]{4}$

b. $\sqrt[9]{16}$

c. $\sqrt[9]{8}$

d. $\sqrt[9]{2}$

---

77. In the context of the tertiary Indian economy sector, which of the following areas comes under it? **(+1, -0.33)**

a. Health Care

b. Animal Husbandry

c. Banking

d. Agriculture

---

78. Which of the following proteins helps the muscle tissue to contract and relax to cause movement ? **(+1, -0.33)**

a. Hemp proteins

b. Whey proteins

c. Contractile proteins

d. Lipoproteins

---

79. Which of the following state assembly elections were held in February 2018? **(+1, -0.33)**

a. Assam

b. Meghalaya

c. West Bengal

d. Gujarat

---

80. The perimeter of a rectangle is 24 cm, while its area is 32 cm ^{2}. What is the length and breadth of that rectangle? **(+1, -0.33)**

a. 5 cm, 7 cm

b. 6 cm, 6 cm

c. 5 cm, 6.4 cm

d. 4 cm, 8 cm

---

81. Read the given statements and conclusions carefully and decide which of the given conclusions logically follows from the given statements. **(+1, -0.33)**

Statement:

A asked C, "What time is it now?" Is it half past two? "

Conclusions:

1. A wants to go to lunch.

2. A wants to confirm what the time is because his watch is off.

a. Both conclusions follow.

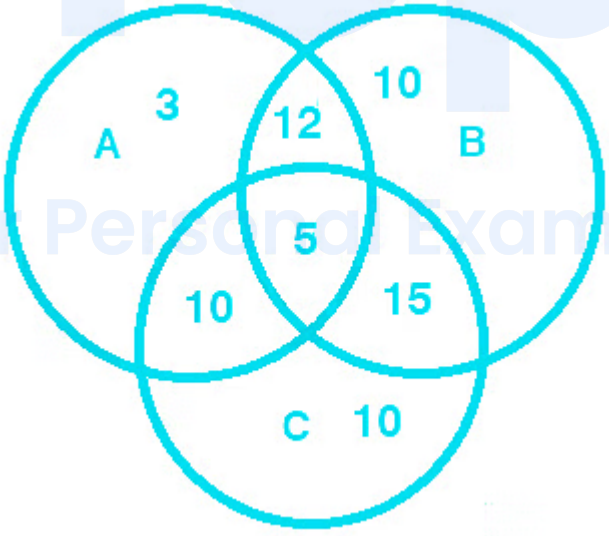
b. Neither conclusion 1 nor 2 follows.

c. Only conclusion 1 follows.

d. Only conclusion 2 follows.

---

82. The following Venn diagram represents the favorite ice cream of some children: A - vanilla, B - chocolate and C - pistachio. Based on the diagram, how many children like more than one flavor of ice cream? **(+1, -0.33)**



a. 42

b. 30

c. 5

d. 25

---

83. Which of the following is not an example of a Döbereiner's triad? **(+1, -0.33)**

a. K, F, Cl

b. Ca, Sr, Ba

c. Cl, Br, I

d. Li, Na, K

---

84. Identify the odd from the given group. **(+1, -0.33)**

Hydra, Sea Anemone, Psychon, Jellyfish

a. Psychon

b. Sea Anemone

c. Jellyfish

d. Hydra

---

85. Identify the **incorrect** statement. **(+1, -0.33)**

According to Ohm's law:

a. I/R = Constant

b. V is directly proportional to I.

c. V/I = Constant

d. V = IR

86. A question is given followed by two statements. Identify which statements are sufficient to answer the question. **(+1, -0.33)**

Question:

A, K, P and X are standing in a row. Who stands second in the row?

Statement:

1. X is on the counter.

2. P is between A and K.

a. Statements 1 and 2 together are sufficient.

b. Statement 2 alone is sufficient.

c. Statement 1 alone is sufficient.

d. Statements 1 and 2 together are insufficient.

87. Arrange the following substance in increasing order of forces of attraction between the particles **(+1, -0.33)**

(A) Water, (B) Wax, (C) Nitrogen

a. Nitrogen, Water, Wax

b. Wax, Water, Nitrogen

c. Water, Wax, Nitrogen

d. Nitrogen, Wax, Water

88. Firoza was born on 2 nd February 2011, while Adesh was born 553 days later. On what date Adesh was born? (+1, -0.33)

a. 11 th August 2012

b. 8 th August 2012

c. 10 th August 2012

d. 9 th August 2012

---

89. Who is the author of the famous book 'New India'? (+1, -0.33)

a. Mother Teresa

b. Mahatma Gandhi

c. Annie Besant

d. Jawaharlal Nehru

---

90. The film 'Pink' won the Best _____ award at the National Film Awards 2017. (+1, -0.33)

a. Feature film

b. Animated Film

c. Children's film

d. Film on social issues

---

91. Find the next term in the following series. (+1, -0.33)

I9R18A26, H8S19C24, _____

a. G7T20E21

b. G7T20E22

c. G7T21E21

d. G7T20E23

---

92. Which of the following metals does not react with cold or hot water? **(+1, -0.33)**

a. Potassium

b. Sodium

c. Zinc

d. Magnesium

---

93. Which famous personality's birthday is celebrated in India on 14 April every year? **(+1, -0.33)**

a. Dr. Sarvepalli Radhakrishnan

b. Dr. B.R. Ambedkar

c. Sardar Vallabh Bhai Patel

d. Dr. A.P.J. Abdul Kalam

---

94. Which of the following numbers is the square root of 13456? **(+1, -0.33)**

a. 116

b. 114

c. 124

d. 126

---

95. The baby is born as a result of rhythmic contraction of muscles in _____. **(+1, -0.33)**

a. Vagina

b. Fallopian tube

c. Cervix

d. Uterus

---

96. To succeed in a test, one must score 38%, then a pass score of 45 marks will be _____. **(+1, -0.33)**

a. 17.4

b. 16.9

c. 16.6

d. 17.1

---

97. The density of a substance is defined as _____. **(+1, -0.33)**

a. Mass per unit area

b. Mass per unit volume

c. Volume per unit mass

d. Force per unit area

---

98. Which of the following numbers will have an even number of factors ? **(+1, -0.33)**

a. 16900

b. 36000

c. 28900

d. 62500

---

99. Find the odd image. **(+1, -0.33)**

a. C

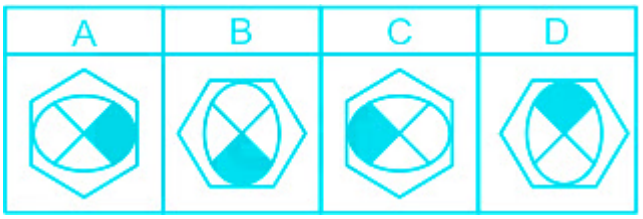
b. D

c. A

d. B

---

100. What is the rotation of the following figure in a 270° clockwise direction? **(+1, -0.33)**



a. C

b. D

c. B

d. A

Answers

1. **Answer: c**

Explanation:

The logic follows here is:-

As The forms of **mud** that we use to make **flowerpot** .

Similarly,

The forms of **waxes** that we use to make **candles** are **candle waxes.**

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

⭐ Additional Information

- The **Mud Flower Pot** is a small decorative block. It has a regular variant and a light-producing **candle** variant.

---

2. **Answer: d**

Explanation:

The correct answer is **Football**.

- **Begum Hazrat Mahal Cup is associated with the sport of football.**

⭐ Key Points

- Begum Hazrat Mahal Cup is associated with football.
- **Other cups/trophies related to football:-**
  - Sanjay Gold Cup, Santosh Trophy, Kalinga cup, Stafford Cup, Subroto Cup, Todd Memorial Trophy, Rovers cup, etc.

⭐ Additional Information

- Begum Hazrat Mahal was Begum of Awadh .
- Nawab wajid Ali shah second wife was Begum Hazrat Mahal .
- During the first revolt of independence in 1857, she rebelled against the British.
- She died in 1879.
- In Calcutta, the husband of Begum Hazrat Mahal was exiled.
- The charge of the state of Awadh was taken by her.
- **Prince Birjis Qadir** was her son.
- He was made the ruler of Awadh by her.
- **Muhammadi Khanum** was her other name.
- She belonged to the Shia Islam religion.

⭐ Important Points

- **Other cups/trophies related to:-**
  - **Cricket:**
    - Deodhar Trophy, Duleep Trophy, Ranji Trophy, Vijay Hazare Trophy, etc.
  - **Hockey:**
    - Agha Khan Cup, Dhyan Chand Trophy, etc.
  - **Kabaddi:**
    - Pro Kabaddi League.

---

3. **Answer: b**

Explanation:

Given :

An item is sold for ₹ 649 with a profit of 18%

Concept used :

Selling price = Cost price + profit on cost price

Selling price = Cost price - loss on cost price

Calculations :

According to the question

649 = Cost price + 18% of cost price

Cost price = 550

Now loss percent at selling price of Rs.418

Let they loss percent be 'x'

So,

418 = Cost price - Loss percent on cost price

418 = 550 - x% of 550

⇒ x% of 550 = 550 - 418

⇒ x% of 550 = 132

⇒ x = 24

∴ Loss per cent at the selling price of Rs.418 will be 24%

---

4. **Answer: b**

Explanation:

The correct answer is **F × s**.

⭐ **Key Points**

- When a force (F) acts in the direction of displacement (s) on an object,

then it can be expressed by the equation mentioned below-

$$W = F \times s$$

- In other words, **work is said to be done when a force applied to an object moves that object.**

- It can be calculated by:-
  - **Multiplying the force by the movement of the object.**
- It is a **scalar quantity** that has magnitude and no direction.

⭐ Additional Information

- **Work is defined as the product of force and displacement.**

---

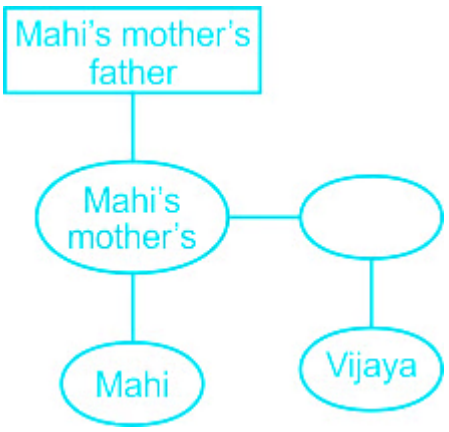
5. **Answer: c**

Explanation:

Family chart,

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

Drawing the family tree as per the given information :



Thus, Mahi met her cousin.

Hence, the correct answer is **"Her cousin".**

---

6. **Answer: d**

Explanation:

Given:

Ghanshyam travelled at a speed between 35 to 40 km/h

Suritha travelled at a speed between 40 to 45 km/h

Time taken by Ghanshyam = 7 hours

Time taken by Sutirtha = 6 hours

Concept used :

Speed is inversely proportional to the time taken.

Speed = Distance/time

Calculations:

Ratio of speeds of Ghanshyam and Sutirtha

Speed of Ghanshyam : Speed of sutirtha = (1/Time taken by Ghanshyam) : (1/speed of Sutirtha)

Speed of Ghanshyam : Speed of sutirtha = (1/7) : (1/6)

⇒ 6 : 7

According to the question,

During this time Ghanshyam traveled at fixed speed which ran between 35 km/h and 40 km/h,

So, Ghanshyam speed must be multiple by 6.

Then, speed of the Ghanshyam be 36 km/hr

Similarly Sutirtha traveled at fixed speed, which was between 40 km/h and 45 km/h.

So, Ghanshyam speed must be multiple by 7.

Then, speed of the Sutirtha be 42 km/hr

Now, Ghanshyam speed at 36 km/h and Sutarthi speed at 42 km/h get the above ratio of speeds

Distance travelled by Ghanshyam = 36 × 7 = 252 km

Distance travelled by Sutarthi = 42 × 6 = 252 km

∴ Distance travelled by them will be 252 km.

⭐ **Shortcut Trick**

Speed of Ghanshyam : Speed of Sutirtha = 6 : 7

Now going through options

Distance must be divisible by both 6 and 7 as this is the ratio of speed

only 252 is getting divisible by 6 and 7 so 252 will be the answer

7. **Answer: c**

Explanation:

The correct answer is (NH 4) 2SO 4.

- The chemical formula of ammonium sulphate is $(NH_4)_2SO_4$.

⭐ Key Points

- Ammonium sulphate is used in so many ways:-
  - It is used as an **inorganic salt** .
  - It is used as a **soil fertiliser** .
- **21% and 24% sulphur** is contained by it.
- For **alkaline soil** , it is used as a fertiliser.
- **Ammonium sulphate lowers the pH balance** of the soil.
- A small amount of acid is formed by it when it is released into the soil.

⭐ Additional Information

- **The other uses of ammonium sulphate are:-**
  - herbicides, insecticides and fungicides.
  - Iron and calcium cations are bound by it in the soil.
  - For **protein purification by precipitation** , ammonium sulphate precipitation is most commonly used.

---

8. **Answer: d**

Explanation:

The correct answer is **Red-brown powder is coated**.

During rusting in iron, Red-brown powder is coated on iron.

⭐ Key Points

- Rust is basically iron oxide.
- It is of reddish-brown color.
- During rusting of iron, the red-brown powder is formed.
- During rusting, **iron and oxygen react in the presence of water or air moisture.**
- Hydrous iron oxide and iron oxide hydroxide are present in the rust.
- Generally, refined iron goes through corrosion.
- An entire iron can be converted into rust with time.

⭐ **Additional Information**

- Many other metals are corroded but rusting of these metals is not called rust.
- **Galvanization** is used to prevent the rusting of iron.
- **In galvanization:-**
  - a layer of zinc is coated on iron.
- Special weathering steel alloys can be used, in which rusting takes place slowly.

---

9. **Answer: a**

Explanation:

Calculations :

(7/11) + (11/7)

⇒ Take LCM of 11 and 7 for denominator

⇒ (49 + 121)/77

⇒ 170/77

∴ Sum of (7/11) and (11/7) will be 170/77

---

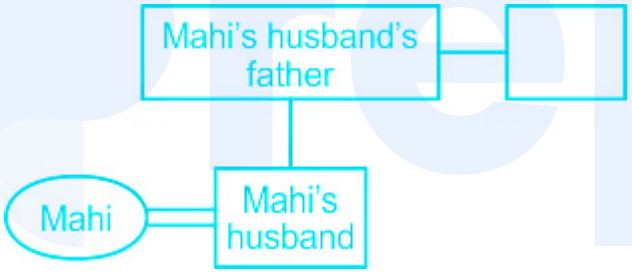
10. **Answer: d**

Explanation:

Family chart,

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

Drawing the family tree as per the given information :



As Mahi met her husband's uncle.

Hence, the correct answer is **"Her husband's uncle".**

---

11. Answer: d

Explanation:

The correct answer is **Tennis**.

- **The terms ace and advantage are associated with tennis.**

⭐ **Key Points**

- **The international tennis federation** is the highest **governing body for the sport of tennis.**
- The game was first played in the **19 th century in England** .
- The game could be outdoor or indoor.
- **Ball, racket, and net** are the equipment that is used in the game.
- It is an Olympic sport.
- The game of tennis can be played as either single (one team) or doubles (doubles).

⭐ Additional Information

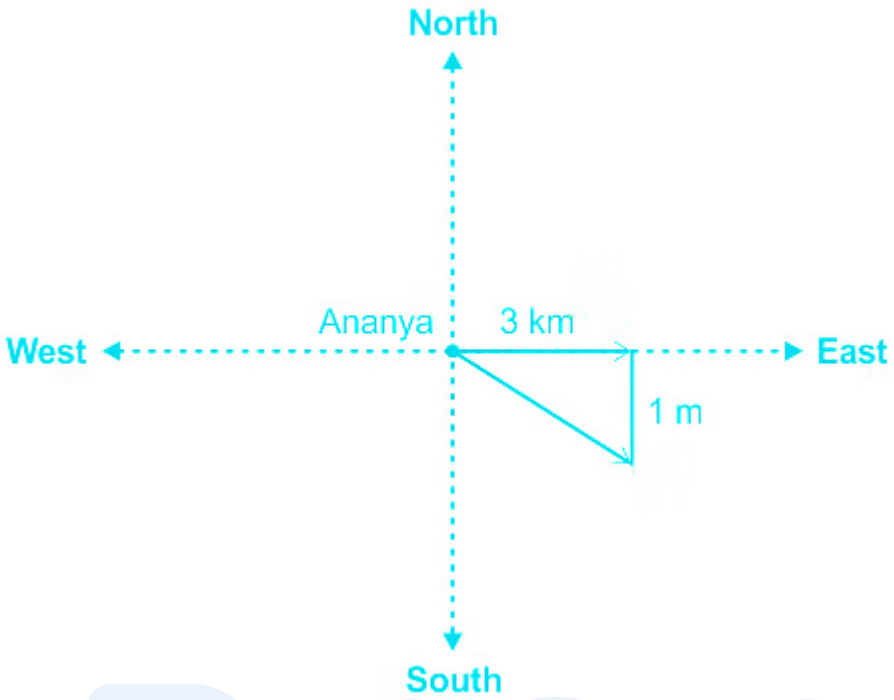
- In **Birmingham England** , modern tennis was originated.
- **Some famous tennis player are** :-
  - Rafael Nadal
  - Serena Williams
  - Roger Federer
  - Mahesh Bhupathi
  - Novak Djokovic

---

12. **Answer: a**

Explanation:

Representing the given information in **NE-SW direction:**



Thus, Ananya is to the South-East from her initial position.

Hence, the correct answer is **"South-East".**

---

13. **Answer: a**

Explanation:

The correct answer is **Chennai**.

- **The national centre for technology for ports, waterways and coast (NTCPWC) will be formed in Chennai.**

⭐ **Key Points**

- It was established to **boost the development of indigenous technology.**
- To expertise in India's port and maritime sector is the other aim of establishing it.
- **It will provide:-**
  - Autonomous platforms for navigation and water quality monitoring.
  - Also, provide night time navigation in inland waterways.

- For small ports, new indigenous technologies will be given.

⭐ Additional Information

- The structure that prevents waves from entering the harbour is called **breakwaters.**
- To consolidate to provide solutions to fulfil the technological requirements of the sector is the major aim of NTCPWC.

---

14. Answer: c

Explanation:

The logic followed here is:- Words are the synonyms of each other.

'Hear' is the synonyms of **'Listen'.**

Similarly,

'Sense' is the synonyms of **'Perceive'.**

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

⭐ Additional Information

- Hearing is simply the ***act of perceiving sound by the ear***. If you are not hearing-impaired, hearing simply happens on its own.
- Listening, however, is something you ***consciously*** choose to do. Listening requires ***concentration*** so that your ***brain processes meaning from words and sentences.***
- ***Perceive*** and **sense** : ***perceive*** is to see, to be aware of, to understand while ***sense*** is to use biological senses: to either smell, watch, taste, hear or feel.

---

15. Answer: c

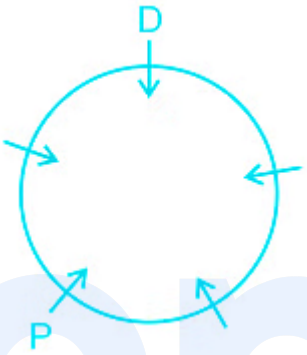
Explanation:

According to the given information :

A, B, P, O, and D are standing in a circle.

Statement 1: P stands ahead of D.

Case 1:



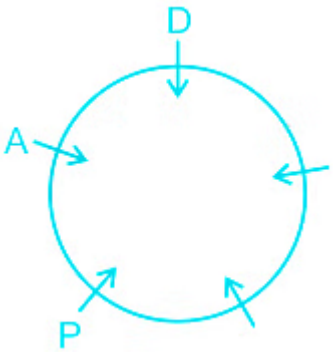
Case 2:

- Here, we do not know the position of O.

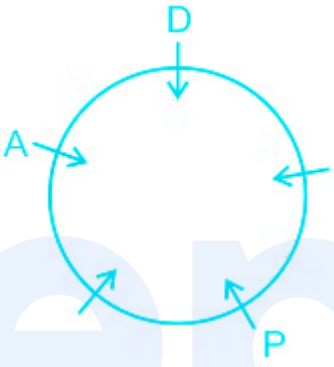
So, it alone is not sufficient to answer the question.

Statement 2: A stands to the right of D.

Case 1:



Case 2:

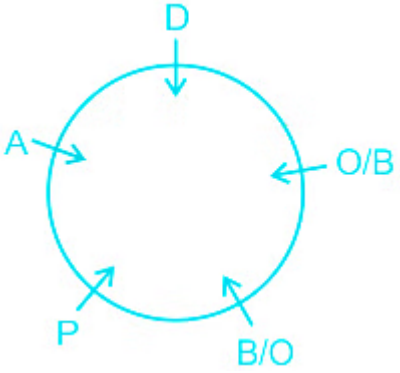


- Here, there are 2 different possible positions for O in each of the 2 cases.

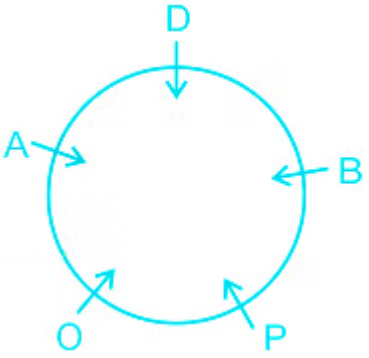
So, statement 2 alone is not sufficient.

Combining statements 1 and 2:

Case 1:



Case 2:



- There are still 2 cases left and both show different positions for O.
- Thus, combining statements 1 and 2 are also not sufficient to determine who stands between O and P.

Hence, the correct answer is **"Statements 1 and 2 together are**

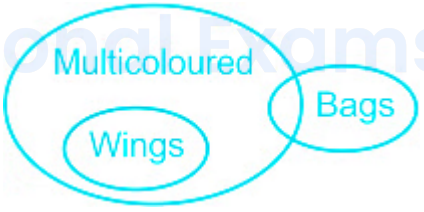
insufficient.".

---

16. **Answer: c**

Explanation:

The least possible Venn diagram from the given statements is:-



Conclusions:

I. Some multicolored are wings → **True** (as "All wings are multicolored" given so it is definitely true)

II. Some bags are wings → **False** (There is no direct relation given between wings and bags so it can be possible but not definite)

Hence, the correct answer is **"Only conclusion 1 follows".**

★ Additional Information

Statement	Conclusion		
	Definite (100% true)	Can't Say	Incorrect (100% false)
All A are B 	Some A are B Some B are A	Some B are not A All B are A	Some A are not B No A is B No B is A
Some A are B 	Some B are A	Some A are not B All B are A Some B are not A All A are B	No A is B No B is A
No A is B 	No B is A Some A are not B Some B are not A		Some A are B Some b are A All A are B All B are A
Some A are not B 		Some B are not A Some A are B Some B are A All B are A No A is B No B is A	All A are B

17. **Answer: d**

Explanation:

Calculation:

Average number of users who are member in the swimming pool

= (10 + 15 + 10 + 10 + 5 + 30)/6 = 80/6 ≈ 13

Average number of users who are non-member in the swimming pool

= (3 + 3 + 1 + 2 + 1 +10)/6 = 20/6 ≈ 3

∴ **Average Users Members are 13 and** Average**User non-members are 3 per day.**

---

18. Answer: b

Explanation:

The correct answer is **The density of the object is less than the density of the water.**

The **incorrect statement isThe density of the object is less than the density of the water.**

- If an object sinks in water, it means that the upper thrust of water on the object is greater than the weight of the object.
- **Whether an object will float or sink in another substance is decided by the density of an object.**
- **If an object is less dense than the liquid, then the object will float in that liquid.**

⭐ **Key Points**

- The characteristic property of an object is density.
- **Density does not depend on the amount of substance.**
- Density measures how heavy something is as compared to its size.
- The size, shape, or type of material does not decide that if the substance will flow or sink in the liquid.
- Some trapped air is contained by all objects that float in the liquid.
- **Archimedes principle:**
  - The principle of Archimedes states “When a body is immersed in a liquid, an upward thrust, equal to the weight of the liquid displaced, acts on it.”

⭐ **Confusion Points**

- **Do not get confused in this question, as the question is asking an INCORRECT statement.**
- **If an object sinks in water then it is due to its higher density as compared to water, therefore the** density of an object is greater than the density of water is a correct statement.
- And the **density of an object is less than the density of water is clearly a false statement** .

---

19. Answer: a

Explanation:

The correct answer is Karnataka.In March 2018, the solar energy park, Shakti Sthala has been inaugurated in Karnataka.

⭐ Key Points

- Shakti Sthala is the **world's largest solar park.**
- The solar park has a capacity of **2000 MW.**
- Rs16500 crore is invested for setting up this park.
- The park is set up at **Pavagada, in the Tumaguru district of Karnataka** .
- This is a drone-prone region.
- The solar energy park is situated 180 km from Bengaluru.
- Shakti Sthala is the first phase of the rupees 16,500 crore park.
- Around 13000 acres of land are used in setting up the park.
- To decrease the dependence on traditional power sources and use environment-friendly ones to meet the power needs of the people is the aim of setting up this park.

⭐ Additional Information

- **About Karnataka** :
  - **Formation** - 1 November 1956
  - **Governor** - Vajubhai Vala
  - **Chief Minister** - Basavaraj Bommai (BJP)

20. **Answer: c**

Explanation:

Concept:

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

Calculations :

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

Use above given order to solve this

⇒ 56 ÷ 7 × (35 – 15) ÷ 4 = ?

⇒ 56 ÷ 7 × 20 ÷ 4 = ?

⇒ 8 × 5

⇒ 40

∴ Option 3 will be the correct choice

21. **Answer: c**

Explanation:

The correct answer is **Uttar Pradesh**.

- **In 2017, the National film award, Uttar Pradesh has won the best film-friendly state award.**

⭐ **Key Points**

- Special mention of Jharkhand was also made by jury members in the award festival.
- The **best feature film award was given to the Marathi film Kasav** .
- The **best non-feature film category award was given to fireflies** .

⭐ **Additional Information**

- The best actor award was given to **Akshay Kumar for Rustam** .
- It was Akshay Kumar's first national award.
- The national award for best Hindi feature film was given to Neerja.
- For the 64 th national award, 344 films from 26 languages have been viewed.
- The best-supporting actress award was given to **Zaira Waseem for Dangal.**

---

22. Answer: b

Explanation:

The pattern follows here is:

The figure is rotating by 90 degrees anti-clockwise.

Hence, the correct answer is **"Option 2".**

---

23. Answer: c

Explanation:

The correct answer is **Mauritius**.

- In March 2018, President Ram Nath Kovind had visited Mauritius.
-

⭐ Key Points

- **He visited during his visit of 6 days visit to the island nation of Madagascar and Mauritius.**
- This region is vital for India's strategic interest.
- Our president was the **chief guest at the 50 th year of independence at Mauritius.**
- It was the first visit of India's VVIP to an Island nation.

⭐ Additional Information

- In the Indian Ocean, these African country lies.
- Chinese naval presence is growing in these regions.
- World Hindi Secretariat in Mauritius was also inaugurated by the President of India.
- **President had also interacted with the business communities in Madagascar.**
- Madagascar is located in the Indian ocean.

---

24. Answer: d

Explanation:

Concept:

- Mechanical energy is a combination of Kinetic energy and Potential energy .
- Mechanical energy is defined as the sum total of kinetic energy and potential energy in an object that is utilized to do work.
- Mechanical energy is a form of energy that is related to the position and motion of an object.

Explanation:

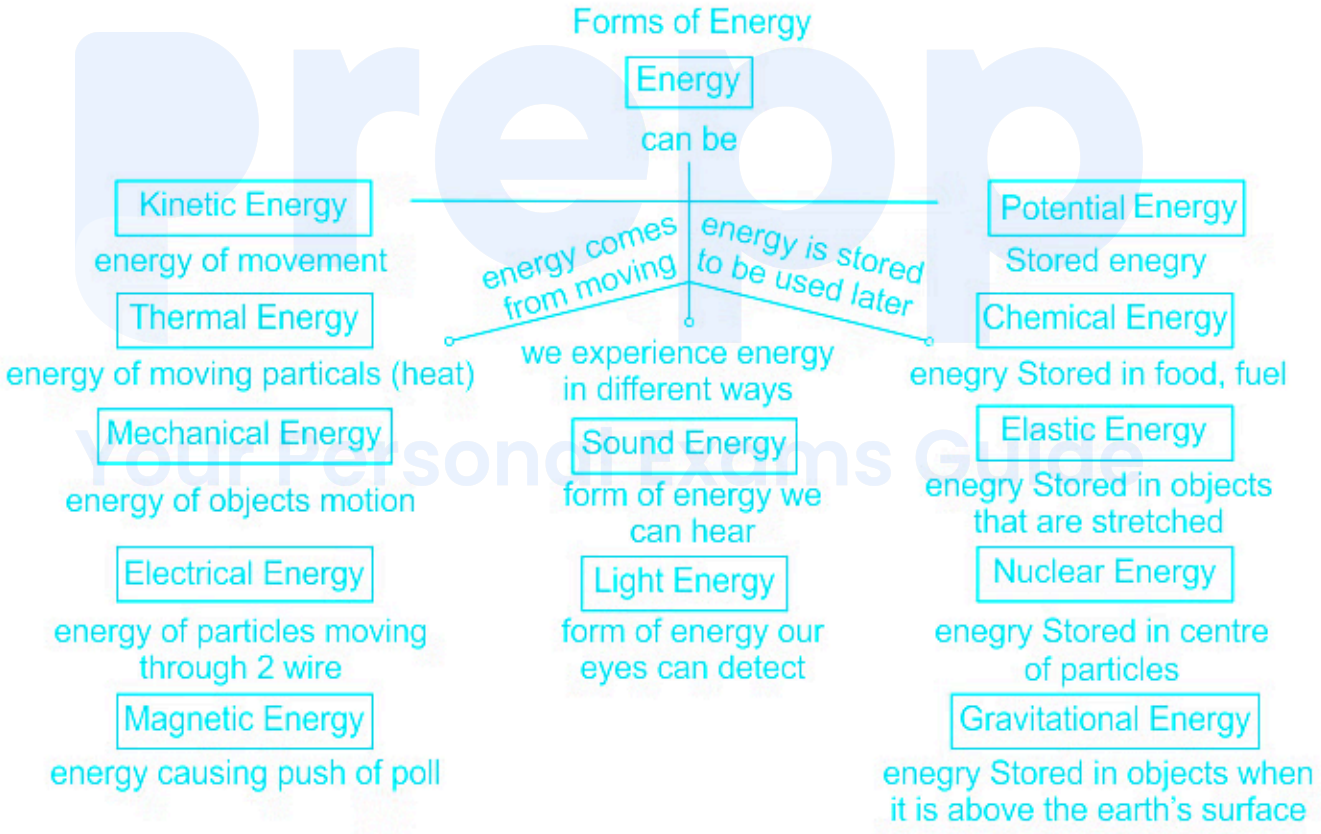
- The sum of potential energy and kinetic energy gives the mechanical energy which is the total energy that is associated with the position and motion of the object.

i.e., M.E = K.E + P.E

- The energy of an object due to its motion is called kinetic energy.
- The energy of an object due to its position is the potential energy .

⭐ **Additional Information**

The following fig shows different forms of energy



---

25. **Answer: d**

Explanation:

Calculations :

The amount of time that B takes to fill the tank, pipe A fills it in its one fourth time

Pipe C takes 3 times as much as time taken by A

Time for completing the work is 33 hours

Concept used :

Time taken by a person to complete a work is inversely proportional to his efficiency

Person's per day work = Total work/Number of days taken by him to complete the work

Calculations :

Ratio of time for A to B is 1 : 4

Ratio of time taken for A to C is 1 : 3

Ratio of time for A, B and C will be 1 : 4 : 3

So ratio of the efficiencies for A, B and C will be

A : B : C = 1 : (1/4) : (1/3)

⇒ 12 : 3 : 4

Let the work done by A, B and C per hour be 12x, 3x and 4x units respectively

A, B and C per hour work = 12x + 3x + 4x = 19x units

Total work = 19x × 33

Total work = 627x units

Time taken by A and B to complete the work = 627x/15x

⇒ 41.8 hours

∴ Total time taken by a and B will be 41.8 hours

---

26. Answer: d

Explanation:

The correct answer is **Maneka Gandhi.**

- **Maneka Gandhi was the minister of women and child welfare in November 2018**.

⭐ **Key Points**

- **At present, Smt. Smriti Zubin Irani is the minister of women and child welfare. (As of Feb 2021)**
- The formulation and administration of the rules and regulations and laws relating to women and child development in India is the responsibility of the ministry of women and child development.
- The **headquarter of the Ministry is located in Shastri Bhawan, New Delhi.**
- The ministry is mandated for the holistic development of women and children.

⭐ **Important Points**

- All the **plans, policies and programmes for the development of women and children are formulated and coordinated by the ministry** .
- A certain innovative programme for women and children are also formulated by the ministry.
- Welfare and support service, training for employment and income generation and gender sensitisation are some programmes that are covered by the ministry.
- The ministry work towards the empowerment of women.
- The **Integrated Child Development Service (ICDS) plan** is implemented by this ministry.

---

27. **Answer: a**

Explanation:

The correct answer is Madan Mohan Malviya.

- Madan Mohan Malviya was awarded Bharat Ratna by the government of India in 2015.

⭐ Key Points

- He was an **Indian scholar, educational reformer, and politician** .
- He played a very crucial role in the Indian independence movement.
- He was president of the Indian National Congress three times.
- **Akhil Bhartiya Hindu Mahasabha** was founded by him.
- **Mahamana** was the title given to him.

⭐ Additional Information

- His wife's name was **Kumari Kundan Devi.**
- He was awarded Bharat Ratna posthumously in 2015.
- **Modern education** was promoted by Madan Mohan Malviya.
- He cofounded **Banaras Hindu University at Banaras.**
- In the Indian indenture system, he played a very important role.
- He was the founder of scouting in India.

---

28. **Answer: b**

Explanation:

The pattern followed here is:

- Figures A, B, and, D contain dots and 4 stars with 5 vertices each.
- Figures A, B, and, D can be obtained from each other by anti-clockwise rotation.

- However,*figure C is different because it contains 3 stars with 5 vertices and 1 star with 4 vertices.*

Hence, the correct answer is **"Option 2".**

---

29. Answer: c

Explanation:

The correct answer is **Volleyball**.

- **Indira Pradhan's trophy is related to volleyball**.

⭐ **Key Points**

- The trophies related to a volleyball game are the **Indira Pradhan trophy, Centennial Cup, and Shivanthi Gold Cup.**
- In this game, two teams of six players are separated by a net.
- **FIVB is the highest governing body of volleyball** .
- The player begins the rally by serving the ball.
- The ball must not let to be grounded within the court by the receiving team.
- With hands or arms, the ball is usually played.
- Many consistent techniques have evolved in volleyball.
- The official ball which was used in the first volleyball was disputed.
- The rules for this game was evolved in this game in **1915 in the Philippines.**

⭐ **Additional Information**

Sports	Cups or trophies
Football	Rovers Cup, Bandodkar Trophy, Merdeka Cup, Confederation Cup, DCM Trophy, Durand Cup, B.C. Raj Trophy(National Championship), FIFA World cup, Jules Rimet Trophy, Indian Super League, Kalinga Cup, Santosh Trophy, IFA Shield, Scissor Cup, Subroto Cup, Sir Ashutosh Mukherjee Trophy, Todd Memorial Trophy, Vittal Trophy, UEFA Champions League.
Cricket	Ashes Cup, Asia Cup, C.K Naidu Trophy, Cooch Behar Trophy, Deodhar Trophy, Duleep Trophy, Gavaskar Border Trophy, G.D Birla Trophy, Gillette Cup, ICC World Cup, IPL, Irani Trophy, Jawaharlal Nehru Cup, Rani Jhansi Trophy, Ranji Trophy, Rohinton Baria Trophy, Rothmans Cup, Sahara Cup, Sharjah Cup, Singer Cup, Titan Cup, Vijay Hazare Trophy, Vijay Marchent Trophy, Wisden Trophy, and Wills Trophy.
Badminton	Amrit Diwan Cup, Asia Cup, Chaddha Cup, European Cup, Harilela Cup, Ibrahim Rahimatullah cup, Challenger Cup, Konica Cup, Sophia Cup, Kitiakara Cup, Malaysian Open, Thomas Cup (Men), and Uber Cup(Women)
Hockey	Agha Khan Cup, Maharaja Rajit, Singh Gold Cup, Dhyanchand Trophy, Sultan Azlan Shah Cup, Wales Trophy, Stanley Cup, Sindhia Gold Cup, Wellington Cup.

---

30. **Answer: a**

Explanation:

The correct answer is **Swimming.**

- **The words crawl, breaststroke, and butterfly are associated with the game of swimming**.

⭐ Key Points

- In this game, **the entire body of the person is moved through the water.**
- In pools or open water, the sports take place.
- The events butterfly, breaststroke, freestyle, and individual medley are associated with swimming.
- A set of specific techniques is required by swimming.
- There are distinct regulations in competition.

⭐ Additional Information

- In prehistoric times, evidence of recreational swimming was found.
- The earliest evidence of painting was found in the stone age.
- **In 1830 in England:-**
  - Swimming emerged as a competitive recreational activity.
- **In the 19th century:-**
  - Competitive swimming became popular.
  - Tapering is the practice of reducing exercise in the days just before an important competition.

---

31. Answer: a

Explanation:

The correct answer is Between F and P.

- A concave mirror creates a virtual, straight, and enlarged image when the object is placed between F and P.

⭐ Key Points

- When the object is positioned between the pole of the mirror and the focus, then the image formed by a concave mirror appears to be virtual, erect, and larger than the object.
- A concave mirror forms different images which depend on the distance between the object and the mirror.

⭐ Additional Information

- A concave mirror is a type of spherical mirror in which, **the reflecting surface is the inner curved surface of the sphere** .
- The incident light is reflected inwards because of its shape. Thus, such mirrors are also called **converging mirrors** .

---

32. Answer: d

Explanation:

Given:

Entry fee per person = Rs 250

Number of people participating from each family = 2

Number of families present = 300

Percentage of the received amount spent on arrangements = 50 %

Calculation:

Total number of people participating = 2 × 300 = 600

Total amount received = 600 × 250 = Rs 1,50,000

Amount spent on arrangements = 50% × 1,50,000 = Rs 75,000

∴ Rs 75,000 is spent on the arrangements.

---

33. Answer: c

Explanation:

The correct answer is **Prakrit**.

⭐ Key Points

- **Prakrit** has not been designated as a classical language by the Government of India.
- Hindi is given the status of the official language of the nation by using article 343 of the constitution.
- An independent literary tradition and a large and ancient body of written literature are the features of classical language.
- Typically dead languages are classified as classical language.
- In India, there are **6 languages** that are classified as **classical language.**

⭐ Additional Information

- **Tamil** was the **first language** to be declared as a **classical language** in India in **2005** .
- **Malayalam** was declared as a classical language in India in **2013** .
- **Kannada** was declared as a classical language in India in 2008 .
- **Sanskrit** was declared as a classical language in India in 2005 .
- The guidelines regarding classical languages are provided by the ministry of culture.

---

34. Answer: a

Explanation:

The correct answer is **Argon**.

- **Argon has three shells that are completely filled with electrons**.

⭐ Key Points

- Argon has **three electron shells** .
- The **third shell is filled with eight electrons** .
- It is the **third of the noble gases or inert gases.**
- It is very **non-reactive** .

⭐ Important Points

- Helium, neon, and argon are those elements that completely filled the outermost shell. **Helium-He(2) ,Neon-Ne (2,8),Argon-Ar (2,8,8)** .
  - They are noble gases.

⭐ Additional Information

- About Argon:-
  - Atomic number: **18.**
  - **Third-most abundant gas** in the Earth's atmosphere.
  - It is produced industrially by **the fractional distillation of liquid air.**
  - It is commonly used to **fill incandescent light bulbs.**
  - It is used in **tungsten filament.**

⭐ Mistake Points

- All Helium, Neon, and Argon have completely filled outermost shells. But it is asked which element have all three shells filled. So, Argon-Ar (2,8,8) has all three shells filled completely filled with electrons.

---

35. **Answer: b**

Explanation:

Given :

$22x^2 - ax + 2 = ax^2 + 18x - 7$

Calculations :

$22x^2 - ax + 2 = ax^2 + 18x - 7$

$(22 - a)x^2 - (a + 18)x + 9 = 0$

If roots are equal then discriminant must be zero

$b^2 - 4ac = 0$

$(a + 18)^2 - 4.(22 - a).9 = 0$

$a^2 + 36a + 324 - 792 + 36a = 0$

$a^2 + 72a - 468 = 0$

$\Rightarrow a^2 + 78a - 6a - 468 = 0$

$\Rightarrow a(a + 78) - 6(a + 78) = 0$

$\Rightarrow (a - 6)(a + 78) = 0$

$\Rightarrow a = 6$ and -78

∴ Positive integral solution is 6

---

36. Answer: b

Explanation:

Given:

The edge of the cube increased by 4cm.

Increase in surface area = 432 cm^2

Formula used:

Total surface area of cube = $6a^2$

Where a is the side of the cube

Calculation:

Increased surface area = $6 \times (a + 4)^2 = 6a^2 + 432$

$\Rightarrow 6 \times (a^2 + 8a + 16) = 6a^2 + 432$

$\Rightarrow a^2 + 8a + 16 = a^2 + 72$

$\Rightarrow 8a = 56$

⇒ a = 7 cm

∴ The original length of each edge of the cube is 7 cm.

---

37. **Answer: b**

Explanation:

Given :

703 ÷ 37 = 19

Calculations :

7.03 ÷ 0.0037 = 7030000 ÷ 3700

⇒ (703 ÷ 37) × 100

⇒ 19 × 100

⇒ 1900

∴ The value of 7.03 ÷ 0.0037 will be 1900

---

38. **Answer: b**

Explanation:

The correct answer is Bicycling.

- Bicycling is not an involuntary action.

⭐ Key Points

- Involuntary action:-
  - Unintended action is called involuntary action .
  - The action is done without will.

- Involuntary actions are automatic.
- The speed of these actions is usually fast.
- **Heartbeat, saliva secretion, digestion, and respiration** all are involuntary actions.

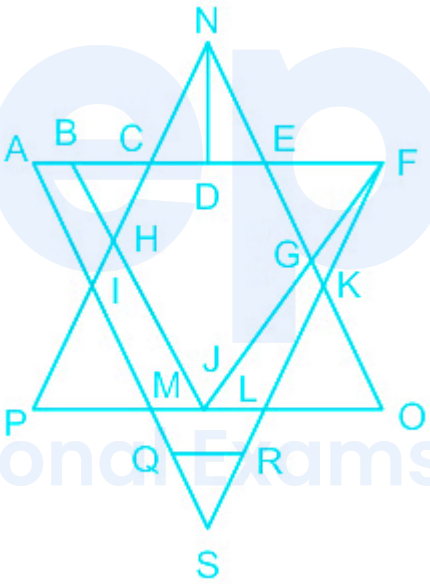
---

39. Answer: d

Explanation:

The logic follows here is:

The total number of triangles here are 18 as given below.



Triangle (NDC, NDE, NCE, BHC, AIC, PIM, KLO, EFG, FGK, EFK, QRS, AFS, BJF, PHJ, JGO, JFL, NPO, SML).

Hence, the correct answer is **"18".**

Note:

- For this question, a discrepancy was found in the question/answer in the official paper. So, this question was dismissed for all candidates.
- The official paper had 17 as the fourth option. However, because there were 18 triangles in all as explained in the solution, we had to change the fourth option.

40. **Answer: a**

Explanation:

The logic follows here is:

All the figure A, B, and C have an arc in it.

while the figure D is made of straight lines and doesn't have an arc.

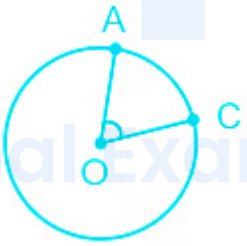
Thus figure D is not similar to the other figures.

Hence, the correct answer is **"Option 1".**

⭐ Additional Information

In general, an arc is any smooth curve joining two points. The length of an arc is known as its arc length.

In a graph, a graph arc is an ordered pair of adjacent vertices.



In particular, an arc is any portion (other than the entire curve) of the circumference of a circle. An arc corresponding to the central angle ∠AOC is denoted arcAC.

41. **Answer: a**

Explanation:

The correct answer is Kolkata.

- Kolkata is known as the city of palaces.

⭐ Key Points

- **Kolkata has a nickname, the "City of Palaces".**
- It is **famous for its Rajbaris** .
- During the **British colonial era from 1700-1912** , when Kolkata was the capital of British India, Kolkata witnessed a spate of frenzied construction activity of buildings largely influenced by the conscious intermingling of Gothic, Baroque, Roman, Oriental, and Islamic schools of design.
- Unlike many north Indian cities, whose construction stresses minimalism, the layout in architectural variety in Kolkata owed its origins to the Occident.
- The buildings were designed and inspired by the tastes of the English gentleman around and the aspiring Bengali Baboo.
- **The numerous palatial mansions built all over the core city led to the city being called the City of Palaces.**

⭐ Additional Information

- The **East India Company founded its trading post in Kolkata.**
- Till 1911, it was the capital of India.
- In 1911, the capital of India was shifted to Delhi by the British.
- The grand colonial architecture, art galleries, and cultural festivals can be found in the city.
- **Kolkata is one of the largest cities in India.**
- It is also the major port.
- The city is located at the bank of the Hoogly River.
- The city is the educational, commercial, and cultural center of India.
- The **capital** of the state of **West Bengal is Kolkata** .

---

42. Answer: c

Explanation:

Concept used :

If a quadratic equation is divisible by (x + a) then we will get equation equals to zero when we put x = -a in this equation

Calculations :

Put x + 3 = 0 to get the value of k

$(-3)^2 + k(-3) - 6 = 0$

$\Rightarrow 9 - 3k - 6 = 0$

$\Rightarrow 3 - 3k = 0$

$\Rightarrow 3 = 3k$

$\Rightarrow k = 1$

∴ The value of k will be 1

∴

---

43. **Answer: a**

Explanation:

Concept used :

Mode of a given group of numbers is the value that appears most often in the given data group

Calulations :

For a group 4, 5, 5, 6, 4, 3, 2, 2, 5, 1

Mode of the group = 5 (5 came 3 times in the given group)

∴ 5 is the mode of the given numbers.

---

44. Answer: c

Explanation:

The correct answer is POSHAN Abhiyan.

- Poshan Abhiyan has been launched by the Indian prime minister to combat malnutrition and stunting among children.

⭐ Key Points

- **On March 8, 2018, the Abhiyan was launched by the government** .
- **To bring down the stunting among children** in the age group of 0-6 years is the **main aim of the scheme** .
- Ensuring service delivery and interventions by use of technology is the aim of the Poshan Abhiyan.
- The Swasth Bharat Preraks will be deployed in each district under the Abhiyan.
- For **tracking the implementation of Abhiyan** , the **Swasth Bharat prerak will act as a catalyst** .

⭐ Additional Information

- The national council on nutrition (NCN) has been set up under the Poshan Abhiyaan.
- NCN is national-level coordination and convergence body on nutrition.
- The vice-chairman of NITI Aayog heads the NCN.

---

45. Answer: c

Explanation:

The correct answer is Nitin Gadkari.

- Nitin Gadkari is the Minister of Road Transport and Highways.

⭐ Key Points

- The **Ministry of Road Transport and Highways is a ministry of the Government of India** .
- It is the apex body for the formulation and management of the rules, regulations, and laws related to road transport.
- This **ministry aims to increase the mobility and efficiency of the road transport system in India** .

⭐ Important Points

- Nitin Jairam Gadkari is an Indian politician and businessman from Maharashtra.
- He is the **current Minister for Road Transport & Highways and the Minister of Micro, Small and Medium Enterprises in the Indian government** .
- His current constituency in the Lok Sabha is Nagpur.
- He previously served as the President of the Bharatiya Janata Party (BJP) from 2009 to 2013.

---

46. **Answer: b**

Explanation:

Given:

Length of arc = 11 cm

Radius of circle = 14 cm

Concept used:

The measure of the arc of length L, subtended by the angle θ, of the circle of radius r is:

$L = (\theta/360) \times 2\pi r$

Calculation:

$11 = (\theta/360) \times 2 \times (22/7) \times 14$

$\theta = 360/8 = 45^\circ$

∴ The value of θ is 45°.

---

47. Answer: b

Explanation:

The logic follows here is:

The water image of the given figure is:

Thus figure B forms closest to the given figures.

Hence, the correct answer is **"Option 2".**

---

48. Answer: d

Explanation:

The correct answer is a Feature film on national integration.

- In 2017, the Assamese film 'Dixon Banat Palash' received the Nargis Dutt Award for Best Feature Film on National Integration.

⭐ Key Points

- The Nargis Dutt Award for Best Feature Film on National Integration is a National Film Award presented annually by the Directorate of Film Festivals

which comes under the **Ministry of Information and Broadcasting, India** .
- The award was instituted in **1965** .
- This award is presented for feature films and awarded with Rajat Kamal (Silver Lotus).

⭐ Important Points

- **Dikchow Banat Palaax** , an Assamese feature film received the Nargis Dutt Award for Best Feature Film on National Integration at the 64 th National Film Awards.
- This film was written and directed by National Award-winning filmmaker **Sanjib Sabhapandit** .

---

49. Answer: c

Explanation:

The logic follows here is:

The water image of the given figure is:

Thus figure B forms closest to the given figures.

Hence, the correct answer is "Option 3".

---

50. Answer: c

Explanation:

Given:

tanα = √ 15 + 4

Calculation:

tanα – cotα = tanα – (1/tanα) = (tan ^{2}α – 1)/tanα

⇒ (tan ^{2}α – 1)/tanα = [(√15 + 4) ^{2}– 1]/(√15 + 4)

⇒ (15 + 8√15 + 15)/(√15 + 4)

Rationalising the above expression,

[(15 + 8√15 + 15) × (√15 – 4)]/[(√15 + 4) × (√15 – 4)] = (30√15 – 120 + 120 – 32√15)/(15 – 16)

⇒ (30√15 – 120 + 120 – 32√15)/(15 – 16) = 2√15

∴ The value of tanα – cotα is 2√15.

Shortcut Trick

As √15 ≈ 4, We can write the reciprocal directly.

The reciprocal of tanα = cotα = 4 - √15

Then, tanα - cotα = 4 + √15 - (4 - √15) = 2√15

∴ The value of tanα – cotα is 2√15.

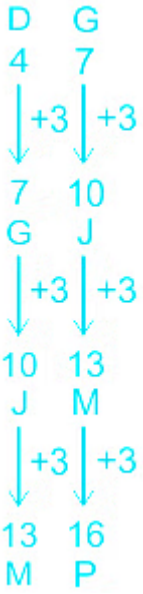
---

51. Answer: a

Explanation:

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

The pattern followed here is:



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

---

52. Answer: c

Explanation:

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

The logic follows here is :

Each alphabet is representing its corresponding place value.

Similarly,

Hence, the correct answer is **"4522912".**

---

53. Answer: a

Explanation:

Arguments :

1. Yes, our health improves when we respect our natural body time and sleep early → **Implicit** (This argument is scientifically proven that following the biological clock improves health).

2. No, nowadays, working till late at night is unavoidable because we work in many time zones → **Explicit** (Working till late at night is unavoidable doesn't mean that it wouldn't affect our health).

Thus, argument 1 holds a strong position.

Hence, the correct answer is **"Only argument 1 is strong".**

⭐ **Additional Information**

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

54. **Answer: c**

Explanation:

The correct answer is **1600 J**.

⭐ **Key Points**

- **Ep = mgh**
- Here,
  - Ep= Potential energy
  - m= mass
  - g= Gravitational field strength
  - h= Vertical height
- **Given-**
  - Mass of the body= 20kg
  - Vertical height= 8m
  - 'g' = 10 ms^{-2}
  - Putting these values in the formula mentioned above, we get-
  - **Ep= 20×10×8 = 1600**
  - The **SI unit of energy is joules (J)**.
  - So, it will be expressed as 1600J.

55. **Answer: d**

Explanation:

Given:

The number is divided in the ratio of 2 : 1

The largest of the number is 52.

Calculation:

Let 2x and x be the numbers.

2x = 52

Or, x = 26

We need to find the number, that is = 2x + x = 3x

3x = 3 × 26 = 78

∴ The number is 78.

---

56. Answer: c

Explanation:

Given:

(16 - 4) × (13 - 6) ÷ x = 12

Concept used:

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

Calculation:

12 × 7 ÷ x = 12

⇒ 12 × 7/x = 12

$\Rightarrow x = 7$

$\therefore$ The value of x is 7.

---

57. Answer: d

Explanation:

Conclusions :

1. The septic tank can be full and needs to be cleaned or emptied → **Follows** (It is clearly given in the statement itself that the septic tank is full).

2. The septic tank of the X's Society is not yet connected to the main gutter line of the municipality → **Not follow** (We can not assume anything that is not mentioned in the statement).

Hence, the correct answer is **"Only conclusion 1 follows".**

⭐ Additional Information

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

---

58. Answer: d

Explanation:

The correct answer is Nickel.

- **Nickel is used as a catalyst in the hydrogenation of vegetable oil** .

⭐ Key Points

- Hydrogenation of vegetable oil was introduced to convert some of the unsaturated fatty acids present in vegetable oils, as well as marine or animal fats to make them more stable to oxidation.
- This process is used to **improve the oxidative stability** of vegetable oils for improved shelf life and to modify the solid's content and melting characteristics of the oil.
- In this process, the **unsaturated double bonds in the fatty acids of the oil molecules react with hydrogen atoms** in the presence of a catalyst.
- **Nickel** as a catalyst is used in the **commercial hydrogenation of edible oils.**

---

59. Answer: b

Explanation:

The correct answer is $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

⭐ Key Points

There are two types of lenses -

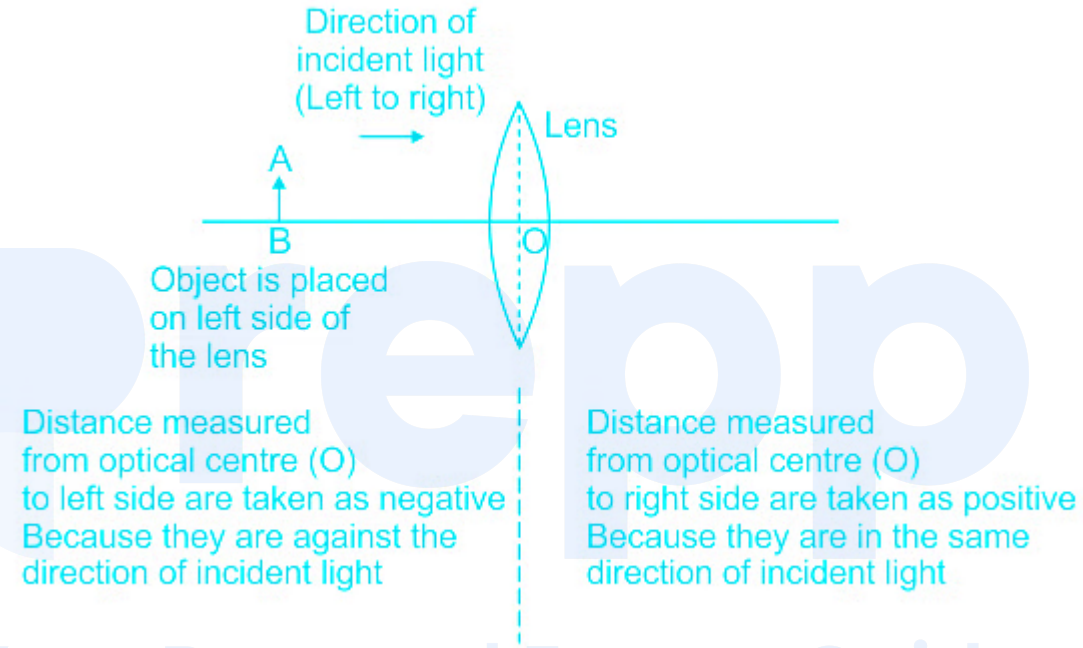
- **Convex Lens:** This type of lens is also known as a Converging lens as when light passes through it converges at one point.
- **Concave Lens:** This type of lens is also known as Diverging lens as all the rays diverged when light passes through it.
- Lens formula

$\frac{1}{\mathbf{f}} = \frac{1}{\mathbf{v}} - \frac{1}{\mathbf{u}}$

Where f is the focal length of the lens, v is the distance of the image on the principal axis from the optical centre. u is the distance of the object on the principle axis from the optical centre.

Sign convention: In the convex lens

- The distance measured from the optical centre (o) to the left side is taken as negative.
- The distance measured from the optical centre (o) to the right side is taken as positive.
- The distance measured from the principal axis (o) to downward be taken as negative.
- The distance measured from the principal axis (o) to upward be taken as positive.



Explanation:

The lens formula can be given by the following relation.

$\frac{1}{\mathbf{f}} = \frac{1}{\mathbf{v}} - \frac{1}{\mathbf{u}}$ or

$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

⭐ **Additional Information**

Lens Maker's Formula:

- If R_1 and R_2 are the radii of curvature of first and second refracting surfaces of a thin lens of focal length f and refractive index μ (w.r.t. surrounding

medium) then the relation between f, μ, R_1 and R_2 are known as lens maker's formula.

$\frac{1}{f} = (\mu - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

---

60. Answer: c

Explanation:

Arguments :

1. Yes, dogs are very loyal and loving; Having a pet dog at home creates a very friendly atmosphere → **Ex**plicit (This argument is neither scientifically proven nor mentioned in the statement).

2.No, this is just a human thinking; Rather, dogs need the freedom to live a life without human intervention → Ex plicit (This argument is neither scientifically proven nor mentioned in the statement).

Hence, the correct answer is "**Neither argument 1 nor 2 is strong**".

⭐ **Additional Information**

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

---

61. Answer: c

Explanation:

The correct answer is **Sodium Carbonate**.

⭐ **Key Points**

- **Sodium carbonate is used to normalize hard water**.

⭐ **Additional Information**

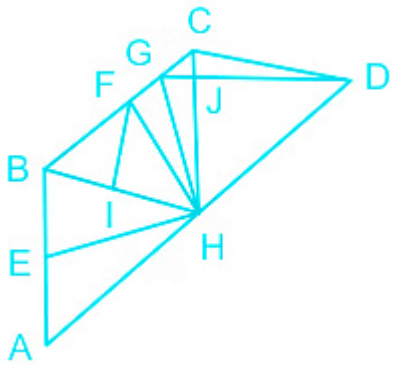
- Washing soda also known as sodium carbonate is a chemical compound with the formula Na 2CO 3.
- It can remove temporary and permanent hardness from water.
- **The hardness of Water-**
  - The Hardness of water is because of the **presence of soluble bicarbonates, chlorides, and sulfates of calcium and magnesium.** Hard water has high mineral content.
  - It is formed when water drains through the deposits of chalk and limestone which are made up of magnesium and calcium carbonates.
  - It does not form lather with soap.
- The hardness of water can be classified into two types:
  - **Temporary Hardness-**
    - It occurs due to the presence of magnesium and calcium carbonates in the water.
  - **Permanent Hardness-**
    - It occurs when soluble salts of magnesium and calcium are present in the form of chlorides and sulfides in water.

---

62. Answer: d

Explanation:

Naming the points and counting triangles :



ΔABH, ΔAEH, ΔBEH = 3

ΔBHC, ΔBHF, ΔBHG, ΔBIF = 4

ΔHCD, ΔHGD, ΔHIF, ΔHFG, ΔHGC, ΔHGJ, ΔHFC, ΔHJD = 8

ΔGJC, ΔGCD = 2

ΔCDJ = 1.

Total triangles = 3 + 4 + 8 + 2 + 1 = 18.

Hence, the correct answer is **"18".**

Note:

- The official answer key was 17. However, because there were 18 triangles in all as explained in the solution, we had to change the fourth option.

---

63. Answer: a

Explanation:

Concept:

- The molecular formula of a compound that shows its constituent atoms and their number per molecule denoted by subscripts .
- Molecular formula if known can be used to calculate:
  - Molecular mass or molar mass.

    - Percentage of elements in the compound .
- The **molecular mass** of any compound is calculated by **adding the masses of all the constituent atoms.** It is the mass of **one molecule** of a substance.
- Molar mass is defined as the mass of one mole of a substance, i.e., **6.022 × 10 23** number of particles of that substance.
- The mass of one unit is expressed in the atomic mass unit, **a.m.u, or simply 'u'.**
- If the percentage composition and molar mass is known, then it can be used to calculate the empirical formula which represents the formula in the simplest whole-number ratio.

Calculation:

Given:

- The compound is: **H2 SO 4**
- Molecular mass of **H = 1, S = 32 and O = 16**
- The molecular mass of H2 SO 4 is calculated by adding the masses of all the constituent atoms **Hydrogen ,Sulphur** and **Oxygen** .

So, the molecular mass of **H2 SO 4**is:

2 × 1 + 32 + 4 × 16 = 98 u.

Hence, the molecular mass of **H2 SO 4 is 98 u.**

⭐ **Important Points**

- The molar mass is the mass of one mole of a substance and is expressed in grams **'g'.**
- It is the same as molecular mass only expressed in grams.
- The molar mass of **H2 SO 4 is 98 g.**

---

64. Answer: a

Explanation:

The correct answer is **O 2.**

- O 2 was not present in the atmosphere at the time of origin of life.

⭐ Key Points

- The **atmosphere of the earth was not initially favorable for the development of life.**
- Origin of life is a kind of **chemical reaction** , which first generated complex organic molecules and assembled them.
- The last phase in the evolution of the earth is associated with the origin and evolution of life.
- The original atmosphere at the time of origin of life was rich in methane, ammonia, water vapor, and the noble gas neon, but it **lacked free oxygen** .
- Thus, there was **no free oxygen available in the primitive atmosphere.**

---

65. **Answer: b**

Explanation:

The correct answer is Hygrometer.

- Hygrometer does not work on Archimedes' principle.

⭐ Key Points

- **Archimedes' principle** :-
  - It states that a body immersed in a liquid is subjected to an upwards force which is equal to the weight of the displaced fluid.
- It experiences a buoyant force that is equal in magnitude to the force of gravity on the displaced fluid.

⭐ Additional Information

- **Lactometer-**
  - Lactometer is an instrument that is used to **test the purity of the milk.**
  - It works on Archimede's Principle.
- **Hydrometer-**
  - A hydrometer is an instrument that is **used to determine specific gravity.**

    - It works on Archimedes' principle.
- **Submarine-**
    - A submarine is a watercraft that is **capable of independent operation below the surface of the water.**
    - It operates using Archimedes' principle by manipulating the buoyancy.
- **Hygrometer-**
    - A hygrometer is an instrument that **measures the humidity or amount of water vapor in the air** or in soil.
    - It works on the phenomenon of **evaporative cooling** .

---

66. Answer: a

Explanation:

The correct answer is mv.

- Momentum is defined as the product of the mass and velocity of a particle.

⭐ Key Points

- It is a vector quantity i.e., it has both magnitudes as well as direction.
- In form of an equation, the **momentum of an object is equal to the mass of the object multiplied by the velocity of the object.**
- It is expressed as:

Momentum = mass× velocity

- Thus, the momentum of a body of mass 'm' moving with 'v' velocity will be-

p = m×v

- Here, the symbol for the momentum is the lower-case p, m is the mass and v is the velocity.
- This formula also illustrates that **momentum is directly proportional to an object's mass and directly proportional to the object's velocity.**

---

67. **Answer: d**

Explanation:

Given :

Mrinalini and Samyukta can paint half of the wall in 14 days

Mrinalini need 4 times more time than Samyukta

Concept used :

Working efficiency is inversely proportional to time taken

Total work = person's efficiency × Number of days he takes for work

Calculations :

Half the work will be completed in 14 days

Full work will be completed in 28 days

Total work = 28 units

Now,

Let the efficiency of Mrinalini be 'x' unit per day

So the efficiency of Samyukta will be '4x' per day

Mrinalini and Samyukta per day work = x + 4x = 5x units

So,

(5x) × 28 = 28 units

⇒ 5x = 28 /28

⇒ x = 1/5 units

Samyukta's per day work = 4x

⇒ 4 × (1/5) = 4/5 units

Total days of working of Samyukta = 28/(4/5)

⇒ 35 days

∴ Samyukta will complete the work in 35 days

---

68. Answer: b

Explanation:

Concept used:

The series follows following pattern

Calculation:

$22 + 3^2 = 31$

$76 + 5^2 = 101$

$31 + 3^2 = \mathbf{40}$

$101 + 5^2 = 126$

∴ The next number in the series will be 40

---

69. Answer: b

Explanation:

Given :

Investing money for 6 years yields ₹ 5600

If the simple rate of interest was increased by 2% per annum and then the yield became ₹ 6020

Concept used :

Interest = (Principle × Time (in years) × Interest rate)/100

Calculations :

Let the Principle be 'P'

Let the rate of interest be 'r'

Interest in 6 years will be '6r'

Increased interest rate will be 'r + 2'

Increased interest in 6 years will be '6r + 12

Extra interest rate in 6 years = 6r + 12 - 6r = 12%

So in 6 years he will pay 12% extra interest

12% extra interest = 6020 - 5600

⇒ 420

So 12% interest on principle will be 420 rupees

So,

420 = (Principle × 12)100

Principle = 420 × (100/12)

⇒ 3500 rupees

∴ The principle will be Rs. 3500

⭐ **Shortcut Trick**

Rate increased by 2% for 6 years

Amount increased = 6020 - 5600 = 420

According to question,

12% = 420

⇒ 1% = 35

∴ Principal amount (100%) = Rs. 3500

---

70. Answer: b

Explanation:

Given :

Priyam is 9 years younger than Pritam

Five years ago Priyam's four times age was equal to Pritam's three times age

Calculations :

Let the age of Pritam be 'P'

So the age of Priyam will be 'P - 9'

Pritam's age 5 years ago 'P - 5'

Priyam's age 5 years ago 'P- 14' years

According to the question

4 × (P - 14) = 3 × (P - 5)

⇒ P = 41 years

Age of Priyam = P - 9

⇒ 41 - 9 = 32

∴ The present age of the Priyam is 32 years

---

71. **Answer: c**

Explanation:

Given :

Sitesh drove 12 hours at a speed of @ 75 km/hr

Concept used :

Average speed = Total distance/Total time

Calculations :

Let the time taken for 90 km/h be 'x'

Total distance = 75 × 12 + 90 × x

⇒ 900 + 90x

Total time = (12 + x) hours

According to the question

The overall average speed is 81 km/h then,

81 = (900 + 90x)/(12 + x)

⇒ 81 × (12 + x) = 900 + 90x

⇒ x = 8

∴ He drove for 8 hours at the speed of 90 km/h

---

72. **Answer: c**

Explanation:

Calculations :

Going through options

Quotient for option 1

2736/171 = 16

Quotient for option 2

2736/18 = 152

Quotient for option 3

2736/19 = 144

Quotient for option 4

2736/9 = 304

We can see that for option 1 and 3 quotient is coming square but the value given in option 3 is smaller

∴ Option 3 will be the correct choice

⭐ Alternate Method

2736 = 8 × 2 × 9 × 19

⇒ 2736 = $2^4 \times 3^2 \times 19$

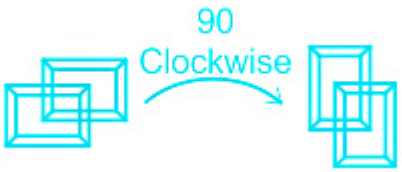
To get a perfect square 2736 must be divided by 19.

---

73. Answer: b

Explanation:

- On rotating the question figure 90° clockwise we get:



Hence, the correct answer is **"Option (2)".**

⭐ Mistake Points

- This is not a mirror image problem. Therefore, option A will be incorrect.

---

74. Answer: b

Explanation:

The correct answer is **Acidic**.

- **Oxides of carbon, nitrogen, and sulfur released while burning fossil fuels are Acidic oxides** .

⭐ Key Points

- Acidic oxides -
  - Acidic oxides are oxides that react with water to form an acid and with a base to form a salt.
  - They are oxides of either metals or non-metals in high oxidation states.
  - They are also called acid anhydrides .
  - Oxides of carbon, nitrogen, and sulfur are released while burning fossil fuels are acidic oxides.

⭐ Additional Information

- **Alkaline oxides** -
  - Basic oxides are also called **base anhydrides** .
  - They are usually formed by the **reaction of oxygen with metals, especially alkali and alkaline earth metals** .

- These compounds are generally **ionic in nature** .

- **Amphoteric oxides** -
  - Amphoteric oxides are oxides **that behave as both acidic and basic oxides.**
  - They have features of acidic as well as basic oxides.
  - These oxides dissolve in water to form alkaline solutions.
- **Neutral oxides** -
  - Neutral oxides are oxides that **are neither acidic nor basic in nature.**
  - Thus, the oxides which neither react with acids or with bases are called neutral oxides.

---

75. Answer: c

Explanation:

Concept used :

If there are different numbers then their highest common divisor is known as HCF

Calculations :

$144 = 2^4 \times 3^2$

$288 = 2^5 \times 3^2$

$396 = 2^2 \times 3^2 \times 11$

In all 3 given numbers $2^2 \times 3^2$ or 36 is the highest common divisor

∴ 36 is the HCF of 144, 288 and 396

---

76. Answer: c

Explanation:

Calculations :

$64^{1/9} \times 4^{1/9} = 2^{6/9} \times 2^{2/9} = 2^{8/9}$

$64^{1/9} \times 16^{1/9} = 2^{6/9} \times 2^{4/9} = 2^{10/9}$

$64^{1/9} \times 8^{1/9} = 2^{6/9} \times 2^{3/9} = 2^{9/9} = 2$

$64^{1/9} \times 2^{1/9} = 2^{6/9} \times 2^{1/9} = 2^{7/9}$

Except option 3 all other are irrational

∴ Option 3 is the correct choice

---

77. Answer: c

Explanation:

The correct answer is **Banking**.

- **Banking comes under the tertiary Indian economy sector**.

⭐ **Key Points**

- The tertiary sector of the economy is the third of the three economic sectors.
- The other ones are the **secondary sector and the primary sector.** This sector consists of the production of services instead of end products.
- The **banking industry** comes under the tertiary sector.
- The banking system plays a **significant role in the modern economic world.**
- Banks collect the savings of the individuals and give them to the business people and manufacturers.
- Banks play an important role in the **creation of new capital in a country and thus help to enhance the growth in the country** .

---

78. Answer: c

Explanation:

The correct answer is **Contractile proteins**.

- **Contractile proteins help the muscle tissue to contract and relax to cause movement.**

⭐ **Key Points**

- Contractile proteins -
  - Contractile proteins are proteins that facilitate the sliding of contractile fibers of a cell's cytoskeleton as well as of cardiac and skeletal muscle.
  - Contraction of the muscles depends on the presence of contractile proteins such as actin and myosin in the myofilaments.
  - They help the muscle tissue to contract and relax to cause movement.

⭐ **Additional Information**

- **Hemp proteins** -
  - Hemp protein is the **protein content of hemp seeds** .
  - The most important benefit of hemp protein is that it can help to lower the risk of cardiovascular disease, cancer, high cholesterol, and high blood pressure.
- **Whey proteins** -
  - Whey protein is **derived from milk** .
  - It is a source of protein and essential amino acids, which are the building blocks of protein and occur naturally within the body.
- **Lipoproteins** -
  - Lipoproteins are formed from **lipid and protein molecule complexes.**
  - The prime function of lipoproteins is the transportation and delivery of fatty acids, triacylglycerol, and cholesterol from the target cells to different organs in the human body.

---

79. **Answer: b**

Explanation:

The correct answer is Meghalaya.

- Meghalaya state assembly elections were held in February 2018.

⭐ Key Points

- The **Meghalaya Legislative Assembly election was conducted on 27 February 2018 to elect 59 of 60 members** to the Meghalaya Legislative Assembly and the results were declared on 3 March 2018.
- In the Meghalaya assembly elections with 60-members, a party needed 31 seats to get a clear majority.
- There were four prominent parties who participated in the Elections which are Indian National Congress (INC), Bharatiya Janata Party (BJP), National People's Party (NPP), and United Democratic Party (UDP).
- The Election was won by the Indian National Congress government led by **Chief Minister Mukul Sangma.**

---

80. Answer: d

Explanation:

Given :

Perimeter of rectangle is 24 cm

Area of rectangle 32 cm^2

Formula used :

Area of rectangle = Length × Breadth

Perimeter of rectangle = 2(Length + breadth)

Calculations :

Let the length be 'L'

Length + Breadth = 12

Then breadth be '12 - L'

Area = L × (12 - L) = 32

12L - L 2 = 32

L 2 -12L + 32 = 0

⇒ L = 4 and 8

Take L = 4 then B = 8 cm

∴ The length and breadth of the rectangle is 4 cm and 8 cm respectively.

⭐ **Shortcut Trick**

According to the question,

24 = 2(length + breadth)

Length + breadth = 12

Now go through options

For option 1

Length + Breadth = 12 and Area = 35

For option 2

Length + Breadth = 12 and Area = 36

For option 4

Length + Breadth = 12 and Area = 32

∴ Option 4 is the correct choice

81. **Answer: b**

Explanation:

Conclusions:

1. A wants to go to lunch. → False (Asking time doesn't mean A wants to have lunch.)

2. A wants to confirm what the time is because his watch is off. → False (Asking time doesn't mean his watch is off. It can also mean he didn't have a watch.)

Hence, the correct answer is **"Neither conclusion 1 nor 2 follow"** .

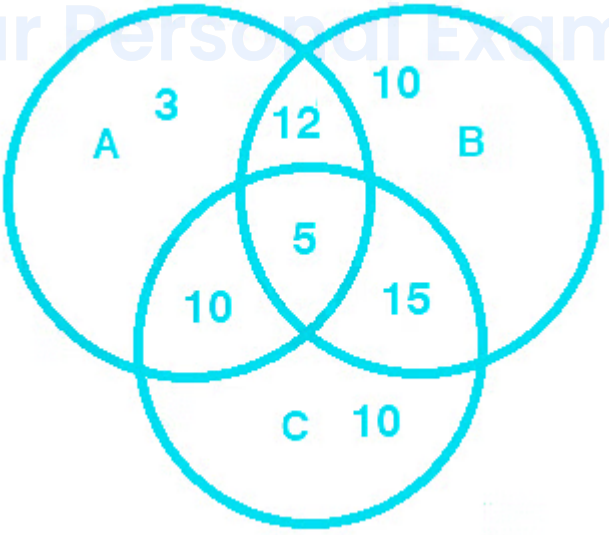
---

82. **Answer: a**

Explanation:

Given:

A - vanilla, B - chocolate and C - pistachio



Calculation:

From the Venn diagram,

the number of children who like more than one flavour of ice cream

= 10 + 12 + 15 + 5 = 42

---

83. Answer: a

Explanation:

The correct answer is **K, F, Cl.**

⭐ **Key Points**

- Dobereiner's triads were basically the groups of elements with similar properties.
- These triads are mentioned below-
  - Triad 1- lithium, sodium, and potassium
  - Triad 2- calcium, barium, and strontium
  - Triad 3- chlorine, bromine, and iodine
  - Triad 4- sulfur, selenium, and tellurium
  - Triad 5- iron, cobalt, and nickel
- **Thus, K, F, Cl is not an example of a Döbereiner's triad.**

⭐ **Additional Information**

- These elements were identified by the German chemist Johann Wolfgang Dobereiner.
- He observed that the groups of **three elements could be formed which share similar physical and chemical properties.**
- The first of Dobereiner's triads was identified in **1817** and three more triads were identified by the year **1829.**

---

84. Answer: a

Explanation:

The correct answer is **Psychon**.

- **Psychon is odd from the group.**
- **Phylum Cnidaria** includes the animals which show **radial or biradial symmetry and are diploblastic** .

⭐ **Key Points**

- Nearly 99 percent of cnidarians are marine species.
- This **phylum includes diverse animals like jellyfish, sea anemones, corals, and Hydra.**
  - **Their general characteristics are as follows-**
    - Cnidarians have two distinct morphological body plans known as polyp and medusa.
    - They are diploblastic and exhibit tissue grade of organization.
    - The body wall is composed of an outer layer called as the epidermis, an inner layer called the gastrodermis and a gelatinous mesoglea is between the outer and inner epidermis.
    - They have an incomplete digestive system with only one opening.
    - Cnidarians are commonly unisexual but some are bisexual. Fertilization is external.
    - Asexual reproduction takes place by budding, fission, and fragmentation and they have a remarkable power of regeneration.

---

85. Answer: a

Explanation:

The correct answer is **I/R = Constant.**

⭐ **Confusion Points**

Note- The question is asking you to identify the wrong statement.

⭐ Key Points

- Ohm's law states that the current flowing through a conductor is directly proportional to the voltage.
- It is used to calculate the relationship between voltage, current, and resistance in an electrical circuit.
- It was **experimentally verified by Georg Simon Ohm** , a German physicist. It is expressed as-

$I = V/R$

- This current-voltage relationship can also be written as **V= IR**
- Here, **I is the current** that flows through the conductor in amperes, **V is the voltage** measured across the conductor in volts, and **R is the resistance** of the conductor in ohms.

---

86. Answer: d

Explanation:

Statement 1: X is on the counter.

Only the first position is known. The second position is not known.

So, it alone is not sufficient to answer the question.

Statement 2 : P is between A and K.

The order can be:

Case I	Case II
A	K
P	P
K	A

The position of X is not known.

So, statement 2 alone is not sufficient.

Combining statements 1 and 2:

The order can be:

Case I	Case II
X	X
A	K
P	P
K	A

The second position can be A or K.

So, the two statements together are also not sufficient.

Hence, the correct answer is **"Statements 1 and 2 together are insufficient** ".

---

87. **Answer: a**

Explanation:

The correct answer is **Nitrogen, Water, Wax.**

- The increasing order of forces of attraction between the particles is Nitrogen, Water, Wax.

⭐ Key Points

- In liquids, **particles have adequate kinetic energy to partly overcome the force of attraction between them** .
- In solids, **particles don't have sufficient kinetic energy to overcome the force of attraction between them** .

    - They are closely packed with each other due to which solids have a fixed volume and shape.
    - They can slide over one another but are not dragged completely apart. As a result, liquids can change shape but have a fixed volume.
- In gases, **particles have maximum kinetic energy.**
    - They can completely overcome the force of attraction between them and move apart from each other due to which they have neither a fixed shape nor a fixed volume.
- The forces of attraction between the molecules are the strongest in solids, followed by liquids, and the weakest in gases.
- So, the **correct increasing order of forces of attraction is Nitrogen, Water, Wax.**

---

88. **Answer: b**

Explanation:

Given

1. Firoza was born on 2 nd February 2011

2. Adesh was born 553 days later

The number of days:

553 = 365 + 188

2012 is a leap year, so February has 29 days.

188 days from 2nd Feb

Here , February has 29 Days, as 2012 is a leap year

So, we count 27 remaining days of February.

= 27 (Feb) + 31 (Mar) + 30 (Apr) + 31 (May) + 30 (June) + 31 (July) + 8 (Aug)

So, Adesh was born on 8th Aug 2012.

Hence, the correct answer is **"8 th August 2012"** .

Mistake Point

2012 is a leap year.

If it is missed, the number of days in February would be considered 28 days.

188 = 26 (Feb) + 31 (Mar) + 30 (Apr) + 31 (May) + 30 (June) + 31 (July) + 9 (Aug)

The answer would come 9 th August 2012, which is wrong.

---

89. Answer: c

Explanation:

The correct answer is **Annie Besant**.

- **Annie Besant is the author of the famous book 'New India'**

⭐ **Key Points**

- Annie Besant was a **British socialist, women's rights activist, and writer.**
- She is regarded as a **champion of human freedom and was an ardent supporter of both Irish and Indian self-rule** .
- She was a **creative author with over three hundred books and pamphlets.**
- She is also one of the **founders of the Banaras Hindu University.**
- This book was authored by her to highlight issues related to the Indian freedom struggle.

---

90. Answer: d

Explanation:

The correct answer is **Film on social issues**.

- **The film 'Pink' won the Best Film on social issues award at the National Film Awards 2017.**

⭐ **Key Points**

- The 64 th National Film Awards was an award ceremony that was presented by the Directorate of Film Festivals to honor the best films of 2016 in the Indian cinema.
- The awards were declared on **7 April 2017, and the ceremony was held on 3 May 2017.**
- Actor Taapsee Pannu, who delivered a creditable performance in Pink co-starred with **Amitabh Bachchan won the Best Film on Social Issues at the 64th National Film Awards 2017.**
- This movie was directed by **Aniruddha Roy Chowdhury.**

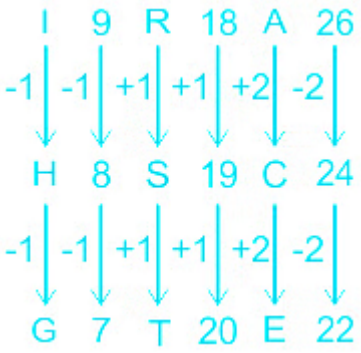
---

91. Answer: b

Explanation:

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

- The pattern followed here is:



- Hence, the correct answer is **"G7T20E22"** .

⭐ Alternate Method

- Observe the first term of the series: I9R18A26
- I9R18A26 can be written as ***I9 - R18 - A26***
- Here,***the positional value of I = 9, the positional value of R = 18, and the positional value of the opposite letter of A which is Z = 26.***
- Among all the given options, the three letters are G, T, and, E in that order.
- The letter opposite to E is V and hence the last number of the term should be 22.
- Therefore, we can eliminate options 1, 3, and 4 directly.
- Hence, the correct answer is "G7T20E22" .

---

92. Answer: c

Explanation:

The correct answer is **Zinc**.

- **Zinc does not react with cold or hot water**.

⭐ Key Points

- Metals reacting with water, produce a metal oxide and hydrogen gas.
- **Metal oxides that are soluble in water dissolve in it and form metal hydroxide.**
- But all metals do not react with water.
- Metals such as potassium and sodium react violently with cold water.

- The reaction of **calcium with water is less violent.**
- Magnesium does not react with cold water. It reacts with hot water and forms magnesium hydroxide and hydrogen.
- Metals like **aluminum, iron, and zinc** do not react either with cold or hot water. But on reacting with steam they form **metal oxide and hydrogen.**

---

93. Answer: b

Explanation:

The correct answer is **Dr. B.R. Ambedkar**.

- **Ambedkar Jayanti is also known as Bhim Jayanti is an annual festival observed on 14 April in memory of B. R. Ambedkar .**

⭐ **Key Points**

- He was the **chairman of the constituent draft assembly and civil rights activist.**
- This day marks the **birth anniversary of Babasaheb Ambedkar** who was born on **14 April 1891.**
- It has been observed as an **official public holiday throughout India since 2015.**
- This day is also celebrated all over the world.
- He struggled for equality throughout his life, so his birthday is also observed as ' **Equality Day** ' in India.

---

94. Answer: a

Explanation:

Calculations :

To check which number is square root of 13456 we will square all given numbers

116 = 13456

114 = 12996

124 = 15376

126 = 15876

∴ **Square root of 13456 will be 116**

---

95. Answer: d

Explanation:

The correct answer is **Uterus.**

- **The baby is born as a result of the rhythmic contraction of muscles in the Uterus**.

⭐ **Key Points**

- The uterus is an inverted pear-shaped muscular part of the female reproductive system.
- It is positioned between the **bladder and the rectum.**
- Its function is to **nourish and encloses a fertilized egg until the offspring, is ready to be delivered.**
- It is within the uterus that the offspring develops during gestation. Once the egg has left the ovary it undergoes fertilization and implants itself in the lining of the uterus.
- The key function of the **uterus is to provide nourishment to the developing fetus prior to birth.**
- Thus, the baby is born as a result of rhythmic contraction of muscles in uterus.

---

96. Answer: d

Explanation:

Given :

Pass score is 38%

Calculation :

Pass score for 45 marks = 38% of 45

⇒ (38/100) of 45

⇒ 17.1

∴ Passing score for 45 marks will be 17.1

---

97. Answer: b

Explanation:

The correct answer is Mass per unit volume.

- The density of a substance is defined as mass per unit volume.

⭐ Key Points

- The formula for density is-

$d = M/V$

- In the above formulae, d is the density, M is mass, and V is volume
- The **density of a material varies with variation in temperature and pressure.**
- This variation is small for solids and liquids but much greater for gases.
- Increasing the pressure on an object decreases the volume of the object and thus increases its density.
- Different materials usually have different densities and are expressed in units of grams per cubic centimeter.

---

98. **Answer: b**

Explanation:

Concept used :

$x = a^p \times b^q \times c^r$ (where a, b and c are prime numbers and p, q and r are their powers then)

Number of factors = $(p + 1)(q + 1)(r + 1)$

Calculations :

$16900 = 13^2 \times 2^2 \times 5^2$

Number of factors of 16900 = $(2 + 1)(2 + 1)(2 + 1) = 27$

$36000 = 2^5 \times 3^2 \times 5^3$

Number of factors of 36000 = $(5 + 1)(2 + 1)(3 + 1) = 72$

$28900 = 2^2 \times 5^2 \times 17^2$

Number of factors of 28900 = $(2 + 1)(2 + 1)(2 + 1) = 27$

$62500 = 2^2 \times 5^6$

Number of factors of 62500 = $(2 + 1)(6 + 1) = 21$

∴ **Only 36000 has even number of factors.**

---

99. **Answer: b**

Explanation:

The pattern followed here is:

Figure	*Minimum no. of lines required*
A	3
B	3
C	3
D	2

So, D is different from other images.

Hence, the correct answer is **"D"**

---

100. Answer: a

Explanation:

When the given figure is rotated 270° clockwise:

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

⭐ **Important Points**

270° clockwise is equivalent to 90° anticlockwise.

Clockwise + Anti-Clockwise = 360°