Prepp.in

# Prepp

## 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 (24 Oct 2018) (Shift 1)

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

## Instructions

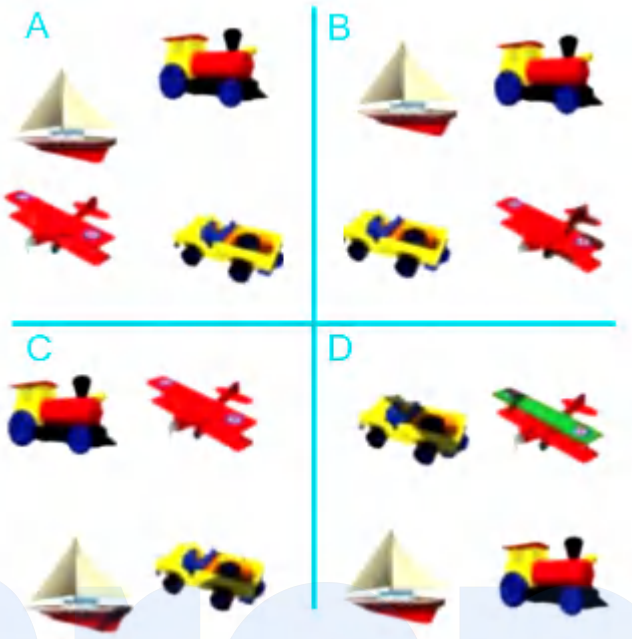
| Sl No. | Section Name | No. of Question | Maximum Marks | Negative Marks | Positive Marks |
|---|---|---|---|---|---|
| 1 | CBT | 100 | 100 | 0.33 | 1 |

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

Consider the above figure. The figure which does not belong to the group is-

**a.** A

**b.** C

**c.** D

**d.** B

---

**2.** The mean of 10 terms is 49. It was discovered that the three terms 30, 40 and 50 were mistakenly read as 10, 20 and 30 respectively. The correct mean is- **(+1, -0.33)**

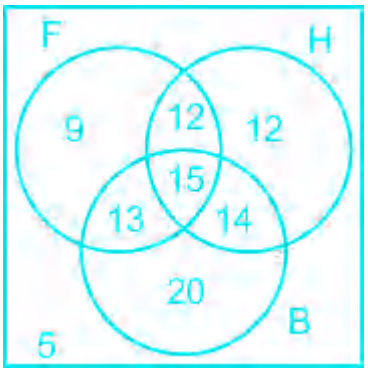
**a.** 45

**b.** 40

**c.** 55

**d.** 50

---

**3.** 


**(+1, -0.33)**

The given diagram shows the number of students who play football (F), hockey (H) and basketball (B) in the class. What is the number of students who play basketball in the class?

**a.** 20

**b.** 62

**c.** 49

**d.** 53

---

**4.** What is dentin (tooth enamel) made of? **(+1, -0.33)**

**a.** Potassium phosphate

**b.** Calcium phosphate

**c.** Ferrous sulfate

**d.** Sodium phosphate

---

5. The cost of installing a paved floor in a circular room at the rate of Rs 10 per sqm is Rs 1540 .What will be the cost of fencing on this floor at the rate of Rs 6 per meter ? **(+1, -0.33)**

a. Rs 260

b. Rs 264

c. Rs 250

d. Rs 265

---

6. The motion of the moon around the earth is due to _____- **(+1, -0.33)**

a. Gravitational force

b. Centrifugal force

c. Centripetal force

d. Nuclear force

---

7. Gravitational force exists between _____ objects, but it cannot be felt unless the mass of the objects is very high, such as in planets. **(+1, -0.33)**

a. Four

b. Each and Every

c. Only two

d. Only one

---

8. Sanjay Gandhi National Park is in _____. (+1, -0.33)

a. Delhi

b. Maharashtra

c. Rajasthan

d. Karnataka

---

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

Statements: Some girls are doctors.

All doctors are sisters.

Conclusion:

I. Some girls are sisters.

II. All sisters are girls.

a. Only II follows

b. Either I or II follows

c. Only I follows

d. Both I and II follows

---

10. What is the atomicity of phosphorus? (+1, -0.33)

a. Binomial

b. Polyatomic

**c.** A nuclear

**d.** Quaternary Atom

---


**11.** **(+1, -0.33)**

In the above circle, $\mathrm{m}\,\overline{\mathrm{AE}}$ = 4 cm, $\mathrm{m}\,\overline{\mathrm{BE}}$ = 15 cm and $\mathrm{m}\,\overline{\mathrm{CE}}$ = 2.5 cm are given. What will be the value of $\mathrm{m}\,\overline{\mathrm{DE}}$

**a.** 16.5 cm

**b.** 20 cm

**c.** 24 cm

**d.** 30 cm

---

**12.** When iron is mixed with _____ and _____, we get stainless steel- **(+1, -0.33)**

**a.** Ni; Cr

**b.** Ni; Co

**c.** Ni; Ca

**d.** Ni; Cu

---

**13.** Simplify the following expression- **(+1, -0.33)**

$\left(\frac{2}{3} \times \frac{4}{6}\right) + \left(\frac{5}{3} \times \frac{7}{10}\right) - \left(\frac{11}{2} \times \frac{4}{33}\right) = ?$

a. $\frac{31}{9}$

b. $\frac{17}{18}$

c. $\frac{16}{9}$

d. $\frac{29}{18}$

---

**14.** Name the next character in the series- **(+1, -0.33)**

A, D, B, E, C, F, D, ?

a. P

b. L

c. T

d. G

---

**15.** What is the position of India in the Most Valuable Nation Brands list as per the Brand Finance 'Nation Brands 2017' list? **(+1, -0.33)**

a. Second

b. Seventh

c. Fifth

d. Eight

---

**16.** What is the number whose 12% is 9? **(+1, -0.33)**

a. 96

**b.** 75

**c.** 108

**d.** 68

---

**17.** Mr Z is standing facing east. He takes a left turn and walks 5 km to reach point A. Then h etakes a left turn and walks 4 km to reach point B. Then he takes a right turn and walks 3 km to reach point C. Finally, he takes a right turn and walks 10 km to reach point D. **(+1, -0.33)**

Which side is Mr Z facing at point B?

**a.** North

**b.** South

**c.** West

**d.** East

---

**18.** Sreetin is playing a secret word game in which FIRE is written as DGPC, then what will SHOT be written as? **(+1, -0.33)**

**a.** QFMR

**b.** QRST

**c.** PQRS

**d.** SNGR

---

**19.** In the code language, MELT is written as 2419. What is the code for TIMID? **(+1, -0.33)**

a. 98283

b. 98383

c. 98284

d. 98384

---

20.  (+1, -0.33)

What is the minimum number of straight lines required to make the above figure?

a. 10

b. 9

c. 11

d. 12

---

21. The Union Ministry of Women and Child Development has launched an online campaign with an aim to end gender bias against women. which is called (+1, -0.33)

a. I am That Woman

b. Women empowerment

c. Woman Uprising

d. Queen is the New King

---

**22.** $\frac{2}{3}$ part of the goods was sold at a profit of 6% and the remaining part at a loss of 3%. If the total profit is Rs 540, then what was the total cost of the article? **(+1, -0.33)**

a. Rs 17,000

b. Rs 18,000

c. Rs 16,500

d. Rs 18,500

---

**23.** In which year the initiative "Swachh Bharat Abhiyan" was introduced by the Government of India? **(+1, -0.33)**

a. 2014

b. 2009

c. 2011

d. 2000

---

**24.** For 2 years Rs 2,000 on 3% p.a. Find the compound interest- **(+1, -0.33)**

a. Rs 112.50

b. Rs 112.80

c. Rs 211.80

**d.** Rs 121.80

---

**25.** A tank can be filled by two taps A and B in 5 hours and 15 hours respectively. Tap C can empty the tank in 5 hours. If all the three taps are opened simultaneously, approximately how long will it take to fill the tank completely? **(+1, -0.33)**

**a.** 24 hours

**b.** 15 hours

**c.** 20 hours

**d.** 12 hours

---

**26.** _____ ruled the region around Madurai and attained supremacy in the thirteenth century- **(+1, -0.33)**

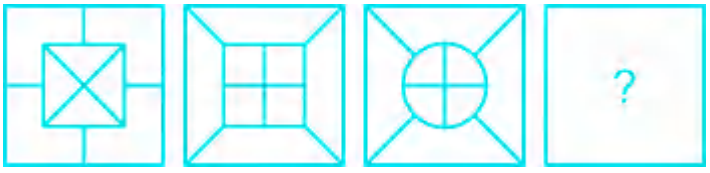
**a.** Rajput

**b.** Chola

**c.** Chera

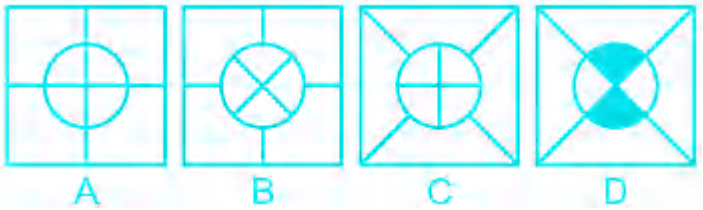
**d.** Pandya

---

**27.** 


**(+1, -0.33)**

Choose the correct option given below from the alternatives that fit the (?) in the blank space-




**a.** D

**b.** C

**c.** B

**d.** A

---

**28.** One-fourth of the 6400 employees of company Z are clerks. If the clerk employees were to be reduced by one-fourth, then what percent of the total number of remaining employees would be clerks? **(+1, -0.33)**

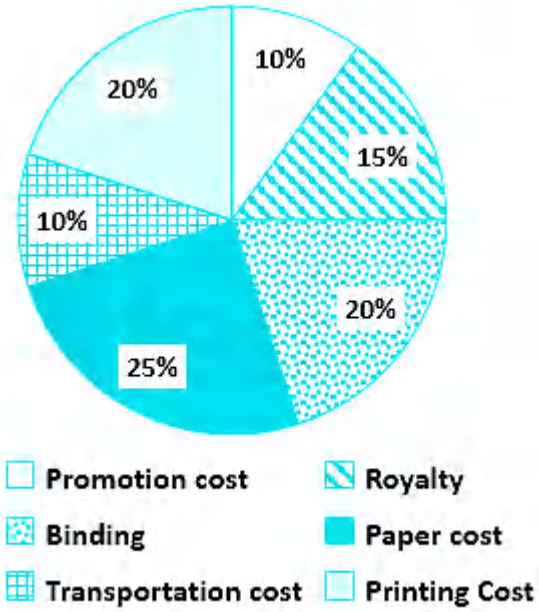
**a.** 18.75

**b.** 6.6

**c.** 20

**d.** 6.25

---




**29.** **(+1, -0.33)**

The pie graph shows the expenditure of a publishing body in Karnataka. If the total expenditure is Rs. 50,000 then the expenditure on transportation is-

**a.** Rs 5000

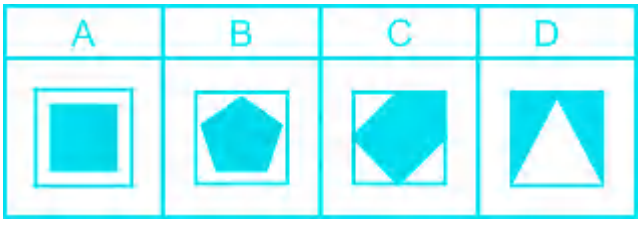
**b.** Rs 7000

**c.** Rs 10000

**d.** Rs 2500

---

**30.** Select odd- **(+1, -0.33)**




**a.** C

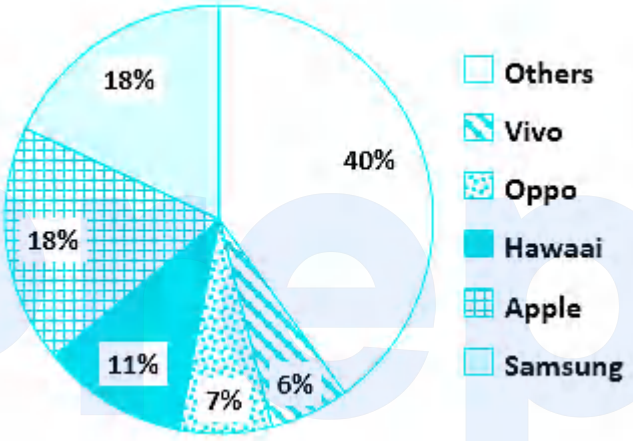
**b.** B

**c.** A

**d.** D

---

**31.** The following pie chart shows the total sales made by different mobile companies in the year 2017. **(+1, -0.33)**




What is the share of the segment corresponding to the sales of 'Others'?

**a.** 150 °

**b.** 155 °

**c.** 145 °

**d.** 144 °

---

**32.** Oscar-winning composer A.R. Rahman has become the official brand ambassador of which state? **(+1, -0.33)**

**a.** Arunachal Pradesh

**b.** Assam

**c.** Sikkim

**d.** Manipur

---

**33.** Which of the following have in common? **(+1, -0.33)**

A. A fast-moving pebble can injure a person or break the glass of the window.

B. Energy of a moving vehicle.

C. Fast-moving wind can damage many homes

D. Wind can move the blades of a windmill.

**a.** Kinetic energy

**b.** Very high speed

**c.** Gravitational pull

**d.** Frictional force



---

**34.** The permanent tissue that provides elasticity is called- **(+1, -0.33)**

**a.** Parenchyma

**b.** Aerenchyma

**c.** Sclerenchyma

**d.** Collenchyma

---

**35.** What should be added to 2.06 to get 3.1? **(+1, -0.33)**

**a.** 1.24

**b.** 0.8

**c.** 1.04

**d.** 1.4

---

**36.** Nalini, Tanvi and Rashi share a cake. Nalini ate 1/12th of it, Tanvi ate 1/3th of it and Rashi ate the rest of the cake. What was the cake's share of Rashi? **(+1, -0.33)**

**a.** $\frac{13}{15}$ th

**b.** $\frac{5}{6}$ th

**c.** $\frac{3}{5}$ th

**d.** $\frac{7}{12}$ th

---

**37.** Which of the following energy increases with speed? **(+1, -0.33)**

**a.** Chemical energy

**b.** Potential energy

**c.** Kinetic energy

**d.** Electrical energy

---

**38.** A concave mirror is placed in front of the Sun in such a way that the rays of the Sun converge at a point 5 cm away on the principal axis of the mirror. Now if a 3 cm long candle is placed on the principal axis of the mirror at a distance of 10 cm, then how far will the image of the candle be formed? **(+1, -0.33)**

**a.** 5 cm

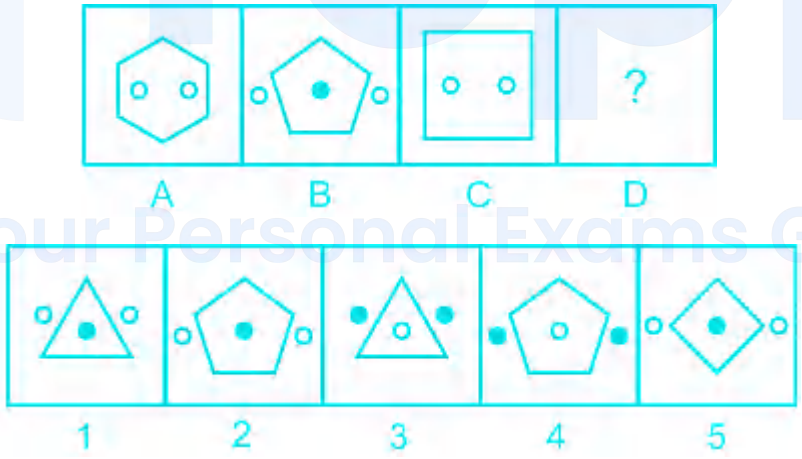
**b.** 15 cm

**c.** 10 cm

**d.** 20 cm

---

**39.** Select the option which is related to figure C in the same way as figure B is related to figure A- **(+1, -0.33)**




**a.** 5

**b.** 3

**c.** 2

**d.** 1

---

**40.** Silica is soluble in- **(+1, -0.33)**

**a.** $HNO_3$

**b.** $H_2SO_4$

**c.** HCl

**d.** HF

---

**41.** In December 2017, the central government launched a new scheme to protect _____ from floods and erosion in Assam. **(+1, -0.33)**

**a.** Haflong

**b.** Dispur

**c.** Manjuli Island

**d.** Jatinga

---

**42.** A filament of an electric bulb carries a current of 0.75 A in 9 minutes. Find the amount of electric charge flowing through the current. **(+1, -0.33)**

**a.** 225 C

**b.** 270 C

**c.** 240 C

**d.** 405 C

---

**43.** Essar Steel Limited, Hazira is located in _____. **(+1, -0.33)**

a. West Bengal

b. Gujarat

c. Odisha

d. Jharkhand

---

**44.** Consider the statement and the following arguments and decide which of the arguments is strong with respect to the statement. **(+1, -0.33)**

Statement:

Should employee medical insurance also cover dental care?

Argument:

I. Yes, dental treatment is costly and if insured, it will be of great help to the employees.

II. No, all dental treatments also include cosmetic changes, so it cannot be covered under medical insurance.

a. Arguments I and II both are strong

b. Neither I nor II is strong

c. Only argument I is strong

d. Only Argument II is strong

---

**45.** Who first gave the idea of Constituent Assembly for India? **(+1, -0.33)**

a. C.G. Roy

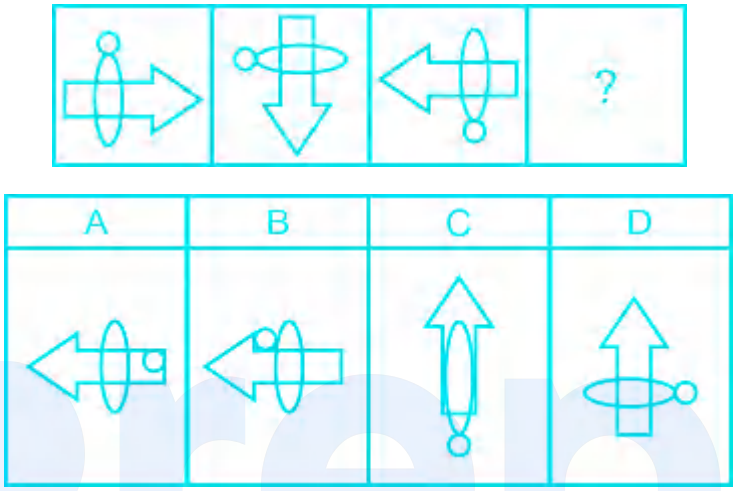
b. M.N. Roy

**c.** Dr. Baba Saheb Ambedkar

**d.** Jawaharlal Nehru

---

**46.** Select the option which is suitable in the place of ? in the given series. **(+1, -0.33)**




**a.** A

**b.** B

**c.** C

**d.** D



---

**47.** The value of $\left(-\sqrt{\frac{144}{576}}\right) \times -\frac{16}{\sqrt{64}}$ is - **(+1, -0.33)**

**a.** 4

**b.** 9

**c.** 1

**d.** 0

---

48. Who among the following was awarded the Best Director Award for the film Dangal for the 64th National Awards 2017? **(+1, -0.33)**

a. Nitesh Tiwari

b. Kabir Khan

c. Raj Kumar Hirani

d. Karan Johar

---

49. A boy is walking at a speed of P km/h to cover a distance of 1 km. However, due to slippery ground, his speed decreases by Q km/h (P > Q). If he takes R hours to cover the distance, then find the relation between R and Q. **(+1, -0.33)**

a. $1/R = P - Q$

b. $R + P - Q$

c. $R = P + Q$

d. $1/R = 1/P + 1/Q$

---

50. The National Sports Award for continuous outstanding performance for four years is _____. **(+1, -0.33)**

a. Khel Ratna Award

b. Dhyan Chand Award

c. Arjuna Award

d. Dronacharya Award

---

**51.** The word which denotes physical characteristics- **(+1, -0.33)**

**a.** controlled by the environment

**b.** genotype

**c.** monotype

**d.** Phenotype

---

**52.** A shopkeeper has different varieties of coffee brands. 55% of the store's sales come from selling the 'Espresso' variety of beans. The remaining 45% comes from selling other brands of beans and powders. In each month, the average sales of the store is Rs. 60,000 is. What are the annual sales from 'Espresso' beans? **(+1, -0.33)**

**a.** Rs. 3,96,000

**b.** Rs. 3,90,000

**c.** Rs. 3,60,000

**d.** Rs. 2,30,000

---

**53.** 77 people are present at a party, the ratio of males to women is 4 : 7. How many total women are there at the party? **(+1, -0.33)**

**a.** 36

**b.** 54

**c.** 73

**d.** 49

54. As of August 2018, which political party is currently ruling the state of Andhra Pradesh? (+1, -0.33)

a. Congress

b. TRS

c. Bharatiya Janata Party

d. TDP

55. Who is the founder of International Premier Tennis League? (+1, -0.33)

a. Linder Paes

b. Sania Mirza

c. Yuki Bhabri

d. Mahesh Bhupathi



56. An example of _____ speed of a bus on a congested road is- (+1, -0.33)

a. unequal

b. uniform

c. circular

d. linear

57. _____ when the direction of force applied and the direction of motion of the object are perpendicular to each other. (+1, -0.33)

**a.** power used

**b.** no work done occurs

**c.** power not used

**d.** work done

---

**58.** Solve the equation- $\sqrt{30+\sqrt{30+\sqrt{30+\sqrt{30+\sqrt{...}}}}}$? **(+1, -0.33)**

**a.** 5

**b.** $\sqrt{30}$

**c.** 6

**d.** 5.8

---

**59.** The average speed of the car on a particular stretch of road is 90 km/hr. On a particular day, the average speed was 1/5 less than on normal days, as a result, it took 16 minutes longer. What is the length (in km) of this particular stretch of road? **(+1, -0.33)**

**a.** 96

**b.** 108

**c.** 120

**d.** 84

---

**60.** Study the statement below followed by two conclusions. **(+1, -0.33)**

**Statement:**

Some monkeys are orangutans.

No orangutan is human.

**Conclusion:**

1. Some monkeys are human.

2. No monkey is human.

Decide which of the conclusion logically follows from the statement?

**a.** Conclusions 1 and 2 both follow

**b.** Only conclusion 1 follows

**c.** Only conclusion 2 follows

**d.** Either conclusion 1 or 2 follows

---

**61.** Given below are three statements followed by two conclusions numbered I and II. You have to take the statements to be true even if they seem to be at variance from commonly known facts. Decide which of the conclusion logically follows from the statement. **(+1, -0.33)**

Statement:

1. Some apples are horses.

2. All apples are trains.

3. All trains are violets.

Conclusion:

I. Some apples are not violets.

II. All horses being train is a possibility.

**a.** Neither conclusion I nor II follows

**b.** Conclusion II follows

**c.** Both conclusions I and II follows

**d.** Conclusion I follows

---

**62.** X is the brother of Y, V is the mother of Y, M is the sister of V's husband, N is the brother of V, then how is the son of N related to Y? **(+1, -0.33)**

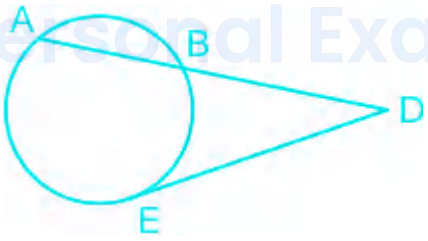
**a.** Sister

**b.** Aunt

**c.** Cousin

**d.** Nephew

---

**63.** 

**(+1, -0.33)**

In the given circle, line $\overline{AB}$ is produced to meet tangent $\overline{DE}$ at point D. If $\overline{AB}$ = 7 cm and $\overline{DE}$ = 12 cm, then what will be the length of $\overline{BD}$ ?

**a.** 7 cm

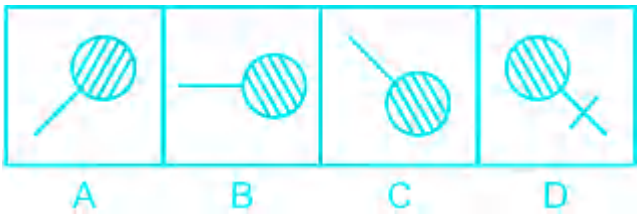
**b.** 9 cm

**c.** $2\sqrt{21}$ cm

**d.** 8 cm

---

**64.** Identify the odd one out- **(+1, -0.33)**




**a.** C

**b.** B

**c.** A

**d.** D

---

**65.** Where is the headquarter of Asian Development Bank located? **(+1, -0.33)**

**a.** Japan

**b.** China

**c.** Philippines

**d.** Bharat

---

**66.** _____ was prosecuted for leading the rebels of the Revolt of 1857 and exiled to Rangoon, where he died in 1862. **(+1, -0.33)**

**a.** Shah Alam

**b.** Bahadur Shah Zafar

c. Shah Alam-I

d. Akabar Shah-II

---

67. Elements in the same group have the same _____ . (+1, -0.33)

a. chemical properties

b. atomic mass

c. atomic radius

d. atomic numbers

---

68. If P means ÷, Q means ×, R means + and S means −, then what is the value of 14Q16P4R7S10? (+1, -0.33)

a. 52

b. 48

c. 53

d. 50

---

69. _____ is known as bisexual flower. (+1, -0.33)

a. Papaya

b. Watermelon

c. Cucumber

d. Mustard

**70.** 3R # 2 A S K 5 % T 7 & N Y + X B / L Q @ 1 **(+1, -0.33)**
If the first half of the above series is reversed, then the 15th term to the right of the 18th term from the right will be-

**a.** T

**b.** Q

**c.** @

**d.** %

---

**71.** Which of the following book was written by Mahatma Gandhi? **(+1, -0.33)**

**a.** Wings of Fire

**b.** The Tensandons

**c.** Hind Swaraj

**d.** Al-Hilal



---

**72.** Amit can do $\frac{1}{2}$ part of a work in 7 days while Alam can do $\frac{1}{2}$ part of the same work in 9 days. In how many days can both together finish the work? **(+1, -0.33)**

**a.** 5.2 Days

**b.** 8 Days

**c.** 12 Days

**d.** $\frac{63}{8}$ Days

---

**73.** The color of iron rust is _____. **(+1, -0.33)**

**a.** Red grey

**b.** Red blue

**c.** Red brown

**d.** Red yellow

---

**74.** In which of the following concave mirror is not used? **(+1, -0.33)**

**a.** search light

**b.** solar furnace

**c.** rear mirror

**d.** car headlight

---

**75.** In the following, there is a certain relationship between two given words, one on one side of : : and the other on the other side of word : : . While one more word has to be found from the given alternatives which has the same relation with this word as in the pair of words given below, select the best option- **(+1, -0.33)**

Knife : Butcher :: Scissors : _____

**a.** Hair dresser

**b.** Wood cutter

**c.** Mechanic

**d.** Cobbler

76. In which kingdom would you place all organisms, which are multicellular eucentric with a cell wall? **(+1, -0.33)**

**a.** protista

**b.** plantea

**c.** monera

**d.** animalia

77. Read the given question and decide which of the following statement(s) is/are sufficient to answer the question. **(+1, -0.33)**

Question:

X, Y, T, U, and V, when arranged in ascending order of their weights, who will stand second from the beginning?

Statements:

1. X weighs less than T. U weighs twice as much as T.

2. The weight of Y and V is less than that of X.

**a.** Statements 1 and 2 both are sufficient

**b.** Statement 1 alone is sufficient

**c.** Statement 2 alone is sufficient

**d.** Statements 1 and 2 both are insufficient

78. Select the alternative which has the same relation to the third word as the second word is to the first word- **(+1, -0.33)**

Captain : Soldier : : Employer :

**a.** Boss

**b.** Director

**c.** Employee

**d.** Officer

---

**79.** Which railway station has entered the Limca Book of Records 2018 for all railway employees to be female? **(+1, -0.33)**

**a.** Vapi Railway Station

**b.** Panvel Railway Station

**c.** Matunga Railway Station

**d.** Dadar Railway Station

---

**80.** Which of the following is/are true/false? **(+1, -0.33)**
Statement:

A. The following is an example of a reversible reaction.

$N_2(g) + 3H_2(g) \rightleftharpoons \because 2NH_3(g)$

B. The following is an example of thermal decomposition.

$CaCO_3(s) \xrightarrow{heat} Cao(s) + CO_2(g)$

**a.** Only A is true

**b.** Both A and B are ture

c. Only B is true

d. Both A and B are false

---

**81.** Ramu's income is 25% more than that of Rohan. Rohan's income is what percent of Ramu's income? **(+1, -0.33)**

a. 80%

b. 50%

c. 75%

d. 60%

---

**82.** _____ shows that the atomic number of an element is a more fundamental property than its atomic mass. **(+1, -0.33)**

a. Henry Cavendis

b. Henry Mosley

c. John Newland

d. Demitri Mendeleev



---

**83.** Select the odd one from the following- **(+1, -0.33)**


a. A

**b.** B

**c.** C

**d.** D

---

**84.** Newton's third law of motion applies to which of the following situations? **(+1, -0.33)**

**a.** When a person jumps from the boat to the bank of the river, the boat goes backwards

**b.** Passengers standing in a bus fall in the rear direction when the stationary bus suddenly starts moving

**c.** When a person falls on a cement floor, he gets hurt

**d.** While catching a fast moving cricket ball, a fielder moves his hands backwards.

---

**85.** Amita's father was 38 years old when she was born, while her mother was 36 years old when her brother was born who was four years younger than her. What is the difference between the ages of his parents? **(+1, -0.33)**

**a.** 4 years

**b.** 6 years

**c.** 8 years

**d.** 2 years

---

**86.** The ratio of the ages of Rohan and Sohan is 4 : 3. After 9 years, Rohan's age will become 33 years. Find the present age of Sohan. **(+1, -0.33)**

a. 15 years

b. 19.5 years

c. 21 years

d. 18 years

---

87. The process of dialysis is related to- **(+1, -0.33)**

a. Liver

b. Lungs

c. Abdomen

d. Kidneys

---

88. What will be the smallest number which when divided by 6, 7, 8, 9 and 12 leaves remainder 2 each time? **(+1, -0.33)**

a. 508

b. 608

c. 502

d. 506

---

89. If the centroid and two vertices of the triangle are (4, 8), (9, 7) and (1, 4), then find the area of the triangle. **(+1, -0.33)**

a. 34.5 unit $^2$

**b.** 111 unit 2

**c.** 33 unit $^2$

**d.** 166.5 unit 2

---

**90.** You have to take the given statement to be true even if it seems to be at variance from commonly known facts and then decide which of the given conclusions logically follow from the given statement. **(+1, -0.33)**

**Statement:**

Due to heavy snowfall in Canada, the normal life of Canadians has come to a standstill.

**Conclusion:**

1. The Government of Canada must take measures to help people and prevent loss of life and property.

2. The government should ask all citizens to stay at home till the weather changes.

**a.** Only conclusion 2 follows

**b.** Only conclusion 1 follows

**c.** Neither conclusion 1 nor conclusion 2 follows

**d.** Either conclusion 1 or conclusion 2 follows

---

**91.** Which ministry regulates cow slaughter in India? **(+1, -0.33)**

**a.** Defense

**b.** Agriculture

c. Home

d. Environment

---

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

**Statement:**

Shyam says to Ram, I would like to find out the effect of mobile radiation on the children.

**Assumptions :**

I. One can trace the effect of mobile radiation on children.

II. Shyam is very good at detecting mobile radiation effects.

a. Both I and II are implicit

b. Neither I nor II is implicit

c. Only assumption I is implicit

d. Only assumption II is implicit

---

93. The color preferences of a group of girls were mapped and the results were as follows: 20 preferred pink, 16 preferred red and 14 preferred green. 5 preferred all the three colours. 9 of them chose Pink and Green. 7 of them chose Pink and Red. 8 of them chose Red and Green. How many girls chose only one colour? **(+1, -0.33)**

a. 17

b. 44

c. 40

d. 36

---

**94.** The correct increasing order of acidity of Mn oxide is- **(+1, -0.33)**

a. $MnO < MnO_2 < Mn_2O_7$

b. $MnO_2 > MnO > Mn_2O_7$

c. $Mn_2O_7 > MnO_2 > MnO$

d. $MnO_2 > Mn_2O_7 > MnO$

---

**95.** 99-year old freedom fighter and Padma awardee, who runs 18 schools in West Bengal and provides free education and food- **(+1, -0.33)**

a. Sitavva Jodadi

b. Sulagitti

c. Sudhanshu Vishwas

d. Damodar Bapat

---

**96.** What is the main component of CNG? **(+1, -0.33)**

a. Methane

b. Butane

c. Ethane

d. Propane

**97.** In a college of 420 students, each student studies 5 subjects and each subject is studied by 60 students. What is the number of subjects? **(+1, -0.33)**

**a.** Exactly 35 :

**b.** Exactly 25 :

**c.** Minimum 50

**d.** Maximum 30

---

**98.** In which country is the Eden Gardens Cricket Ground located? **(+1, -0.33)**

**a.** Pakistan

**b.** Shri Lanka

**c.** Bangladesh

**d.** Bharat

---



**99.** The greatest common factor of 290 and 660 is 10. What is their least common factor? **(+1, -0.33)**

**a.** 38280

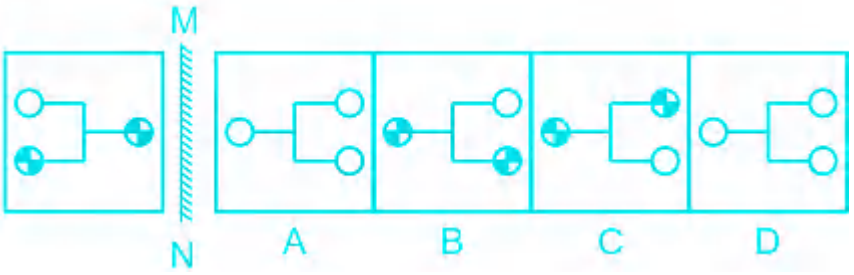
**b.** 9570

**c.** 19140

**d.** 191400

---

**100.** Select the correct image formed in the mirror of the following figure- **(+1, -0.33)**




**a.** D

**b.** A

**c.** B

**d.** C

# Answers

1. **Answer: c**

**Explanation:**

The logic followed here is:-

- In Figures A, B, and C the colour of the aeroplane is red
- In option D there are two colours, red and blue, in the aeroplane. Thus, figure D is the odd one.

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

---

2. **Answer: c**

**Explanation:**

Given:

The mean of 10 terms is 49.

Three terms 30, 40 and 50 were mistakenly read as 10, 20 and 30 respectively

Concept used:

Total = Mean × Number of terms

Calculation:

The total of 10 terms considering 49 as the mean = 49 × 10 = 490

So, the total of 7 numbers excepts 10, 20, and 30 = (490 - 10 - 20 - 30) = 430

Now, the total of 10 terms taking the correct terms = (430 + 30 + 40 + 50) = 550

So, the mean of 10 terms = 550 ÷ 10 = 55

∴ The correct mean is 55.

---

3. **Answer: b**

**Explanation:**

The Venn diagram is given below:-


- No. of students who play only basketball = 20
- No. of students who play basketball and football = 13
- No. of students who play basketball and hockey = 14.
- No. of students who play basketball, football, and hockey = 12
- Thus, total students who play basketball in the class = 20 + 13 + 14 + 15 = 62

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

---

4. **Answer: b**

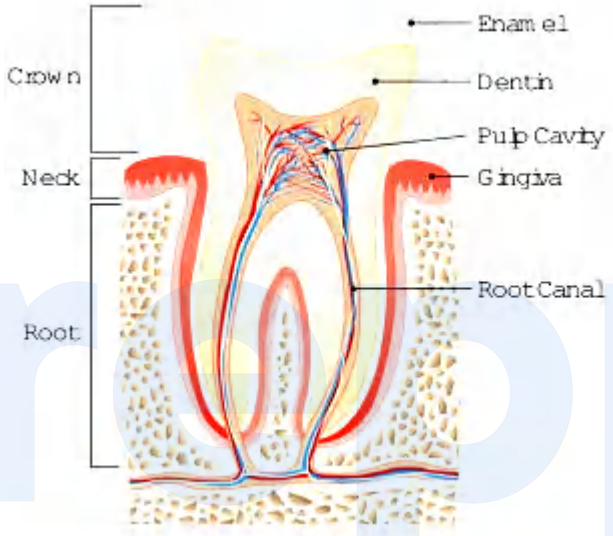
**Explanation:**

The correct answer is **Calcium phosphate**.

- **Dentin** (tooth enamel) is made of **Calcium and Phosphate.**

⭐ Key Points

- **Dentin** is a **composite substance** of **organic** and **inorganic material** found in the **tooth's interior.**
- **Dentin** is **pale yellow** and becomes **darker** with **age** .
- It constitutes the **bulk of the tooth** , providing its structure and protecting the more **sensitive pulp inside of it.**
- It is one of the major components of **human teeth** . When **dentin is damaged** or **exposed** , a variety of **problems can occur** , such as **tooth sensitivity.**




⭐ Additional Information

- **Dentin** is one of **four major components** of a **tooth** .
- The other layers of a tooth include:
  - Enamel:Calcified tissue that acts as a protective barrier for the crown of the tooth. It is the hardest substance in the human body, composed of hydroxyapatite crystals (calcium and phosphate ions).
  - Dental pulp:This soft tissue forms the tooth's inner core, containing the blood vessels and nerves.
  - Cementum: Forms a tough, protective covering of the root of the tooth, anchoring it in the jaw bone.

---

5. **Answer: b**

### Explanation:

Given:

The cost of installing a paved floor in a circular room at the rate of Rs 10 per sqm is Rs 1540 .

The cost of fencing on this floor at the rate of Rs 6 per meter.

Concept used:

A circle circumference formula is given by $2\pi R$

Area of a circle = $\pi R^2$

Where R is its radius

Calculation:

Let the radius of the circular room be R meter.

According to the question,

$\pi R^2 \times 10 = 1540$

$\Rightarrow R = 7$

So, the circumference of the circular room = $2\pi R = 2\pi \times 7 = 44m$

Now, the cost of fencing = $(44 \times 6)$ = Rs. 264

**∴ The cost of fencing on this floor at the rate of Rs 6 per meter will be Rs. 264.**

---

6. **Answer: a**

### Explanation:

The correct answer is **Gravitational force**.

- The motion of the moon around the earth is due to **gravitational force** .

⭐ Key Points

- The **gravitational attraction** provides the **centripetal force** needed to keep planets in **orbit** around the **Sun** and **all types of satellites** in orbit around the **Earth.**
- The **Earth's gravity keeps the Moon orbiting us** . It keeps changing the direction of the **Moon's velocity.**
- The moon has **two movements** , the first is that it will **revolve around itself** in its **own axis** and the second, it will **move around the Earth** .
- The moon takes **30 days** to move around the Earth and it can be observed in the sky for **15 days** and another **15 days** it will be **another side of the Earth** that we cannot see.

⭐ Additional Information

- Centrifugal force:
  - Centrifugal force is a pseudo force in a circular motion which acts along the radius and is directed away from the center of the circle. The force does not exist when measurements are made in an inertial frame of reference.
- Centripetal force:
  - A centripetal force is a force that makes a body follow a curved path. Its direction is always orthogonal to the motion of the body and towards the fixed point of the instantaneous centre of curvature of the path.
- Nuclear force:
  - The nuclear force is a force that acts between the protons and neutrons of atoms. Neutrons and protons, both nucleons, are affected by the nuclear force almost identically.

---

7. **Answer: b**

**Explanation:**

The correct answer is Each and Every.

- Gravitational force exists between **each and every object** , but it cannot be felt unless the mass of the objects is very high, such as in planets.

⭐ Key Points

- **Gravity** , also called **gravitation,** in mechanics, is the universal force of attraction acting between all **matter** .
- On **Earth, all bodies have a weight,** or downward force of **gravity** , proportional to their **mass** , which Earth's mass exerts on them.
- Gravity is measured by the **acceleration** that it gives to freely falling objects.

⭐ Additional Information

- **Universal Gravitation Equation.**
- **This equation describes the force between any two objects in the universe:**
  - **F** is the force of gravity (measured in Newtons, N).
  - **G** is the gravitational constant of the universe and is always the same number.
  - **M** is the mass of one object (measured in kilograms, kg).
  - **m** is the mass of the other object (measured in kilograms, kg).
  - **r** is the distance those objects are apart (measured in meters, m).

Formula

Newton's law of universal gravitation

$$F = G\frac{m_1 m_2}{r^2}$$

$F$ = force
$G$ = gravitational constant
$m_1$ = mass of object 1
$m_2$ = mass of object 2
$r$ = distance between centers of the masses

---

8. **Answer: b**

## Explanation:

The correct answer is **Maharashtra**.

- **Sanjay Gandhi National Park** is in **Maharashtra.**

⭐ **Key Points**

- **Sanjay Gandhi National Park** is a protected area in **Mumbai, Maharashtra** State in **India** . It was established in **1969** with headquarters at **Borivali** .
- Previously the park was named **Krishnagiri National Park** in the pre-independence era. At that time the area of the park was only 20.26 sq. km.
- In **1969** , the park was expanded to its present size by acquiring various reserve forest properties adjoining the park.
- After this, an **independent unit** of the Forest Department called **Borivali National Park Sub-division** administered the area.
- **Krishnagiri National Park** was created in **1974** and later renamed **Borivali National Park** .
- In **1981** , it was re-dedicated as **Sanjay Gandhi National Park** in memory of **Sanjay Gandhi,** the son of ex-Prime Minister of India **Indira Gandhi.**

⭐ **Additional Information**

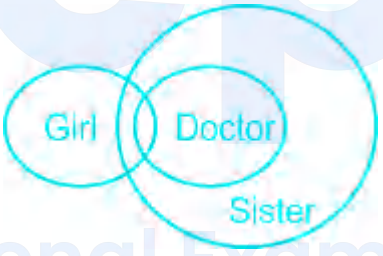
| State | National Parks |
| --- | --- |
| Haryana | • Sultanpur National Park (Gurugram) |
| Rajasthan | • Ranthambore National Park.<br>• Sariska National Park.<br>• Gajner Wildlife Sanctuary. |
| Maharashtra | • Chandoli National Park.<br>• Gugumal National Park.<br>• Navegaon National Park. |
| Karnataka | • Bannerghatta National Park.<br>• Bandipur National Park.<br>• Nagarhole National Park. |

9. **Answer: c**

**Explanation:**

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

The logical Venn diagram is given below:-






**Conclusion:**

I. Some girls are sisters. → True (this can be seen in the Venn diagram; girls that are doctors are sisters)

II. All sisters are girls. → False (it is possible but not definite. )

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

---

10. **Answer: d**

**Explanation:**

The correct answer is **Quaternary Atom.**

- **Quaternary Atom** is the **atomicity** of **phosphorus.**

⭐ **Key Points**

- **Atomicity** is the number of **atoms** of an **element** present in **one molecule** of that **element.**
- The **number of atoms** present in a **molecule** of **phosphorus** is **4**. So the atomicity of phosphorus is **4.**

⭐ **Additional Information**

- Atomicity is defined as the total number of atoms present in a molecule.
- **Atomicity, molecules can be classified as below:**
  - **Monatomic:**Composed of one atom e.g. He, Ne, Ar, Kr (all noble gases are monatomic).
  - **Diatomic:** Composed of two atoms e.g. H2, N2, O2, F2, Cl2 (all halogens are usually diatomic).
  - **Triatomic:**Composed of three atoms e.g. O3.
  - **Polyatomic:**Composed of three or more atoms e.g. P4, S8.

---

**11. Answer: c**

**Explanation:**

Given:

$\mathrm{m}\,\overline{\mathrm{AE}}$ = 4 cm

$\mathrm{m}\,\overline{\mathrm{BE}}$ = 15 cm

$\mathrm{m}\,\overline{\mathrm{CE}}$ = 2.5 cm

Concept used:

If AB & CD, two chords of a circle, intersect each other at point P. Then, we know,

AP × BP = CP × DP

Calculation:

AB & CD are the chords of the circle. That intersected each other at point E.

So, we know,

AE × BE = CE × DE

⇒ 4 × 15 = 2.5 × DE

⇒ DE = 24

**∴ 24 cm will be the value of** $\mathrm{m}\,\overline{\mathrm{DE}}$ **.**

---

**12. Answer: a**

**Explanation:**

The correct answer is **Ni; Cr.**

- When iron is mixed with **Ni** and **Cr,** we get **stainless steel.**
- **Stainless steel** is steel containing at least **10.5% chromium** , less than **1.2% carbon,** and other **alloying elements.**

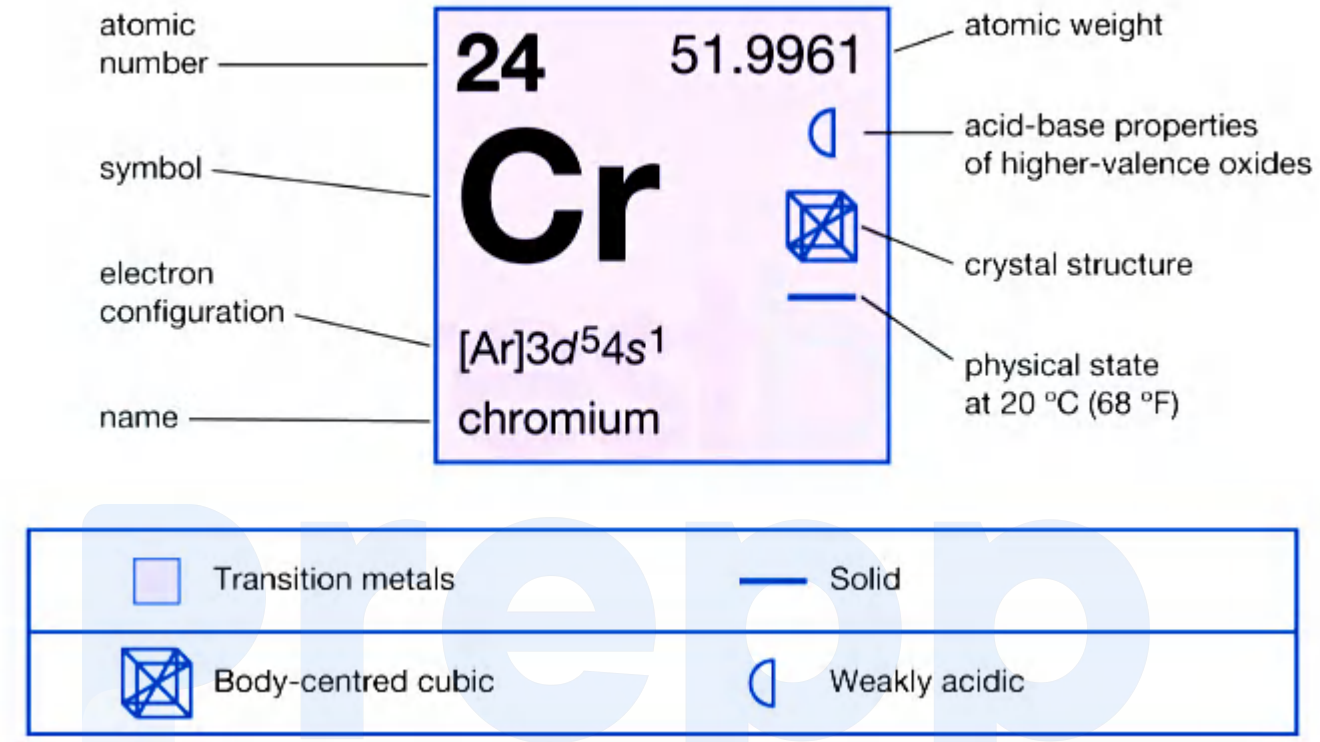


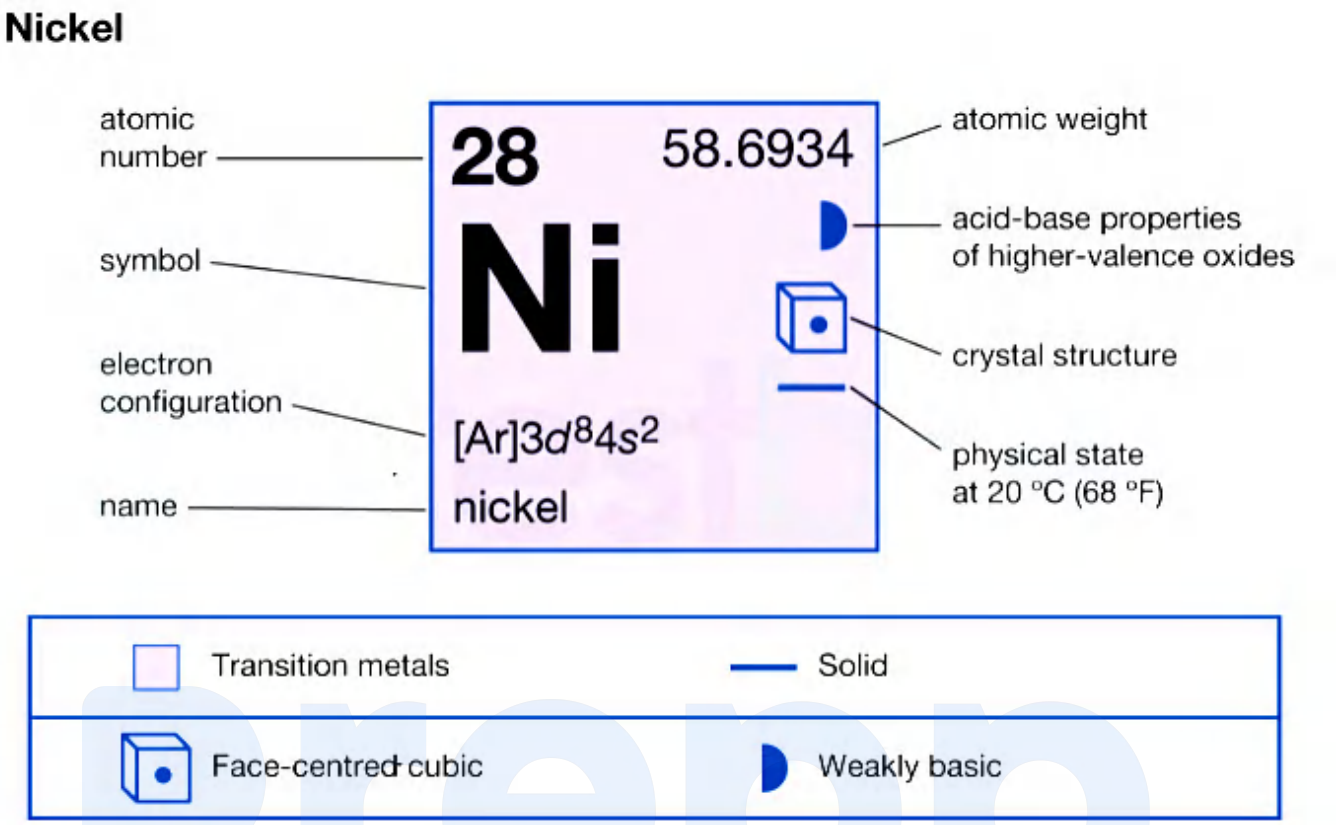
⭐ **Key Points**

- **Stainless steel** is an alloy of **Iron** ,**Nickel** , and **chromium** . This alloy makes the **metal strong, durable, and corrosion-resistant.**
  - Stainless steel is an alloy of iron, **chromium, and nickel.**
  - Because of the interactions between the **atmosphere** and its **alloying components, stainless steel** is known to **remain stainless and avoid rusting.**
  - **Chromium plays** an important role in the production of **stainless steel** . It gives **hardness** to the **stainless steel** and makes it tough. It improves corrosion **resistance, particularly at high temperatures.**

## Additional Information

### Chromium






13. **Answer: b**

**Explanation:**

Given:

$\left(\frac{2}{3} \times \frac{4}{6}\right) + \left(\frac{5}{3} \times \frac{7}{10}\right) - \left(\frac{11}{2} \times \frac{4}{33}\right)$

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:

$\left(\frac{2}{3} \times \frac{4}{6}\right) + \left(\frac{5}{3} \times \frac{7}{10}\right) - \left(\frac{11}{2} \times \frac{4}{33}\right)$

⇒ 4/9 + 7/6 - 2/3

⇒ 17/18

**∴ The required value of $\left(\frac{2}{3} \times \frac{4}{6}\right) + \left(\frac{5}{3} \times \frac{7}{10}\right) - \left(\frac{11}{2} \times \frac{4}{33}\right)$ is 17/18.**

---

## 14. Answer: d

### Explanation:

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

The logic followed here is:-

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

---

## 15. Answer: d

### Explanation:

The correct answer is **Eight**.

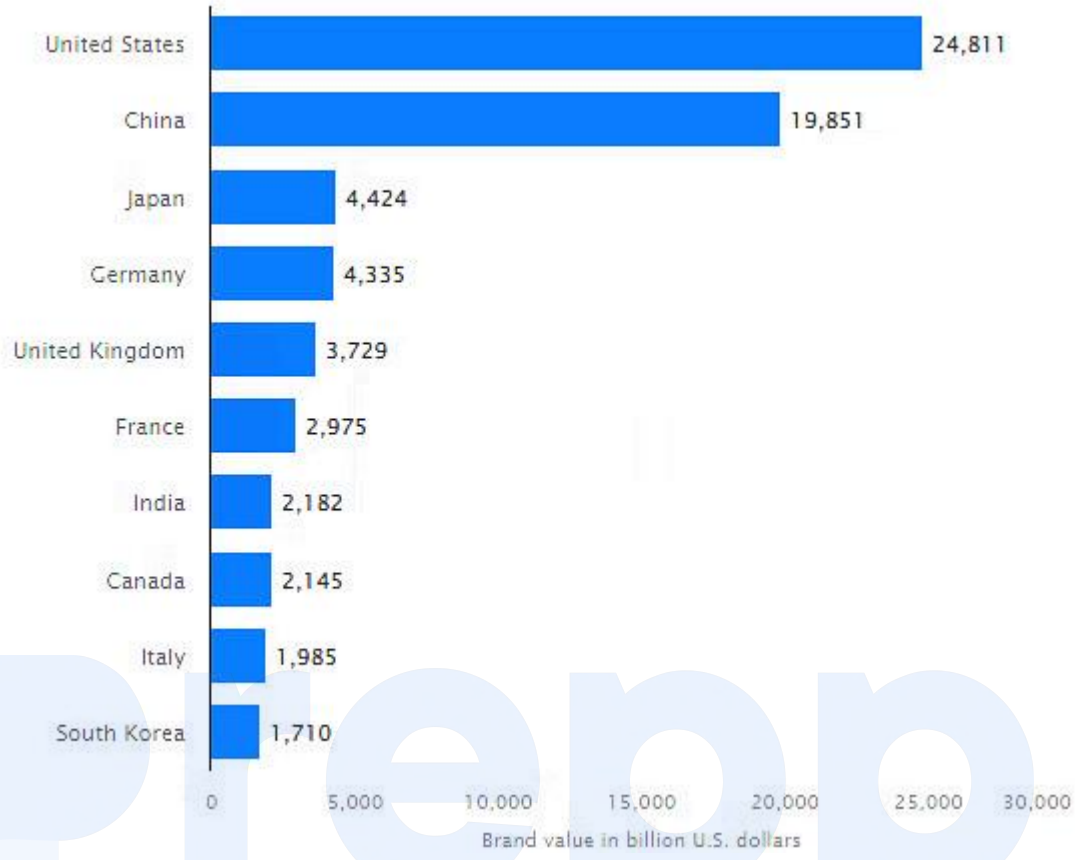
- **Eight positions** of **India** in the **Most Valuable Nation Brands list** as per the **Brand Finance 'Nation Brands 2017' list.**

⭐ **Key Points**

- **The NBI looks at each nation's reputation along six dimensions of national competence:**
  - The Anholt Ipsos **Nation Brands Index** is a global nation brand survey. The NBI examines the images of around 50 nations each year, by conducting online interviews with 20,000 adults aged 18 and over, in 20 core panel countries.
  - The **NBI looks** at each nation's reputation along six dimensions of national competence: **Exports, Governance, Culture, People, Tourism, Immigration, and Investment** . Together these provide an overall indication of a **nation's reputation.**
  - The **Scottish Government** subscribed to the **NBI in 2008** (collecting baseline data reported in the NPF) and **2009** and has subscribed on a biannual basis since **2010.**

⭐ **Additional Information**

- **Most valuable nation brands worldwide in 2021:**




16. **Answer: b**

**Explanation:**

Given:

There is a number whose 12% is 9

**Concept used:**

Application of percentage

Calculation:

Let the number P.

According to the question,

$P \times 12\% = 9$

$\Rightarrow P = 75$

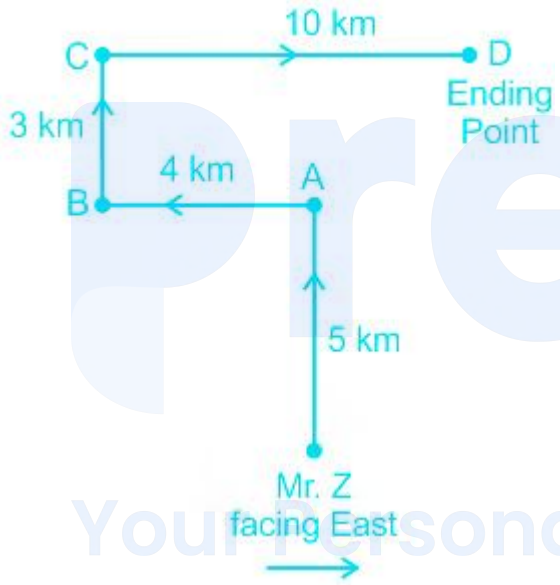
**$\therefore$ 12% of 75 is 9.**

---

17. **Answer: c**

**Explanation:**

The diagram is given below:-




- Mr Z facing west at point B.

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

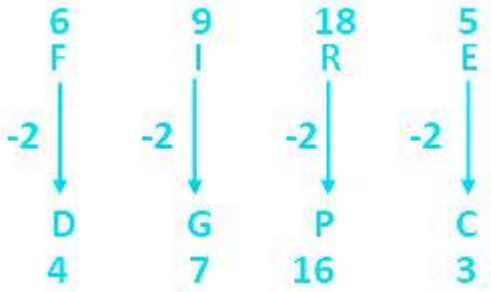
---

18. **Answer: a**

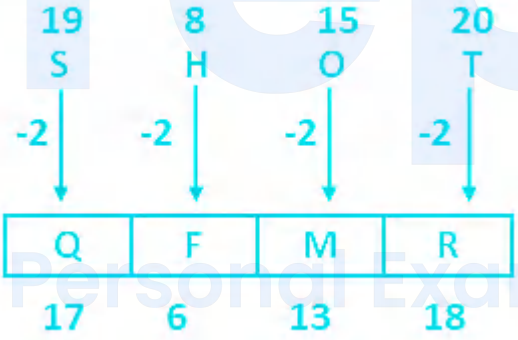
**Explanation:**

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

The logic followed here is:-




Similarly,




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

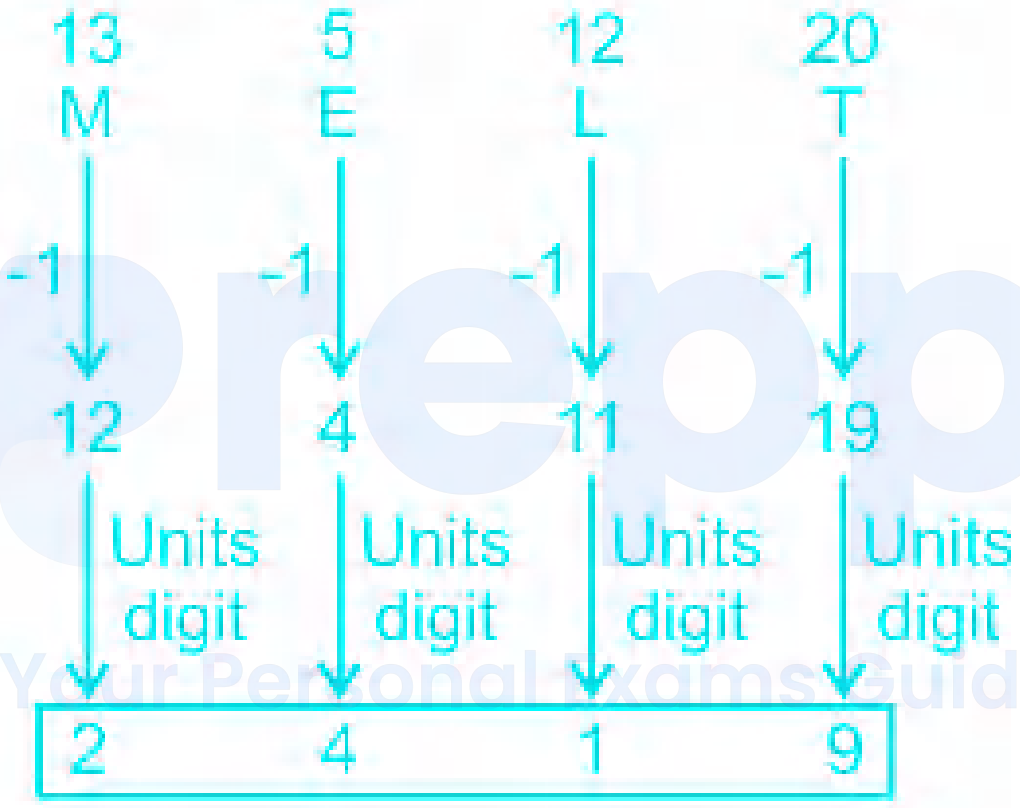
---

19. **Answer: a**

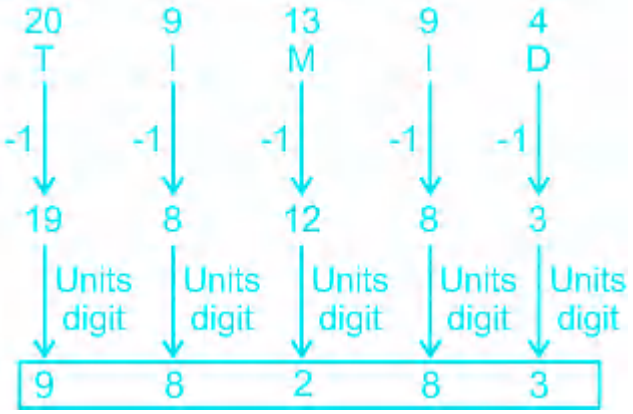
**Explanation:**

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

The logic followed here is:-

- Code of a letter = digit in the units place of its positional value - 1
- 


Similarly,



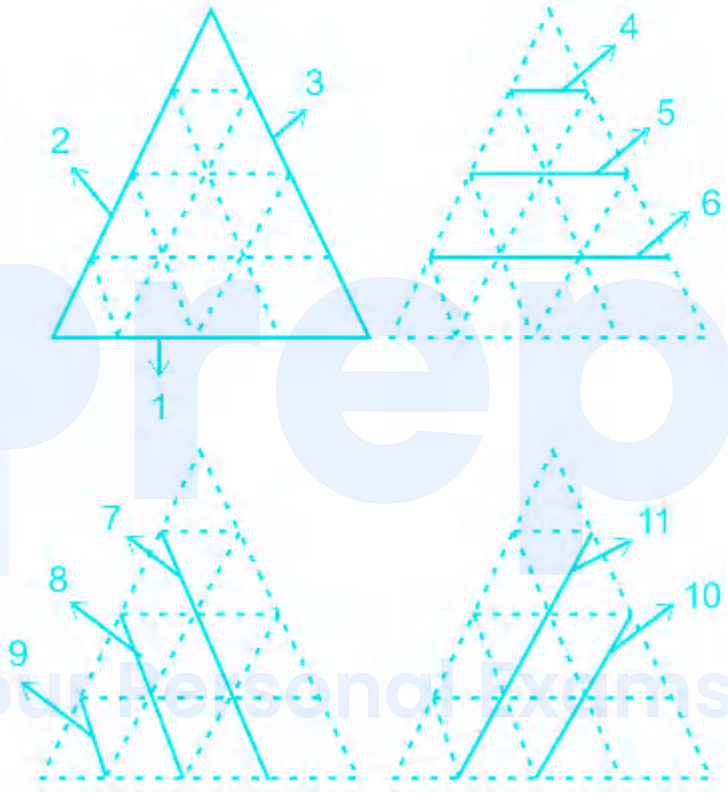
Hence, **"option 1"** is the correct answer.

---

## 20. Answer: c

### Explanation:

The figure is given below:-




- The minimum number of lines to make the question figure is 11.

Hence, "option 3" is the correct answer.

---

## 21. Answer: a

### Explanation:

The correct answer is **I am That Woman.**

- The **Union Ministry of Women and Child Development** has launched an **online campaign** with an aim to end gender bias against women is **I am that women.**

⭐ **Key Points**

- T he **Union Ministry of Women and Child Development** (WCD) has launched an online campaign **#IamThatWoman** to end gender bias in women against **women** .
- Through the campaign, the Ministry seeks to highlight the various aspects of women standing **by** and **for** women.
- The purpose of the campaign is to shed light on the enormous contributions made by **women** for **women** .

⭐ **Additional Information**

- **Twitter** and **Facebook** users have been encouraged to tag and share **stories** of women helping **women** with a **photograph** and post online with the hashtag **#IamThatWoman** .

---

**22. Answer: b**

**Explanation:**

Given:

$\frac{2}{3}$ part of the goods was sold at a profit of 6%

The remaining part at a loss of 3%

T he total profit is Rs 540

Concept used:

Selling price = Cost price × (1 + Profit percentage/100)

Selling price = Cost price × (1 - Loss/100)

Calculation:

Let the cost price of each article be 100P and the number of articles is 300Q.

So, the total cost price of all the articles = 30000PQ.

Now,

The selling price of articles that are sold at a 6% profit

⇒ (300Q × 2/3) × (100P × 1.06)

⇒ 21200PQ

The selling of articles that are sold at a 3% loss

⇒ (300Q × 1/3) × (100P × 0.97)

⇒ 9700PQ

So, overall profit = (21200Q + 9700PQ) - 30000PQ = 900PQ

According to the question,

900PQ = 540

⇒ PQ = 0.6

⇒ 30000PQ = 18000

**∴ The total cost of the articles is Rs. 18000.**

⭐ **Shortcut Trick**

Now, using the seesaw method of Mixture and Alligation.

Let the overall profit be P.

So,

(6 - P)/(P + 3) = 1/2

⇒ P = 3%

So, let the total cost price = A
Now,

A × 3% = 540

⇒ A = 18000

∴ The total cost of the articles is Rs. 18000.

---

## 23. Answer: a

### Explanation:

The correct answer is **2014.**

- In **2014** the initiative " **Swachh Bharat Abhiyan** " was introduced by the Government of India.

⭐ **Key Points**

- **Swachh Bharat Abhiyan** is a national level campaign by the Government of India covering **4041 statutory towns** to clean the **streets, roads** and **infrastructure of the country.**
- The campaign is **India's biggest ever cleanliness drive** and **3 million government employees** and **schools** and c **olleges students** of India participated in this event.
- On **2nd October 2014 ,Swachh Bharat Mission** was launched throughout length and breadth of the country as a **national movement.**
- The campaign aims to achieve the vision of a **Clean India by 2nd October 2019.**
- The mission aims to cover **1.04 crore households** , provide **2.5 lakh community toilets, 2.6 lakh public toilets** , and a **solid waste management facility** in **each town.**

⭐ **Additional Information**

- **Objectives of Swachh Bharat Abhiyan:**
  - Villages to be kept clean with Solid and Liquid Waste Management.

- Construction of individual, cluster and community toilets.
- To eliminate or reduce open defecation. Open defecation is one of the main causes of deaths of thousands of children each year.
- Solid and liquid waste management through gram panchayats.
- To provide toilets, separately for Boys and Girls in all schools by 15.8.2015.

---

**24. Answer: d**

**Explanation:**

Given:

Principal amount = Rs. 2000

Rate of interest = 3% pa

Time = 2 years

Concept used:

Compound interest, CI = $P(1 + R/100)^n - P$

where

P = Principal amount

R = Rate of interest per year

N = Time in years

Calculation:

So, the compound interest

$\Rightarrow 2000 (1 + 3/100)^2 - 2000$

$\Rightarrow 121.80$

**∴ The compound interest on Rs 2,000 for 2 years at 3% p.a. is Rs. 121.80.**

25. **Answer: b**

**Explanation:**

Given:

A tank can be filled by two taps A and B in 5 hours and 15 hours respectively.

Tap C can empty the tank in 5 hours.

Concept used:

Entire work = Work done per hour × Total time taken

Calculation:

LCM (5,15) = 15

Let the capacity of the tank be given by the LCM of 5,15.

So, the capacity is 15 units.

Now,

Tap A fills the tank by hourly = (15 ÷ 5) = 3 units

Tap B fills the tank by hourly = (15 ÷ 15) = 1 unit

Tap C empties the tank by hourly = (15 ÷ 5) = 3 units

So, the time taken to fill the tank when three taps are open simultaneously = 15 ÷ (3 + 1 - 3) = 15 hours

**∴ I f all three taps are opened simultaneously, 15 hours it will take to fill the tank completely.**

26. **Answer: d**

## Explanation:

The correct answer is **Pandya**.

- **Pandya** ruled the region around **Madurai** and attained supremacy in the **thirteenth century** .

⭐ **Key Points**

- The **Pandyas** established their **dynastic rule** in **southern Tamil Nadu** by the end of the **sixth century CE** after **Kalabhras.**
- The **foundation** for the **Pandya supremacy** in south India was laid by **Maravarman Sundara I** .
- Pandya ruled initially from **Korkai** , a **seaport** on the **southernmost tip** of the **Indian peninsula** , and in later times moved to **Madurai** .
- **Jatavarman Sundara Pandyan** expanded their empire into the **Telugu country** and invaded **Sri Lanka** to conquer the northern half of the **island.**
- The **Pandyan Kingdom** finally became extinct after the establishment of the Madurai Sultanate in the **14th century CE.**

⭐ **Additional Information**

| Dynasty | Description |
| --- | --- |
| Rajput | • This Rajput dynasty was founded by Simharaj, who is famously known as the founder of the city of Ajmer.<br>• Prithviraj Chauhan was considered the greatest of all Chauhan rulers.<br>• The Rajputs became prominent in the early medieval period in about the seventh century and dominated in regions now known as Rajasthan, Delhi, Haryana, Western Gangetic plains, and Bundelkhand. |
| Chola | • The Chola dynasty was a Tamil dynasty that ruled primarily in southern India until the 13th century.<br>• The dynasty originated in the fertile valley of the Kaveri River.<br>• Karikala Chola was the most famous among the early Chola kings, while Rajaraja Chola, Rajendra Chola, and Kulothunga Chola I were famous emperors of the medieval Cholas. |
| Chera | • The founder of the Chera dynasty was Uthiyan Cheral Athan.<br>• The Chera dynasty was one of the principal lineages to have ruled over southern India in early history.<br>• The Cheras controlled the central and northern parts of Kerala and the Kongu region of Tamil Nadu. |

---

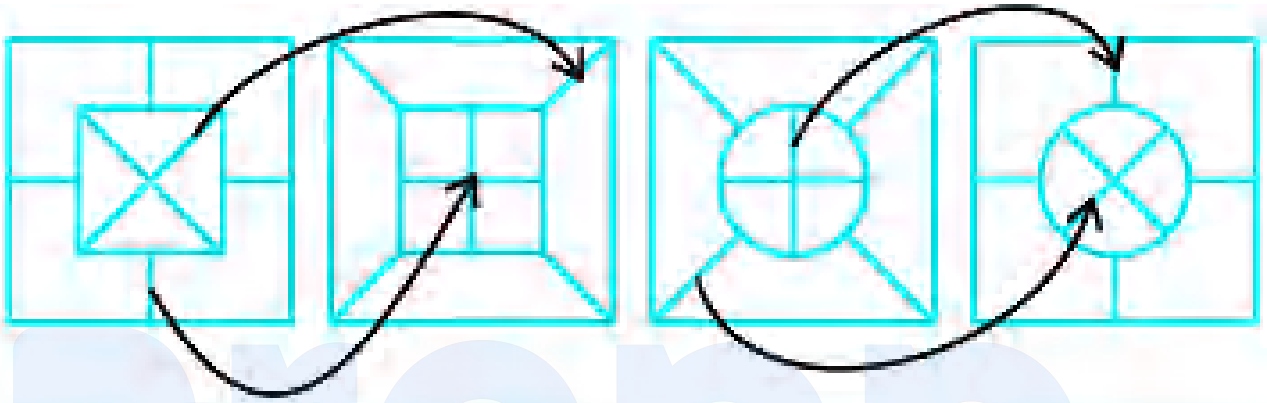
27. **Answer: c**

**Explanation:**

The logic followed here is:-

- Figure 1 to Figure 2: lines inside the internal square are interchanged with the lines inside the external square

Similarly,

- Figure 3 to Figure 4: lines inside the internal circle should be interchanged with the lines inside the external square
- Therefore, figure B will be the next figure.
- 

Hence, "option 3" is the correct answer.

---

**28. Answer: c**

**Explanation:**

Given:

One-fourth of the 6400 employees of company Z are clerks.

The clerk employees were to be reduced by one-fourth.

Calculation:

Number of employees that are clerks = 6400 × 1/4 = 1600

Reduction should be done by = 1600 × 1/4 = 400

So, the recent number of employees that are clerks = 1600 - 400 = 1200

Now, the total number of employees = (6400 - 400) = 6000

So, required percentage = (1200/6000) × 100% = 20%

**∴ 20%of the total number of remaining employees would be clerks.**

---

## 29. Answer: a

### Explanation:

The total expenditure is Rs. 50,000.

The expenditure on transportation = (50000 × 10%) = Rs. 5000

**∴ The expenditure on transportation is Rs. 5000.**

---

## 30. Answer: d

### Explanation:

The logic followed here is:-

- In figure A, the inner square is shaded and the outer square is not.
- In figure B, the inner pentagon is shaded and the outer square is not.
- In figure A, the inner pentagon is shaded and the outer square is not.
- ***In figure D, the outer square is shaded and the inner triangle is not.***

So figure D is different from others.

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

---

## 31. Answer: d

### Explanation:

Total pie chart that 360° circle represents 100% of the data.

So, the share of the segment corresponding to the sales of 'Others' = 360/100 × 40 = 144°

**∴ The share of the segment corresponding to the sales of 'Others' is 144°.**

---

## 32. Answer: c

### Explanation:

The correct answer is **Sikkim.**

- Oscar-winning composer **A.R. Rahman** has become the official brand ambassador of **Sikkim state.**

⭐ **Key Points**

- **AR Rahman** was born on 6 January 1967, is an **Indian film composer, record producer, singer,** and **songwriter** who works predominantly in **Tamil and Hindi films** .
- In **2010,** the **Indian government** awarded him the **Padma Bhushan.**
- In **1992** , he was approached by director **Mani Ratnam** to compose the score and soundtrack for his **Tamil film, Roja.**
- Rahman's film career began in **1992** when he started **Panchathan Record** Inn, a recording and mixing studio in his backyard.

⭐ **Additional Information**

| State | Chief Minister | Brand ambassador |
|---|---|---|
| **Arunachal Pradesh** | Pema Khandu | Sanjay Dutt |
| **Assam** | Himanta Biswa Sarma | Priyanka Chopra |
| **Manipur** | N. Biren Singh | Mirabai Chanu |

---

33. **Answer: a**

## Explanation:

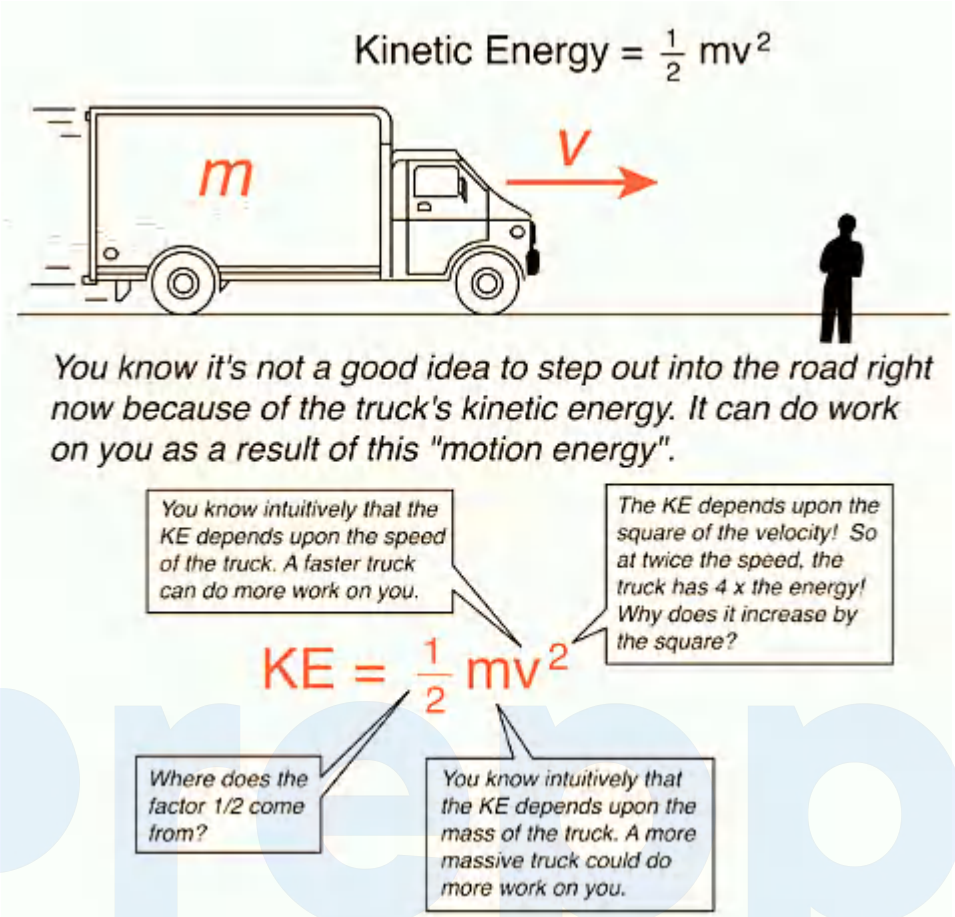
The correct answer is **Kinetic Energy**.

⭐ **Key Points**

- Kinetic energy is a form of **energy** that an **object** or a **particle** has by reason of its **motion** .
- If work, which **transfers energy** , is done on an object by applying a **net force** , the o **bject speeds up and thereby gains kinetic energy.**
- There are many forms of kinetic energy, **vibrational** (the energy due to vibrational motion), **rotational** (the energy due to rotational motion), and **translational** (the energy due to motion from one location to another).
- **Kinetic energy** is a **scalar quantity,** it does not have a **direction** . Unlike **velocity, acceleration, force,** and **momentum** , the kinetic energy of an object is completely described by **magnitude alone.**

⭐ **Additional Information**

- **Kinetic Energy Concept:**




---

**34. Answer: d**

**Explanation:**

The correct answer is **Collenchyma.**

- The permanent tissue that provides elasticity is called **Collenchyma.**

⭐ **Key Points**

- **Collenchyma cells** are **long elongated cells with an irregular thick wall.** They have thick walls which provide support and **elasticity to the plant's part.**
- They provide **structural support and flexibility to the growing stems** . It acts as a supporting tissue in the stems of young plants. It provides **mechanical support, elasticity, and tensile strength to the plant body.**

- **Elasticity** is provided by collenchyma because of the presence of **hydrated pectin in their cell walls** .
- Collenchyma consists of **narrow cells.**

⭐ Additional Information

- Collenchyma mainly provides **mechanical strength to the growing plant parts.**
- Collenchyma generally occurs in the **hypodermis of the dicot stem.** It is absent in the roots and also occurs in petioles and pedicels.

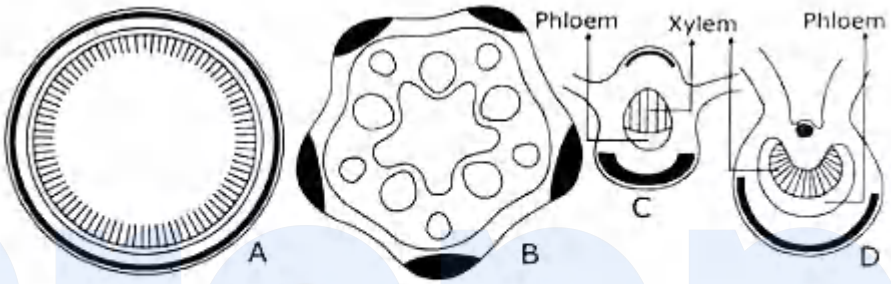



Diagram illustrating the distribution of collenchyma (shaded) in transverse section of stems and a leaf (C). A. *Sambucus* stem. B. *Cucurbita* stem. D. Midvein of *Humulus* leaf.

---

35. **Answer: c**

**Explanation:**

Given:

2.06 and 3.1

Calculation:

So, (3.10 - 2.06) = 1.04 should be added.

**∴ 1.04 should be added to 2.06 to get 3.1.**

---

36. **Answer: d**

### Explanation:

Given:

Nalini, Tanvi, and Rashi share a cake.

Nalini ate 1/12th of it, Tanvi ate 1/3th of it and Rashi ate the rest of the cake.

Calculation:

Let the entire cake be P.

So,

Nalini ate = P × 1/12 = P/12.

Tanvi ate = P × 1/3 = P/3

So, the share of the cake of Rashi = (P - P/12 - P/3) = 7P/12 = (7/12) × P

∴ **The cake's share of Rashi was 7/12.**

---

## 37. Answer: c



### Explanation:

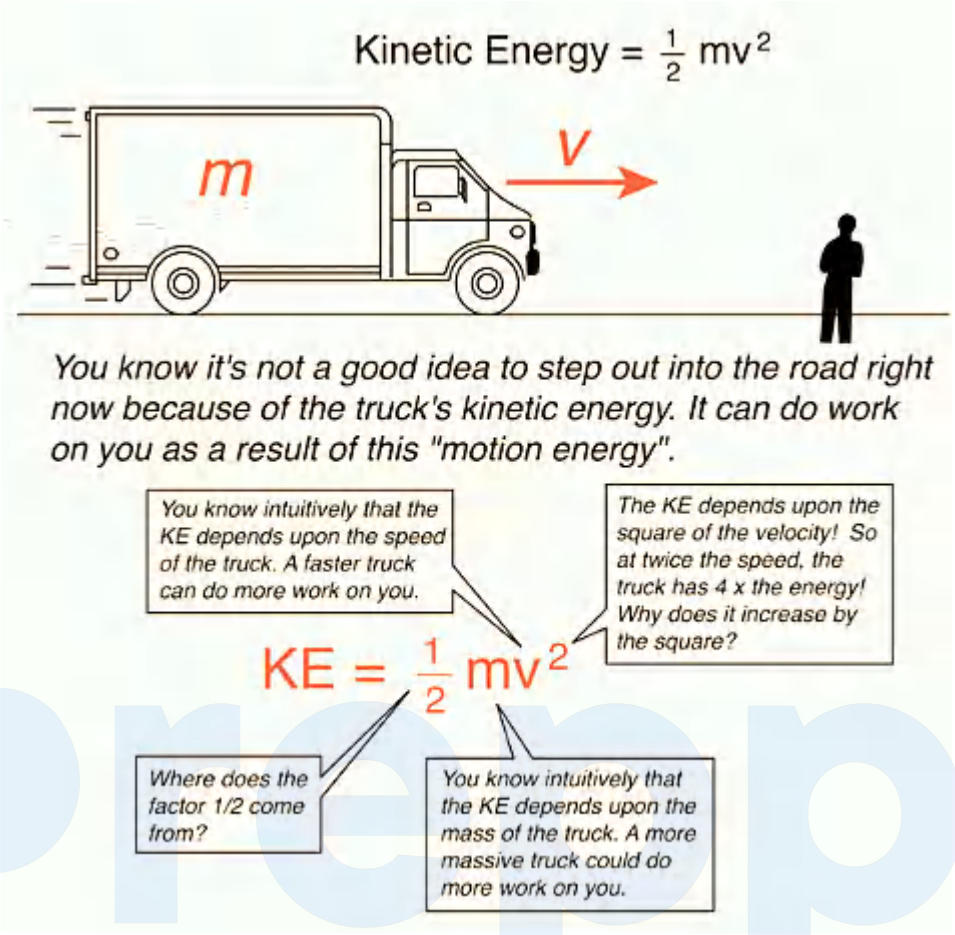
The correct answer is **Kinetic Energy.**

- **Kinetic energy** increases with **speed** .

⭐ **Key Points**

- **Kinetic energy** is seen when the object is in **motion** . Energy is exerted on the object in order to make it **move** .
- The **kinetic energy** of the object is dependent on the **mass of the object and the speed** at which it moves.

Kinetic Energy Concept:




## ⭐ Additional Information

- **Chemical energy:**
  - Chemical energy is energy stored in the bonds of chemical compounds, like atoms and molecules. This energy is released when a chemical reaction takes place.
- **Potential energy:**
  - P otential energy, stored energy that depends upon the relative position of various parts of a system. Spring has more potential energy when it is compressed or stretched.
- **Electrical energy:**
  - Electrical energy is energy derived as a result of the movement of electrically charged particles. This energy is supplied by the combination of electric current and electric potential that is delivered by an electrical circuit.

38. **Answer: c**

## Explanation:

The correct answer is **10 cm.**

Concept:

- Concave mirror: The mirror in which the rays converge after falling on it is known as the concave mirror.
  - Concave mirrors are also known as converging mirror .
  - The focal length of a concave mirror is negative according to the sign convention.
- Mirror Formula: The following formula is known as the mirror formula:

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

where,

f = focal length

v = the distance of the image from the mirror,

u = the distance of the object from the mirror.

Calculation:

Here the rays of the sun are focussed at 5 cm away from the mirror, so the focus of the mirror is 5 cm.

f = -5 cm

u = -10 cm

v = ?

We know that,

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

$\Rightarrow \frac{1}{-5} = \frac{1}{-10} + \frac{1}{v}$

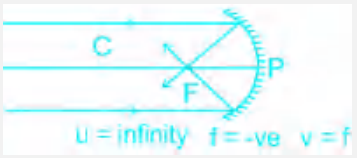
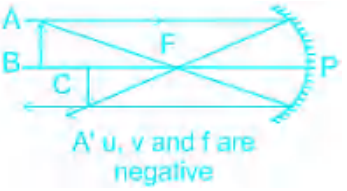
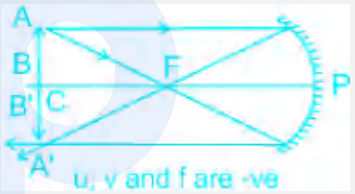
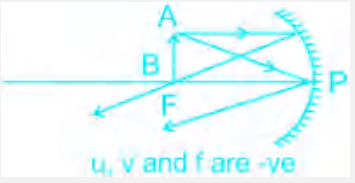
**⇒ v = -10 cm i.e in front of the mirror**

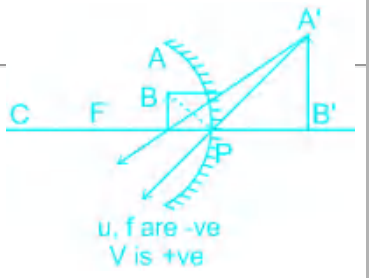
⭐ **Alternate Method**

When the object is at double the focus point i.e at C, then the image is also formed at C in concave mirror.

Hence the image is at 10 cm

⭐ **Additional Information**

| Position of object | Position of image | Nature of image | Ray diagram |
|---|---|---|---|
| (i) At infinity | At focus | Real, Inverted and diminished |   |
| (ii) Beyond C | Between F and C | Real, Inverted and diminished |   |
| (iii) At C | At C | Real, Inverted and same size |   |
| (iv) Between F and C | Beyond C | Real, Inverted and enlarged |   |
| (v) At F | At Infinity | Real Inverted and highly enlarged |   |

| | | | |
|---|---|---|---|
| (vi) Between F and P | Behind the mirror | Virtual, enlarged and erect image |   |

39. **Answer: d**

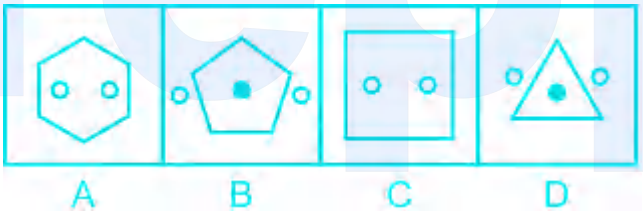
**Explanation:**

The logic followed here is:-

- Figure A to figure B: Hexagon changes to pentagon (one side decreased); no. of circles increases by 1 and only the middle circle is shaded

Similarly,

- Figure C to figure D: Square should change to triangle (one side decreases ); no. of circles should increase by 1 and only the middle circle will be shaded. This condition is satisfied by figure 1.




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

---

40. **Answer: d**

**Explanation:**

The correct answer is **HF.**

⭐ **Key Points**

- **Silica** is soluble in HF.
- **Silica** is the name given to a **group of minerals** composed of **silicon and oxygen** , the two most abundant elements in the **earth's crust.**

- Silica is found commonly in the **crystalline state** and rarely in an **amorphous state** .
- It is composed of one atom of silicon and two atoms of oxygen resulting in the chemical formula **$SiO_2$**.
- Silica exists in **nine different crystalline forms** or polymorphs with the three main forms being **quartz** , which is by far the most common, tridymite and **cristobalite** .

## ⭐ Additional Information

- Hydrofluoric acid has the ability to dissolve (most) oxides, glass, and silicates.
  - $SiO_2+6HF \rightarrow H_2SiF_6+2H_2O$ .
- The dissolution process of silica and silicates from rocks into water is mainly due to the hydrolysis of silica-oxygen-silica bonds, resulting in the liberation of silicic acid (Si(OH)4) and silicates into the **aqueous phase.**

## ⭐ Important Points

| Element | Details |
|---|---|
| HNO 3 | • Nitric acid ($HNO_3$). A colourless liquid that is used in the manufacture of inorganic and organic nitrates and nitro compounds for fertilizers, dye intermediates, explosives, and many different organic chemicals. |
| H 2SO 4 | • Sulphuric acid is highly acidic. Therefore, it is used in the cleaning of metals, removal of impurities from oil, manufacturing of chemicals nitric acid, hydrochloric acid, synthesis of dye, drugs, detergents, explosives, etc. |
| HCl | • Hydrogen chloride (HCl), a compound of the elements hydrogen and chlorine, is a gas at room temperature and pressure. A solution of the gas in water is called hydrochloric acid. |

41. **Answer: c**

## Explanation:

The correct answer is **Manjuli Island**.

- In **December 2017** , the central government launched a new scheme to protect **Manjuli Island** from floods and erosion in **Assam.**

⭐ **Key Points**

- The scheme was sanctioned by **Government in March 2017** and funding for it will be from the **Ministry of Development of the North Eastern Region** (DoNER).
- **The major components of the scheme include are:**
  - Bank revetment with geo bags filled with earth/sand for a reach length of 27 km in 14 locations.
  - RCC porcupine works in 41 locations.
  - Construction of a sluice.
  - Construction of a Pilot channel of the length of 3.50 km.

⭐ **Additional Information**

- **Manjuli Island:**
  - Majuli Island is the largest river island in the world and the first island district in the country.
  - It is formed by the Brahmaputra River in the south and Kherkutia Xuti, another branch of Brahmaputra, joined by Subansiri River in the north.
  - Geomorphologically, the entire Majuli island is part of the alluvial flood plains of the Brahmaputra river.
  - The problem of erosion was exacerbated after the 1950 disastrous earthquake and has become a severe environmental issue as it remains mostly uncontained.

42. **Answer: d**

**Explanation:**

The correct answer is **405C**.

⭐ **Key Points**

- A filament of an electric bulb carries a current of 0.75 A in 9 minutes. Find the amount of electric charge flowing through the current;
  - Current (I): **0.75 A.**
  - Time (t): **9 minutes.**
- Time in minutes can be converted into seconds as follows.
  - Time (t) = 9 × 60
  - t = 540 sec
  - Q = I X t
  - Q = 0.75 X 540
  - Q = 405C

---

43. **Answer: b**

**Explanation:**

The correct answer is **Gujarat.**

- **Essar Steel Limited** , Hazira is located in **Gujarat** .

⭐ **Key Points**

- Essar Steel was a **steel manufacturing company** of the **Essar Group of Companies** .
- Its main subsidiary was **Essar Steel India Limited** , a fully integrated flat **carbon steel manufacturer** based in **Mumbai** , which owned and operated a steel mill in **Hazira, Surat district** of **Gujarat state** .

- In addition, it had also a beneficiation plant at Bailadilla, Chhattisgarh, and pellet plants at Visakhapatnam, Andhra Pradesh, and Paradeep, Odisha.
- **Essar Steel India Limited** was acquired by **ArcelorMittal Nippon Steel India Limited** .**Aditya Mittal** is the **Chairman of ArcelorMittal Nippon Steel** and **Dilip Oommen** is the **CEO.**

⭐ Additional Information

- Hazira:
  - Hazira is a suburb and a transshipment port in Surat City in the Gujarat state of India. It is the westmost end of Surat.
  - Hazira is one of the major ports of India and the most important element of the Surat Metropolitan Region.

⭐ Important Points

| State | Chief Minister |
|---|---|
| West Bengal | • Mamata Banerjee |
| Gujarat | • Bhupendrabhai Patel |
| Odisha | • Naveen Patnaik. |
| Jharkhand | • Hemant Soren. |



---

## 44. Answer: c

### Explanation:

- Argument I agrees with the statement and justifies it by explaining that dental treatment is costly so it will be good for the employees if covered by insurance.

So, Argument I is strong.

- Argument II disagrees with the statement. It would be unreasonable if necessary cosmetic changes that are expensive are not considered. Minor cosmetic changes are inevitable sometimes in treatments like burns and injuries too. So, argument II is not strong.

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

---

## 45. Answer: b

### Explanation:

The correct answer is **M.N. Roy.**

- **M.N.Roy** first gave the idea of **Constituent Assembly for India.**

⭐ **Key Points**

- An official demand for a **Constituent Assembly** to frame the **Constitution of India** was made for the first time by **Indian National Congress** in **1935.**
- Finally, in **1940** , this demand was accepted by the **British Government** in the **August Offer** .

⭐ **Additional Information**

- The idea of a **Constituent Assembly** for **India** for the **first time** was put forward by **M.N. Roy** was a pioneer of the communist movement in India in **1934** .
- On behalf of the **Indian National Congress, Jawaharlal Nehru** declared that the **Constitution of free India** must be framed by a **Constituent Assembly elected on the basis of the adult franchise without outside interference.**
- At the point when this interest was acknowledged by the **August OfferSir Stafford Cripps** , an individual from the **bureau** , came to **India** in **1942** with a draft proposal of the **British Government** on the outlining of an autonomous Constitution to be received after **World War II.**
- As the **Muslim League** wanted **India** to be **divided into two autonomous states** with **two separate Constituent Assemblies** , thus they rejected the **Cripps**

**Proposals.**

- Under this scheme formulated by the **Cabinet Mission Plan, in November 1946** , the **Constituent Assembly was constituted** . The Constituent Assembly was to be a partly nominated and **partly elected body** .

⭐ Important Points

- The **elections** to the **Constituent Assembly** were held in **July-August 1946.**
- **208 seats** were **won** by the **Indian National Congress** ,**73 seats** by the **Muslim League** , and **15** by the **small groups and independents.**
- However, the **princely states** were allotted **93 seats** but these were **not filled** as they **decided** to stay away from the **Constituent Assembly.**

---

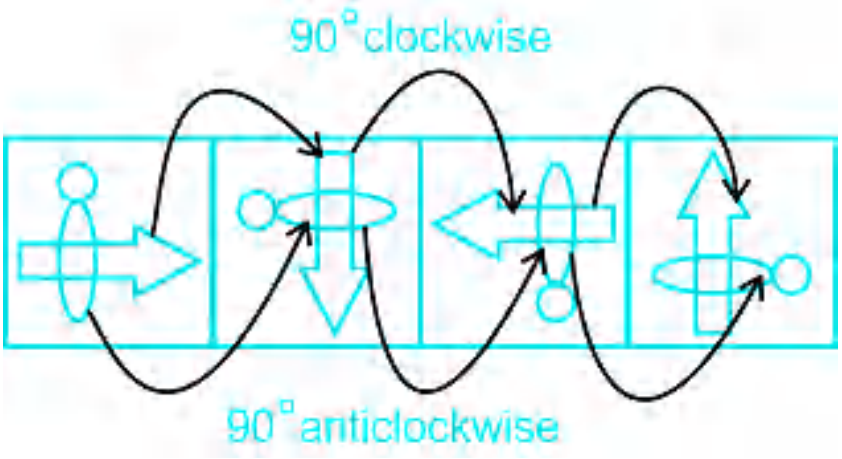
46. **Answer: d**

**Explanation:**

The logic followed here is:-

- - arrow moves 90 $^{\circ}$ clockwise direction in each step.

- moves 90 ° anticlockwise direction in each step

- 


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

---

## 47. Answer: c

### Explanation:

Given:

$\left(-\sqrt{\frac{144}{576}}\right) \times -\frac{16}{\sqrt{64}}$

Calculation:

$\left(-\sqrt{\frac{144}{576}}\right) \times -\frac{16}{\sqrt{64}}$

⇒ (-12/24) × (-16/8)

⇒ 1

∴ The required value of $\left(-\sqrt{\frac{144}{576}}\right) \times -\frac{16}{\sqrt{64}}$ is 1.

---

## 48. Answer: a

### Explanation:

The correct answer is Nitesh Tiwari.

- **Nitesh Tiwari** was awarded the **Best Director Award** for the film **Dangal** for the **64th National Awards 2017.**
- 16-year-old **Zaira Wasim** , who played **Aamir Khan's** on-screen **daughter** in **Dangal** , won her first **National Award** . Zaira won the award for her portrayal of young **Geeta Phogat** .

⭐ Key Points

- **Nitesh Tiwari** is a writer and director, known for **Dangal** (2016), **Chhichhore** (2019) and **Bareilly Ki Barfi** (2017).
- He made his directorial debut by co-directing **Chillar Party** (2011) which won the **National Film Award** for Best **Children's Film for that year.**
- In 2016, Tiwari scripted and directed **Dangal** which was screened at the **Beijing International Film Festival** in **April 2017** and second **BRICS festival** in **June 2017** .
- Nitesh Tiwari Awards are:
  - National Film Award for Best Feature Film in Hindi (2021).
  - Filmfare Award for Best Director (2017).
  - National Film Award for Best Screenplay (2012).
  - Screen Award for Best Dialogue (2017).

---

49. **Answer: a**

**Explanation:**

Given:

Initial speed = P km/h,

Decreased by Q km/h,

Distance covered = 1 km.

Time taken = R hours.

Concept used:

Distance = Speed × Time

Calculation:

So, the actual speed of the boy = (P - Q) km/h

According to the question,

(P - Q) × R = 1

⇒ 1/R = (P - Q)

**∴ The relation between R and Q is 1/R = (P - Q).**

---

## 50. Answer: a

### Explanation:

The correct answer is **Khel Ratna Award**.

- The **National Sports Award** for continuous outstanding performance for four years is **Khel Ratna Award** .

⭐ **Key Points**

- **Khel Ratna Award:**
  - **Khel Ratna Award** is the **highest sporting honor of India.** It is awarded annually by the **Ministry of Youth Affairs and Sports.**
  - As of 2020, the award comprises a **medallion, a certificate,** and a **cas** h prize of Rs 25 lakh.
  - Khel Ratna Award was established in **1991–1992.**
  - The award since August **6, 2021,** is named after **Major Dhyan Chand** , an **Indian field hockey player** , widely regarded as one of the **greatest field hockey players of all time** .
  - The **Khel Ratna Award was first received** by **Viswanathan Anand** in the chess game **1992** .

⭐ **Additional Information**

- **Arjuna Award:**

- The Arjuna Award for Outstanding Performance in Sports and Games is the second-highest sporting honor of India .
- It was established in 1961.

- **Dronacharya Award:**
  - The Dronacharya Award for Outstanding Coaches in Sports and Games in the sports coaching honor of the Republic of India.
  - It was established in 1985.

---

## 51. Answer: d

### Explanation:

The correct answer is **Phenotype**.

- The word denotes **physical characteristics Phenotype** .

⭐ **Key Points**

- The term **phenotype** refers to the **observable physical properties** of an **organism** , these include the **organism's appearance, development, and behavior.**
- An **organism's phenotype i** s determined by its **genotype,** which is the set of **genes the organism carries,** as well as by e **nvironmental influences upon these genes.**
- Due to the influence of **environmental factors,** organisms with identical genotypes, such as **identical twins** , ultimately express nonidentical phenotypes because each organism encounters unique environmental influences as it develops.
- **Examples** of phenotypes include **height, wing length,** and **hair color.**

⭐ **Additional Information**

- **Genotype:**
  - A genotype is an individual's collection of genes.
  - The genotype is expressed when the information encoded in the genes' DNA is used to make protein and RNA molecules.

- **Monotype:**
  - A monotypic species is one that does not include subspecies or smaller, infraspecific taxa.
  - a monotypic genus is a genus in the special case where a genus and a single species are simultaneously described.

---

**52. Answer: a**

**Explanation:**

Given:

55% of the store's sales come from selling the 'Espresso' variety of beans.

In each month, the average sales of the store are Rs. 60,000.

Calculation:

So, the sales of Espresso beans average monthly = 60000 × 55% = Rs. 33000

Now, the annual sales of Espresso beans = 33000 × 12 = Rs. 3,96,000

**∴ The annual sales from 'Espresso' beans are Rs. 3,96,000.**



---

**53. Answer: d**

**Explanation:**

Given:

There are total of 77 people present in the party.

The ratio of males to women is 4 : 7.

Concept used:

Ratio proportion

Calculation:

Number of total women in the party = 77 × {7/(4+7)} = 49

**∴ Total 49 women are there in the party.**

---

## 54. Answer: d

### Explanation:

The correct answer is **TDP.**

- As of **August 2018, TDP political party** is currently ruling the state of **Andhra Pradesh.**
- As of **January 2022 YSR congress party** , a political party is currently ruling the state of **Andhra Pradesh.**

⭐ **Key Points**

- The **Telugu Desam Party** is a regional **Indian political party** active in the southern states of **Andhra Pradesh** and **Telangana.**
- The party was founded by **N. T. Rama Rao** on **29 March 1982** .
- Since 1995 the party has been headed by **N. Chandrababu Naidu** , former **Chief Minister of Andhra Pradesh** .
- The party's headquarters is located at **NTR Bhavan** in **Hyderabad.**
- TDP was the first regional party to become the main opposition party at the 8th Lok Sabha from 1984 to 1989.
- On 16 March 2018, the TDP walked out of the National Democratic Alliance (NDA).

⭐ **Additional Information**

| Political Party Name | Details |
|---|---|
| Congress | • Congress was founded in 1885, it was the first modern nationalist movement to emerge in the British Empire in Asia and Africa.<br>• From the late 19th century, and especially after 1920, under the leadership of Mahatma Gandhi, Congress became the principal leader of the Indian independence movement. |
| TRS | • In the 2014 Telangana Assembly Election, the party won a majority of seats and formed the first government of the state with K. Chandrashekar Rao as its chief minister.<br>• Telangana Rashtra Samithi is an Indian regional political party that is predominantly active in the state of Telangana.<br>• It was founded on 27 April 2001 by K. Chandrashekar Rao, with a single-point agenda of creating a separate Telangana state with Hyderabad as its capital. |
| Bharatiya Janata Party | • The Bharatiya Janata Party is one of the political parties in India.<br>• The BJP was founded by Atal Bihari Vajpayee and L K Advani.<br>• The official ideology of the BJP is integral humanism, first formulated by Deendayal Upadhyaya in 1965.<br>• The BJP's origins lie in the Bharatiya Jana Sangh, popularly known as the Jana Sangh, founded by Syama Prasad Mukherjee in 1951 in response to the politics of the dominant Congress party. |

55. **Answer: d**

## Explanation:

The correct answer is **Mahesh Bhupathi.**

- **Mahesh Bhupathi** is the founder of the **International Premier Tennis League.**

⭐ **Key Points**

- **International Premier Tennis League:**
  - The **International Premier Tennis League** was an annual team **tennis league** that took place in **various cities in Asia** .
  - It was **founded in 2013,** the elite level exhibition tennis tournament took place for the **first time in November 2014.**

⭐ **Additional Information**

| Person Name | Details |
| --- | --- |
| Linder Paes | • Leander Adrian Paes OLY is an Indian former professional tennis player.<br>• He holds the record for the most doubles wins in the Davis Cup.<br>• Paes has won eight men's doubles and ten mixed doubles Grand Slam titles.<br>• Paes was honored with the Arjuna award 1990, Padma Shri 2001, and Padma Bhushan. |
| Sania Mirza | • Sania Mirza is an Indian professional tennis player. A former doubles world No. 1, she has won six Grand Slam titles in her career.<br>• Mirza was honored with Arjuna award 2006, Padma Shri 2006, Khel Ratna award 2015 and Padma Bhushan 2016. |
| Yuki Bhabri | • Yuki Bhambri is an Indian professional tennis player. He is a former junior no. 1 and winner of the 2009 Australian Open Junior Championship.<br>• He is the first Indian to win the junior Australian Open title and the fourth Indian in history to capture a junior singles title at a Grand Slam championship. |

56. **Answer: a**

**Explanation:**

| | |
|---|---|
| Mahesh Bhupathi | • Mahesh Shrinivas Bhupathi is an Indian former doubles world No. 1 tennis player.<br>• In 1997, he became the first Indian to win a major tournament. With his win at the 2006 Australian Open mixed doubles.<br>• He joined the elite group of eight tennis players who have achieved a career in the Grand Slam in mixed doubles.<br>• Bhupati has been honoured with the Arjuna award 1995 and Padma Shri 2014. |

The correct answer is Unequal.

- An example of the unequal speed of a bus on a congested road.

⭐ Key Points

- In a crowded road, moving through different traffic conditions, a bus travels at different speeds at different points of time. So, this is an example of unequal motion.
- Unequal motion:
  - This type of motion is defined as the motion of an object in which the object travels with varied speed and it does not cover some distance in equal time intervals, irrespective of the time interval duration.

⭐ Additional Information

- Uniform motion:
  - This type of motion is defined as the motion of an object in which the object travels in a straight line and its velocity remains constant along that line as it covers equal distances in equal intervals of time, irrespective of the duration of the time.
- Circular Motion:
  - In physics, circular motion is a movement of an object along the circumference of a circle or rotation along a circular path.
- Linear motion:
  - Linear motion, also called rectilinear motion, is one-dimensional motion along a straight line, and can therefore be described mathematically using only one spatial dimension.

57. **Answer: b**

**Explanation:**

The correct answer is **no work done occurs.**

- **No work done occurs** when the direction of force is applied and the direction of motion of the object is **perpendicular to each other.**

⭐ **Key Points**

- **Force:** It is defined as the push/pull which is required to change the state of the object.
- **Work:** It is the amount of force required to move an object.
- **Work = Force x Displacement.**
  - If the direction of applied force and direction, in which an object moves, are perpendicular to each other, then the work is done = 0 i.e no work is done.
  - Work is done only when a certain force is applied to an object and the object moves a certain distance in the direction of the applied force. Hence work done is zero when the direction is perpendicular.



---

58. **Answer: c**

**Explanation:**

Given:

$$\sqrt{30+\sqrt{30+\sqrt{30+\sqrt{30+\sqrt{\ldots}}}}}$$

Concept used:

Middle term factor

Calculation:

Let $\sqrt{30+\sqrt{30+\sqrt{30+\sqrt{30+\sqrt{\ldots}}}}}$ be P.

So,

P = $\sqrt{30+\sqrt{30+\sqrt{30+\sqrt{30+\sqrt{\ldots}}}}}$

$\Rightarrow P^2 = 30 + \sqrt{30+\sqrt{30+\sqrt{30+\sqrt{30+\sqrt{\ldots}}}}}$

$\Rightarrow P^2 = 30 + P$

$\Rightarrow P^2 - P - 30 = 0$

$\Rightarrow (P - 6)\ (P + 5) = 0$

So, P = 6 ($\because$ Sum of positive numbers can't be negative)

**$\therefore$ The value of $\sqrt{30+\sqrt{30+\sqrt{30+\sqrt{30+\sqrt{\ldots}}}}}$ is 6.**

---

**59. Answer: a**

**Explanation:**

Given:

The average speed on normal days is 90kmph

On a particular day, the average speed was 1/5 less than on normal days and it took 16 minutes i.e. 4/15 hours longer .

Concept used:

Distance = Speed × Time

Calculation:
Let the length of the stretch of the road & time taken on a normal day be D km & H

hours respectively.

On that particular day, the average speed = 90 - 90/5 = 72kmph

According to the question,

D = 90 × H ....(1)

D = 72 × (H + (4/15)) ....(2)

So,

90 × H = 72 × (H + (4/15))

⇒ 60H + 16 = 75H

⇒ H = (16/15)

⇒ 90 × H = 90 × (16/15)

⇒ D = 96 (From 1)

∴ The length of this particular stretch of road is 96 km.

---

60. **Answer: d**

**Explanation:**

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

The logical Venn diagram is given below:-


Conclusion:

1. Some monkeys are human. → False (it is possible but not definite )

2. No monkey  is human. .→ False (it is possible but not definite )

- Statements 1 and 2 form a complementary pair.
- Therefore, "either statement 1 or 2 follows.."

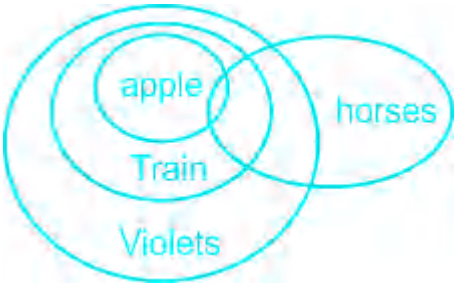
Hence, **"option 4"** is the correct answer.

---

## 61. Answer: b

### Explanation:

The least possible Venn diagram is as follows:

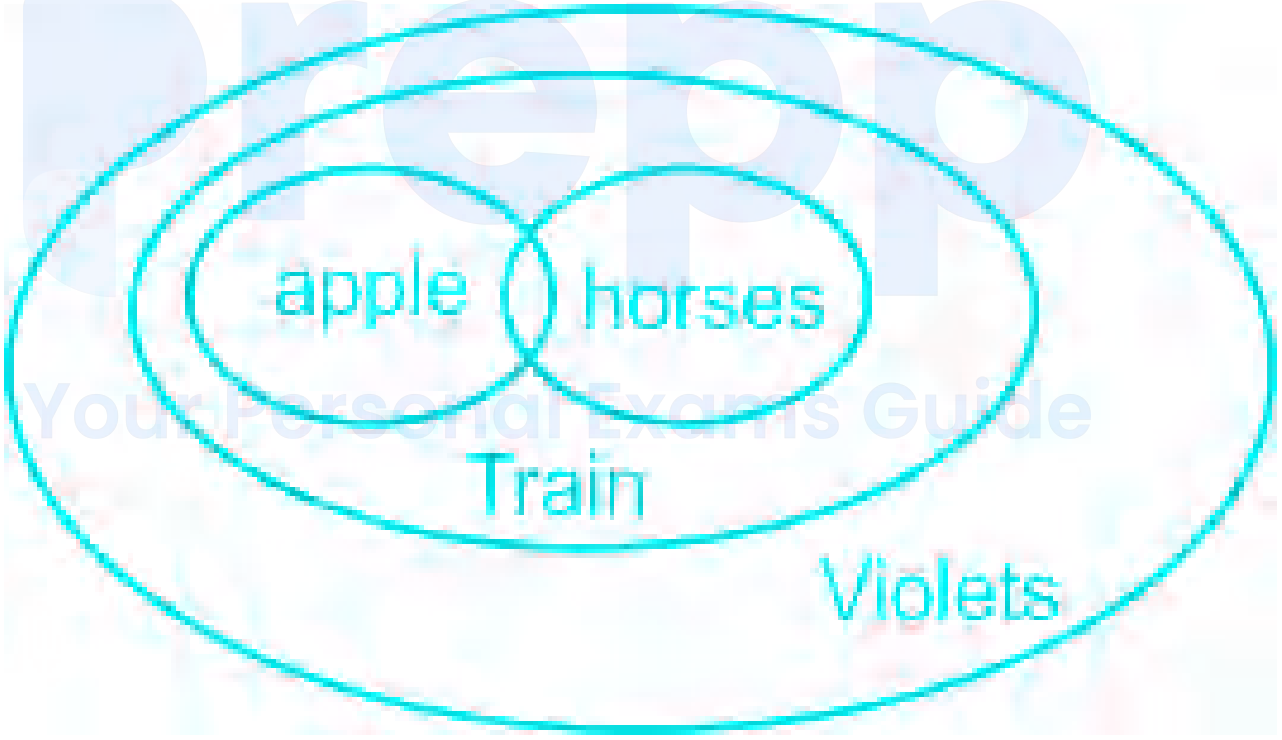



**Conclusion:**

I. Some apples are not violets. → False (as can be seen in the Venn diagram, this is not possible because all apples are violets)

II. All horses being train is a possibility. → True (the possibility exists as shown in the below Venn diagram).

- **Possibility diagram for conclusion II:**
-




Hence, **"Conclusion II follows"** is the correct answer.

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

Note:In the original paper, the second conclusion was "Some violets being train is a possibility." and it was stated as true. This is incorrect. So, we have changed it.

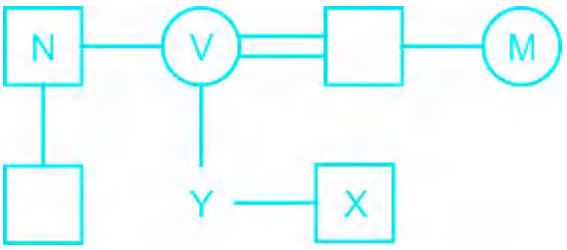
---

62. **Answer: c**

**Explanation:**

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

The family tree is given below:-




The son of N is the cousin of Y.

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

---

## 63. Answer: b

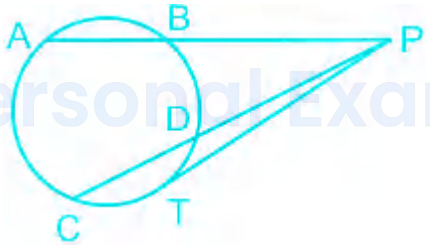
### Explanation:

Given:

AB = 7 cm

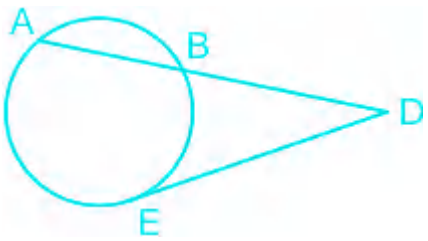
DE = 12 cm

Concept used:




Here, PA & PC are two secants and PT is a tangent at point T on the circle.
So, we know,
$PA \times PB = PC \times PD = (PT)^2$

Calculation:




Here, AD is secant and DE is a tangent.

So, we know,

$AD \times BD = (DE)^2$

$\Rightarrow (AB + BD) \times BD = 12^2$

$\Rightarrow (7 + BD) \times BD = 144$

$\Rightarrow BD^2 + 7BD - 144 = 0$

$\Rightarrow (BD + 16)(BD - 9) = 0$

So, $BD = 9$ ($\because$ length can't be negative)

**$\therefore$ The length of BD is 9 cm.**

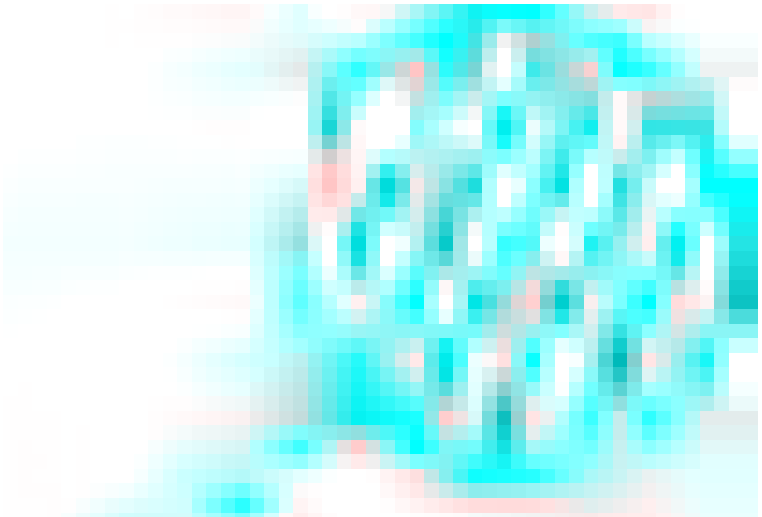
---

## 64. Answer: d

### Explanation:

The logic followed here is:-

- We have



in figure A, B, and, C

- In figure D, there is an additional line segment.

Thus, Figure D is different from others.

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

65. **Answer: c**

## Explanation:

The correct answer is **Philippines**.

- **The Philippines** is the headquarter of the Asian Development Bank.

⭐ **Key Points**

- **Asian Development Bank** is an **international development finance institution** whose mission is to help its **developing member countries** reduce **poverty** and improve the quality of life of their people.
- Asian development bank established in **1966,** ADB is owned and financed by its **67 members,** of which **48** are from the region and **19 are** from **other parts of the globe.**
- Under Strategy **2020,** a long-term strategic framework adopted in **2008,** ADB will follow **three complementary strategic agendas: inclusive growth ,environmentally sustainable growth** , and **regional integration.**
- As of now **January 2022** the **president** of the Asian development bank is **Masatsugu Asakawa** .

⭐ **Key Points**



| Country | Capital | Currency |
|---|---|---|
| **Japan** | Tokyo | Japanese yen |
| **China** | Beijing | Renminbi |
| **Philippines** | Manila | Philippine peso |
| **India** | New Delhi | Indian rupee |

66. **Answer: b**

## Explanation:

The correct answer is **Bahadur Shah Zafar**.

- **Bahadur Shah Zafar** was prosecuted for leading the rebels of the **Revolt of 1857** and exiled to **Rangoon,** where he died in **1862** .

⭐ **Key Points**

- The **Indian Rebellion of 1857** was a major uprising in India in **1857–58** against the rule of the **British East India Company,** which functioned as a sovereign power on behalf of the **British Crown** .
- The **main centers of revolt,** commonly known as the sepoy mutiny in these regions namely **Kanpur, Lucknow, Bareilly, Jhansi, Gwalior,** and **Arrah in Bihar.**
- The impact that the **revolt of 1857** created was to **develop unity & patriotism among the nation.**

⭐ **Additional Information**

- **Leaders of Revolt of 1857:**

| Leaders | Place |
| --- | --- |
| Kanpur | • Tantia Tope |
| Lucknow | • Begum Hazrat Mahal, Birjis Qadir, Ahmadullah |
| Barrackpore | • Mangal Pandey |
| Jhansi | • Rani Laxmibai |
| Bihar | • Kunwar Singh, Amar Singh |
| Delhi | • Bahadur Shah II, General Bakht Khan |

⭐ Important Points

- Bahadur Shah Zafar:
  - He was born in 1775 in old Delhi.
  - Bahadur Shah Zafar ascended the Mughal throne in 1837 at the age of 62.
  - Zafar had been on the throne for twenty years when the First War of Independence took place in 1857.
  - On 4th December 1858, Zafar along with his family was transported from Diamond Harbor to Rangoon on the Ship Magoera.


---

## 67. Answer: a

### Explanation:

The correct answer is **Chemical properties**.

- **Elements** in the **same group** have the **same chemical properties.**

⭐ **Key Points**

- The **elements** in the **periodic table** are arranged according to the **Modern periodic law** .
- It states that the **physical** and **chemical properties** of the elements are periodic functions of their **atomic numbers** .

- The **physical** and **chemical properties** depend on the **number of valence electrons** in an **atom** .

⭐ Additional Information

- A **vertical column** in the **periodic table** of elements is called a **group** .
- There are a total of **18 groups present** in the **periodic table** . In the basic theme of organization of elements in the periodic table, elements having a **similar outer electronic configuration** in their atoms are arranged in the **same group** .
- So, we should know that an element's group number also denotes the number of **electrons present** in its outermost shell or **valence shell.**
- These valence electrons are responsible for the **vast majority** of **physical properties, chemical properties** , and reactivities of the elements.
- If the **valence shell** electronic configuration remains the same within a **group, physical** and **chemical properties** tend to remain somewhat consistent.

---

68. **Answer: c**

**Explanation:**

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

Given: 14Q16P4R7S10

| Symbol | P | Q | R | S |
|---|---|---|---|---|
| Meaning | ÷ | × | + | − |

- After replacing the symbols with their meanings, we get: 14 × 16 ÷ 4 + 7 − 10

14 ×16 ÷ 4+ 7 - 10

=14 × 4+ 7 - 10

=56 + 7- 10

=63 - 10

= 53

Hence, **"53"** is the correct answer.

---

## 69. Answer: d

### Explanation:

The correct answer is **Mustard**.

- **Mustard** is known as a **bisexual flower.**

⭐ **Key Points**

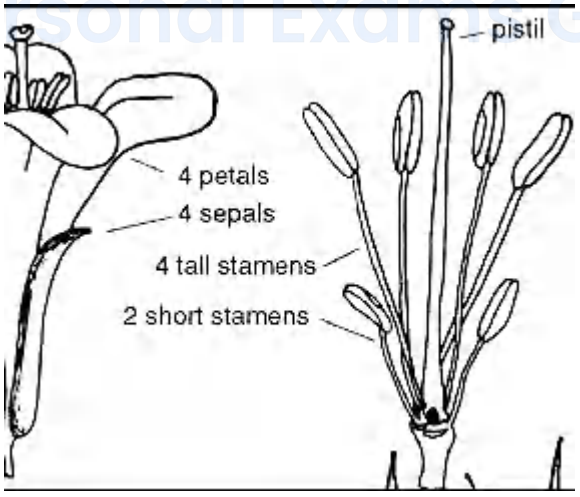
- **Bisexual Flower:**
  - The flowers which contain both male and female reproductive organs are known as full or bisexual flowers.
  - The bisexual flower will self-pollinate themselves.
  - **Examples:** Tulip, Sunflower, and Lily.
- **Unisexual flowers:**
  - The flowers which contain only the male or female reproductive organs are called unisexual flowers. They are called incomplete flowers. To reproduce they undergo cross-pollination.
  - They do not have both stamen and carpels.
  - **Examples:**Papaya, White mulberry, and Watermelon.

⭐ **Additional Information**

| Unisexual flowers | Bisexual flower |
| --- | --- |
| • They are of two types: monoecious or dioecious flowers. | • They are also called androgynous flowers. |
| • Due to the absence of either male or female parts, they are called the incomplete flower. | • They have both male and female parts on the same flower, they are called the complete flower. |
| • The male part (androecium) or the female part (gynoecium) of the flower, but not both, can be present in the same flowers. | • Both the male and female portions of the flower are present in the same flower. |

⭐ Important Points

- Mustard is a **bisexual flower** . Here the male reproductive system is stamens and the female reproductive system is the pistil.

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70. **Answer: b**

### Explanation:

Given series: 3R # 2 A S K 5 % T 7 & N Y + X B / L Q @ 1

If the first half of the above series is reversed then:-

7 T % 5 K S A 2 # R 3& N Y + X B / L Q @ 1

- 18th term from the right end = K
  - 7 T % 5*K*S A 2 # R 3 & N Y + X B / L Q @ 1
- 15th term to the right of K = Q
  - 7 T % 5 K S A 2 # R 3 & N Y + X B / L*Q*@ 1

Hence, "Q" is the correct answer.

---

## 71. Answer: c

### Explanation:

The correct answer is Hind Swaraj.

- **Hind Swaraj's b** ook was written by Mahatma Gandhi.



⭐ Key Points

- **Gandhi** was an **Indian lawyer, anti-colonial nationalist,** and political ethicist who employed nonviolent resistance to lead the successful campaign for **India's independence from British rule.**
- His birthday (2nd October) is commemorated worldwide as **International Day of Nonviolence** .
- Mohandas Karamchand Gandhi was assassinated in the garden of the former **Birla House.**
- Gandhi Ji set up a small colony, **Tolstoy Farm** at an **1100 acre** site, 21 miles from **Johannesburg, South Africa** for his colleagues in the **Satyagraha struggle.**
- Books are written by Mahatma Gandhi:
  - The Story of My Experiments with Truth (1927).

- Hind Swaraj (1909).
- India of my dreams (1947).
- Satyagraha in South Africa (1928).

⭐ Additional Information

| Book Name | Author |
|---|---|
| **Wings of Fire** | • A. P. J. Abdul Kalam and Arun Tiwari |
| **The Tensandons** | • E. Hershey Sneath |
| **Al-Hilal** | • Maulana Abul Kalam Azad's |

---

**72. Answer: d**

**Explanation:**

Given:

Amit can do $\frac{1}{2}$ part of a work in 7 days.

Alam can do $\frac{1}{2}$ part of the same work in 9 days.

Concept used:

Entire Work (in units) = Units done in each day × Total time taken (in days)

Calculation:

Amit does the entire work in = (7 × 2) = 14 days

Alam does the entire work in = (9 × 2) = 18 days

LCM (14,18) = 126

Let the entire work be the LCM of 14 & 18.

So, the entire work = 126 units.

Now,

Amit does each day = (126/14) = 9 units of work

Alam does each day = (126/18) = 7 units of work

Together they do each day = (9 + 7) = 16 units of work

So, time taken by them to finish the entire work together = (126/16) = (63/8) days

∴ In (63/8) days both of them can finish the work.

---

**73. Answer: c**

**Explanation:**

The correct answer is **Red Brown**.

⭐ **Key Points**

- **Rust** , commonly referred to as **oxidation** , occurs when **iron or metal alloys** that **contain iron** , such as **steel** , are exposed to **oxygen and water for a long period of time.**
- **Rust** forms when **iron undergoes the process of oxidation but not all oxidation forms rust** . As stated previously, **only iron or alloys** that **contain iron can rust** , but other metals can corrode in a similar way.

⭐ **Additional Information**

- **Corrosion:**
  - Corrosion occurs when an element that easily loses its electrons (like some metals) combines with an element that absorbs extra electrons (oxygen) and then comes into contact with an electrolyte solution (water).

- The job of the water in the corrosion process is to accelerate the flow of electrons from the metal to oxygen.
- This process is called a redox reaction and is actually two chemical processes that happen at the same time: reduction and oxidation.

⭐ Important Points

- Reduction:
  - A reduction Reaction refers to a reaction in which either the addition of Hydrogen takes place or the removal of oxygen takes place.

  Oxidation:
  - Oxidation Reaction refers to a reaction in which either the addition of Oxygen takes place or the removal of Hydrogen takes place.

---

74. **Answer: c**

**Explanation:**

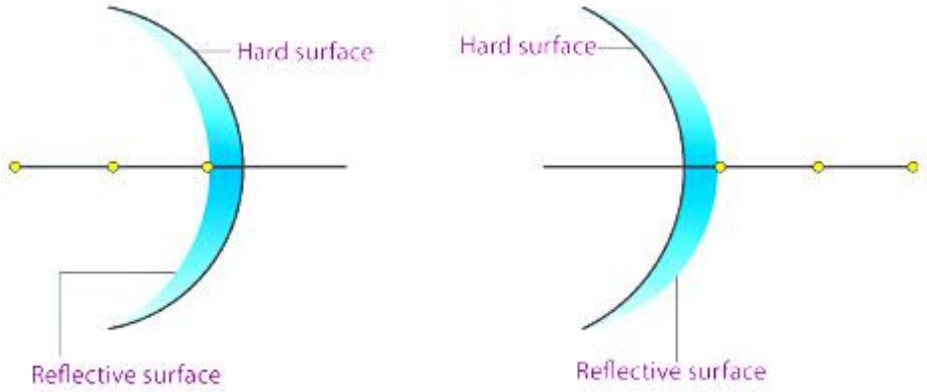
The correct answer is a **rear mirror.**

- In the **rear mirror** , a **concave mirror** is **not used.**
- A **rear-view mirror** is a flat mirror in **automobiles** and other **vehicles** , designed to allow the driver to see rearward through the **vehicle's rear window.**

⭐ Key Points

- **Magnification:**In a **concave mirror,** the magnification is the ratio of the height of the image to the **height of the object** .
- When the image is real, the magnification will be **negative** because the real image is **inverted.**
- When the image is virtual, the magnification will be **positive** because the virtual image is erect.
- The concave mirror can form a magnified image when the object is kept at a **certain distance.**

⭐ Additional Information




---

## 75. Answer: a

### Explanation:

The logic followed here is:-

The knife is used by a butcher.

Similarly,

Scissors are used by a hair dresser.

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

---

## 76. Answer: b

### Explanation:

The correct answer is **Plantae**.

- In **Plantae,** all organisms, are multicellular eccentric with a **cell wall.**

⭐ **Key Points**

- **Plantae** is a **taxonomic group** that includes **land plants and green algae.**

- In the older classification of organisms, there are basically five kingdoms according to Robert Whittaker: **Animalia, Plantae, Fungi, Protista,** and **Moner.**
- **Kingdom Plantae i** ncludes **multicellular** , (mostly) autotrophic eukaryotes that (usually) conduct **photosynthesis.**

⭐ Additional Information

- Protista:
  - A protist is any eukaryotic organism that is not an animal, plant, or fungus. While it is likely that protists share a common ancestor, the exclusion of other eukaryotes means that protists do not form a natural group or clade.
- Monera:
  - Monera is a biological kingdom that is made up of prokaryotes. As such, it is composed of single-celled organisms that lack a true nucleus. The taxon Monera was first proposed as a phylum by Ernst Haeckel in 1866.
- Animalia:
  - Animals are multicellular, eukaryotic organisms in the biological kingdom Animalia.
  - With few exceptions animals consume organic material breathe oxygen, are able to move can reproduce sexually and go through an ontogenetic stage in which their body consists of a hollow sphere of cells the blastula during embryonic development.



---

## 77. Answer: d

### Explanation:

Given that:-

X, Y, T, U, and V, when arranged in ascending order of their weights.

1. X weighs less than T. U weighs twice as much as T.

- $X < T, U = 2T \Rightarrow X < T < U$

- Here, there is no information about Y and V. Therefore, statement 1 alone is not sufficient.

2. The weight of Y and V is less than that of X.

- Y and V < X
- No information is given about T and U. Therefore, statement 2 alone is not sufficient.

From statements 1 and 2 we get the following cases:

- Case 1: Y < V < X < T < U
- Case 2: V < Y < X < T < U
- So, either V or Y would be second from the beginning.

Thus, statements 1 and 2 both are not sufficient to answer the question.

Hence, "option 4" is the correct answer.

---

**78. Answer: c**

**Explanation:**

The logic followed here is:-

- A captain is also a soldier.

Similarly,

- An employer is also an employee.

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

⭐ **Alternate Method**

- A captain leads or manages a group of soldiers.

Similarly,

- An employer leads or manages a group of employees.

Hence, "employee" is the correct answer.

---

## 79. Answer: c

### Explanation:

The correct answer is Matunga Railway Station.

- **Matunga Railway Station** has entered the **Limca Book of Records 2018** for all railway employees to be female.

⭐ Key Points

- **Mamta Kulkarni** , the **first women ASM** to be recruited on the **Mumbai Division of Central Railway** in **1992,** is in Incharge of **Matunga Railway Station.**
- A total of **41 women staff** is handling the operations of the **station round the clock** .
- **Matunga Railway Station** has become the **first station in India** that has **all women staff managing the operations of the stations.**
- Ladies staff across all departments viz. **operating, commercial, RPF,** etc. are posted at **Matunga Railway Station** to make it the first of its kind station on **Railways.**

⭐ Additional Information

- The **Limca Book of Records** is an annual reference book published in **India documenting world records held by Indians.**
- The **Limca book** of record was **launched** in **1990.**

---

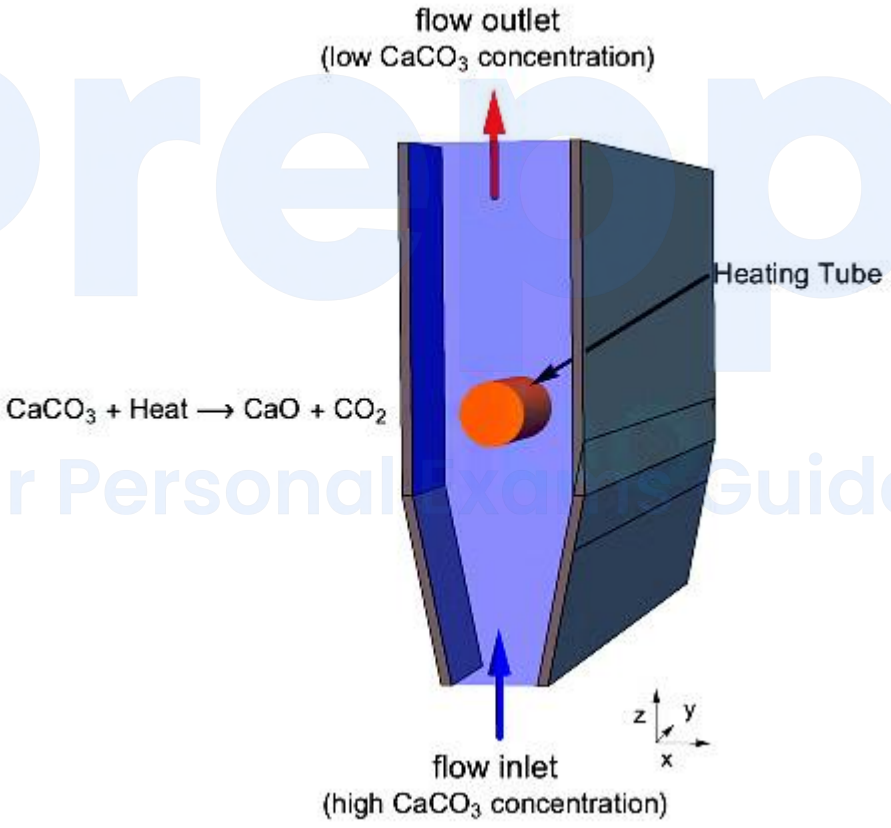
## 80. Answer: b

### Explanation:

The correct answer is **Both A and B are true**.

## ⭐ Key Points

- **Thermal decomposition:**
  - Thermal decomposition is a chemical reaction where heat is a reactant.
  - Since heat is a reactant, these reactions are endothermic meaning that the reaction requires **thermal energy** to break the **chemical bonds in the molecule.**
  - Calcium carbonate, **CaCO3** , will decompose into carbon dioxide, **CO2** , and calcium oxide, **CaO,** when heated above **900 degrees Celcius** at a pressure of the atmosphere.




## ⭐ Additional Information

- **Reversible reaction:**
  - A reversible reaction is a **reaction in which the conversion of reactants to products and the conversion of products to reactants occur**

**simultaneously.**

- A and B can react to form C and D or, in the reverse reaction, C and D can react to form A and B. This is distinct from a reversible process in **thermodynamics.**
- The forward reaction **N 2 (g)+3H 2 (g)<-->2NH 3 (g)** (the production of ammonia) is exothermic.
- According to Le Chatelier's Principle, this will be favoured if you lower the temperature, a very low temperature will cause a reaction to occur very slowly and hence, not efficiently.
- Therefore, **400 - 450°C** is a compromise temperature producing a high proportion of ammonia in the equilibrium mixture.

---

## 81. Answer: a

### Explanation:

Given:

Ramu's income is 25% more than that of Rohan.

Concept used:

Application of percentage

Calculation:

Let the income of Rohan be 100A.

So, the income of Ramu = 100A + 100A × 25% = 125A

So, the required percentage = (100A/125A) × 100% = 80%

**∴ Rohan's income is 80% of Ramu's income.**

---

## 82. Answer: b

## Explanation:

The correct answer is **Henry Mosley.**

- **Henry Mosley** shows that the a **tomic number of an element** is a **more fundamental property** than its **atomic mass.**

⭐ **Key Points**

- At present, **118 elements** are known to us. All these have **different properties** . Out of these **118,** only **94** are n **aturally occurring.**
- In **1913, Henry Moseley** showed that the **atomic number** (symbolized as Z) of an **element** is a more fundamental property than its **atomic mass** .
- The number of electrons in turn is equal to the number of protons in the **nucleus** .
    - The atomic number is a more fundamental property of an element than its atomic mass because when the elements are arranged in the increasing order of their atomic number, most of the defects of Mendeleev's classification get rectified.

⭐ **Additional Information**

| Person Name | Description |
|---|---|
| Henry Cavendis | • Henry Cavendish was an English natural philosopher, scientist, and an important experimental and theoretical chemist and physicist.<br>• He is noted for his discovery of hydrogen, which he termed inflammable air. |
| Henry Mosley | • Henry Moseley was an English physicist, whose contributed to the science of physics.<br>• Moseley's law advanced atomic physics, nuclear physics and quantum physics by providing the first experimental evidence in favour of Niels Bohr's theory. |
| John Newland | • John Newlands was a British chemist who worked concerning the periodicity of elements.<br>• Newlands was the first person to devise a periodic table of chemical elements arranged in order of their relative atomic masses. |
| Demitri Mendeleev | • Dmitri Mendeleev was a Russian chemist and inventor.<br>• He is known for formulating the Periodic Law and creating a farsighted version of the periodic table of elements. |



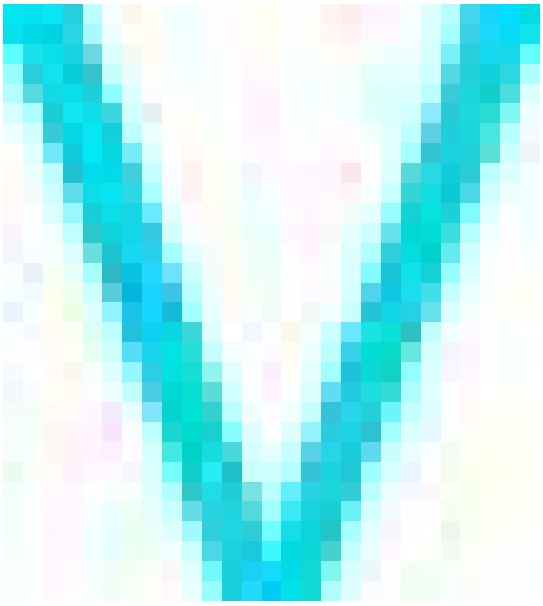
---

**83. Answer: d**

**Explanation:**

The logic followed here is:-

- Figure A -

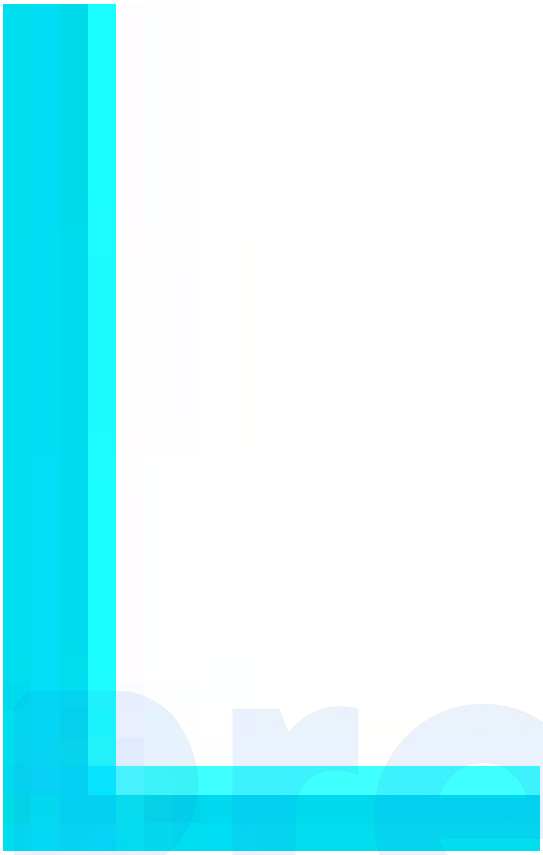


made with two lines.

- Figure B -

made with two lines.

- Figure C -



made with two lines.

- Figure D -

made with three lines.

So, figure D is different from others.

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

---

## 84. Answer: a

### Explanation:

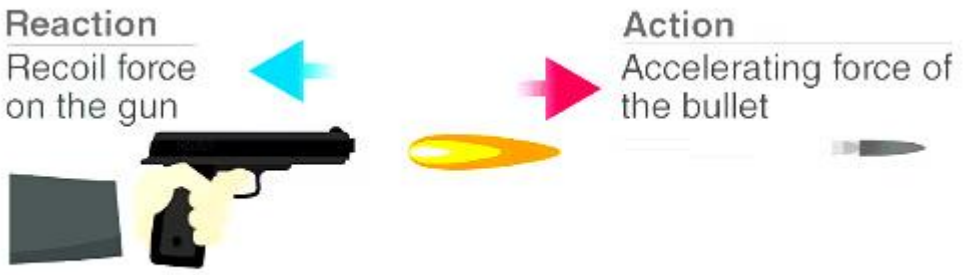
The correct answer is **When a person jumps from the boat to the bank of the river, the boat goes backwards.**

- **Newton's third law** of motion applies to **when a person jumps from the boat to the bank of the river, the boat goes backwards.**

⭐ **Key Points**

- **Newton's 3rd Law:**
  - **Force** is a **push or pull** acting on an object resulting in its interaction with **another object.**
  - Force is a result of an **interaction** .
  - **Force** can be classified into **two categories: contact force** such as frictional force and **non-contact force** such as gravitational force.
  - If object **A**exerts a force on object **B**, then object **B**must exert a **force of equal magnitude** and **opposite direction back** on object **A**.
- **Newton's third law of motion states that** .
  - When one body exerts a force on the other body, the first body experiences a force that is equal in magnitude in the opposite direction of the force which is exerted.

⭐ **Additional Information**



85. **Answer: b**

**Explanation:**

Given:

Amita's father was 38 years old when she was born.

Her mother was 36 years old when her brother was born.

Her brother was four years younger than her.

Calculation:

Let the present age of Amita be P years.

So,

The age of her father = (38 + P) years

The age of her brother = (P - 4) years

The age of her mother = 36 + (P - 4) = (32 + P) years

Now, the age difference between her parents = (38 + P) - (32 + P) = 6 years

∴ **The difference between the ages of her parents is 6 years.**

86. **Answer: d**

**Explanation:**

Given:

The ratio of the ages of Rohan and Sohan is 4 : 3.

Concept used:

Ratio Proportion

Calculation:

Let the common ratio be P.

So,

The age of Rohan = 4P years

The age of Sohan = 3P years

According to the question,

4P + 9 = 33

⇒ P = 6

⇒ 3P = 18

∴ **The present age of Sohan is 18 years.**

---

87. **Answer: d**

**Explanation:**

The correct answer is **Kidney**.

- The process of **dialysis** is related to the **Kidney** .

⭐ **Key Points**

- The **kidneys filter your blood** by removing **waste** and **excess fluid** from your **body** . This waste is sent to the **bladder** to be eliminated when you **urinate** .
- **Dialysis performs** the function of the **kidneys** if they've **failed.** According to the **National Kidney Foundation** , end-stage **kidney**failure occurs when the kidneys are performing at o **nly 10 to 15 per cent** of their **normal function** .
- **Dialysis** is a treatment that **filters and purifies the blood** using a **machine** . This helps keep your fluids and electrolytes in balance when the kidneys can't do

their job.

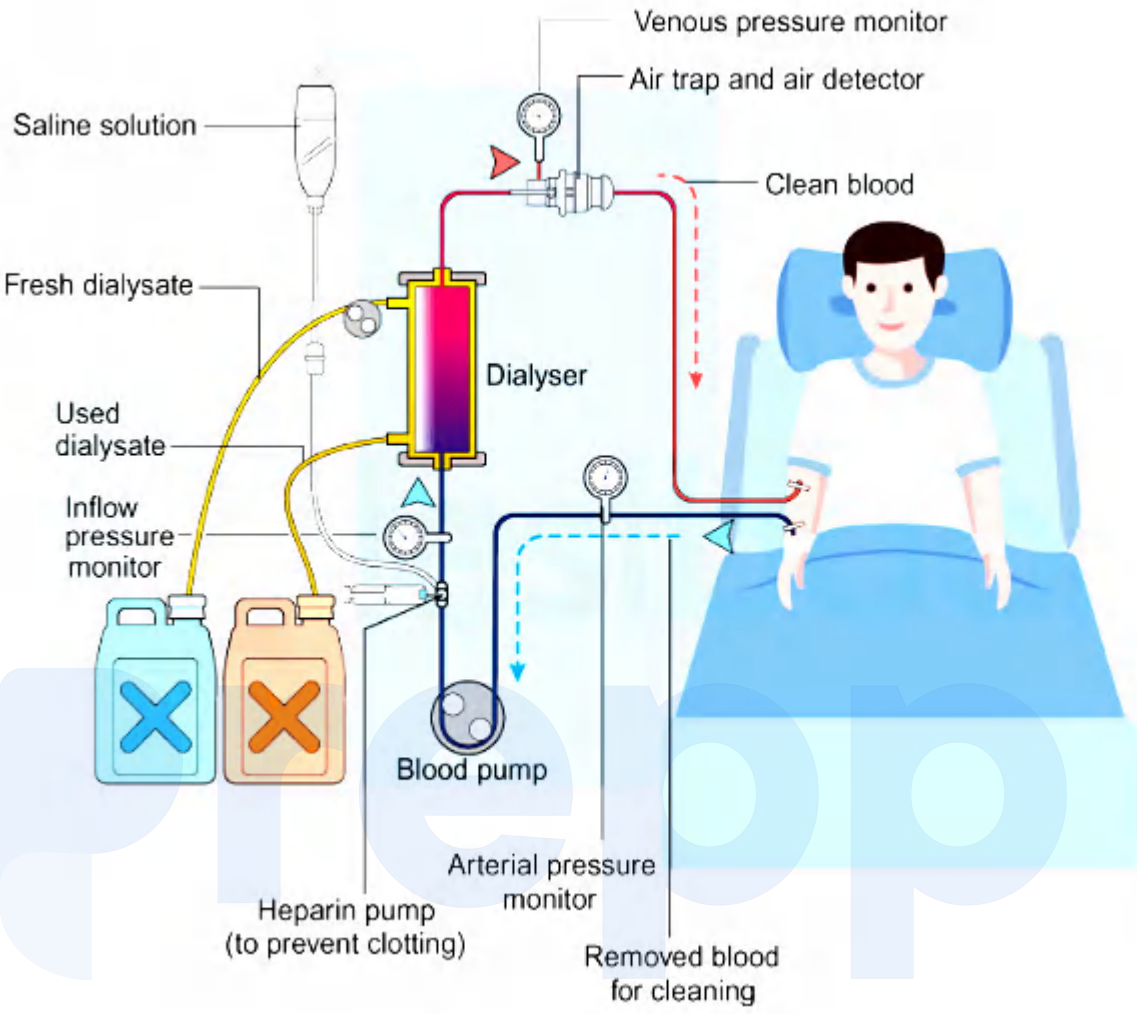
- **Dialysis** has been used since the **1940s** to treat people with **kidney problems.**

## ⭐ Additional Information

- There are three different types of dialysis:
- Hemodialysis:
  - Hemodialysis is the most common type of dialysis. This process uses an artificial kidney (hemodialyzer) to remove waste and extra fluid from the blood. The blood is removed from the body and filtered through the artificial kidney.
- Peritoneal dialysis:
  - Peritoneal dialysis involves surgery to implant a peritoneal dialysis (PD) catheter into your abdomen. The catheter helps filter your blood through the peritoneum, a membrane in your abdomen.
- Continuous renal replacement therapy (CRRT):
  - This therapy is used primarily in the intensive care unit for people with acute kidney failure. It's also known as hemofiltration.

## ⭐ Important Points

- Dialysis Process:






88. **Answer: d**

**Explanation:**

Given:

6, 7, 8, 9, and 12.

Concept used:

The least common multiple (LCM) of a set of numbers is the smallest number that leaves 0 as the remainder each time when divided by any of those numbers.

Calculation:

LCM ( 6, 7, 8, 9 12) = 504

So, 504 is the smallest number that leaves 0 as the remainder each time when divided by any of 6, 7, 8, 9, and 12.

So, the required number = (504 + 2) = 506

**∴ 506 will be the smallest number which when divided by 6, 7, 8, 9, and 12 leaves the remainder 2 each time.**

---

## 89. Answer: a

### Explanation:

Given:

Coordinate of the centroid = (4,8)

Coordinate of the vertex 1 = (9,7)

Coordinate of the vertex 2 = (1,4)

Concept used:

If the coordinates of the vertices of a triangle are (x 1, y 1), (x 2, y 2), (x 3, y 3), then the formula for the centroid of the triangle is given below:

The centroid of a triangle = ((x 1 + x 2+ x 3)/3, (y 1+ y 2 + y 3)/3)

The area = (1/2) [x 1 (y 2 – y 3 ) + x 2 (y 3 – y 1 ) + x 3(y 1 – y 2)]

Calculation:

Let the coordinate of the third vertex be (a,b).

According to the question,

(a + 9 + 1) ÷ 3 = 4

⇒ a = 2

$(b + 7 + 4) \div 3 = 8$

$\Rightarrow b = 13$

So, the coordinate of the third vertex is (2,13)

So, the area of the triangle = $(1/2)\ [9(13 - 4) + 2(4 - 7) + 1(7 - 13)] = 34.5$ Unit $^2$

**∴ The area of triangle is 34.5 unit $^2$.**

---

## 90. Answer: a

### Explanation:

The statement tells that the normal life of Canadians is disrupted or paused because of heavy snowfall.

- Conclusion 1 suggests that the government should take measures to save the lives and property of people. According to the statement, "***only normal life is affected in Canadd***". The statement does not suggest any threat to life and property due to the snowfall. Therefore, conclusion 1 does not follow.
- The government asking people to stay at home is reasonable because the statement implies that the weather conditions are bad and not conducive to moving around as they do normally. Therefore, conclusion 2 follows.

Hence the correct answer is **"option 1"** .

---

## 91. Answer: d

### Explanation:

The correct answer is **Environment**.

- **The environment ministry** regulates **cow slaughter in India.**

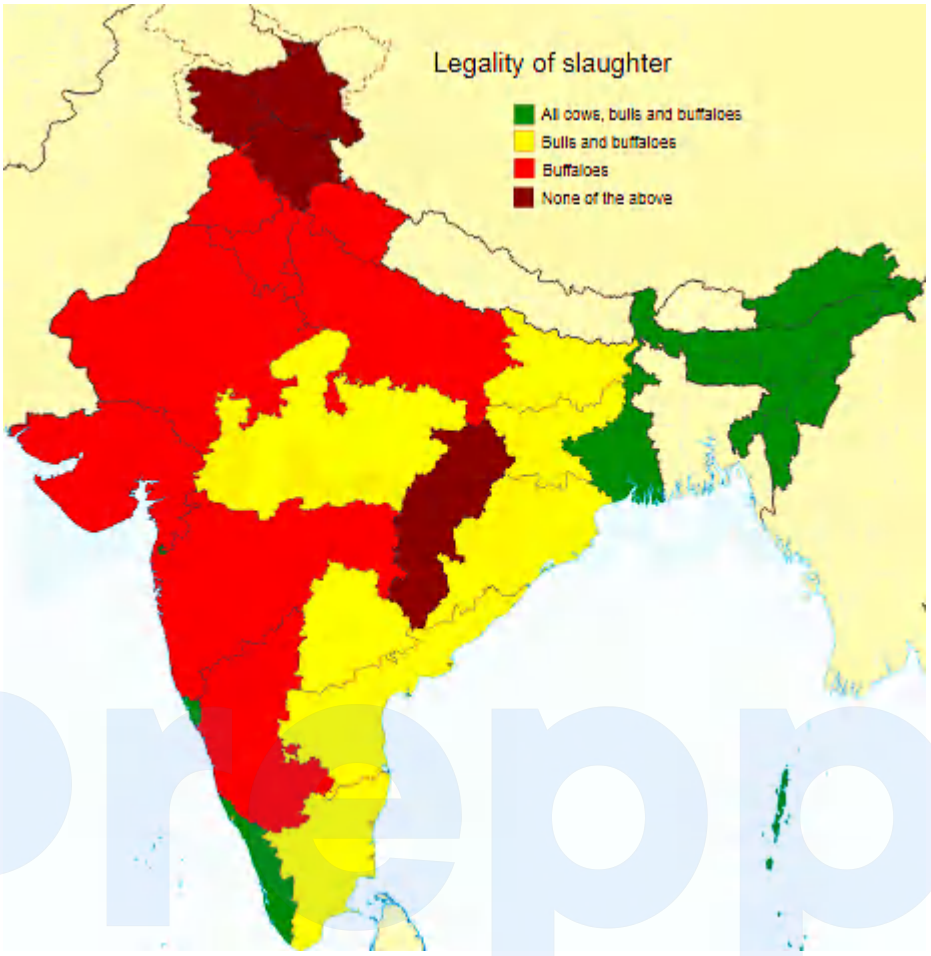
## ⭐ Key Points

- The **law** has imposed a complete ban on the slaughter of **cows, bulls, bullocks,** and **male** and **female buffaloes,** below the **age of 13** and has enhanced **penalties and punishments** .
- On **26 May 2017** , the **Ministry of Environment of the Government of India** led by the **Bharatiya Janata Party** imposed a ban on the sale and purchase of **cattle for slaughter at animal markets across India** , under Prevention of **Cruelty to Animals statutes.**
- According to a **2016 United States Department of Agriculture review** ,**India** has rapidly grown to become the **world's largest beef exporter** , accounting for **20% of the world's beef trade** based on its large water **buffalo meat processing industry.**

## ⭐ Additional Information

- **Ministry of Environment, Forest and Climate Change (MoEFCC):**
  - Ministry of Environment, Forest, and Climate Change was founded in **1947.**
  - The ministry portfolio is currently held by **Bhupender Yadav,** Union Minister of Environment, Forest, and Climate Change.

## ⭐ Important Points




92. **Answer: c**

**Explanation:**

From the statement, it is clear that Shyam wants to find the effect of mobile radiation on children.

- Thus, it can be safely assumed that Shyam is saying this to Ram because it is possible to trace the effect of mobile radiation on children. So, assumption I is implicit.
- The statement does not talk about Shyam's ability to detect the radiation, so assumption II is not implicit. Shyam might be able to detect the radiation but need not be good at it.

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

93. **Answer: a**

**Explanation:**

Given:

20 preferred pink, 16 preferred red, and 14 preferred green.

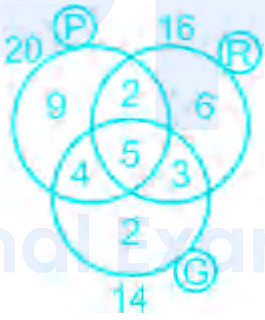
5 preferred all three colours.

9 of them chose Pink and Green. 7 of them chose Pink and Red. 8 of them chose Red and Green.

Concept used:

Venn Diagram

Calculation:




So,

The number of girls who only chose Pink & Green = 9 - 5 = 4

The number of girls who only chose Pink & Red = 7 - 5 = 2

The number of girls who only chose Green & Red = 8 - 5 = 3

Now,

The number of girls who only chose Pink = 20 - 4 - 5 -2 = 9

The number of girls who only chose Red = 16 - 5 - 3 - 2= 6

The number of girls who only chose Green = 14 - 5 - 3 - 4 = 2

So, the number of girls who chose only one colour = (9 + 6 + 2) = 17

**∴ 17 girls chose only one colour.**

---

## 94. Answer: a

### Explanation:

The correct answer is **MnO < MnO 2 < Mn 2 O 7.**

- The correct increasing order of acidity of Mn oxide is **MnO < MnO2 < Mn 2 O 7.**

⭐ **Key Points**

- MnO has the **lowest oxidation state,** so it is the most basic.
  - **Mn2O3** is next, then **MnO2** , and finally **Mn2O7** (which is actually acidic).
  - Due to the **difference in oxidation state:** Mn in **Mn2O7** the oxidation state is **+7** state but Mn in **MnO** the oxidation state is **+2.**

⭐ **Additional Information**

- More than **30 Mn oxide minerals** occur in a wide variety of **geological settings.**
- They are major components of **Mn** nodules that pave huge areas of the **ocean floor** and **bottoms of many fresh-water lakes.**
- **Mn oxide minerals** are ubiquitous in **soils and sediments** and participate in a variety of chemical reactions that affect **groundwater and bulk soil composition.**
- **Formula:** $MnO_2$
- **Molar mass:** 86.9368 g/mol
- **Melting point:** 535 °C

---

## 95. Answer: c

### Explanation:

The correct answer is **Sudhanshu Vishwas**.

- 99-year old freedom fighter and Padma awardee, who runs 18 schools in West Bengal and provides free education and food are **Sudhanshu Vishwas.**

⭐ **Key Points**

- **Sudhanshu Biswas:**
  - He has honored by the **Padma Shri** in **2018** , he is a veteran **99-year-old freedom fighter** who left his home in his early teens to fight for our **independence** .
  - He has been jailed several times, one of which was for his bold attack for carrying a **live bomb** at a **British administration gathering.**
  - He established **Sri Ramakrishna Sevashram.**
  - In the last four decades, he has set up **18 residential schools** for such children, all boys, in the most remote areas around West Bengal.

⭐ **Additional Information**

- **Sitavva Jodadi:**
  - Sitavva Joddati, who champions women's development and empowerment, especially 'Devadasis' and Dalits; Nouf Marwari, the first yoga instructor of Saudi Arabia who played an instrumental role in legalizing yoga in that country, will be given the Padma Shri.
- **Sulagitti:**
  - Nonagenarian farm laborer Sulagatti Narasamma, who provides midwifery services in the backward region of Karnataka without any medical facility, too was awarded the Padma Shri.

---

## 96. Answer: a

### Explanation:

The correct answer is **Methane.**

## ⭐ Key Points

- CNG is an abbreviation of **"Compressed Natural Gas"** . The main component of CNG is **Methane** .
- It is composed mostly of methane but also composed of **ethane** and **propane** in smaller quantities.
- CNG is developed by compressing natural gas mainly methane, down to less than one per cent of its total volume.
- CNG is known to be an **eco-friendly** alternative option to gasoline which is harmful to nature.

## ⭐ Additional Information

| Gas | Description |
|---|---|
| **Butane** | • Butane is a petroleum-derived gaseous liquid.<br>• This is primarily used for camping, cooking in the backyard, and in cigarette lighters. |
| **Ethane** | • It is in the alkanes substance group with the molecular formula CnH2n+2.<br>• Ethane is the main component of natural gas and is also found in marsh gas. |
| **Propane** | • Propane is actually a byproduct of both petroleum refining and natural gas processing.<br>• Propane comes from natural gas and petroleum wells. About 69 per cent of the propane used in the United States is extracted from raw natural gas. |

97. **Answer: a**

**Explanation:**

**Given**

Number of students in the college = 420

Number of subjects studied by every student = 5

Each subject is studied by 60 students.

**Calculation:**

Let the number of subjects = P

If every student studies one subject, then the number of students = 60P

According to the question,

420 = 60P ÷ 5

⇒ P = 35

∴ **The number of subjects is exactly 35.**



---

98. **Answer: d**

**Explanation:**

The correct answer is **Bharat**.

- The **Eden Gardens Cricket Ground** is located in **Bharat** .

⭐ **Key Points**

- The **Eden Gardens** is a **cricket ground** is located in **Kolkata, West Bengal.**
- It was established in **1864** .

- It is the **oldest** and **second-largest cricket stadium** in **India** after the **Narendra Modi Stadium** .
- The largest cricket stadium in the world by area **Narendra Modi Stadium** Located in **Ahmedabad, India** , the stadium will be the new home of the **Gujarat Cricket Association** .
    - Spread across **63 acres** with a capacity of **132,000** , Narendra Modi Stadium surpasses the previous largest cricket stadium's **Australia's Melbourne** Cricket Ground.
- On **22 November 2019** , the venue hosted the **first-ever day/night test match** in **India** during the second Test between **India and Bangladesh** .

⭐ Additional Information

- The **Melbourne Cricket Ground** is the largest cricket ground in the **world.**
- Pakistan:
    - Rafi is the biggest cricket stadium in Pakistan with 50000 capacity.
- Shri Lanka:
    - R. Premadasa International Cricket Stadium is the biggest cricket stadium in Shri Lanka with the capacity of 35000.
- Bangladesh:
    - Sher-e-Bangla National Cricket Stadium is the biggest cricket stadium in Bangladesh with the capacity of 26000.



---

99. **Answer: c**

## Explanation:

Given:

Numbers are 290, 660.

Greatest Common Factor means HCF (290, 660) = 10.

Concept used:

A × B = LCM (A,B) × HDF (A,B)

Calculation:

Least Common Multiple or LCM = (290 × 660) ÷ 10 = 19140

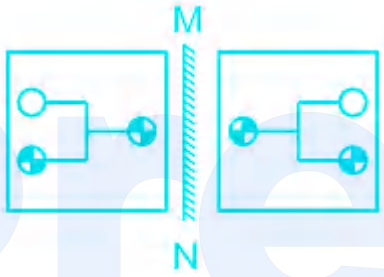
∴ **The least common multiple of 290 & 660 is 19140.**

---

**100. Answer: c**

**Explanation:**

The mirror image of the question figure is given below.




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