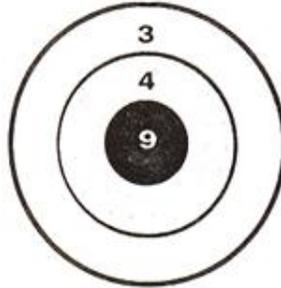


Section – C (Quantitative Reasoning)

43. Kavi fires three arrows. Each one hits a scoring ring. Which one of the following total is not possible?



- 1) 17
- 2) 18
- 3) 21
- 4) 22

Solution: Option (1) is possible, if two arrows hit four and one arrow hit 9.

Option (2) is not possible as there are three arrows and getting a sum of 18 is not possible with any combination of 9, 4 and 3.

Option (3) is possible, if two arrows hit 9 and one arrow hit 3.

Option (4) is possible, if two arrows hit 9 and one arrow hit 4.

Hence, option (2) is the correct choice.

44. A parcel weighing 12 kg, it to be send from New Delhi to Mumbai, a distance of 1450 km. The Parcel Postage Rates are shown in the following table.

Indian Parcel Postage Rates		
Distance Category	Rate up to 2 kg INR	For every additional kg over 2 kg INR
Local	35	5
Upto 500 km	50	8
501 – 1000 km	60	12
1001 – 2000 km	70	25
More than 2000 km	90	35

How much will it cost to send the parcel?

- 1) 85 INR
- 2) 95 INR
- 3) 320 INR
- 4) 840 INR

Solution: Weight of the parcel sent from New Delhi to Mumbai = 12 kg

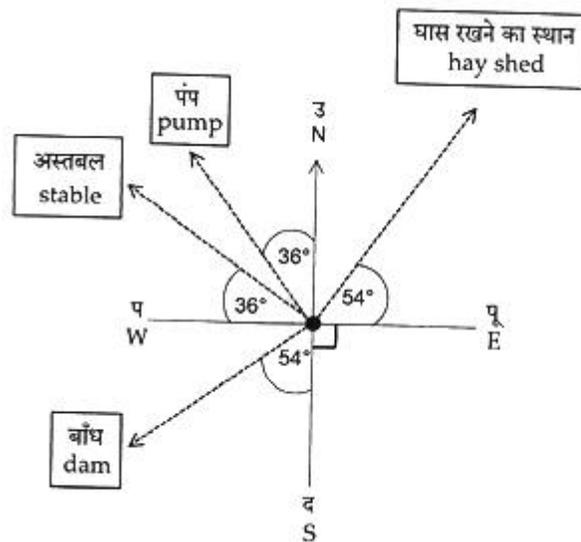
Distance between New Delhi and Mumbai = 1450 km

This distance lies in the distance category 1001-2000 km. So, the cost to send 12 kg parcel would be the cost of sending a 2 kg parcel at Rs 70 plus the cost for every additional kg over 2 kg i.e. at Rs 25 /kg.

Thus, cost of sending the parcel = Rs 70 + (12 – 2) kg × Rs 25/kg = Rs 70 + Rs 10 × 25 = Rs 320

Hence, option (3) is the correct choice.

Gajra's positions on her farm is shown by the dot on this diagram.



45. When Gajra walks in the direction N 54° W, she will be heading towards the

- 1) dam
- 2) pump
- 3) stable
- 4) hay shed

Solution: Given that *Gajra* walks in the direction N 54 degrees W. This means that *Gajra* moves 54 degrees from north towards the west.

From the graph, it is clear that *Gajra* would be heading in the direction of Stable.

Hence, option (3) is the correct choice.

For her parent's 50th wedding anniversary celebration Malina decides to buy 50 balloons. Her supplier only sells balloons in bunches of 12 for Rs 250 and 7 for Rs 175. Malina buys exactly 50 balloons.

46. What is the total price she pays?

- 1) Rs 1,042
- 2) Rs 1,100
- 3) Rs 1,175
- 4) Rs 1,225

Solution: Cost of balloons in bunches of 12 = Rs 250

Cost of the balloons in bunches of 7 = Rs 175

Number of balloons bought by Malina is 50. Since the seller sells balloons in bunches of 12 and 7, so Malina need to buy 3 bunches of 12 balloons and 2 bunches of 7 balloons.

Thus, total price paid by her = $3 \times$ Cost of bunch of 12 balloons + $2 \times$ Cost of bunch of 7 balloons

$$\begin{aligned} &= 3 \times \text{Rs } 250 + 2 \times \text{Rs } 175 \\ &= \text{Rs } 750 + \text{Rs } 350 \\ &= \text{Rs } 1,100 \end{aligned}$$

Hence, option (2) is the correct choice.

47. Bahdrak has a standard pack of 52 playing cards. He removes the king of clubs, the four of spades and all the aces. He then draws a card at random.

Which of the following is it most likely to be?

- 1) a club
- 2) a king
- 3) a spade
- 4) a diamond

Solution: Given that from a standard pack of 52 cards, Bahdrak removes the king of clubs, the four of spades, and all the aces.

Number of cards that remain in the pack = $52 - 1 - 1 - 4 = 46$.

Out of the remaining 46 cards, there are $13 - 2 = 11$ clubs, $4 - 1 = 3$ kings, $13 - 2 = 11$ spades, and $13 - 1 = 12$ diamonds.

Therefore, out of the options given, the probability that a randomly picked card is a diamond will be the largest.

Hence, option (4) is the correct choice.

48. At Shavi's school the first class starts at 8:30 a.m. and the fourth class ends at 11:30 a.m. There are four minutes between classes. Each class is the same length.

How long is each class?

- 1) 41 minutes
- 2) 42 minutes
- 3) 71 minutes
- 4) 72 minutes

Solution: There are four classes at Shavi's school.

This means that there will be three intervals of 4 minutes each. So, a total of 12 minutes of break between the classes.

Let the length (in minutes) of each class be m .

Therefore, $4m + 12(\text{break}) = 3 \text{ hours} = 180 \text{ minutes}$.

Therefore, $m = (180 - 12)/4 = 42 \text{ minutes}$.

Hence, option (2) is the correct choice.

49. Indian electricity prices have risen from Rs 6.4 to Rs 6.5 per unit. Arvi's factory expected to use 600 units in the next billing period. He installed solar panels at the start of that period. This reduced his electricity usage by 90%.

How much did Arvi's bill increase?

- 1) Rs 6
- 2) Rs 38
- 3) Rs 39
- 4) Rs 54

Solution: Number of units of electricity used in the factory = 600

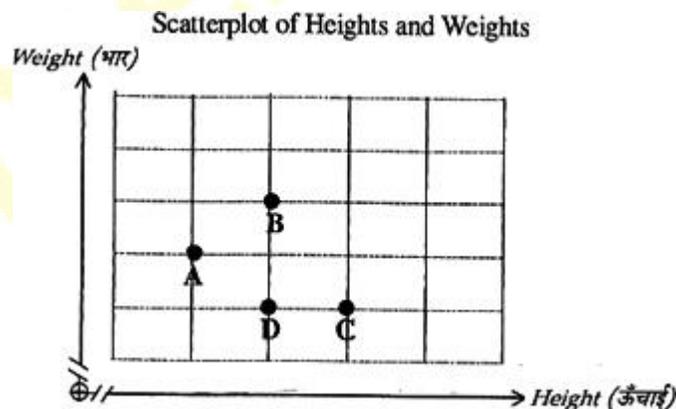
Number of units of electricity used after installing solar panels = $600 - 90\% \text{ of } 600 = 60$

Increase in the cost of one unit electricity = $\text{Rs } 6.5 - \text{Rs } 6.4 = \text{Rs } 0.1$

\therefore Increase in Arvi's bill = $\text{Rs } 0.1 \times 60 = \text{Rs } 6$

Hence, option (1) is the correct choice.

50. Daha sketched points on the graph represents his height and weight and those of his sisters Farha, Madhu and Padmal. The graph follows:



Daha is taller than Farha, but shorter than Madhu. Madhu has the same weight as Padmal.

Which of the points on the graph represents Daha?

- 1) A
- 2) B
- 3) C
- 4) D

Solution: Given that Daha is taller than Farha, but shorter than Madhu.

Therefore, from the graph Daha could be denoted by either point B or point D. Farha is represented by point A and Madhu is represented by point C.

Given that Madhu has the same weight as Padmal.

Also, from the graph weights of sisters represented by points D and C are the same. We know that Madhu is represented by point C. Therefore, Padmal is represented by point B.

This means that Daha is represented by point D.

Hence, option (4) is the correct choice.

51) Six students participated in a 400-metre race.

- Ram finished after Amar and after 2 other students.
- Amar finished after Sameer.
- Firoz finished before Sameer.
- Vinod finished before Hari.

Who came fifth?

- 1) Ram
- 2) Amar
- 3) Firoz
- 4) Vinod

Solution: Given that Ram finished after Amar and after two other students.

Amar finished after Sameer, therefore, Ram finished after Sameer.

Firoz finished before Sameer, therefore Firoz finished before Amar and Ram as well.

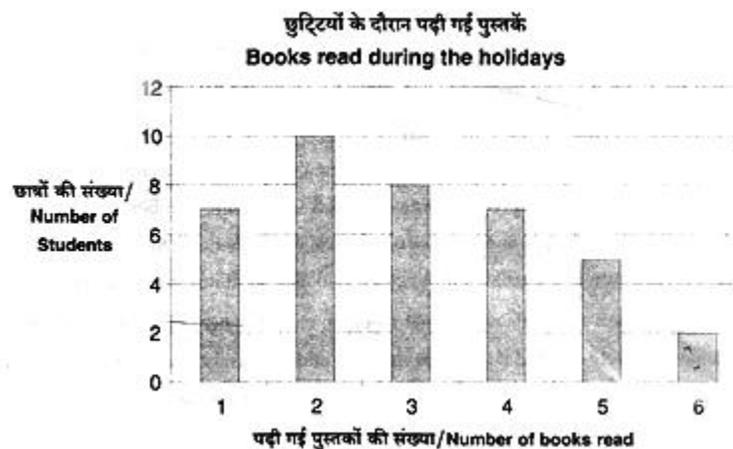
Given that Vinod finished before Hari.

Therefore, the order in which six students finished, is Firoz, Sameer, Amar, Ram, Vinod and Hari,

Therefore, Vinod came fifth.

Hence, option (4) is the correct choice.

52. The graph below shows the number of books read by 39 students during the school holidays.



Ali and Ram read more books than the other students in the class. Hari read more than 1 book. Sameer read twice as many books as Hari.

Which statements is correct?

- 1) Sameer read 2 books and Hari read 1 book.
- 2) Sameer read 3 books and Ali read 5 books.
- 3) Hari read 2 books and Ram read 6 books.
- 4) Hari read 4 books and Ali read 6 books.

Solution: Given that Ali and Ram read more books than the other students in the class.

It is given in the bar-graph that maximum number of books read by any student is 6, and two students read 6 books each. Therefore, Ali and Ram read 6 books each.

Given that Hari read more than 1 book and Sameer read twice as many books as Hari. This is only possible, if Hari read 2 books and Sameer read 4 books.

Please note that Hari cannot read 3 books as then Sameer would read 6 books. This is not possible as there are only two students – Ali and Ram who have read 6 books each.

Hence, option (3) is the correct choice.

(Question 53 – 56) : Read the following passage and answer the questions that follow:

Everything on this planet is made up of atoms. Each atom contains a positively charged centre, or nucleus, which is surrounded by negatively charged electrons. For most objects, the number of positive charges is equal to the number of negative charges and because they cancel each other out, the object ends up with no overall electric charge. However, it is possible for objects to gain an overall negative or positive charge.

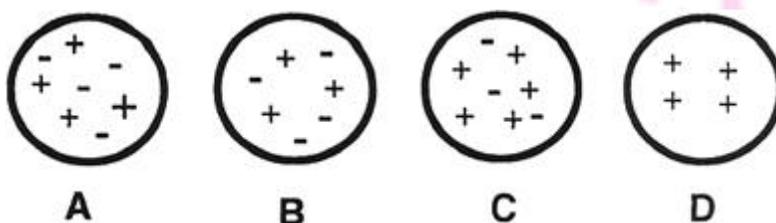
When objects made of different materials are rubbed together, electrons may jump from one object to the other. Objects become positively charged if they lose electrons and negatively charged if they gain electrons. You can predict which way the charges will jump by referring to a triboelectric chart such as the one shown here.

Human skin
Leather
Rabbit's fur
Glass
Human hair
Nylon
Wool
Cat's fur
Silk
Cotton
Perspex
Acrylic
Polystyrene
Rubber balloon
Polyester

Plastic wrap
Ebonite

This list of common materials is arranged in order of how likely they are to lose electrons. In general, when two materials are rubbed together, the material that is higher on the list will lose electrons to the materials listed below it. For example, if a perspex rod is rubbed with a piece of wool, the wool will lose electrons to the perspex so the wool will end up with an overall positive charge and the perspex will end up negatively charged. The further apart the materials are on the list, the more easily the electrons are transferred between them (which means that you don't have to rub them together very long to get them to charge up). If you were to rub glass with rabbit's fur, far fewer electrons will move to the glass than if you were to rub the rabbit fur on something like ebonite.

53. Which of the following objects has an overall negative charge?



- 1) A
- 2) B
- 3) C
- 4) D

Solution: Since there are 4 negative charge and 3 positive charge in B, thus the overall charge on B is negative (-1).

Hence, option (2) is the correct choice.

54. Cotton will gain most electrons when it is rubbed for one minutes against

- 1) silk
- 2) acrylic
- 3) perspex
- 4) cat's fur

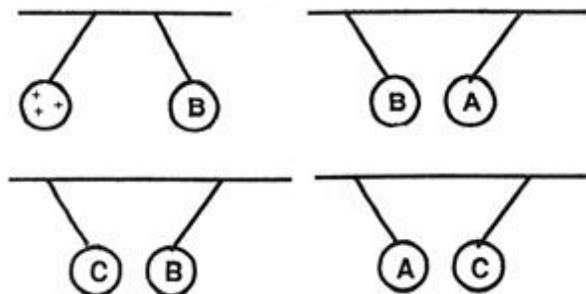
Solution: Since acrylic and Perspex lies below cotton in the list, thus cotton loses electron when rubbed to them. As cat's fur lies above the silk in the list thus it loses more electrons to cotton when rubbed with the cotton. Thus cotton will gain most electrons when it is rubbed for one minute against cat's fur.

Hence, option (4) is the correct choice.

Objects that have opposite electric charges move towards each other while objects that have the same electric charge push each other away.

A charged objects and uncharged object will move towards each other.

The diagram below show that what happens when different balloons are hung on strings near each other or near a charged object.



55. What are the overall charges on the balloons?

S. No	A	B	C
1)	Positive	Positive	No charge
2)	No charge	No charge	Negative
3)	Negative	Positive	No charge
4)	Negative	No charge	Positive

Solution: Since B is repelled by positive charge, thus it carries the same charge, i.e., positive charge. As B attracts A which means A carry opposite charge of B i.e., negative charge. Since C is attracted by both A and B which means it is attracted due to induction of charge in it so, it is neutral i.e., it does not carry any charge.

Hence, option (3) is the correct choice.

56. Which of these four materials, when rubbed against each of the other three, will become positively charge each time?

- 1) perspex
- 2) polyester
- 3) polystyrene
- 4) plastic wrap

Solution: As perspex lies above all the other three options in the triboelectric chart, so, it loses electrons when rubbed with any of the three materials thus acquires positive charge each time.

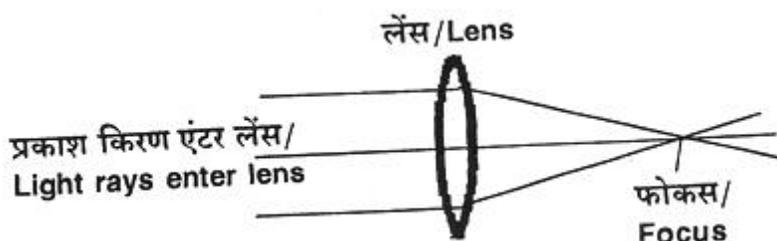
Hence, option (1) is the correct choice.

(Question 57 – 60) : Read the following passage and answer the questions that follow:

Lenses are objects made to transparent material such as glass or clear plastic that has curved surface. There are two main kinds of lenses. Diverging lenses are thicker at their edges than in their centers and they make light rays passing through them spread out. Converging lenses are thicker in the middle than at their edges and were the earliest kind of lens made. The earliest examples of these date back two thousand years. They have been used in spectacles to help people with poor vision see better since at least the tenth century.

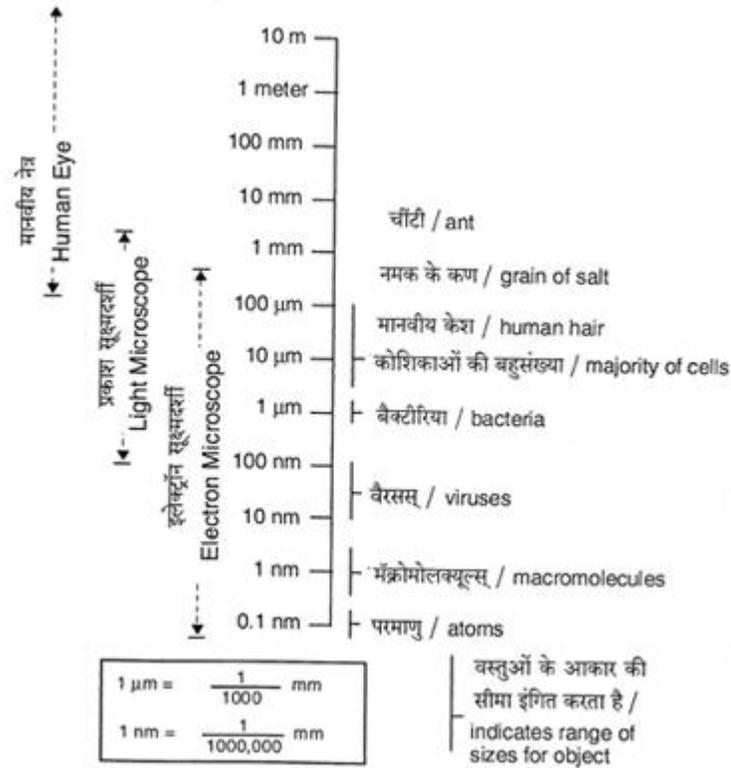
These days, as well as being used in spectacles, converging lenses are used in many other devices. Magnifying glasses, microscopes and some types of telescopes use converging lenses to make small things appear much larger or to make distant objects appear much closer.

Converging lenses magnify by bending the rays of light that pass through them to meet at point. This point is called the focus. The thicker that a converging lens is in its centre, the more it magnifies and the closer the focus is to the lens.

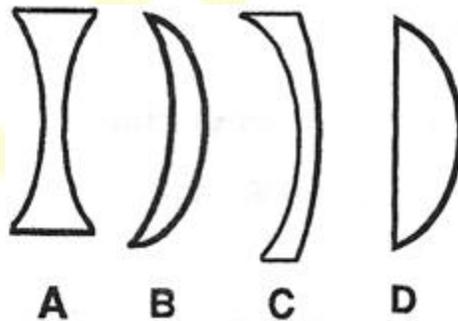


The magnifying power of a single converging lens such as that use in a camera or magnifying glass is equal to the length of the enlarge image divided by the length of the original object. For example, if a 2 cm long beetle appears to be 6 cm long when viewed through a magnifying glass, the glass' magnifying power is 3 (written as "3x"). Similarly, a 10x lens would make an object look 10 times longer. It will also look 10 times wider.

The diagram below shows the sizes of objects that can be observed effectively using the human eye, a light microscope and an electron microscope.



57. Which of the following diagram show side view of converging lenses?



- 1) A and C
- 2) B and D
- 3) B and C
- 4) B, C and D

Solution: Converging lens are thicker in the middle than at their edges. Since lens B and D are thicker in the middle than at the edges.

Hence, option (2) is the correct choice.

58. When seen through a 5x magnifying glass, a small leaf appear to have an area of 25 mm^2
What is the actual area of the leaf?

- 1) 1 mm^2
- 2) 5 mm^2
- 3) 20 mm^2
- 4) 125 mm^2

Solution: Since, magnifying power = length of image/length of object

Let y be the length of the leaf.

Since area of the image = 25 mm^2

Hence length of the image = 5 mm

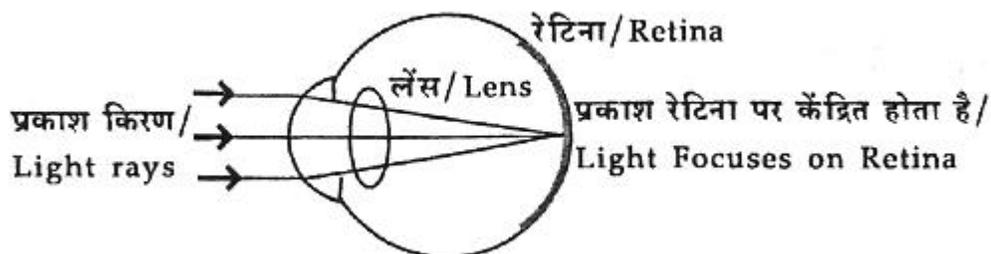
$$5 = 5/y$$

$$y = 1 \text{ mm.}$$

Hence area of the object = $1 \times 1 = 1 \text{ mm}^2$.

Hence, option (1) is the correct choice.

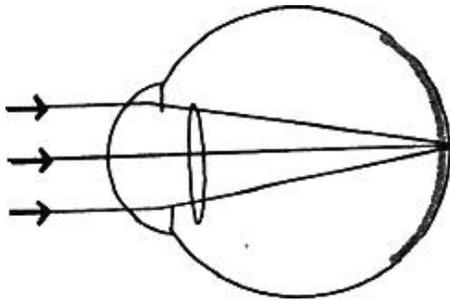
The human eye contains a lens that allows light rays entering the pupil to be focused on the retina which is located at the back of the eye.



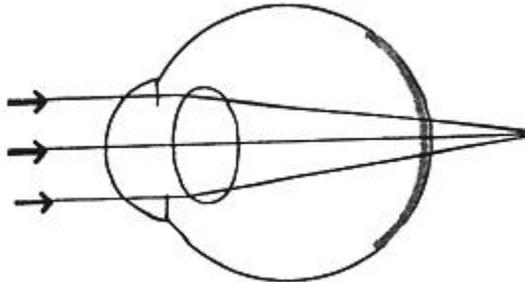
The lens is surrounded by muscles that can change the thickness of the lens. One of the diagrams below correctly shows the way light rays are focused when the thickness of the lens is changed.

59. Which is the correct diagram?

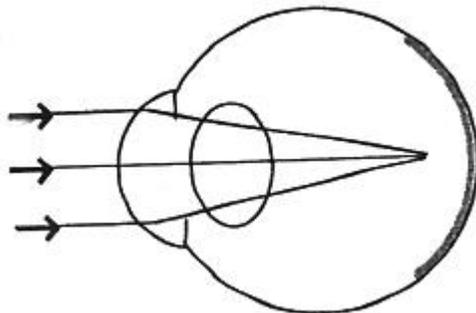
1)



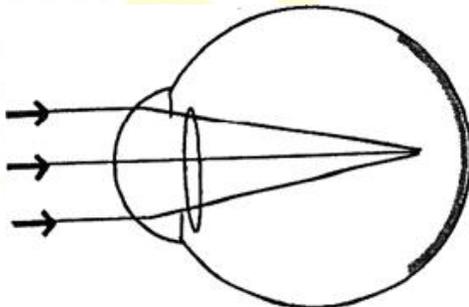
2)



3)



4)



Solution: With the increase in the thickness of the lens the focus comes closer to the lens, thus in option 3 the lens is thicker so the focus is closer to the lens.

Hence, option (3) is the correct choice.

60. If the smallest of the viruses appears to have a diameter of 2 mm when observed through an electron microscope, the microscope's magnification power is

- 1) 20x
- 2) 200x
- 3) 20 000 x
- 4) 200 000x

Solution: Since, magnifying power = size of image/size of object

$$\text{Magnification power} = (2 \text{ mm}) / (10 \text{ nm}) = (2 \times 10^{-3}) / (10 \times 10^{-9}) = 2 \times 10^5 = 200000x$$

Hence, option (4) is the correct choice.

