

PART I : PHYSICS

This section contains **10 Single Choice Questions (Q : 01 to Q : 10)**. Each question has four choices **(A), (B), (C) and (D)** out of which **ONLY ONE** is correct.

1. Which of the following scenarios demonstrates a non-contact force?

- (A) Pushing a swing
- (B) Writing on a board
- (C) Magnet attracting iron
- (D) Kicking a ball

2. What is the correct relation between pressure, force and area?

- (A) $P = F \times A$
- (B) $F = P / A$
- (C) $P = F / A$
- (D) $A = F \times P$

3. Match **Column - I** with **Column - II** and select the correct answer using the codes given below.

Column - I	Column - II
P. Manometer	1. Measures gas pressure mainly
Q. Spring Balance	2. Measures absolute atmospheric pressure
R. Barometer	3. Measures applied force
S. Mechanical Pressure Gauge	4. Measures mechanical pressure

Code :

- | | P | Q | R | S |
|-----|---|---|---|---|
| (A) | 1 | 3 | 2 | 4 |
| (B) | 3 | 2 | 4 | 1 |
| (C) | 3 | 1 | 4 | 2 |
| (D) | 2 | 1 | 4 | 3 |

4. A block of mass 2 kg is at rest on a horizontal surface. If the coefficient of static friction is 0.5, what is the maximum force that can be applied before it starts to move?

(Take $g = 10 \text{ m/s}^2$)

- (A) 50 N
- (B) 10 N
- (C) 150 N
- (D) 20 N

5. Which of the following best explains why rolling friction is less than sliding friction?

- (A) Rolling involves more area
- (B) Deformation is less in rolling
- (C) Gravity affects rolling
- (D) Rolling is faster

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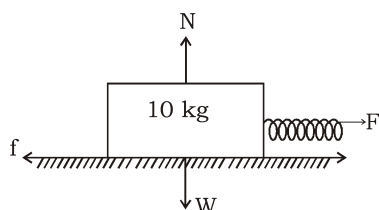
6. Assertion (A) : In mountains, fountain pens may leak ink.

Reason (R) : Atmospheric pressure at high altitudes is higher than inside the pen.

- (A) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are the true but Reason (R) is not a correct explanation of Assertion (A).
- (C) Assertion (A) is true and Reason (R) is false.
- (D) Assertion (A) is false and Reason (R) is true.

Paragraph for Questions 07 & 08

A 10 kg block is placed on a horizontal rough surface. A spring scale is used to pull the block. The frictional force gradually increases until the block just begins to move when the spring scale reads 40 N. Once the block starts sliding, the force required to keep it moving at constant speed drops to 30 N. The gravitational acceleration (g) is 10 m/s^2 . The diagram shows the forces acting on the block:



7. What is the coefficient of static friction (μ_s) between the block and the surface?

- (A) 0.3
- (B) 0.4
- (C) 0.5
- (D) 0.6

8. What is the magnitude of normal force applied by the surface on block ?

- (A) 30 N
- (B) 40 N
- (C) 100 N
- (D) 50 N

9. Assertion (A) : Friction always acts in the direction opposite to the motion of a body.

Reason (R) : Friction resists relative motion between two surfaces in contact.

- (A) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are the true but Reason (R) is not a correct explanation of Assertion (A).
- (C) Assertion (A) is true and Reason (R) is false.
- (D) Assertion (A) is false and Reason (R) is true.

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Sequence Based

10. Sequence the changes when a spacecraft re-enters Earth's atmosphere:

Statements:

1. Air friction generates intense heat
2. High-speed motion causes air drag
3. Spacecraft hits denser air layers
4. Heat shields protect internal components

(A) 1 → 2 → 3 → 4

(B) 3 → 2 → 1 → 4

(C) 1 → 3 → 2 → 4

(D) 4 → 1 → 2 → 3

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PART II : CHEMISTRY

This section contains **10 Single Choice Questions (Q : 11 to Q : 20)**. Each question has four choices **(A), (B), (C) and (D)** out of which **ONLY ONE** is correct.

11. During a fuel investigation activity, students observed that petrol evaporates quickly when left open, whereas kerosene remains in the container for a longer period. Which of the following conclusions is correct?

- (A) Petrol is less volatile.
- (B) Kerosene is more volatile than petrol.
- (C) Petrol is a volatile liquid and evaporates faster than kerosene.
- (D) Kerosene is a non-volatile liquid that catches fire easily.

12. The necessary conditions for combustion process to occur are

- 1. Availability of air/oxygen only
- 2. Availability of air/oxygen and fuel
- 3. Temperature of fuel below ignition temperature
- 4. Temperature of fuel above ignition temperature

Select the correct alternative.

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

13. Match **Column - I** with **Column - II** and select the correct answer using the codes given below.

Column - I	Column - II
P. Peat	1. High moisture, low carbon
Q. Lignite	2. Highest carbon content
R. Bituminous	3. Used widely in industries and homes
S. Anthracite	4. Brown coal, soft

Code :

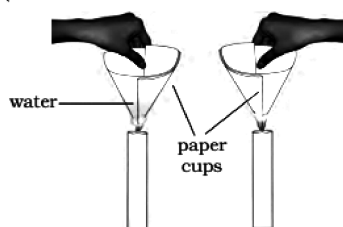
	P	Q	R	S
(A)	1	4	3	2
(B)	4	3	2	1
(C)	3	1	4	2
(D)	2	1	4	3

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14. Shubham heats a paper cup filled with water directly over a flame. Surprisingly, the cup does not catch fire. What is the correct scientific explanation for this?



- (A) Paper is a poor conductor of heat, so it does not get hot enough to burn.
- (B) The water inside absorbs the heat and keeps the paper's temperature below its ignition point.
- (C) Flames cannot burn paper because paper has very low ignition point.
- (D) The outer surface of the paper cup reflects heat away from the flame.
15. Read the following statements and mark the correct ones from the given options.
- (i) Coal, petroleum and natural gas are called fossil fuels.
- (ii) Coal and natural gas are two exhaustible substances.
- (iii) Coke is used in manufacture of steel.
- (iv) Fossil fuels are present in unlimited quantities.

- (A) (i) and (ii)
- (B) (i) and (iv)
- (C) (i), (ii) and (iii)
- (D) (i), (ii), (iii) and (iv)

16. **Assertion (A)** : The colour of LPG flame is blue while a candle flame is yellow.

Reason (R) : LPG undergoes complete combustion while wax undergoes incomplete combustion.

- (A) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are the true but Reason (R) is not a correct explanation of Assertion (A).
- (C) Assertion (A) is true and Reason (R) is false.
- (D) Assertion (A) is false and Reason (R) is true.

Paragraph for Questions 17 & 18

Fuels with a high calorific value release more energy and are considered efficient, while those with a low calorific value produce less energy and may leave behind more residue. Calorific value is a key factor in selecting fuels for domestic and industrial use, as it determines the energy output, cost-effectiveness, and environmental impact of the fuel.

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17. A fuel burns completely and releases 55,000 kJ of heat by burning 2.5 kg of the fuel. What is its calorific value?
- (A) 2200 kJ/kg
(B) 13,750 kJ/kg
(C) 22,000 kJ/kg
(D) 55,000 kJ/kg

18. Arrange the following fuels in increasing order of calorific value:

- (A) Wood < Coal < Petrol < LPG
(B) LPG < Wood < Petrol < Coal
(C) Coal < Wood < LPG < Petrol
(D) Wood < LPG < Coal < Petrol

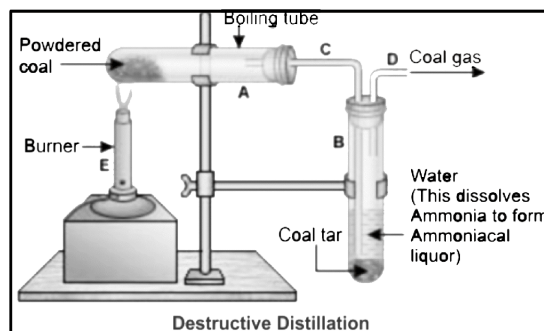
19. **Assertion (A)** : Bitumen is preferred over coal tar for road surfacing in modern construction.

Reason (R) : Bitumen is less toxic, more adhesive, and easier to handle than coal tar.

- (A) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are the true but Reason (R) is not a correct explanation of Assertion (A).
(C) Assertion (A) is true and Reason (R) is false.
(D) Assertion (A) is false and Reason (R) is true.

Sequence Based

20. During the process of destructive distillation of coal, which of the following shows the correct sequence in which the by-products are formed and collected, based on their volatility and physical properties?



- (A) Coke → Coal gas → Ammoniacal liquor → Coal tar
(B) Coal gas → Ammoniacal liquor → Coal tar → Coke
(C) Ammoniacal liquor → Coal gas → Coal tar → Coke
(D) Coal gas → Ammoniacal liquor → Coke → Coal tar

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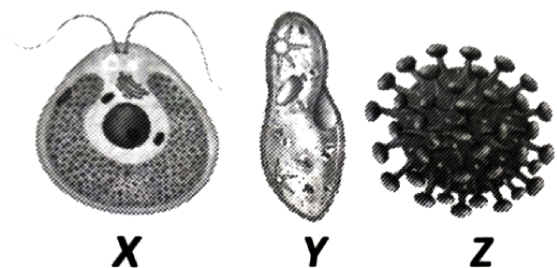
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PART III : BIOLOGY

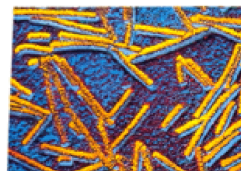
This section contains **10 Single Choice Questions (Q : 21 to Q : 30)**. Each question has four choices **(A), (B), (C) and (D)** out of which **ONLY ONE** is correct.

21. Identify organisms X, Y, and Z shown in the given figures and select the correct statement regarding them.

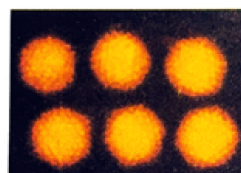


- (A) Organisms X and Y have cellular structure while organism Z does not have a cellular structure.
- (B) Organisms X and Y are autotrophic in nature while organism Z is parasitic in nature.
- (C) Organisms X and Y are unicellular eukaryotes while organism Z is a unicellular prokaryote.
- (D) Organism Y reproduces by asexual methods only while organisms X and Z reproduce by both asexual and sexual methods.

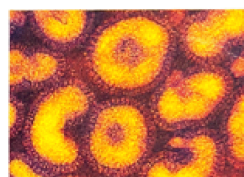
22. Which of the following viruses infects plants?



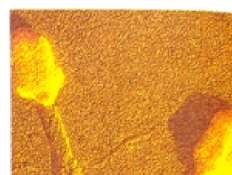
a. Tobacco mosaic virus



b. Ademo virus



c. Influenza virus



d. Bacteriophage

- (A) Influenza virus
- (B) Adeno virus
- (C) Bacteriophage
- (D) Tobacco mosaic virus

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23. Match **Column – I** with **Column – II** and select the correct answer using the codes given below.

Column – I	Column – II
Microorganisms	Functions / Characteristics
P. Nitrosomonas	1. Produces the first widely used antibiotic
Q. Mycobacterium tuberculosis	2. A cyanobacterium that fixes atmospheric nitrogen
R. Anabaena	3. Causes a deadly infectious disease in lungs
S. Penicillium notatum	4. Converts ammonia into nitrites during nitrification

Code :

	P	Q	R	S
(A)	1	2	3	4
(B)	4	3	2	1
(C)	3	1	4	2
(D)	2	1	4	3

24. If a farmer uses only the tool shown in **Fig.A** for both ploughing and sowing, what major disadvantage might farmer face?

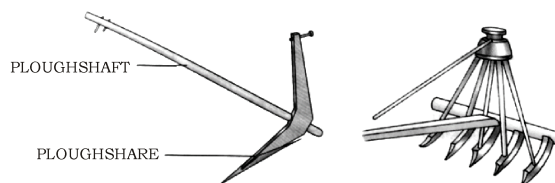


Fig.A

Fig.B

- (A) Seeds may germinate too quickly.
- (B) Seeds may remain on the surface and not germinate properly.
- (C) Soil may become too soft.
- (D) Fertilizers may not reach the roots.

25. A farmer wants to minimize water usage while ensuring that water reaches the root zone directly. Which irrigation method shown in **Image** should he adopt?



- (a)
- (b)
- (c)
- (A) Image (a)
- (B) Image (b)
- (C) Image (c)
- (D) All of these

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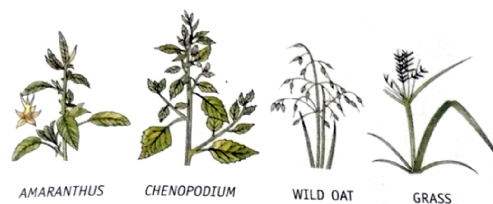
26. Assertion (A) : Bacteria can be found in the human body and in extreme environments such as the sea floor and volcanic regions.

Reason (R) : Bacteria are multicellular organisms that form cysts to protect themselves in all environments.

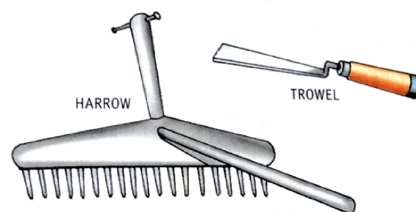
- (A) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are the true but Reason (R) is not a correct explanation of Assertion (A).
- (C) Assertion (A) is true and Reason (R) is false.
- (D) Assertion (A) is false and Reason (R) is true.

Paragraph for Questions 27 & 28

In farms, sometimes plants grow that are not planted by the farmer. These are called weeds. They compete with the main crops for water, sunlight, nutrients, and space. Some common weeds found in fields are Amaranthus, Chenopodium, Wild Oat, and different types of grass. If weeds are removed early, the crops grow better. Tools like harrow and trowel help in removing weeds by hand. Removing weeds at the right time improves soil quality and crop production.



Some common weeds



Implements used for weeding

- 27.** How can a farmer easily tell the difference between Chenopodium and Wild Oat?
- (A) By looking at their leaves and branches.
 - (B) By checking how deep their roots go.
 - (C) By noticing the time they absorb sunlight.
 - (D) By checking the water in the soil around them.
- 28.** When is the use of a trowel best for removing weeds?
- (A) When the weeds have deep roots all over the field.
 - (B) When weeds need to be removed quickly using chemicals.
 - (C) When few weeds are near the crop with shallow roots.
 - (D) When weeds are left in the field until harvesting.

Space for rough work

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29. Assertion (A) : Pesticides generally do not harm the plant when used in proper doses.

Reason (R) : Pesticides are selectively toxic to pests and safe for all other living organisms.



- (A) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are the true but Reason (R) is not a correct explanation of Assertion (A).
- (C) Assertion (A) is true and Reason (R) is false.
- (D) Assertion (A) is false and Reason (R) is true.

Sequence Based

- 30.** What is the correct sequence describing the transfer of nitrogen from plants to carnivores?
- (A) Nitrates in soil → Plant proteins → Herbivores eat plants → Carnivores eat herbivores
 - (B) Atmospheric nitrogen → Plant proteins → Carnivores eat plants → Herbivores eat carnivores
 - (C) Ammonification → Plant proteins → Carnivores eat plants → Herbivores eat plants
 - (D) Denitrification → Plant proteins → Herbivores eat plants → Carnivores eat herbivores

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PART IV : MATHEMATICS

This section contains **20 Single Choice Questions (Q : 31 to Q : 50)**. Each question has four choices **(A), (B), (C) and (D)** out of which **ONLY ONE** is correct.

31. If the product of two rational number is

$$-\frac{13}{35}. \text{ If one of them is } \frac{3}{7}, \text{ then find the}$$

absolute value of the difference of the two rational numbers.

(A) $\frac{2}{35}$

(B) $1\frac{31}{105}$

(C) $\frac{4}{5}$

(D) $\frac{46}{105}$

Sequence Based

32. Arrange the following types of quadrilaterals from the most general to the most specific, based on their properties.

P. Quadrilateral

Q. Parallelogram

R. Rectangle

S. Square

Which list shows the steps in the correct order?

(A) P, Q, R, S

(B) P, R, Q, S

(C) R, Q, S, R

(D) P, Q, S, R

33. Five year ago, Ram was thrice as old as Shyam. Ten years from now, Ram's age will be twice Shyam's age. What is the sum of their present ages ?

(A) 60 years

(B) 70 years

(C) 75 years

(D) 80 years

34. Assertion (A) : For each rational number $\frac{p}{q}$, $q \neq 0$.

Reason (R) : Rational numbers are always positive.

(A) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are the true but Reason (R) is not a correct explanation of Assertion (A).

(C) Assertion (A) is true and Reason (R) is false.

(D) Assertion (A) is false and Reason (R) is true.

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35. How many sides does a regular polygon have, if the measure of an exterior angle is 24° .

- (A) 15 sides
- (B) 10 sides
- (C) 12 sides
- (D) 20 sides

36. Which of the following statement/s is/ are **True(T)** or **False(F)** ?

(i) If a quadrilateral has two pairs of equal adjacent sides, then it must be a kite.

(ii) A rectangle whose diagonals are perpendicular to each other, then it must be a square.

(iii) The sum of interior angle of any concave quadrilateral is different from that of a convex quadrilateral.

(iv) If all angles of a quadrilateral are equal, then all its sides must also be equal.

Code :

(i) (ii) (iii) (iv)

- (A) T F T F
- (B) T F T T
- (C) T T F F
- (D) F T T F

37. A card is drawn from a well shuffled pack of 52 cards. The probability of drawing Red colour king is :

- (A) $\frac{1}{52}$
- (B) $\frac{2}{26}$
- (C) $\frac{1}{26}$
- (D) $\frac{1}{13}$

Paragraph for Questions 38 & 39

Japnek decided to buy a plot of commercial land for Rs. 450000. He sells one-third at a loss of 25% and two-fifth at a gain of 30%. He also makes an overall profit of 10%.



38. Find the proposed selling price.

- (A) Rs. 480000
- (B) Rs. 485000
- (C) Rs. 490000
- (D) Rs. 495000

39. Find the selling price of remaining plot.

- (A) Rs. 184500
- (B) Rs. 418500
- (C) Rs. 248500
- (D) Rs. 148500

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40. Match **Column – I** with **Column – II** and select the correct answer using the codes given below.

Match the numbers in column-I with their square roots in column-II.

Column – I	Column – II
P. 2809	1. 55
Q. 4225	2. 47
R. 3025	3. 53
S. 2209	4. 65

Code :

	P	Q	R	S
(A)	1	2	3	4
(B)	4	3	2	1
(C)	3	4	1	2
(D)	2	1	4	3

41. Find the square root of “ $2 + \sqrt{3}$ ”.

- (A) $\frac{\sqrt{3} + \sqrt{2}}{\sqrt{2}}$
- (B) $\frac{\sqrt{3} + 1}{\sqrt{2}}$
- (C) $\frac{\sqrt{3} + \sqrt{6}}{\sqrt{2}}$
- (D) $\frac{\sqrt{3} + \sqrt{2}}{\sqrt{3}}$

Sequence Based

42. Arrange the following steps in the correct sequence to construct a grouped frequency distribution table from raw data :

- P.** Go through each data value and put a tally mark against the corresponding class interval.
- Q.** Count the tally marks for each class interval to get the frequency.
- R.** Set up column for class intervals, tally marks and frequency.
- S.** Determine the range of the data and decide on the number of classes/class interval.

Which list shows the steps in the correct order?

- (A) S, R, Q, P
- (B) P, R, Q, S
- (C) S, R, P, Q
- (D) P, Q, S, R

43. Find the cube root of $\sqrt[3]{392} \times \sqrt[3]{448}$.

- (A) 56
- (B) 65
- (C) 57
- (D) 75

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44. Assertion (A) : $\frac{4x+8}{9} = \frac{6x-2}{8}$ is a

linear equation.

Reason (R) : Solution of the equation is -2 .

- (A) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are the true but Reason (R) is not a correct explanation of Assertion (A).
- (C) Assertion (A) is true and Reason (R) is false.
- (D) Assertion (A) is false and Reason (R) is true.

45. Find the compound interest on Rs.

15625 for $1\frac{1}{2}$ years, at 8% per annum when compounded half yearly.

- (A) Rs. 1954
- (B) Rs. 1945
- (C) Rs. 1951
- (D) Rs. 1955

46. Which of the following statement/s is/ are **True(T)** or **False(F)** ?

The bar graph below shows the number of books read by students in a class during a summer vacation.



Consider the following statement based on the bar graph.

- (i) The highest number of students read exactly 2 books.
- (ii) More student's reads 4 or 5 books than those who read 0 and 1 book.
- (iii) The total no. of student surveyed in the class is 25.
- (iv) Exactly one student read the maximum number of book.

Code :

- (i) (ii) (iii) (iv)
- (A) T F T F
- (B) T T T T
- (C) T T F T
- (D) F T T F

47. Simplify : $\sqrt{41 - \sqrt{21 + \sqrt{19 - \sqrt{9}}}}$

- (A) 6
- (B) 8
- (C) $\sqrt{5}$
- (D) $\sqrt{6}$

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Paragraph for Questions 48 & 49

The students of class 8 are organizing a school fair to raise funds for charity. They decide to sell handmade greeting cards and small potted plants. Each greeting card is sold for Rs. 15 and each potted plant is sold for Rs. 30. They manage to sell a total of 120 items (cards and plants combined). They collected a total of Rs. 2700 from the sales.

48. If 'x' represents the number of greeting cards sold, which of the following equations correctly represents the total money collected ?

- (A) $15x + 30(120 - x) = 2700$
- (B) $15(120 - x) + 30x = 2700$
- (C) $15x + 30x = 2700$
- (D) $15x + 30(120) = 2700$

49. How many greeting cards were sold at the fair ?

- (A) 60
- (B) 70
- (C) 80
- (D) 90

50. Match **Column - I** with **Column - II** and select the correct answer using the codes given below.

Match the given statements/numbers in column-I with their corresponding properties results in column-II.

Column - I	Column - II
P. The smallest natural number that is a perfect cube and ends with 0 is	1. A perfect cube
Q. Cube of an odd number	2. 1000
R. Number of zeroes at the end of the cube of 100.	3. is always odd
S. 2197	4. 6

Code :

	P	Q	R	S
(A)	1	2	3	4
(B)	4	3	2	1
(C)	3	1	4	2
(D)	2	3	4	1

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PART V : LOGICAL REASONING & IQ

This section contains **10 Single Choice Questions (Q : 51 to Q : 60)**. Each question has four choices **(A), (B), (C) and (D)** out of which **ONLY ONE** is correct.

Direction (51-52) : In the given number series, find the next term :

51. 6, 6, 8, 24, 28, 140, ?

- (A) 144
- (B) 146
- (C) 145
- (D) 148

52. 16, 32, 96, 192, 576, ?

- (A) 1052
- (B) 1152
- (C) 1252
- (D) 1154

53. Pratima departs from her house and walks 29m towards the North and then turns right and walks 16m. Now she turns right again and walks 17m. She again takes a right turn and stops after walking for 21m. What is the shortest distance between Pratima and her house now ?

(Assuming that all turns are 90 degree only)

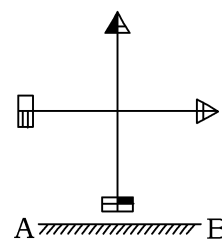
- (A) 17 m
- (B) 18 m
- (C) 13 m
- (D) 12 m

54. In this question, choose the correct mirror - image from alternatives (MN is mirror) :



- (A) K E L Y L G H
- (B) K E T A L G H
- (C) K E T Y L G H
- (D) K E T A L G H

55. In this question, choose the correct water - image from alternatives :

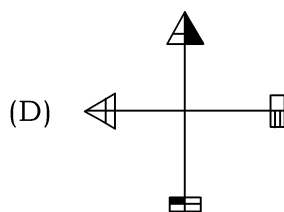
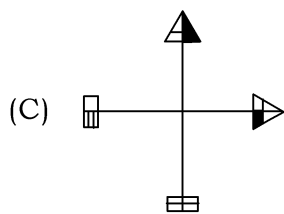


- (A)
- (B)

Space for rough work

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56. Vijay and Shankr are ranked 9th and 13th from the top in a class of 57 students. What will be their respective ranks from the bottom of the class ?

- (A) 48th, 44th
- (B) 49th, 45th
- (C) 45th, 49th
- (D) 47th, 43rd

57. If '@' means 'addition', '%' means 'multiplication', '\$' means 'division', and '#' means 'subtraction', then find the value of the following expression-

$$23 @ 105 \$ 15 \% 6 \# 29$$

- (A) 23
- (B) 28
- (C) 36
- (D) 40

58. Which two signs should be interchanged to make the given equation correct ?

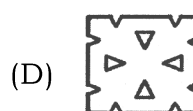
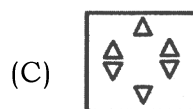
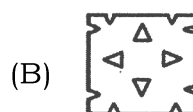
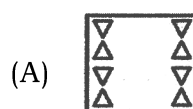
$$121 + 11 - 42 \times 6 \div 7 = 83$$

- (A) - and ÷
- (B) + and ÷
- (C) ÷ and ×
- (D) × and -

59. Find the completely unfolded figure of Z.



X Y Z



60. All 92 people are standing in a row facing North. Manju is 16th from the left end while Nisha is 9th from the right end. How many people are there between Manju and Nisha ?

- (A) 58
- (B) 67
- (C) 48
- (D) 65

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Space for rough work

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