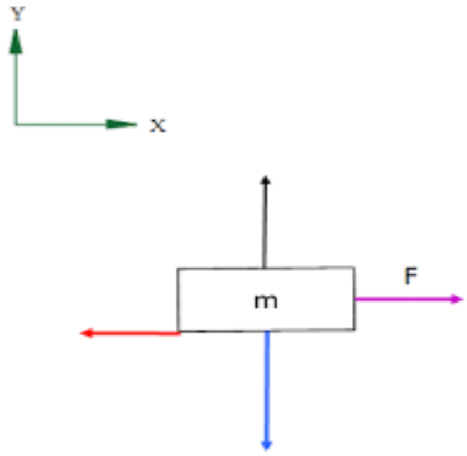
PART I : PHYSICS

*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 best explains why the shape of a camel's feet helps it walk on sand?

(A) Less weight
(B) More pressure
(C) Larger surface area reduces pressure
(D) It floats on sand

2. In the diagram below, a force 'F' is applied to pull a box of mass 'm' on a smooth surface. Which of the following options shows the correct direction of force acting in the given situation.



(A) Frictional force to the right
(B) Weight upward
(C) Normal reaction downward
(D) None of these

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

Column – I (Medium)	**Column – II (Friction Type / Nature)**
P. Solid-Solid	**1.** Viscosity determines internal resistance
Q. Solid-Liquid	**2.** Known as air drag or air resistance
R. Air (Gas)	**3.** Friction depends on shape and speed
S. Liquid-Liquid	**4.** Caused by interlocking of surface irregularities

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

Space for rough work

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4. A 5 kg object is sliding on a rough floor with a coefficient of kinetic friction 0.3. What is the frictional force acting on it ? (Take g = 9.8 m/s²)

(A) 14.7 N

(B) 10.5 N

(C) 19.6 N

(D) 5.9 N

5. A truck and a bicycle are moving at the same speed on a dry road. Who will experience more rolling friction?

(A) Truck

(B) Bicycle

(C) Both experience equal friction

(D) Cannot be determined

6. **Assertion (A) :** A needle pierces the cloth easily, but a finger does not.

Reason (R) : Pressure is directly proportional to area when force is constant.

(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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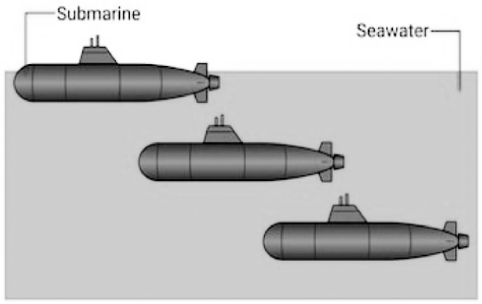
Paragraph for Questions 07 & 08

A team of marine engineers is working on a new class of submarines meant to move silently and efficiently underwater. One of the main challenges is minimizing fluid friction that acts when an object moves through water. The engineers study aquatic animals like dolphins and sharks, whose streamlined bodies allow them to move fast with little energy loss. By mimicking their shapes and using special non-stick coatings, the engineers reduce friction and improve the submarine's fuel efficiency.



7. Fluid friction doesn't depends on —

(A) Speed of the submarine

(B) Shape of the submarine

(C) Colour of the submarine

(D) Density of water

Space for rough work

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8. What would be the effect of increasing the submarine's speed in terms of fluid friction?

(A) Fluid friction decreases

(B) Fluid friction remains unchanged

(C) Fluid friction increases

(D) No friction acts underwater

9. **Assertion (A) :** Spikes are provided in the soles of sports shoes, especially for runners and football players.

Reason (R) : Spikes decreases the area of contact with the ground, there by increasing the pressure exerted and providing a better grip.

(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.

***** B08121025 *****

Sequence Based

10. Which of the following steps correctly describe how a hydraulic lift works?

P. The vehicle is lifted up due to the large output force.

Q. The pressure is transmitted equally through the fluid.

R. A larger piston receives the transmitted pressure.

S. A small force is applied on a piston.

(A) S → Q → R → P

(B) S → R → Q → P

(C) P → Q → R → S

(D) R → Q → P → S

Space for rough work

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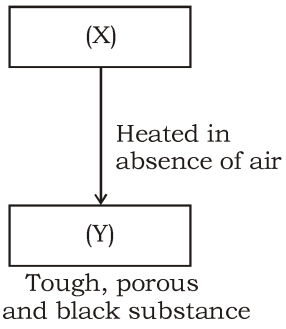
PART II : CHEMISTRY

*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. 'Y' is formed when 'X' is heated in absence of air. 'Y' is tough, porous and black substance. Both 'X' and 'Y' are carbon-rich materials.



What could '**X**' and '**Y**' be?

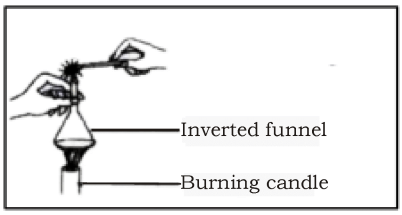
(A) X = Coal, Y = Coke

(B) X = Petroleum, Y = Petrol

(C) X = Coal, Y = Coal tar

(D) X = Petroleum, Y = Diesel

12. Hold an inverted funnel above the flame as shown in figure given below. Bring a lighted matchstick near the mouth of the funnel. Which of the following is correct observation?



(A) A strong downward wind blows into the funnel's mouth.

(B) The flame of the matchstick bends inward into the funnel.

(C) The flame of the matchstick remains unaffected.

(D) The flame of the matchstick extiguishes.

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

Column – I	**Column – II**
P. Water gas	**1.** Fuel for vehicles
Q. Producer gas	**2.** $CO + H_2$
R. Compressed natural gas	**3.** $CO + N_2$
S. Liquefied petroleum gas	**4.** Household fuel

Code :

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

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Space for rough work

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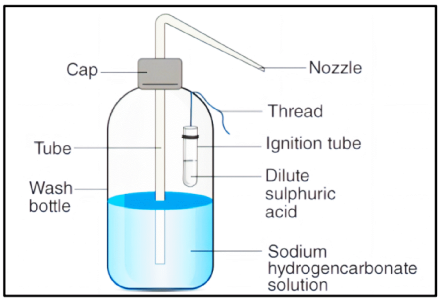
14. In the diagram, a small test tube containing sulfuric acid is placed inside a larger container having sodium hydrogencarbonate solution. What is the purpose of this setup?



(A) To keep the internal atmosphere cool

(B) To create foam for smothering

(C) To produce carbon dioxide to extinguish small fire.

(D) To act as a catalyst in combustion

15. P is processed in industries to get some useful products such as Q, R and S. S is obtained during the processing of P to get Q, R is a mixture of about 200 substances. Identify P, Q, R and S.

(A) P-Coal, Q-Coal tar, R-Coke, S-Coal gas

(B) P-Coke, Q-Coal R-Coal tar, S-Coal gas

(C) P-Coal Q-Coke, R-Coal tar, S-Coal gas

(D) P-Coke, Q-Coal, R-Coal gas, S-Coal tar

16. Assertion (A) : Water is used to extinguish all types of fires.

Reason (R) : Water cools down the burning material below its ignition temperature.

(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

A fuel is a substance which is used to produce heat energy for domestic and industrial purposes. A good fuel is one which is readily available. Burning of these fuels produce harmful substances. These substances can cause global warming, acid rain and also cause many diseases.

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Space for rough work

B08121025

17. Burning of coal and diesel releases X (gas) which is extremely suffocating and corrosive. Petrol engines give off mainly Y (a gaseous substance) but X less in amount. These X and Y substances dissolve in rain water and produce Z. Here, X, Y and Z are :

(A) X-sulphur dioxide, Y-oxides of nitrogen, Z-acid rain

(B) X-nitrogen dioxide, Y-oxides of sulphur, Z-acid rain

(C) X-nitrogen monoxide, Y-oxides of sulphur, Z-basic rain

(D) X-sulphur trioxide, Y-oxides of nitrogen, Z-basic rain

18. Calorific values of some fuels are given:

Fuel	Calorificvalue (kj/kg)
Biogas	35,000 - 40,000
Petrol	45,000
Hydrogen	1,50,000
CNG	50,000

On the basis of this data, find out the correct order of efficiency of fuels.

(A) Biogas > Petrol > CNG > Hydrogen

(B) CNG > Hydrogen > Biogas > Petrol

(C) Hydrogen > CNG > Petrol > Biogas

(D) Petrol > CNG > Biogas > Hydrogen

***** B08121025 *****

19. **Assertion (A) :** Sugar charcoal is a crystalline form of carbon.

Reason (R) : It is prepared by using Conc. H_2SO_4 which acts as a dehydrating agent with sugar on heating.

(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. Which of the following correctly represents the logical sequence of processes in a petroleum refinery?

(A) Cracking → Blending → Fractional Distillation → Product Distribution

(B) Heating Crude Oil → Fractional Distillation → Separation of Fractions → Cracking → Blending and Treatment → Distribution

(C) Product Distribution → Cracking → Separation → Distillation

(D) Extraction → Reforming → Condensation → Blending → Fractional Distillation

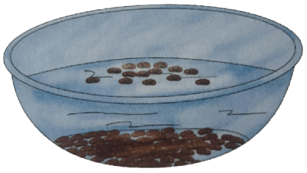
Space for rough work

B08121025

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. What is the state of the seeds that float in the water?



(A) Healthy and heavy

(B) Unhealthy and lighter

(C) Germinating

(D) Ready for consumption

22. For large-scale storage of grains, which methods are recommended to protect them from pests like rodents and microbes?

(A) Storing them in gunny bags only.

(B) Using well-ventilated godowns, granaries, or silos.

(C) Leaving them in open fields.

(D) Applying pesticides directly to the grains.

***** B08121025 *****

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

Column – I	Column – II
P. Transplantation	**1.** Sowing 2+ crops in the same field
Q. Mixed Cropping	**2.** Growing different crops in succession
R. Crop Rotation	**3.** Nutrients loss from same crop continuously
S. Soil Depletion	**4.** Transferring seedlings

Code :

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

Space for rough work

B08121025

24. The fungus shown in image 'a' (Penicillium) is famously associated with:

a. *Penicillium*

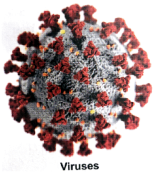
(A) Being a primary ingredient in brewing alcoholic beverages.

(B) The spoilage of fruits and vegetables in pantries.

(C) The production of a widely used life-saving antibiotic.

(D) Its role as a mycorrhizal partner with plant roots.

25. What happens to a cell infected by a virus?



Viruses

(A) The cell starts producing more nutrients for the virus.

(B) The cell's nucleus stops functioning, but the cell remains alive.

(C) The cell eventually dies and bursts, releasing new viruses.

(D) The cell transforms into a virus itself.

***** B08121025 *****

26. Assertion (A) : Rabi crops are typically harvested between September and October in India.

Reason (R) : Kharif crops are known as monsoon crops, as they are sown at the beginning of the rainy season.

(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

Microorganisms come in a wide variety of shapes and structures. Some have a rounded appearance, while others may look elongated, spiral, or even irregular. These structural differences help in their identification and classification. Certain microorganisms are single-celled and naturally green in color, often found in moist or aquatic environments, and can reproduce rapidly under suitable conditions.

Space for rough work

B08121025

27. Which shape is represented by "Coccus" bacteria?

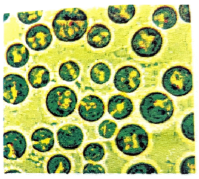
(A) Rod-shaped

(B) Spherical

(C) Curved

(D) Spiral

28. Which microorganism is shown in the image as being spherical and green?



(A) Yeast

(B) Chlamydomonas

(C) Chlorella

(D) Amoeba

29. **Assertion (A) :** Dengue fever is caused by the dengue virus.

Reason (R) : The Aedes mosquito is the vector for dengue fever.

(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.

***** B08121025 *****

Sequence Based

30. After a crop is harvested, what is the typical sequence of events to prepare the grains for storage?

(A) Winnowing → Threshing → Drying → Storage

(B) Threshing → Winnowing → Drying → Storage

(C) Drying → Threshing → Winnowing → Storage

(D) Storage → Threshing → Winnowing → Drying

Space for rough work

B08121025

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 cost price of 21 copies of a books, are the same as the selling price of 18 copies of the book, then gain percent is :

(A) $14\frac{2}{7}\%$

(B) $16\frac{2}{3}\%$

(C) $33\frac{1}{3}\%$

(D) $23\frac{1}{3}\%$

Sequence Based

32. Arrange the following steps in the correct sequence to draw a pie chart.

P. Label each sector appropriately.

Q. Draw a cricle of suitable radius.

R. Draw radii making central angles corresponding to each components.

S. Calculate the central angle for each component

Which list shows the steps in the correct order?

(A) P, R, Q, S

(B) S, Q, R, P

(C) R, P, Q, S

(D) P, Q, S, R

***** B08121025 *****

33. Find the cube root of $\frac{0.064}{3.375}$.

(A) $\frac{8}{25}$

(B) $\frac{4}{15}$

(C) $\frac{15}{4}$

(D) $\frac{4}{25}$

34. Assertion (A) : The measure of each interior angle of a regular hexagon is 120°.

Reason (R) : Sum of a interior angles of a regular polygon of n sides is $\frac{(2n-4)}{n}$ right angles.

(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.

Space for rough work

B08121025

35. What least number must be subtracted from 7250 to get a perfect square ?

(A) 25

(B) 35

(C) 125

(D) 55

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

(i) The square of an odd number is always an odd number.

(ii) A number ending with 0, 1, 4, 5, 6 or 9 can be a perfact square.

(iii) The number of digits in the square root of a 4-digits perfect square is always 2.

(iv) The sum of first 'n' odd natural number is n^2.

Code :

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

37. In a simultaneous throw of three coin, what is the number of possible outcomes ?

(A) 6

(B) 12

(C) 8

(D) 18

***** B08121025 *****

Paragraph for Questions 38 & 39

The angles of a quadrilateral are in the ratio of 3 : 5 : 7 : 9.

38. The sum of the least and greatest angle is :

(A) 175°

(B) 180°

(C) 170°

(D) 185°

39. The measure of all angles are :

(A) 45°, 70°, 105°, 140°

(B) 40°, 80°, 105°, 135°

(C) 45°, 75°, 110°, 130°

(D) 45°, 75°, 105°, 135°

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

Match the quantities given in column-I to the respective ratio given in the column-II.

Column – I	**Column – II**
P. 36 to 64	**1.** 2 : 5
Q. 40 paise to Rs.3	**2.** 9 : 16
R. 24 minutes to an hour	**3.** 1 : 16
S. 125 ml to 2 litres	**4.** 2 : 15

Space for rough work

B08121025

Code :

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

41. Solve for x : $\frac{(x+2)(2x-3)-2x^2+6}{x-5}=2$.

(A) x = 10

(B) $x=\frac{2}{5}$

(C) $x=12$

(D) $x=2.5$

Sequence Based

42. Arrange the following steps in the correct sequence to find the square root of a perfect square by prime factorization method :

P. Group the prime factors in pairs of identitcal factors.

Q. Take one factor from each pair.

R. Multiply these selected factors to get the square root.

S. Find the prime factorization of the given number.

Which list shows the steps in the correct order?

(A) S, P, Q, R

(B) P, R, Q, S

(C) R, P, Q, S

(D) P, Q, S, R

***** B08121025 *****

43. Which of the following is equivalent to $-\frac{3}{7}$?

(A) $\frac{9}{-21}$

(B) $-\frac{6}{14}$

(C) $-\frac{15}{35}$

(D) All of the above

44. Assertion (A) : The probability of getting an odd number, when a dice is thrown is $\frac{1}{2}$.

Reason (R) : Probability of an event (E) $P(E)=\frac{\text{Number of favourable outcomes}}{\text{Total number of possible outcomes}}$

(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.

Space for rough work

B08121025

45. Which of the following options is correctly arranges in ascending order.

(A) $-\frac{5}{6},-\frac{7}{12},-\frac{11}{18},\frac{-3}{-4}$

(B) $-\frac{7}{12},-\frac{11}{18},\frac{5}{-6},\frac{-3}{-4}$

(C) $-\frac{5}{6},-\frac{11}{18},-\frac{7}{12},\frac{-3}{-4}$

(D) $\frac{-3}{-4},\frac{-11}{18},\frac{-7}{12},\frac{5}{-6}$

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

(i) The cube of a single digit number can be a two digit number.

(ii) The cube root of a number ending in 8 will end in 2.

(iii) If a number is a perfect cube, then its prime factors must appear in triplets.

(iv) There are no perfect cubes between 100 and 200.

Code :

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

***** B08121025 *****

47. If the length of a diagonal of a square is 8 cm, find the length of the side of the square.

(A) 2 cm

(B) 64 cm

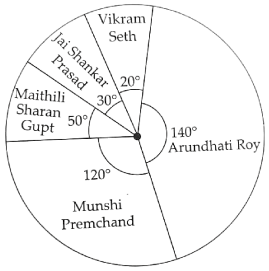
(C) $8\sqrt{2}$cm

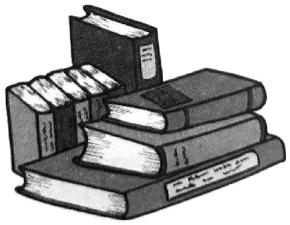
(D) $4\sqrt{2}$cm

Paragraph for Questions 48 & 49

As a holiday maths project, Abhinav surveyed on famous author's novels read by some persons in his society.

The number of persons who read novels of different famous authors are shown in the following pie chart.





48. What percentage of the total number of persons in the survey read Arundhati Roy's novels ?

(A) 35%

(B) 38.89%

(C) 39.6%

(D) 40.8%

Space for rough work

B08121025

49. What percentage of the total number of persons in the survey read maithili Sharan Gupt's novels ?

(A) 9.6%

(B) 11.2%

(C) 12.56%

(D) 13.89%

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

Match the rational number concepts in column-I with their definitions/properties in column-II.

Column – I	**Column – II**
P. Multiplicative inverse	**1.** A number that can be expressed in the form of $\frac{p}{q}$, where p and q are an integer and $q \neq 0$.
Q. Rational number	**2.** The number '0'.
R. Multiplicative identity	**3.** If $a \times b = 1$, then b is the reciprocal of a.
S. Additive identity	**4.** The number 1

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

***** B08121025 *****

Space for rough work

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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.*

51. In this given number series, find the next term :

225, 100, 36, 9, 1, ?

(A) 4

(B) 0

(C) -3

(D) 5

52. In this question, a number of letter are given. There are blanks which can be filled with the help of the letters of the options below. Choose the correct option and complete the series :

p _ q q r _ p p q _ r r _ p q _ _r

(A) p r q p q r

(B) r p q r p q

(C) q q p p r r

(D) q p r q r q

53. Anita starts from her house and cycles 6 km towards the South and then turns left and cycles 8 km. She again turns left and cycles for X km to reach her school. Point A is to the West of her school and also 3 km to the North of her house. What is the value of X ?

(A) 9 km

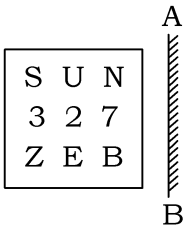
(B) 3 km

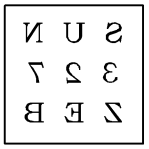
(C) 7 km

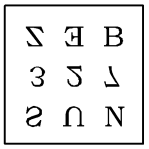
(D) 11 km

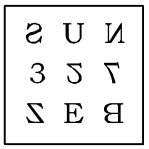
***** B08121025 *****

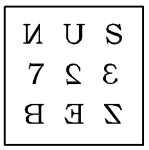
54. In this question, choose the correct mirror - image from alternatives (AB is mirror) :



(A) 

(B) 

(C) 

(D) 

55. In a class of students, Rajesh ranks 15th from the top and Prakash ranks 25th from the bottom. Gyan is 10th place ahead of Prakash. If there are 10 students exactly in between Rajesh and Gyan, then how many total students are there in the class ?

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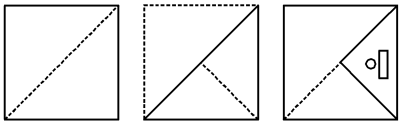
(A) 60
(B) 55
(C) 40
(D) 50

56. Hema ranks 11th in a class of 36 students. What is her rank from last?
(A) 25th
(B) 26th
(C) 27th
(D) 28th

57. If '@' means 'addition', '%' means 'multiplication', '$' means 'division' and '#' means 'subtraction', then find the value of the following expression :
126 $ 7 % 3 @ 19 # 21
(A) 52
(B) 18
(C) 23
(D) 4

58. Which two numbers need to be interchanged to make the following equation correct ?
4 + 2 ÷ 3 × 8 – 1 = 6
(A) 3 and 4
(B) 2 and 4
(C) 8 and 4
(D) 3 and 8

59. Find the completely unfolded figure of Z.



X Y Z

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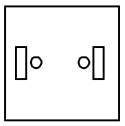
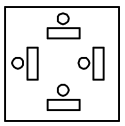
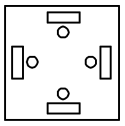
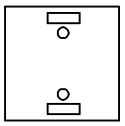
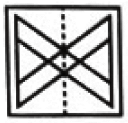
(A) 

(B) 

(C) 

(D) 

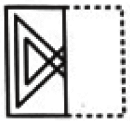
60. Find out from amongst the four alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.

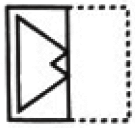


(X)

(A) 

(B) 

(C) 

(D) 

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