

**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. A body, initially at rest, undergoes uniformly accelerated motion in a straight line such that the distance covered in the 5th second alone is 25 m. Which of the following most accurately estimates the acceleration acting on the body?
  - (A)  $2.5 \text{ m/s}^2$
  - (B)  $5 \text{ m/s}^2$
  - (C)  $1 \text{ m/s}^2$
  - (D)  $10 \text{ m/s}^2$
  
2. A block of 2 kg is acted upon simultaneously by two horizontal forces: 18 N to the right and 10 N to the left. Taking into account a constant frictional force of 4 N opposing the motion, identify the direction and magnitude of the resultant acceleration experienced by the block, adhering strictly to Newton's laws.
  - (A)  $2 \text{ m/s}^2$ , right
  - (B)  $4 \text{ m/s}^2$ , left
  - (C)  $2 \text{ m/s}^2$ , left
  - (D)  $1 \text{ m/s}^2$ , right

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

Column - I	Column - II
<b>P.</b> Instantaneous Velocity	<b>1.</b> Limit of average velocity as time interval approaches zero
<b>Q.</b> Distance-Time Curve	<b>2.</b> Graphical tool to analyse non-linear motion
<b>R.</b> Relative Motion	<b>3.</b> Frame-dependent displacement comparison
<b>S.</b> Variable Acceleration	<b>4.</b> Rate of change of velocity is not constant over time

**Code :**

	<b>P</b>	<b>Q</b>	<b>R</b>	<b>S</b>
(A)	2	1	4	3
(B)	4	3	2	1
(C)	3	1	4	2
(D)	1	2	3	4

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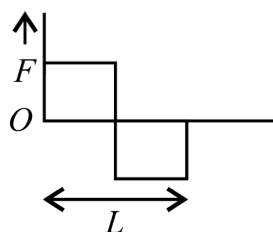
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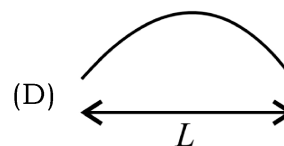
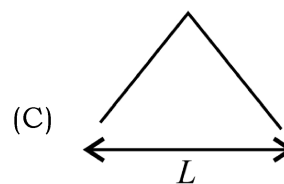
4. Which of the following scenarios is the most accurate physical interpretation of Newton's First Law, based on an object suspended in a lift accelerating downward with an acceleration of  $2 \text{ m/s}^2$ ? Assume  $g = 10 \text{ m/s}^2$ .

- (A) The tension becomes zero, indicating free fall
- (B) The tension equals weight, proving equilibrium
- (C) The tension is less than weight, supporting the inertia of motion
- (D) The net force is upward due to inertia resisting downward motion

5. A person used force  $F$ , shown in figure to move a load with constant velocity on a surface. Identify the correct surface profile.



- (A)
- (B)



6. **Assertion (A)** : A body in motion cannot change its direction or speed unless acted upon by an external unbalanced force.

**Reason (R)** : Inertia of motion governs all states of motion irrespective of direction or speed.

- (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**

When a moving bus comes to an abrupt halt, passengers lurch forward. This phenomenon is not a result of the bus pushing them, but rather a demonstration of the passengers' inertia of motion. Newton's first law states that a body in motion tends to remain in motion with the same velocity unless acted upon by an external unbalanced force. The floor of the bus suddenly decelerates due to the brakes, but the upper body of the passengers, having no direct interaction with the braking system, continues its state of motion momentarily. This is the reason seat belts are critical in vehicles, especially during rapid deceleration, as they provide the required unbalanced force to stop the forward motion of the passenger's body.

7. Which of the following best explains why passengers fall forward in a sudden stop?
- (A) Due to an unbalanced backward force from the bus floor
  - (B) Due to inertia keeping the upper body in motion
  - (C) Because Newton's third law acts on the seat
  - (D) Because gravity momentarily stops acting

8. Which Newton's law is most appropriately demonstrated in the phenomenon described above?
- (A) First Law
  - (B) Second Law
  - (C) Third Law
  - (D) Law of Conservation of Energy

9. **Assertion (A)** : For a freely falling object from a certain height, the velocity keeps increasing but the gravitational acceleration remains constant throughout the fall.

**Reason (R)** : The constant gravitational acceleration acts only till the object reaches the terminal velocity, after which it becomes zero.

- (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.** Block A is heavier than Block B. They are connected by a light string over a smooth pulley and released from rest. Arrange the events in the correct order.

- 1.** The heavier block A moves down; the lighter block B moves up.
- 2.** The string gets tight and both blocks start moving together.
- 3.** A difference in weights creates a net unbalanced force.
- 4.** Tension forms equally in the string on both sides.

(A) 4 → 2 → 1 → 3

(B) 1 → 2 → 4 → 3

(C) 3 → 4 → 2 → 1

(D) 4 → 3 → 2 → 1

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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.** Read the following statements carefully.

Select all the correct ones:

- i.** The potassium permanganate crystals are diffused in water as evidence that particles of same matter attract each other.
- ii.** Solids do not exhibit diffusion under any circumstances.
- iii.** Brownian motion in colloids is due to the collision of dispersed particles with the molecules of the dispersion medium.
- iv.** Sublimation is a process that supports the particle nature of matter.

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

**12.** Which of the following correctly explains steel ?

**Types of Steel**

**Carbon Steel**

**Stainless Steel**

**Alloy Steel**

**Tool Steel**

- (A) It contains different elements that cannot be separated.  
 (B) Its components are chemically bonded in fixed proportions.  
 (C) Its composition can vary and components are not chemically bonded.  
 (D) It contains only one type of atom.

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

Column – I	Column – II
<b>P.</b> Milk with fats	<b>1.</b> Emulsion- Centrifugation
<b>Q.</b> Water and Alcohol	<b>2.</b> Mixture- Sublimation
<b>R.</b> Blood cells and Plasma	<b>3.</b> Sol- Centrifugation
<b>S.</b> Iodine and Copper sulfate	<b>4.</b> True solution- Distillation

**Code :**

	<b>P</b>	<b>Q</b>	<b>R</b>	<b>S</b>
(A)	1	4	3	2
(B)	4	3	2	1
(C)	3	1	4	2
(D)	2	1	4	3

14. Which of the following represents inorganic compound?

- (A) Formic acid ( $\text{HCOOH}$ )
- (B) Sulfuric acid ( $\text{H}_2\text{SO}_4$ )
- (C) Citric acid ( $\text{C}_6\text{H}_8\text{O}_7$ )
- (D) Acetic acid ( $\text{CH}_3\text{COOH}$ )

15. Which physical change best illustrates the use of latent heat?

- (A) Water cooling from  $80^\circ\text{C}$  to  $60^\circ\text{C}$
- (B) Ice melting at  $0^\circ\text{C}$
- (C) Steam cooling from  $120^\circ\text{C}$  to  $100^\circ\text{C}$
- (D) Iron expanding on heating

16. **Assertion (A) :** An unsaturated solution can become saturated by adding more solute without changing the temperature.

**Reason (R) :** A solution can always dissolve more solute regardless of temperature conditions.

- (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 17 & 18**

Evaporation is a surface phenomenon where liquid molecules at the surface gain enough energy to become gas. It can occur at any temperature, not just at the boiling point. On the other hand, vaporisation generally refers to the process of changing from a liquid to a gas and includes both evaporation and boiling. Boiling happens at a fixed temperature called the boiling point, and occurs throughout the liquid, not just at the surface.

17. Ravi spilled equal amounts of water on two pieces of cloth. He spread one cloth completely flat in sunlight and left the other one crumpled in the shade. After 30 minutes, what does Ravi correctly conclude?
- (A) Crumpled cloth absorbs more water than flat cloth.
- (B) Water evaporates faster in sunlight and when the surface area is more.
- (C) Wind speed helps in evaporation so cloth still remains wet when in shade.
- (D) Flat cloth reflects heat and keeps the water cool.

18. Imagine the following graph shows the melting and boiling points of four substances (A, B, C, D):

Substance	Melting Point (°C)	Boiling Point (°C)
A	-114	78
B	0	163
C	801	1413
D	5	59

If all four substances are heated to 90°C, which substance/s will be in the liquid state?

- (A) A and D
- (B) B and C
- (C) A, B, and D
- (D) Only B
19. **Assertion (A)** : Burns caused by steam are more severe than burns caused by boiling water at the same temperature.
- Reason (R)** : Steam undergoes a phase change upon contact with skin, releasing its latent heat.
- (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**

20. Calculate the % of oxygen in  $\text{H}_2\text{SO}_4$ .

Select and arrange logically in correct sequence from the following :

1. Apply formula:

$$\frac{\text{Mass of element}}{\text{Molar mass of H}_2\text{SO}_4} \times 100$$

$$= \frac{32}{98} \times 100 = 32.653\%$$

2. Total mass of hydrogen =  $2 \times 1 = 2 \text{ g}$

3. Mass of oxygen =  $4 \times 16 = 64 \text{ g}$

4. Apply formula :

$$\frac{\text{Mass of element}}{\text{Molar mass of H}_2\text{SO}_4} \times 100$$

$$= \frac{2}{98} \times 100 = 2.04\%$$

5. Apply formula:

$$\frac{\text{Mass of element}}{\text{Molar mass of H}_2\text{SO}_4} \times 100$$

$$= \frac{64}{98} \times 100 = 65.31\%$$

6. Molar mass of  $\text{H}_2\text{SO}_4 = (2 \times 1) + 32$

$$+ (4 \times 16) = 98 \text{ g/mol}$$

(A) 3 → 1 → 5

(B) 5 → 2 → 4

(C) 6 → 2 → 4

(D) 6 → 3 → 5

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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.** If living cells, similar to those found on earth, were found on another planet, where there was no oxygen, then which cell organelle would most probably be absent?

- (A) Ribosomes
- (B) Golgi apparatus
- (C) Mitochondria
- (D) Endoplasmic Reticulum

**22.** Which one of the following cellular parts is correctly described?

- (A) Ribosomes- those on chloroplast are larger (80S) while those in the cytoplasm are smaller (70S).
- (B) Lysosomes-optimally active at pH of about 8.5.
- (C) Thylakoids-flattened membranous sacs forming the grana of chloroplasts.
- (D) Centrioles - sites for active RNA synthesis.

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

Column - I	Column - II
<b>P.</b> Robert Brown	<b>1.</b> Ribonucleo proteins
<b>Q.</b> Flemming	<b>2.</b> Nucleus as cell organelle
<b>R.</b> Palade	<b>3.</b> Packaging of materials
<b>S.</b> Camillo Golgi	<b>4.</b> Staining of nucleus material

**Code :**

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

**24.** How many of the following structures are examples of connective tissue?

Cartilage, Bone, Tendon, Ligament, Cardiac muscle, Smooth muscle, Neuron and skeletal muscle

- (A) Three
- (B) Five
- (C) Six
- (D) Four

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25. Vascular bundles in monocotyledons are considered closed because:

- (A) There are no vessels with perforations.
- (B) Cambium is absent.
- (C) Xylem is surrounded all around by phloem.
- (D) A bundle sheath surrounds each bundle.

26. **Assertion (A)** : Plant cell does not burst on account of endosmosis when kept in hypotonic solution.

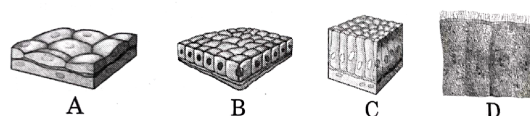
**Reason (R)** : Plant cell possess large vacuoles that remove excess water entering the cell and prevent it from bursting.

- (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**

Epithelial tissue is the simplest tissue which forms the outer protective covering all over the animal body and lines the inside of all cavities such as those of the mouth, throat, stomach, intestine, windpipe and lungs. The epithelial cells are tightly packed with little or no intercellular substances between them. The epithelial tissue rests on a non-cellular basement membrane which is made up of a network of glycoprotein and collagen fibres. Epithelium may be one-cell thick, that is, single layered (simple epithelium) or it may be several-cell thick, that is, many-layered (compound or stratified epithelium).

27. Identify the following simple epithelial tissues and select the correct option.



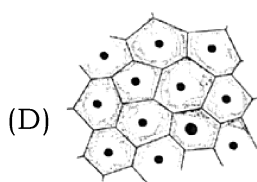
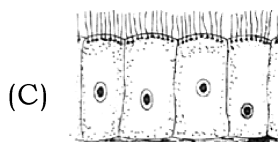
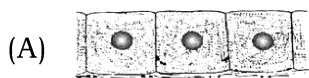
- (A) A-Cuboidal, B-Squamous, C-Columnar, D-Ciliated columnar
- (B) A-Squamous, B-Cuboidal, C-Columnar, D-Ciliated columnar
- (C) A-Squamous, B-Columnar, C-Cuboidal, D-Ciliated cuboidal
- (D) A-Squamous, B-Columnar, C-Cuboidal, D-Pseudostratified columnar

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28. The epithelial tissue that lines the stomach and the intestine is :



29. **Assertion (A)** : Apical meristems are present only at the apices of the stem.

**Reason (R)** : Apical meristems add length to the plants.

- (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. Choose the correct sequence of steps during endocytosis in an animal cell.

- (A) Vesicle formation → Cell engulfs particle → Lysosome digests content
- (B) Particle attaches → Membrane folds inward → Vesicle forms → Digestion
- (C) Golgi body wraps particle → Vesicle moves → Digestion begins
- (D) Ribosome forms vesicle → Membrane closes → Particle digested

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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. The value of :

$$\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \frac{1}{\sqrt{4}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{8}} + \frac{1}{\sqrt{8}+\sqrt{9}}$$

- (A) 2  
(B) 0  
(C) 1  
(D) 4

**Sequence Based**

32. **Problem** : If the polynomial

$p(x) = x^3 - 2ax^2 + 16$  is divisible by  $(x + 2)$ , what is the value of 'a'?

**P.** Substitute the value of x into the polynomial :

$$p(-2) = (-2)^3 - 2a(-2)^2 + 16$$

**Q.** Solve for 'a' to get the final answer :  
 $8 = 8a \Rightarrow a = 1$

**R.** Apply the Factor Theorem, which state that since the polynomial is divisible by  $(x + 2)$ , then  $p(-2) = 0$ .

**S.** Simplify the resulting equation :

$$-8 - 8a + 16 = 0$$

$$\Rightarrow 8 - 8a = 0$$

Which list shows the steps in the correct order?

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

33. Find the ratio in which the line joining the points (6, 4) and (1, -7) is divided by x-axis.

- (A) 1 : 3  
(B) 2 : 7  
(C) 4 : 7  
(D) 6 : 7

34. **Assertion (A)** : In a triangle ABC, if  $AB = AC$  and the bisector of angle B intersects AC at point D such that  $BD = BC$ , then the measure of angle A is  $36^\circ$ .

**Reason (R)** : In an isosceles triangle, the angles opposite to the equal sides are equal.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A).  
(B) Both Assertion (A) and Reason (R) are 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. If  $\sqrt{X} + \frac{1}{\sqrt{X}} = 7$ , then the value of  $X + \frac{1}{X}$

is equal to :

- (A) 47
- (B) 49
- (C) 51
- (D) 45

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

- (i) The set of irrational numbers is closed under the operation of multiplication.
- (ii) For any rational number  $q$  and any irrational number  $r$ , the number  $q + r$  is necessarily irrational.
- (iii) A number is classified as irrational if and only if its decimal representation is non-terminating.
- (iv) The set of irrational numbers is not dense between any two distinct rational numbers.

**Code :**

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

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

37. PQR is a triangle in which  $PQ = PR$ . Points S and T are on QR such that  $QS = ST = TR$ . Which of the following must be true ?

- (A)  $\Delta PQS \cong \Delta PTR$
- (B)  $\Delta PST$  is an equilateral triangle.
- (C)  $PS = PT$
- (D)  $PS \perp QR$

**Paragraph for Questions 38 & 39**

A chemist is mixing two types of acid solutions. Solution A contains 30% acid, and Solution B contains 60% acid. The final mixture needs to have a total volume of 100 liters. Let  $x$  be the volume of Solution A and  $y$  be the volume of Solution B in liters. The chemist wants the final mixture to have a 45% acid concentration.

38. Which of the following linear equations correctly represents the total acid concentration in the final mixture?

- (A)  $0.3x + 0.6y = 45$
- (B)  $30x + 60y = 0.45(100)$
- (C)  $0.3x + 0.6y = 0.45(x + y)$
- (D)  $0.3x + 0.6y = 100$

39. Using the equation from the first question and the total volume constraint, how many liters of Solution A are required?

- (A) 30 liters
- (B) 40 liters
- (C) 50 liters
- (D) 60 liters

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

Column – I	Column – II
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- |   |  |
|---|--|
| <b>P.</b> The point of concurrency of the angle bisectors of a triangle.                      | <b>1.</b> Circumcentre                                     |
| <b>Q.</b> The point of concurrency of the perpendicular bisectors of the sides of a triangle. | <b>2.</b> Ratio of the squares of corresponding altitudes. |
| <b>R.</b> The point of intersection of all the three median of a triangle is called           | <b>3.</b> Incentre   |
| <b>S.</b> The ratio of the areas of two similar triangles is equal to the                     | <b>4.</b> Centroid   |

**Code :**

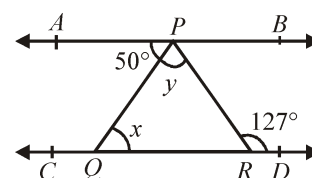
- |     | <b>P</b> | <b>Q</b> | <b>R</b> | <b>S</b> |
|-----|----------|----------|----------|----------|
| (A) | 1        | 2        | 3        | 4        |
| (B) | 4        | 3        | 2        | 1        |
| (C) | 3        | 1        | 4        | 2        |
| (D) | 2        | 1        | 4       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

41. Three points with coordinate (5, 3), (5, 6) and (5, -4) lie on a line, parallel to which axis ?

- (A) X-axis  
(B) Y-axis  
(C) All of the above  
(D) None of the above

**Sequence Based**

42. **Problem :** In the figure below, if  $AB \parallel CD$ ,  $\angle APQ = 50^\circ$ , and  $\angle PRD = 127^\circ$ . Find  $x$  and  $y$ .



- P.** Now, consider the straight line QRD. The sum of angles on a straight line is  $180^\circ$ .  
So,  $\angle PRD + \angle PRQ = 180^\circ$ .
- Q.** Next, use the property that the sum of the interior angles of a triangle is  $180^\circ$ . In  $\triangle PQR$ , we have  $\angle PQR + \angle PRQ + y = 180^\circ$ .
- R.** Since  $AB \parallel CD$ , the alternate interior angles are equal. Therefore,  $\angle APQ = \angle PQR = 50^\circ$ .
- S.** Substitute the known values into the triangle angle sum property :  
 $50^\circ + 53^\circ + y = 180^\circ$ .  
This simplifies to  $103^\circ + y = 180^\circ$ ,  
which gives  $y = 77^\circ$ .

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**T.** Substitute the given value of  $\angle PRD$  to find  $\angle PRQ$ :  
 $127^\circ + \angle PRQ = 180^\circ$ , which means  
 $\angle PRQ = 53^\circ$ .

Which list shows the steps in the correct order?

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

**43.** The parking charges of a car on Pune railway station for first 3 hours is Rs. 70 and Rs. 20 for subsequent hours. Write down an equation for this information.

- (A)  $20x + y - 10 = 0$
- (B)  $20x - y - 10 = 0$
- (C)  $20x - y + 10 = 0$
- (D)  $20x + y + 10 = 0$

**44. Assertion (A) :** The number  $\sqrt{11+2\sqrt{30}}$  is an irrational number.

**Reason (R) :** The product of two irrational number is always an irrational number.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are 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.** The point P and S are on the same side of the line segment QR, such that  $\angle PQR = 90^\circ$ ,  $\angle SRQ = 90^\circ$  and  $PQ = SR$ . Select the correct statement.

- (A)  $\triangle PQR \cong \triangle SRQ$  by ASS
- (B)  $\triangle PQR \cong \triangle SQR$  by SAS
- (C)  $\triangle PQR \cong \triangle SQR$  by RHS
- (D)  $\triangle PQR \cong \triangle SRQ$  by SAS

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

- (i) A polynomial with exactly two non-zero terms can be constructed for any positive integer degree.
- (ii) The degree of the polynomial representing the ratio of the circumference of a circle to its diameter is not defined.
- (iii) If  $\deg(P(x)) = n$  and  $\deg(Q(x)) = n$ , where  $n > 0$ , then the degree  $P(x) + Q(x)$  is always  $n$ .
- (iv) A polynomial of degree  $n$  must possess at least  $n$  terms.

**Code :**

- |     |            |             |              |             |
|-----|------------|-------------|--------------|-------------|
|     | <b>(i)</b> | <b>(ii)</b> | <b>(iii)</b> | <b>(iv)</b> |
| (A) | T          | F           | T            | F           |
| (B) | T          | F           | T            | T           |
| (C) | T          | F           | F            | F           |
| (D) | F          | T           | T            | F           |

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47. The angles of a triangle are such that one angle is the average of the other two angles, then which of the following will be the angles ?

- (A)  $\frac{\pi}{6}, \frac{\pi}{3}, \frac{\pi}{2}$   
 (B)  $\frac{\pi}{3}, \frac{\pi}{3}, \frac{\pi}{2}$   
 (C)  $\frac{\pi}{6}, \frac{\pi}{3}, \frac{\pi}{4}$   
 (D)  $\frac{\pi}{2}, \frac{\pi}{2}, \frac{\pi}{3}$

**Paragraph for Questions 48 & 49**

A local school is planning to redesign its playground. The school management has asked the geometry club to help map out key features using a coordinate system. They've decided to place the main entrance of the school at the origin (0, 0).

The proposed locations for some new features are:

- **Slide (S)** : Located at point (6, 8)
- **Swing Set (W)** : Located at point (12, 8)
- **Merry-Go-Round (M)** : Located at point (6, 0)

All coordinates are in meters. The students need to analyze the distances and positions to ensure the design is optimal and safe.

48. What is the distance between the Slide (S) and the Merry-Go-Round (M)?

- (A) 6 meters  
 (B) 8 meters  
 (C) 10 meters  
 (D) 12 meters

49. If a new drinking water fountain (F) is to be installed exactly at the midpoint of the line segment connecting the Slide (S) and the Merry-Go-Round (M), what would be its coordinates?

- (A) (6, 4)  
 (B) (9, 4)  
 (C) (4, 6)  
 (D) (6, 8)

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

Column – I	Column – II
------------	-------------

**P.** If  $x = 2 + \sqrt{3}$ ,  
the value of  
 $x - \frac{1}{x}$ .

**1.** 2

**Q.** The integer  
value of the  
denominator  
after  
rationalizing

**2.**  $\sqrt{7} - \sqrt{3}$

$$\frac{1}{\sqrt{7} - \sqrt{3}}$$

**R.** The value of a  
if  $\frac{6}{3\sqrt{2} - 2\sqrt{3}} =$   
 $3\sqrt{2} + a\sqrt{3}$

**3.**  $2\sqrt{3}$

**S.** The simplified  
value of

**4.** 4

$$\sqrt{10 - \sqrt{84}}$$

**Code :**

	<b>P</b>	<b>Q</b>	<b>R</b>	<b>S</b>
(A)	1	2	3	4
(B)	3	4	1	2
(C)	3	1	4	2
(D)	2	1	4	3

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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 the following question, select the missing number from the given series.

142, 150, 123, 187, 62, ?

- (A) 281
- (B) 285
- (C) 278
- (D) 300

**52.** Which of the following number will replace the question mark (?) in the given series ?

324, 722, 1200, ?, 2420

- (A) 1764
- (B) 1632
- (C) 1634
- (D) 1736

**53.** Aditi departs from her home and walks 38 m towards West and then turns right and walks 19 m. Now she turns right and walks 25 m. She then takes a left turn again and walks 38 m. She takes a final left turn and walks 25 m to stop at point X. How far is she from a pole which is 57 m North of her house ?

- (A) 38 m
- (B) 49 m
- (C) 57 m
- (D) 51 m

**54.** Q is to the East of S. E is to the South of S. P is to the North-East of Q and North of T. If T is to the South-East of Q. What is the position of S with respect to T ?

- (A) South-East
- (B) South-West
- (C) West
- (D) North-West

**55.** B, C, D, F and H have different marks. Only one person has scored between C and D. only one person has scored between H and D. F has scored less than C and D. How many people have scored less than B ?

- (A) Four
- (B) Three
- (C) One
- (D) Two

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*Space for rough work*

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**56.** In a row of people, Raghav is standing at the 14<sup>th</sup> position from the extreme left end and Naresh is at the 16<sup>th</sup> position from the extreme right end. If they interchange their respective positions, Raghav now becomes 23<sup>rd</sup> from the extreme left end.

What is the position of Naresh from the extreme right end after the interchange ?

- (A) 24<sup>th</sup>
- (B) 28<sup>th</sup>
- (C) 25<sup>th</sup>
- (D) 22<sup>nd</sup>

**57.** By interchanging the given two signs ( $\div$  and  $\times$ ) which of the following equation will be correct ?

- (A)  $11 \div 12 \times 6 + 8 - 10 = 25$
- (B)  $23 - 20 + 35 \div 2 \times 10 = 10$
- (C)  $32 + 3 - 12 \div 18 \times 9 = 10$
- (D)  $9 \times 3 + 8 \div 4 - 7 = 30$

**58.** In this question, two statements are followed by four conclusions given as options. Decide which conclusion (options) is definitely true, based on the given statements.

**Statements :**

$$P \geq Q \geq R \geq S < T$$

$$J \leq K \leq R$$

(A)  $J > T$

(B)  $P \geq J$

(C)  $K \leq T$

(D)  $S \geq P$

**59.** A question is given, followed by two statements labelled I and II. Decide which of the sufficient/necessary to answer the question and select the correct answer statement is/are

**Question :** Who is the shortest among Shamita, Tanya and Rekha ?

**Statement-I :** Shamita is taller than Rekha, Rekha is shorter than Tanya.

**Statement-II :** Rekha is shorter than Surbhi, Surbhi is taller than Shamita. Tanya is shorter than Surbhi.

- (A) Statement I alone is sufficient to answer the questions.
- (B) Statement II alone is sufficient to answer the questions.
- (C) Both statements I and II together are not sufficient to answer the question.
- (D) Both statement I and II together are necessary to answer the questions.

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60. Each of D, E, F, K, L, M and N has an exam on a different day of a week starting from Monday and ending on Sunday of the same week.

N has exam on Thursday. L has an exam on Tuesday. Only four people have exams between F and L. M has an exam on just after L. D has an exam on the day immediately before E.

How many people have exams between E and M ?

- (A) Four
- (B) Three
- (C) Two
- (D) One

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*Space for rough work*

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