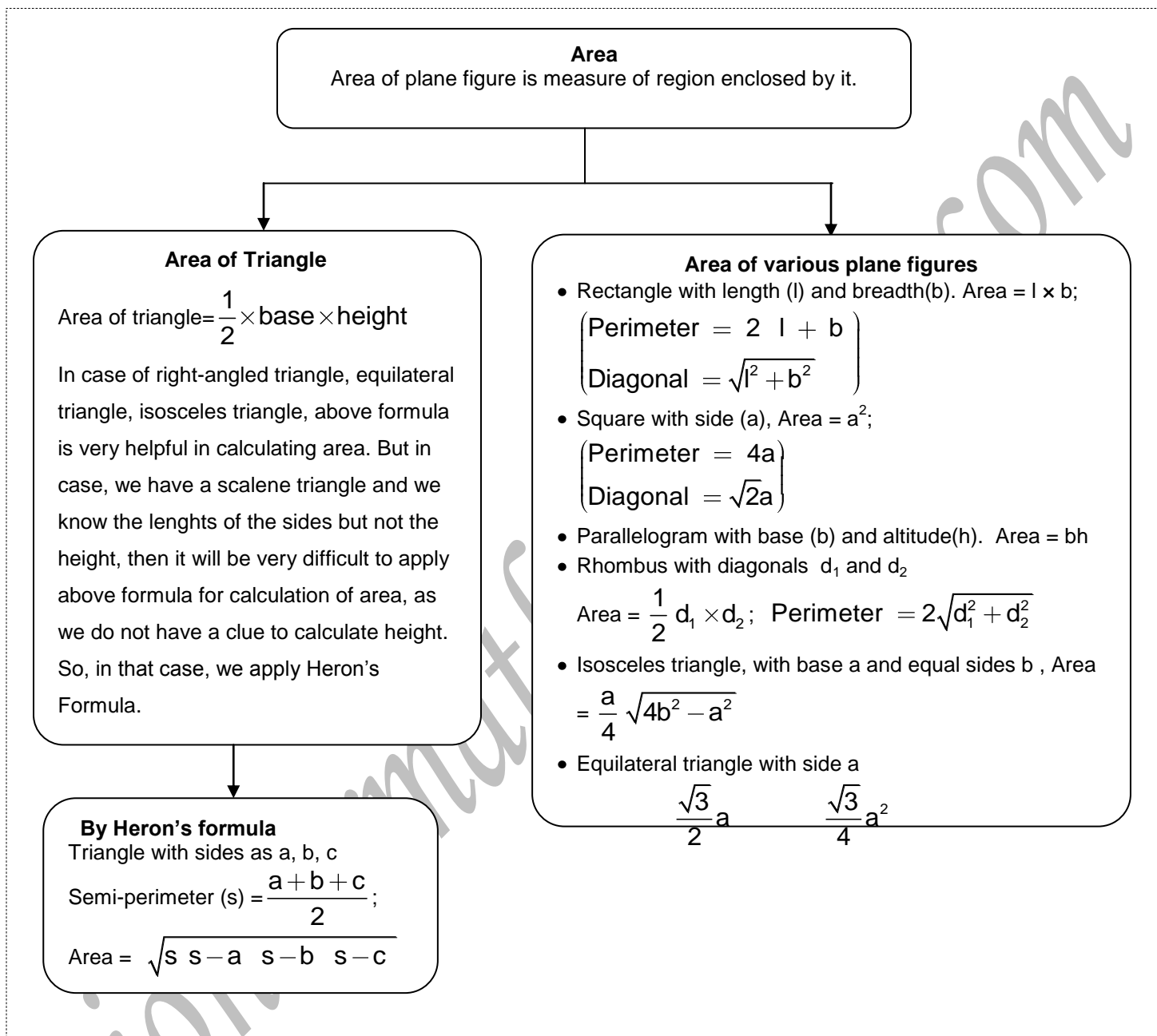


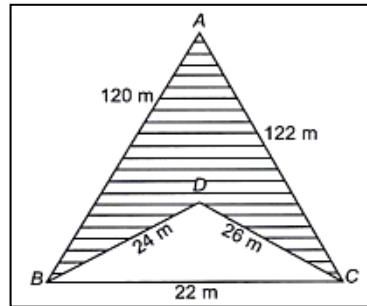
Heron's Formula Chapter Flowchart

The Chapter Flowcharts give you the gist of the chapter flow in a single glance.

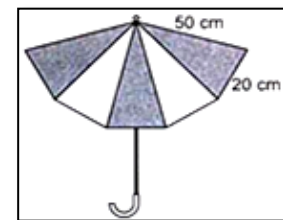


Revision Question Bank

- Find the area of an equilateral triangle having each side $4a$.
- Find the area of an isosceles triangle having base 4 cm and length of one of equal sides as 6 cm.
- The length of the sides of a triangle are in the ratio $4:3:5$. If the perimeter of the triangle is 96 cm. Find its area.
- Two parallel sides of a trapezium are 120 cm and 154 cm and other sides are 50 cm and 52 cm. Find the area of trapezium.
- In the figure, find the area of the shaded region.



- Find the area of a triangle two sides of which are 18 cm and 10 cm and the perimeter is 42 cm.
- A traffic signal board, indicating 'SCHOOL AHEAD' is an equilateral triangle with side ' a '. Find the area of a signal board using Heron's formula. If its perimeter is 180 cm, then what will be the area of the signal board?
- Find the area of the cyclic quadrilateral ABCD having sides ' a ' = 7 cm, $BC = 9$ cm, $CD = 12$ cm and $DA = 6$ cm.
- For an equilateral triangle, find.
 - area, when its perimeter is 48 cm.
 - perimeter, when its area is $144\sqrt{3}$ cm², if required take $\sqrt{3} = 1.732$.
- An umbrella is made by stitching 10 triangular pieces of cloth of two different colours, each piece measuring 20 cm, 50 cm and 50 cm. How much cloth of each colour is required for the umbrella?



Answers

- | | | | |
|-------------------------------------|--------------------------------|-----------------------------|----------------------------------|
| 1. $4\sqrt{2} a^2$ sq. units | 2. $8\sqrt{2}$ cm ² | 3. 384 cm ² | 4. 6663.68 cm ² |
| 5. 104 m ² | 6. 69.65 cm ² | 7. 1558.8 cm ² | 8. $20\sqrt{11}$ cm ² |
| 9. (i) $64\sqrt{3}$ cm ² | (ii) 72 cm | 10. 2450 cm ² | |

For Solutions: www.pioneermathematics.com/latestupdates

Previous Years Questions Bank

1. Find the area of a triangle whose sides are 3 cm, 4 cm and 5 cm. Hence, find the corresponding altitude using longest side as base. **[CBSE Schools 2016-17]**
2. Perimeter of a triangle is 450 m and its sides are in the ratio 5: 12: 13. Find the area of the triangle and its smallest altitude. **[CBSE Schools 2016-17]**
3. Find area of an isosceles triangle which has perimeter 50 m and whose unequal side is 10 m.
(Use $\sqrt{15} = 3.87$) **[CBSE Schools 2016-17]**
4. Find the area of the trapezium in which parallel sides are 25 cm and 10 cm and non-parallel sides are 14 cm and 13 cm. **[CBSE Schools 2016-17]**
5. If the area of a parallelogram is 64 cm^2 , base is 12 cm, then find the altitude of the parallelogram. **[CBSE Schools 2016-17]**
6. Find the perimeter of an isosceles right angled triangle having an area of 200 cm^2 . **[CBSE Schools 2016-17]**
7. An umbrella is made by stitching ten triangular pieces of cloth, each measuring 60 cm, 60 cm and 20 cm. Find the area of the cloth required for the umbrella. **[CBSE Schools 2016-17]**
8. Find the area of a triangle, two sides of which are 8 cm and 11 cm and the perimeter is 32 cm. **[CBSE Schools 2016-17]**
9. An umbrella is made by stitching 10 triangular pieces of cloth of two different colours, each piece measuring 20 cm, 50 cm and 50 cm. How much cloth of each colour is required for the umbrella?
[use $\sqrt{6} = 2.45$] **[CBSE Schools 2016-17]**
10. The area of an equilateral triangle is $64\sqrt{3} \text{ cm}^2$. Find its side. **[CBSE Schools 2016-17]**
11. Using Heron's formula, calculate the area and altitude of an equilateral triangle of side 80 cm.
(Use $\sqrt{3} = 1.73$) **[CBSE Schools 2016-17]**
12. The sides of a quadrilateral ABCD taken in order are 5, 12, 14 and 15 metres and the angle formed by the first two sides is a right angle. Find its area. **[CBSE Schools 2016-17]**
13. In a rhombus, lengths of diagonals are 400 m and 410 m. Find the area and side of the rhombus. **[CBSE Schools 2015-16]**
14. A field is in the shape of trapezium whose parallel sides are 25m and 10m. The non-parallel sides are 14m and 13m. Find the area of the field. **[CBSE Schools 2015-16]**
15. The perimeter of a triangle is 300 cm and its sides are in the ratio 5:12:13. Find its area. **[CBSE Schools 2015-16]**

16. The sides of a triangular plot are in the ratio 3:5:7 and its perimeter is 300m. Find area.

[CBSE Schools 2015-16]

17. Find the perimeter of an isosceles right angled triangle having an area of 5000 m²

(Use $\sqrt{2}=1.41$).

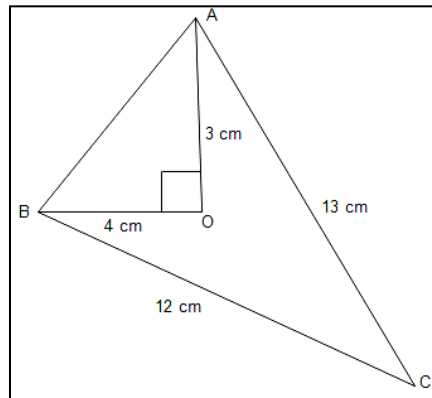
[CBSE Schools 2014-15]

18. Find the area of an equilateral triangle if perimeter of the triangle is 12 cm.

[CBSE Schools 2014-15]

19. In the given fig., calculate area of the shaded region.

[CBSE Schools 2014-15]



20. Two sides of triangle are 32 m and 40 m and its perimeter is 96 m. find the area of the triangle.

[CBSE Schools 2014-15]

21. Find the area of a quadrilateral field ABCD in which $AB = BC = 75\text{m}$, $CD = 60\text{m}$, $DA = 66\text{m}$ and $\angle CDB = 90^\circ$.

[CBSE Schools 2014-15]

22. Find the area of a triangle two sides of which are 18 cm and 10 cm and the perimeter is 42 cm.

[CBSE Schools 2014-15]

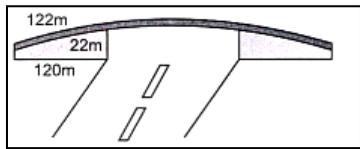
23. A rhombus shaped field has green grass for 18 cows to graze. If each side of the rhombus is 30 m and its longer diagonal is 48m, how much area of grass field will each cow be getting? [CBSE Schools 2014-15]

Chapter Test

Maximum Marks: 30

Maximum Time: 1 hr.

- If a field is in the shape of trapezium whose parallel sides are 25m and 10m. The non-parallel sides are 14 m and 13 m, then find the area of the field. [3]
- Find the area of a triangle whose sides are 9 cm and 5 cm and perimeter 21 cm. [3]
- The triangular side walls of a flyover have been used for advertisement 'SAVE WATER'. The sides of the walls are 122m, 22m and 120 m. The advertisement yield an earning of Rs. 5000 per m² per year. A company hired one of its walls for 3 months.



 - How much rent did it pay? [4]
 - What is the value of the message 'SAVE WATER' in the society? [4]
- A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26 cm, 28 cm and 30 cm and the parallelogram stands on the base 28 cm, then find the height of the parallelogram. [4]
- A cyclic quadrilateral ABCD, in which AB = 4m, BC=9m, CD = 11 m and DA = 6m. Find the area of the quadrilateral ABCD. [4]
- A rhombus shaped field has green grass for 20 cows to graze. If each sides of the rhombus is 52 m and its longer diagonal is 96 m,. Then how much area of the grass field will each cow be getting? [4]
- Anita has piece of land which is in the shape of a rhombus. She has two children, one daughter Preeti and one son. Narendra to work on the land produce different types of crops. She divided the land in two equal parts. If the perimeter of the land is 200 m and one of the diagonal is 70 m, then solve the following questions.
 - How much area each of them will get for their crops? [4]
 - Anita covered the land by wires. How much wire is required to cover the land? [4]
 - As Anita divided the land into two equal parts. Justify her decision. [4]
- A rhombus sheet, whose perimeter is 32 m and whose one diagonal is 10m long, is pained on both sides at the rate of Rs. 5 per m². Find the cost of painting. [4]

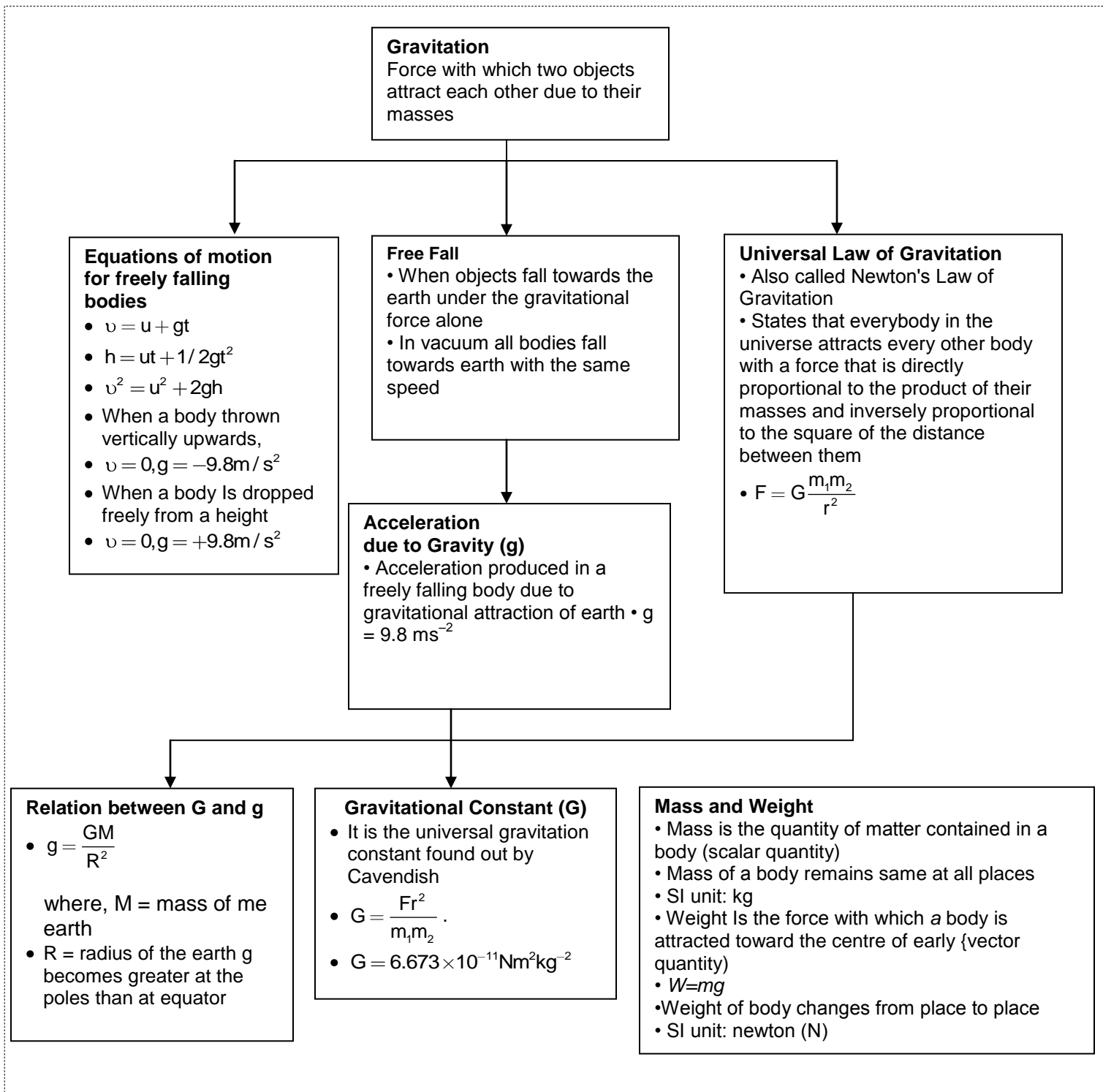
Answers

- (i) Rs. 1650000 (ii) Water is precious. We should not use it unnecessarily. We should conserve it for coming generation.
- 484 cm², 242 cm², 373.04 cm²
- 46.76 cm² 4. 12 cm 5. $6\sqrt{66}$ m² 6. 48 m²
- 196 m² 8. (i) $175\sqrt{51}$ m² (ii) 200m(iii) Anita believes in gender equality, there is no difference between son and daughter.
- Rs. 624.50 10. $\frac{21}{4}\sqrt{11}$ cm²

Gravitation

Chapter Flowchart

The Chapter Flowcharts give you the gist of the chapter flow in a single glance.



Revision Question Bank

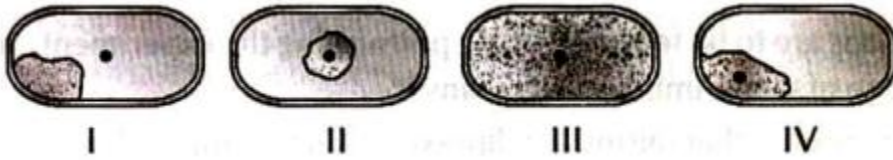
1. Why does the weight of a body vary from poles to equator?
2. Gravitational force acts on all objects in proportion to their masses. Why does a heavy object not fall faster than a light object?
3. Explain Newton's law of gravitation.
4. You buy a bag of sugar of weight w at a place on the equator. You take this to Antarctica. Would its weight be the same there? If not, would it increase or decrease?
5. If a planet exists with radius double than that of the earth's radius and made of same material density d , find the new acceleration due to gravity in terms of that on the surface of the earth.
6. (a) Which is greater, the attraction of the earth for 1 kg of iron or the attraction of 1 kg iron for the earth? Why?
(b) A boy throws a ball vertically upwards and catches it back in 10s. Calculate (i) the velocity with which it was thrown up and
(ii) maximum height attained by the ball (take $g=10 \text{ ms}^{-2}$)
7. A car falls off a ledge and drops to the ground in 0.5s. Let $g=10\text{ms}^{-2}$, then
 - (a) What is its speed on striking the ground?
 - (b) How high is the ledge from the ground?
 - (c) What is its average speed during 0.5s?
8. Compare the weight of an object on the surface of earth with its weight on the surface of moon.
9. Two objects of different masses are dropped down from top of a tower, which one will reach the ground earlier and why?
10. Define universal gravitational constant and give its SI unit with value.

For Solutions: www.pioneermathematics.com/latestupdates

MCQ's [Practical Based Questions]

1. Students A, B and C were given five raisins each of equal weight. The raisins were soaked in distilled water at room temperature. A removed the raisins after 20 minutes; B after two hours and C after 40 minutes. If P_A , P_B and P_C denote percentage absorption of water obtained by students A, B and C respectively, then :
- (a) $P_A > P_B > P_C$ (b) $P_A < P_B < P_C$ (c) $P_A < P_B > P_C$ (d) $P_A = P_B = P_C$.
2. A student dissolved 1 g of sugar in 10 mL of distilled water in a beaker A. He dissolved 10 g of sugar in 100 mL of distilled water in beaker B. Then he dropped a few raisins, in each. After two hours he found the raisins :
- (a) swollen in A and shrunken in B (b) shrunken in A and swollen in B
(c) swollen in both (d) shrunken in both.
3. While performing an experiment with raisins, a student recorded the following data.
Mass of water taken in the beaker = 50 g
Mass of raisins before soaking = 20 g
Mass of raisins after soaking = 30 g
Mass of water in the beaker left after experiment = 40 g
The % of water absorbed by the raisins is :
- (a) 10% (b) 20% (c) 45% (d) 50%.
4. 5 g of raisins were placed in distilled water for 24 hours. The weight of soaked raisins was found to be 7 g. The correct percentage of water absorbed by raisins is :
- (a) 20% (b) 25% (c) 40% (d) 45%.
5. A student soaked 5 g of raisins in beaker (A) containing 25 mL of ice-chilled water and another 5 g of raisins in beaker (B) containing 25 mL of tap water at room temperature. After one hour the student observed that:
- (a) water absorbed by raisins in beaker (A) was more than that absorbed by raisins of beaker (B)
(b) water absorbed by raisins in beaker (B) was more than that absorbed by raisins of beaker (A)
(c) the amount of water absorbed by the raisins of both beakers (A) and (B) was equal
(d) no water was absorbed by raisins in either of the beakers (A) and (B).
6. Raisins swell up after being placed them in a beaker containing water for sometime because:
- (a) the concentration of water in the cell sap is higher than the water in the beaker
(b) the concentration of water in the cell sap is lower than the water in the beaker
(c) the concentration of water in the cell sap is the same as that of water in the beaker
(d) water inside the raisins passes out of them when placed in a beaker of water.

7. In the diagrams drawn by four students who studied plasmolysis in the cells of onion peel, the correct drawing is represented in figure :



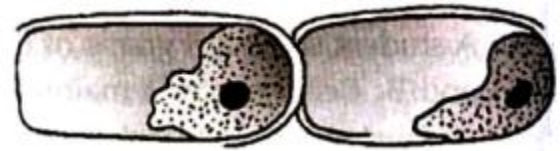
- (a) 1 (b) II (c) III (d) IV.

8. Raisins are soaked in water for determining the percentage of water absorbed by raisins. The formula, used by a student, for calculating the percentage of water absorbed, is :

- (a) $\frac{\text{Initial weight} - \text{Final weight}}{\text{Initial weight}} \times 100$ (b) $\frac{\text{Final weight} - \text{Initial weight}}{\text{Initial weight}} \times 100$
 (c) $\frac{\text{Final weight} - \text{Initial weight}}{\text{Final weight}} \times 100$ (d) $\frac{\text{Initial weight} - \text{Final weight}}{\text{Final weight}} \times 100$

9. The given figure shows plant cells which had been placed in :

- (a) an isotonic solution
 (b) a hypertonic solution
 (c) an isosmotic solution
 (d) a hypotonic solution.



10. The formula used to calculate the percentage of water absorbed by raisins is

$$\frac{W_2 - W_1}{W_1} \times 100$$

W_2 in the formula refers to.

- (a) mass of raisins before absorption of water
 (b) mass of raisins after absorption of water
 (c) mass of water left in the beaker at the end
 (d) mass of water absorbed by the raisins.

Answers

1.	c	2.	c	3.	d	4.	c	5.	b
6.	b	7.	d	8.	b	9.	b	10.	b

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Previous Year Questions

1. Identify the force and explain how: **[CBSE Schools 2016-17]**
 - (i) it is responsible for the moon revolving round the earth.
 - (ii) it is involved in the formation of tides in the sea.
2. The weight of a body at a height equal to be radius of the earth is 'N'. What will be its weight at a height equal to three times the radius of the earth? **[CBSE Schools 2016-17]**
3. (a) As the altitude increases/ how do the weight and mass of the body vary? **[CBSE Schools 2016-17]**
(b) A stone resting on the ground has a gravitational force of 20 N acting on it. What is the weight and mass of the stone? (Take $g = 10 \text{ ms}^{-2}$)
4. (a) Establish a relation between g and G . **[CBSE Schools 2016-17]**
(b) Write the units of 'g' and 'G'
(c) Which force accelerates a body in free fall? A ball thrown vertically upwards comes to rest after reaching at a height. Why? What is its acceleration while going up?
5. The weight of a man on the surface of earth is 588 N. Find his mass, taking $g = 9.8 \text{ ms}^{-2}$. If the man were taken to the surface of moon, his weight would be 98 N. What is his mass on the moon? **[CBSE Schools 2016-17]**
6. Can a body has mass, but no weight? Give reasons for your answer. **[CBSE Schools 2016-17]**
7. (a) Derive an equation to calculate the acceleration due to gravity using Universal law of gravitation and Newton's second law of motion. **[CBSE Schools 2016-17]**
(b) Two objects with different masses are thrown from the same height. Will they reach the surface at the same time? Justify.
8. "All the objects in the universe attract each other". **[CBSE Schools 2016-17]**
 - (a) What is this force of attraction called as?
 - (b) Name any two factors on which this force of attraction depends.
9. The gravitational force between two objects is 100 N. How should the distance between these objects be changed so that the force between them becomes 50 N? **[CBSE Schools 2016-17]**
10. Explain the force responsible for the following: **[CBSE Schools 2016-17]**
 - (i) Moon revolves around the earth.
 - (ii) Objects lying apart on earth attract each other, yet they do not cling to each other.
11. (i) Suppose a planet exists whose mass and radius both are one - half of the value of earth Calculate the acceleration due to gravity on the surface of this planet. **[CBSE Schools 2016-17]**
(ii) What is the acceleration produced in a freely falling body of mass 10kg (Neglect an resistance).

12. (a) What is the weight of an object with mass 10 kg on moon? The value of gravitational acceleration on moon = $\frac{g}{6}$ and (g on earth = 9.8 ms^{-2}) **[CBSE Schools 2016-17]**
- (b) Differentiate between mass and weight of a body. Write any four differences.
13. The earth's gravitational force causes an acceleration of 5 m/s^2 in a 1 kg mass somewhere in space. How much will the acceleration in a 3kg mass be at the same place? Give your answer with reason. **[CBSE Schools 2016-17]**
14. Find the weight of an object at a height 6400 km above the earth's surface. The weight of the object at the surface of the earth is 20 N and the radius of the earth is 6,400 km. **[CBSE Schools 2016-17]**
15. Derive the formula for the gravitational force using the factors on which it depends. **[CBSE Schools 2016-17]**
16. (i) Is the acceleration due to gravity of earth 'g' always a constant at every place? Discuss.
(ii) During a free fall will heavier objects accelerate more than lighter ones? Give reason for your answer. **[CBSE Schools 2016-17]**
17. An object is thrown upwards with a velocity of 20 m/s . Find the time taken by the object to return to the ground. **[CBSE Schools 2016-17]**
18. State Newton's law of gravitation. Give two points of importance of this law. **[CBSE Schools 2014-15]**
19. Where is the value of acceleration due to gravity more-on poles or on equator of earth? Find the force of attraction between two objects of mass 5 kg and 2kg separated by a distance of 4m. **[CBSE Schools 2014-15]**
20. Why is Newton's law of gravitation called universal law? **[CBSE Schools 2014-15]**
- (a) Give its numerical expressions.
(b) Mass of an object is 10 kg. What is its weight on the earth? ($g = 9.8 \text{ m/s}^2$)
21. Give reason- **[CBSE Schools 2014-15]**
- (a) Why does a sheet of paper fall slower than a crumpled ball of paper.
(b) Why does 1 kg of potato weigh more than 1 kg at equator?
(c) Why does every object fall downwards when dropped from a height?
22. What will be the value of 'g' at the poles as compared to the value of 'g' at the equator? **[CBSE Schools 2014-15]**
23. State the importance of the universal law of Gravitation on what factors the value of 'g' depends. **[CBSE Schools 2014-15]**
24. At some place on the equator, a bag of sugar weighs 'W' kg. Will it weigh same, or more or less when taken to Antarctica? Give reason for your answer. **[CBSE Schools 2014-15]**

25. (a) An object is thrown vertically upwards and rises to a height of 10m. Calculate:
(i) the velocity with which the object was thrown upward and
(ii) the time taken by the object to reach the highest point. **[CBSE Schools 2014-15]**
26. How does the force of gravity depend upon masses of body and distance between them? **[CBSE Schools 2014-15]**
27. "Several phenomena of celestial bodies were believed to be unconnected but universal law of gravitation was successful to explain them". Mention any two phenomena. **[CBSE Schools 2014-15]**
28. What is the relation between the mass m and the weight w of a body? What are the differences between the two? **[CBSE Schools 2014-15]**
29. Is there a change in the velocity of a freely falling object? Why? **[CBSE Schools 2014-15]**
30. (a) Differentiate between 'G' and 'g'. **[CBSE Schools 2014-15]**
(b) Is the value of 'g' same everywhere on earth? Reason out.
(c) How does the gravitational force between two objects change if distance between them is tripled?
31. Explain an activity to show that, during a free fall heavier and lighter objects accelerate at the same rate. **[CBSE Schools 2014-15]**
32. A ball A is dropped from a 44.1 m high cliff. Two seconds later, another ball B is thrown downwards from the same place with some initial speed. The two balls reached the ground together. Find the speed with which the ball B was thrown. **[CBSE Schools 2014-15]**
33. Define 'acceleration due to gravity of earth'. Does the acceleration produced in a freely falling body depend on the mass of the body? Justify your answer mathematically. **[CBSE Schools 2014-15]**
34. Communication satellites move in orbits of radius 44, 000 km around the earth. Find the acceleration of such a satellite assuming that the only force acting on it is that due to the earth.
Mass of the earth = 6×10^{24} kg. ($G = .667 \times 10^{-11}$ Nm²/kg²) **[CBSE Schools 2014-15]**
35. Calculate the force of gravitation between two objects of masses 10 kg and 20 kg at a distance of 10 m from each other. **[CBSE Schools 2014-15]**
[$G = 6.67 \times 10^{-11}$ Nm⁻²kg⁻²]
36. (a) Write answer of the following with appropriate reason : **[CBSE Schools 2014-15]**
(i) How does value of 'g' vary at equator and at poles
(ii) Weight of an object is 98 N at the surface of the earth. What will be its weight at the centre of the earth?
(iii) The earth's gravitational force cause an acceleration of 5 m/s² on a 1 kg mass somewhere in space. How much will the acceleration of a 3 kg mass be at the same place?

37. (a) A person weighs 110.84 N on moon, whose acceleration due to gravity is $\frac{1}{6}$ of that earth. If the value of 'g' on earth is 9.8 ms^{-2} . Calculate. **[CBSE Schools 2014-15]**
- (i) 'g' on moon. (ii) mass of person on moon (iii) weight of person on earth
- (b) How does the value of 'g' vary on earth and why?
38. Let us consider the force of gravitation between two objects as 'F' and distance between them as 'r'. What will be the effect on force if : **[CBSE Schools 2014-15]**
- (a) 'r' is reduced to $\frac{1}{4}$.
- (b) If the masses of both the objects are increased by three times.
39. Define: **[CBSE Schools 2014-15]**
- (i) Universal gravitational constant. (ii) Centripetal force.
- (iii) Free fall

For Solutions: www.pionermathematics.com/latestupdates

Chapter Test

Maximum Marks: 30

Maximum Time: 1 hrs.

- To find the height of a bridge over a river, when a stone is dropped freely in the river from the bridge. The stone takes 2 s to touch the water surface in the river. Calculate the height of the bridge from the water level ($g = 9.8 \text{ m/s}^2$). [2]
- Planet Mars has radius one-half of the Earth and mass 1/9th of the Earth. Find the value of g on the surface of Mars. Given that value of g on the surface of Earth is 9.81 ms^{-2} . [2]
- At what height above the surface of the earth, the value of g becomes 64% of its value on the surface of the earth. Take the radius of the earth = 6400 km. [3]
- State universal law of gravitation. Write SI unit of G . The gravitational force between two objects is 100 N. How should the distance between the objects be changed, so that force between them becomes 50 N? [3]
- An object is thrown vertically upwards and rises to height of 80 m. Find [3]
 - the velocity with which the object was thrown upwards and
 - the time taken by the object to reach the highest point ($g = 10 \text{ ms}^{-2}$).
- A small sphere of mass 40 kg is being attracted by another small sphere of mass 80 kg with a force equal to weight of $1/4^{\text{th}}$ of a milligram, when their centres are 30 cm apart. Calculate the value of gravitational constant G in SI units. [3]
- What must be the separation between a 5.2 kg particle and a 2.4 kg particle for their gravitational attraction to have a magnitude of $23 \times 10^{-12} \text{ N}$. [3]
- A ball thrown up vertically returns to the thrower after 6 s. Find [3]
 - velocity with which it was thrown up.
 - the maximum height it reaches.
 - its position after 4 s.
- (a) Distinguish between G and g . [4]
(b) What is the effect of shape of earth on value of g ?
- Two objects of masses m_1 and m_2 , when separated by a distance d , exerts a force F on each other. What happens when [4]
 - value of mass of first is doubled?
 - masses of both objects are doubled?
 - masses are brought so closer that distance between them becomes $d/2$?
 - the space between the two objects has no air, i.e., it is complete vacuum?

For Solutions: www.pioneermathematics.com/latestupdates