

7th Science Lesson 1 Questions in English**1] Measurement**

1. Which among the following is not the physical quantities?

- a) Mass
- b) Distance
- c) Temperature
- d) **None of the above**

Explanation

In day-to-day life, we measure many things such as the weight of fruits, vegetables, food grains, volume of liquids, temperature of the body, speed of the vehicles etc., Quantities such as mass, weight, distance, temperature, volume are called physical quantities.

2. Which among the following is not the classification of physical quantities?

- a) Fundamental quantities
- b) Derived quantities
- c) **Logistic quantities**
- d) None of the above

Explanation

Generally, physical quantities are classified into two types, namely, (i) Fundamental quantities and (ii) Derived quantities.

3. Which among the following statement is correct

- 1) A set of physical quantities which cannot be expressed in terms of any other quantities are known as "Derived quantities". Their corresponding units are called "Derived units".
 - 2) All other derived quantities which can be obtained by multiplying, dividing or by mathematically combining the derived quantities are known as "Fundamental quantities". Their corresponding units are called "Fundamental units".
- a) Only 1
 - b) Only 2
 - c) Both 1 and 2
 - d) **None**

Explanation

A set of physical quantities which cannot be expressed in terms of any other quantities are known as "Fundamental quantities". Their corresponding units are called "Fundamental units".

All other physical quantities which can be obtained by multiplying, dividing or by mathematically combining the fundamental quantities are known as “derived quantities”. Their corresponding units are called “Derived units”.

4. Which among the following is the Derived unit of Area?

- a) m
- b) **m^2**
- c) m^3
- d) None of the above

Explanation

The area is a measure of how much space there is on a flat surface. The area of the plot of land is derived by multiplying the length and breadth

Area = length $\times$ breadth

The unit of the area is = metre $\times$ metre

= metre^2

= m^2 (Read as square metre).

Area is a derived quantity as we obtain are by multiplying twice of the fundamental physical quantity length

5. Which among the following is the Fundamental unit of Luminous (light) intensity?

- a) Mole
- b) Ampere
- c) **Candela**
- d) Kelvin

Explanation

Length – Metre (m); Mass – Kilogram (kg); Time – Second (s); Temperature – Kelvin (K); Electric current – Ampere (A); Amount of substance – Mole (Mol); Luminous (light) intensity – Candela (cd).

6. Which among the following is the derived unit of Electric charge?

- a) square metre (or) m^2
- b) cubic metre (or) m^3
- c) kg m^{-3}
- d) **Coulomb (C)**

Explanation

Area = length $\times$ breadth – $m \times m = \text{square metre (or) } m^2$; Volume = length $\times$ breadth $\times$ height – $m \times m \times m = \text{cubic metre (or) } m^3$; Speed = distance / time – m / s (or) $m s^{-1}$; Electric charge = electric current $\times$ time – $A \times s = As$ (or) Coulomb (C); Density = mass / volume – Kg / m^3 (or) $kg m^{-3}$.

7. What is the area of 10 squares each of side of 1 m?

- a) 1 square metre
- b) 10 square metre**
- c) 100 square metre
- d) 0.1 square metre

Explanation

Area of a square = side $\times$ side

$$= 1 m \times 1 m = 1 m^2 \text{ or } 1 \text{ square metre}$$

Area of 10 squares = 1 square metre $\times$ 10

$$= 10 \text{ square metre}$$

(Even though the area is given in square metre, the surface need not to be square in shape).

8. Which among the following is the area of Triangle?

- a) a^2
- b) lb
- c) πr^2
- d) $\frac{1}{2} \times b \times h$**

Explanation

Square = side $\times$ side = $a \times a = a^2$; Rectangle = length $\times$ breadth = $l \times b = lb$; Circle = $\pi \times (\text{radius})^2 = \pi \times r^2 = \pi r^2$; Triangle = $(1/2) \times \text{base} \times \text{height} = 1/2 \times b \times h$.

9. The area of such irregularly shaped figures can be calculated using what?

- a) Formula
- b) Graph sheet**
- c) Linear line
- d) None of the above

Explanation

In our daily life, we encounter many irregularly shaped figures like leaves, maps, stickers of stars or flowers, peacock feather etc. The area of such irregularly shaped figures cannot be calculated using any formula. We can find the area of these figures with the help of a graph sheet.

10. Find the area of the following regular shaped figures: (Take $\pi = 22/7$)

(i) A rectangle whose length is 12 m and breadth is 4 m

(ii) A circle whose radius is 7 m.

(iii) A triangle whose base is 6 m and height is 8 m

- a) 3m, 22m, 48m^2
- b) 48m^2 , 22m, 48m^2
- c) **48m^2 , 154m^2 , 24m^2**
- d) 16m^2 , 154m^2 , 24m^2

Explanation

(i) Area of rectangle = length $\times$ breadth = $12 \times 4 = 48\text{m}^2$

(ii) Area of circle = $\pi \times r^2 = (22/7) \times 7 \times 7 = 154\text{m}^2$

(iii) Area of triangle = $(1/2) \times \text{base} \times \text{height} = (1/2) \times 6 \times 8 = 24\text{m}^2$

11. The amount of space occupied by a three-dimensional object is known as its ____

- a) Area
- b) Surface area
- c) Breadth
- d) **Volume**

Explanation

The amount of space occupied by a three-dimensional object is known as its volume. volume = surface area $\times$ height.

12. The SI unit of volume is _____

- a) m^{-2}
- b) m^2
- c) **m^3**
- d) m^{-3}

Explanation

The SI unit of volume is cubic metre or m^3 . As in the case of area, the volume of the regularly shaped objects can also be determined using an appropriate formula.

13. Which among the following is the formula used to find volume of cuboid?

- a) **a^3**

b) $l \times b \times h$

c) $\frac{4}{3} \pi r^3$

d) $\pi r^2 h$

Explanation

The volume of Cuboid is length $\times$ breadth $\times$ height = $l \times b \times h = l b h$.

14. Which among the following is the formula used to find volume of cylinder?

a) a^3

b) $l \times b \times h$

c) $\frac{4}{3} \pi r^3$

d) $\pi r^2 h$

Explanation

The volume of cylinder is $\pi \times (\text{radius})^2 \times \text{height} = \pi \times r^2 \times h = \pi r^2 h$.

15. Find the volume of (Take $\pi = 22/7$)

i. a cube whose side is 3 cm

ii. a cylinder whose radius is 3 m and height is 7 m.

a) $9 \text{ cm}^3, 198 \text{ m}^3$

b) $9 \text{ cm}^3, 66 \text{ m}^3$

c) $27 \text{ cm}^3, 198 \text{ m}^3$

d) $27 \text{ cm}^3, 66 \text{ m}^3$

Explanation

(i) Volume of a cube = side $\times$ side $\times$ side = $3 \text{ cm} \times 3 \text{ cm} \times 3 \text{ cm} = 27 \text{ cubic cm or cm}^3$.

(b) Volume of a cylinder = $\pi \times r^2 \times \text{height} = (22/7) \times 3 \times 3 \times 7 = 198 \text{ m}^3$

16. Which among the following is the formula used to find the volume of sphere?

a) a^3

b) $l \times b \times h$

c) $\frac{4}{3} \pi r^3$

d) $\pi r^2 h$

Explanation

The volume of the sphere is $\frac{4}{3} \times \pi \times (\text{radius})^3 = \frac{4}{3} \times \pi \times r^3 = \frac{4}{3} \pi r^3$.

The volume of cube is a^3 .

17. Which among the following statement is correct

- 1) Liquids also occupy some space and hence they also have volume. But liquids do not possess any definite shape. So, the volume of a liquid cannot be determined as in the case of solids. When a liquid is poured into a container, it takes the shape and volume of the container.
- 2) The volume of any liquid is equal to the space that it fills and it can be measured using a measuring cylinder or measuring beaker. The maximum volume of liquid that a container can hold is known as the "capacity of the container". The volume of a liquid is equal to the volume of space it fills in the container. This can be directly observed from the readings marked in the measuring containers.
- 3) To understand this unit of volume, let us first understand how much a litre means. Litre is the commonly used unit to measure the volume of liquids. we can understand that the unit of volume is cubic cm if the dimensions of the object are given in cm. This cubic cm is commonly known as cc. A volume of 100 cc is termed as one litre (l). 1 litre = 100 cc or cm^3 100 ml = 1 litre.
 - a) Both 1 and 2
 - b) Both 1 and 3
 - c) Both 2 and 3
 - d) All 1, 2 and 3

Explanation

To understand this unit of volume, let us first understand how much a litre means. Litre is the commonly used unit to measure the volume of liquids. we can understand that the unit of volume is cubic cm if the dimensions of the object are given in cm. This cubic cm is commonly known as cc. A volume of 1000 cc is termed as one litre (l). 1 litre = 1000 cc or cm^3 1000 ml = 1 litre.

18. Which among the following is not the unit to measure the volume of liquids?

- a) Gallon
- b) Ounce
- c) Quart
- d) Pascal

Explanation

To measure the volume of liquids, some other units are also used. Some of them are gallon, ounce, and quart.

19. Which among the following is the value of 1 gallon?

- a) 2482 ml
- b) 3785 ml

- c) 4824 ml
- d) 1893 ml

Explanation

1 gallon = 3785 ml.

20. Which is defined as the mass of the substance contained in unit volume (1 m^3)?

- a) Surface area
- b) Quarts
- c) **Density**
- d) Mole

Explanation

Density of a substance is defined as the mass of the substance contained in unit volume (1 m^3).

21. Which among the following is the equation of density?

- a) $D = M V$
- b) $D = \frac{1}{M V}$
- c) $D = \frac{M}{V}$
- d) $D = M+V$

Explanation

If the mass of a substance is "M" whose volume is "V", then, the equation for density is given as

$$\text{Density (D)} = \frac{\text{mass (M)}}{\text{volume (V)}} = \frac{M}{V}$$

22. What is the SI unit of density?

- a) Kg m
- b) Kg/m
- c) Kg/m^2
- d) **Kg/m^3**

Explanation

The SI unit of density is kg/m^3 .

23. The CGS unit of density is _____

- a) g/m^3
- b) **g/cm^3**
- c) kg/cm^3

d) kg/m^3

Explanation

The CGS unit of density is g/cm^3 .

24. The materials with lower density are called _____

- a) Denser
- b) Rarer**
- c) Pitcher
- d) Glitter

Explanation

Different materials have different densities. The materials with higher density are called "denser" and the materials with lower density are called "rarer".

25. Which among the following material has higher density?

- a) Air
- b) Kerosene
- c) Water
- d) Mercury**

Explanation

Air – 1.2 kg/m^3 , Kerosene – 800 kg/m^3 , Water – 1000 kg/m^3 , mercury – 13600 kg/m^3 .

26. What is the density of wood?

- a) 770 kg/m^3**
- b) 1200 kg/m^3
- c) 1780 kg/m^3
- d) 2190 kg/m^3

Explanation

The density of wood is 770 kg/m^3 .

27. Which among the following material has higher density?

- a) Gold**
- b) Copper
- c) Silver
- d) Iron

Explanation

Iron – 7800 kg/m³, Copper – 8900 kg/m³, Silver – 10500 kg/m³, Gold – 19300 kg/m³.

28. A solid cylinder of mass 280 kg has a volume of 4 m³. Find the density of cylinder?

- a) 1040 kg m³
- b) 70 kg/m³**
- c) 284 kg m³
- d) None of the above

Explanation

$$\text{Density of cylinder} = \frac{\text{mass of cylinder}}{\text{volume of cylinder}} = \frac{280}{4} = 70 \text{ Kg/m}^3.$$

29. A box is made up of iron and it has a volume of 125 cm³. Find its mass. (Density of iron is 7.8 g / cm³).

- a) 16.02 cm⁶ g⁻¹
- b) 7.605 kg
- c) 975 g**
- d) None of the above

Explanation

Density = Mass / Volume

Hence, Mass = Volume × Density = 125 × 7.8 = 975 g.

30. Which among the following equation is incorrect

- 1) Density = Mass × Volume
- 2) Mass = Density / Volume
- 3) Volume = Density / Mass
- a) Both 1 and 2
- b) Both 1 and 3
- c) All the above**
- d) None of the above

Explanation

Density = Mass / Volume

Mass = Density × Volume

Volume = Mass / Density

31. A sphere is made from copper whose mass is 3000 kg. If the density of copper is 8900 kg/m³, find the volume of the sphere.

- a) 0.34 m^3
- b) 2.96 m^{-3}
- c) $11,900 \text{ kg/m}^3$
- d) None of the above

Explanation

Density = Mass / Volume

Hence, Volume = Mass / Density

$$= 3000 / 8900 = 30 / 89 = 0.34 \text{ m}^3.$$

32. Which among the following is the unit used in space research by astronomers to measure very long distances such as the distance between the earth and a star or the distance between two stars?

- a) **Astronomical unit**
- b) Celestial point
- c) Conjunction unit
- d) All the above

Explanation

Normally, we use centimetre, metre and kilo metre to express the distances that we measure in our day-to-day life. But, for space research, astronomers need to measure very long distances such as the distance between the earth and a star or the distance between two stars. To express these distances, we shall learn about two such units, namely, i. Astronomical unit ii. Light year.

33. What is the density of castor oil?

- a) 748 kg/m^3
- b) 892 kg/m^3
- c) **961 kg/m^3**
- d) 1038 kg/m^3

Explanation

Water has more density than oils like cooking oil and castor oil, although these oils appear to be denser than water. Density of castor oil is 961 kg/m^3 . If we put one drop of water in oil, water drop sinks. But, if we put one drop of oil in water, oil floats and forms a layer on water surface. However, some oils are denser than water.

34. Which is position of the shortest distance between the earth and the sun?

- a) aphelion position
- b) **Perihelion position**

- c) Proxima position
- d) Kepler position

Explanation

We all know that the earth revolves around the sun in an elliptical orbit. Hence, the distance between the sun and the earth varies every day. Perihelion is position of the shortest distance between the earth and the sun.

35. What is the distance between sun and earth in perihelion position?

- a) 122.3 million kilometres
- b) 138.6 million kilometres
- c) **147.1 million kilometres**
- d) 158.9 million kilometres

Explanation

When the earth is in its perihelion position (Perihelion is position of the shortest distance between the earth and the sun), the distance between the earth and the sun is about 147.1 million kilometres.

36. Which is the position of farthest distance between the earth and the sun?

- a) **aphelion position**
- b) Perihelion position
- c) Proxima position
- d) Kepler position

Explanation

When the earth is in its farthest position, that is when the distance between Earth and Sun is the largest it is called aphelion position.

37. What is the distance between sun and earth in aphelion position?

- a) 149.4 million kilometres
- b) **152.1 million kilometres**
- c) 158.6 million kilometres
- d) 163.9 million kilometres

Explanation

When the earth is in its farthest position, that is when the distance between Earth and Sun is the largest (called aphelion position) the distance is 152.1 million kilometres.

38. The average distance between the earth and the sun is about _____

- a) 143.4 million kilometres
- b) 149.6 million kilometres**
- c) 151.4 million kilometres
- d) 153.7 million kilometres

Explanation

The average distance between the earth and the sun is about 149.6 million kilometres. This average distance is taken as one astronomical unit. One astronomical unit is defined as the average distance between the earth and the sun.

$$1 \text{ AU} = 149.6 \text{ million km} = 149.6 \times 10^6 \text{ km} = 1.496 \times 10^{11} \text{ m.}$$

39. What is the distance of Neptune from the sun?

- a) 12 AU
- b) 26 AU
- c) 30 AU**
- d) 42 AU

Explanation

Neptune is 30 AU away from the Sun. It means it is thirty times farther than the Earth.

40. The nearest star to our solar system is _____

- a) Alpha Centauri
- b) Proxima Centauri**
- c) Sirius
- d) Betelgeuse

Explanation

The nearest star to our solar system is Proxima Centauri. It is at a distance of 2,68,770 AU.

41. We can clearly see that using the AU for measuring distances of stars would be unwieldy. Therefore, astronomers use a special unit, called _____

- a) Light year**
- b) Astronaut year
- c) Century year
- d) Sirius year

Explanation

We can clearly see that using the AU for measuring distances of stars would be unwieldy. Therefore, astronomers use a special unit, called 'light year', for measuring the distance in deep space. One light year is defined as the distance travelled by light in vacuum during the period of one year.

42. What is the speed of light in vacuum?

- a) 1.2×10^8 m
- b) 3×10^8 m**
- c) 4.2×10^8 m
- d) 5×10^8 m

Explanation

We, have learnt that the speed of light in vacuum is 3×10^8 m/s. This means that light travels a distance of 3×10^8 m in one second.

43. What is the value of 1 light year?

- a) 9.46×10^{15} m
- b) 10.13×10^{15} m**
- c) 14.62×10^{15} m
- d) 19.31×10^{15} m

Explanation

In a year (non-leap), there are 365 days. Each day has 24 hours; Each hour has 60 minutes; Each minute has 60 seconds. Thus, the total number of seconds in one year = $365 \times 24 \times 60 \times 60 = 3.153 \times 10^7$ second.

If light travels a distance of 3×10^8 m in one second, then the distance travelled by light in one year = $3 \times 10^8 \times 3.153 \times 10^7 = 9.46 \times 10^{15}$ m. This distance is known as one light year.

1 Light year = 9.46×10^{15} m.

44. In terms of light year, Proxima Centauri is at what distance from Earth and the Solar System (and Earth)?

- a) 1.72 light-years
- b) 2.91 light-years
- c) 4.22 light-years**
- d) 6.18 light-years

Explanation

In terms of light year, Proxima Centauri is at 4.22 light-years from Earth and the Solar System (and Earth).

45. The Earth is located about how many light-years away from the galactic centre?

- a) 12000 light-years
- b) 18000 light-years
- c) 20000 light-years
- d) **25000 light-years**

Explanation

The Earth is located about 25,000 light-years away from the galactic centre.

46. What is the value of 1 ounce of liquid?

- a) 15 ml
- b) **30 ml**
- c) 42 ml
- d) 58 ml

Explanation

1 ounce = 30 ml; 1 quart = 1 litre