

①

### BSe

① Length: Length is the distance between two points.

SI Unit = Meter (m)

② Time: Time is the duration of an event or interval between two occurrences.

SI Unit = Second (s)

③ Mass: Mass is the measure of the amount of matter in an object.

SI Unit = Kilogram (kg)

④ Work: Work is the transfer of energy to or from an object when a force acts on it and causes displacement.

SI Unit = Joule (J)

⑤ Energy: Ability to do work is energy.

SI Unit = J (Joule).

⑥ Potential Energy: Potential energy is the energy stored in an object due to its position, configuration or condition. / Unit = J.

⑦ Power: Power is the rate of doing work.

Unit of power = W (watt)

(2)

② 1 unit = ? Joule.

$$\begin{aligned}
 \text{Answer: } 1 \text{ unit} &= 1 \text{ kWh} \\
 &= 1 \text{ kW} \times 3600 \text{ s} \\
 &= 1000 \text{ W} \times 3600 \text{ s} \\
 &= 36,00,000 \text{ ws} \\
 &= 3.6 \times 10^6 \text{ ws} \\
 &= 3.6 \times 10^6 \text{ J.}
 \end{aligned}$$

Here,  
 $1 \text{ kW} = 1000 \text{ W}$   
 $h = (60 \times 60) \text{ s}$   
 $= 3600 \text{ s}$

③ Potential Energy किएँ हैं निम्न वस्तु?

आपना जानि, We know that,

$$E_p = mgh, \text{ where } m \text{ हलो Mass (जड़)} \\ g \text{ हलो gravity अस्थिरकर्त्तव्य} \\ h \text{ हलो Height ऊँचाई,}$$

Example: A 10kg object is lifted to a height of 5 meters above the ground. What is the potential energy?

Solve/ Solution:

Given that,  $M = 10 \text{ kg}$

$$H = 5 \text{ m}$$

$$g = 9.8 \quad \left[ \text{प्रथम एक भाग में,} \right. \\ \left. \text{मूख्य राखा रहे} \right]$$

We know that,

$$\begin{aligned}
 E_p &= mgh \\
 &= 10 \times 5 \times 9.8 = 490 \text{ J.}
 \end{aligned}$$

Answer: 490

⑥ ଅନୁକ୍ରମ ଏବଂ କୃତ୍ସମ ଜ୍ୟୋତିଷ ବୀଳ ।

\* ଅଞ୍ଚ ଯମାରୀନ କରାର ଦ୍ୱାରା ହେଉଥିଲା, ଯେବେ ଯାନ ଦୂର୍ଦ୍ଵୟା ଆଛି, ଯେପଣେ

SI Unit - ଏ ପ୍ରକାଶ କରା କିମ୍ବା ଅର୍ଥ୍ୟ ଏକବିନ୍ଦୁ - ଏ ଦେଖା ଆଛି କିମ୍ବା,

(ମେଟର,

$H = 500 \text{ cm}$  ଦେଖା ଆଛି, ଅର୍ଥ୍ୟ ଦ୍ୱାରା ଏବଂ ମାନ

ଦେଖା ଆଛି (cm) ମେଟିମେଟୋ, ତାହା ଆମା (cm)

ମେଟିମେଟୋ - ଏ ବିଭିନ୍ନ ପ୍ରକାଶ କରିବ ଆବଶ୍ୟକ

$$H = 500 \text{ cm}$$

$$= (500 \div 100) \text{ m}$$

$$= 5 \text{ m}$$

(ମନ୍ଦିର,

$M = 10,000 \text{ gm}$  - ଏ ଦେଖାଆଛି, ଆମାର ବାନି,

କେବଳ ଏକକ ହୁଲା Kg (କିଲୋଗ୍ରାମ). କିନ୍ତୁ ଦେଖାନେ (gm) ପାଇଁ  
ଦେଖା ଆଛି, ଆମାର ଧାର ଯେହି କିଲୋଗ୍ରାମ - ଏ ପ୍ରତିଶର୍କ୍ଷା,

$$M = 10,000 \text{ gm}$$

$$= (10,000 \div 1000) \text{ Kg}$$

$$= 10 \text{ Kg}.$$

⊗ କିନ୍ତୁ ମୁଖ୍ୟ ରାଶିର ବିଷୟ;

$$1 \text{ Kilometer} = 1000 \text{ meter} \quad \left. \begin{array}{l} 1 \text{ Kg} = 1000 \text{ gram} \\ \dots \end{array} \right\}$$

$$100 \text{ cm} = 1 \text{ m}$$

$$1000 \text{ mm} = 1 \text{ meter.}$$

③ Example: A 50,000 gm object is lifted to a height 3000 centimeter above the ground. What is the potential energy?

Solving: Given that,

$$M = 50,000 \text{ gm}$$

$$= (50,000 \div 1000) \text{ kg}$$

$$= 50 \text{ kg}$$

$$h = 3000 \text{ cm}$$

$$= (3000 \div 100) \text{ m}$$

$$= 30 \text{ m}$$

$$g = 9.8 \left[ \text{পেট স্টুডিক} \right]$$

We know that;

$$E_p = mgh$$

$$= 50 \times 9.8 \times 30$$

$$= 17640 \text{ J.}$$

④ Example: A 40 kg object, ~~height is 20m~~ Potential energy is 1960 J. What is the height?

We know that,  $E_p = mgh$

$$\Rightarrow mgh = E_p$$

$$\Rightarrow h = \frac{E_p}{mg} = \frac{1960}{40 \times 9.8} = \underline{\underline{5 \text{ m}}}.$$

(2)

Ex. Example: Height is 15 m, Potential energy  $\checkmark$  5145 J

What is the mass?

Solving:

We know that,

$$E_p = mgh$$

$$\Rightarrow mgh = E_p$$

$$\Rightarrow m = \frac{E_p}{gh}$$

$$= \frac{5145}{9.8 \times 15}$$

$$= \underline{\underline{35}} \text{ kg.}$$

Here,

$$E_p = 5145 \text{ J.}$$

$$h = 15 \text{ m}$$

$$g = 9.8$$

Ans

① Doing positive work  $\rightarrow$  giving energy to the object.

② Doing negative work  $\rightarrow$  taking away energy from the object.

(15)

⊗ ଯେତେ ସ୍ଥାନ ଶୁଭ୍ରାତା ବା ଯାକାଳେ ଏହା କଥାଟି ଆବଶ୍ୟକ ନାହିଁ ।

$$① W = FS$$

$$② F = mg$$

$$③ E_K = \frac{1}{2} mv^2$$

$$④ E_p = mgh$$

$$⑤ P = \frac{W}{t}$$

W = Work

F = Force

m = mass

g = gravity

E<sub>K</sub> = Kinetic energy

V = Velocity

E<sub>p</sub> = Potential energy

$$⑥ \text{Density} = \frac{\text{mass}}{\text{Volume}} \quad \text{kg/m}^3$$

h = height

P = Power

t = time

start Math solving — — —

⊗ SI Unit — କୌଣସିବାରେ ? — Convert to SI unit ? —

① Length = 1.3 Kilometer.

We know, 1 Kilometer = 1000 m.

$$\begin{aligned} \therefore 1.3 \text{ km} &= (1.3 \times 1000) \text{ m} \\ &= 1300 \text{ m. } (\underline{\text{Ans.}}) \end{aligned}$$

② Length = 2345 millimeter. Convert to SI unit.

We know, 1000 millimeter = 1 meter.

$$\therefore 1 \text{ m} = \frac{1}{1000} \text{ m}$$

$$\therefore 2345 \text{ mm} = \frac{1 \times 2345}{1000} \text{ m}$$

$$= 2.345 \text{ m } (\text{Ans.})$$

③ Mass = 2300 gram. Convert to SI Unit.

We know,

$$\therefore 1 \text{ kg} = \frac{1}{1000} \text{ g}$$

$$\therefore 2300 \text{ g} = \frac{1 \times 2300}{1000}$$

$$= 2.300 \text{ kg. } (\text{Ans.})$$

④ Mass = 123400 milligram. Convert SI.

We know,

$$1,00,000 \text{ milligrams} = 1 \text{ kg}$$

$$\therefore 1 \text{ kg} = \frac{1}{1,00,000} \text{ mg}$$

$$\therefore 123400 \text{ mg} = \frac{123400}{1,00,000} \text{ kg}$$

$$= 1.23400 \text{ kg. }$$

(Ans.)



⑥ Calculate the density of an object with a mass of 300kg and a volume of  $0.15\text{ m}^3$ .

Solve:

We know,

$$\begin{aligned}\text{Density} &= \frac{\text{mass}}{\text{volume}} \text{ kg/m}^3 \\ &= \frac{300}{0.15} \text{ kg/m}^3 \\ &= \underline{\underline{2000 \text{ kg/m}^3}}\end{aligned}$$

Here,

$$m = 300\text{ kg}$$

$$V = 0.15\text{ m}^3$$

⑦ Calculate the mass of an object with a density of  $800\text{ kg/m}^3$  and a ~~velocity~~ volume of  $0.002\text{ m}^3$ .

Solve:

We know,

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

$$\text{Ansatz, } D = \frac{m}{V} \text{ kg/m}^3$$

Here,

$$D = 800\text{ kg/m}^3$$

$$V = 0.002\text{ m}^3$$

$$\Rightarrow D \times V = M$$

$$\Rightarrow M = D \times V$$

$$= 800 \times 0.002$$

$$= \underline{\underline{1.6 \text{ Kg}}} \text{ (Ans)}$$

⑧ Calculate the volume of an object with a density of  $700 \text{ kg/m}^3$

and mass  $1.6 \text{ kg}$ .

Solve:

$$\text{We know, } D = \frac{m}{V} \text{ kg/m}^3$$

$$\Rightarrow D \times V = \frac{m}{1} \text{ kg/m}^3$$

$$\Rightarrow V = \frac{m}{D}$$

$$= \frac{1.6}{700}$$

$$= 0.0023 \text{ m}^3 \quad (\text{Ans})$$

⑨ Your mass is  $70 \text{ kg}$ . You have climbed up  $30 \text{ meter}$ ,  
how much work have you done?

Solve:

Given,

$$m = 70 \text{ kg}$$

$$S = 30 \text{ m. } [\because S = \text{Distance}]$$

We know,

$$\text{Work (W)} = FS$$

Again,

$$F = mg$$

$$= 70 \text{ kg} \times 9.8$$

$$= 686 \text{ N.}$$

Hence,

$$g = 9.8$$

$$m = 70 \text{ kg}$$

$$\begin{aligned}\therefore W &= FS \\ &= 686 \times 30 \\ &= 20580 \text{ J.}\end{aligned}$$

(Ans!)

Here,  
 $F = 686 \text{ N.}$

$$S = 30 \text{ m.}$$

- ⑩ Your mass is 80 Kg. You have climbed up a 10 storied building, height of floor is 4 m. How much work you have done?

Solve:

We know,

$$W = FS.$$

$$F = mg$$

$$= 80 \times 9.8$$

$$= 784 \text{ N.}$$

( $m$  এর পরে  $F$  নিয়ম করেছে)  
 (যেহেতু জটি অক্ষে প্রযুক্তি  
 অন্যথার ক্ষেত্রে নেই)

Here,

$$m = 80 \text{ Kg.}$$

$$S = (10 \times 4) \text{ m}$$

$$= 40 \text{ m.}$$

$$g = 9.8$$

Now,  $W = FS$

$$= 784 \times 40 \text{ m}$$

$$= 31360 \text{ J.}$$

⑪ ১৩

⑪ If A 10 kg object has run with 4 m/s velocity,  
what will be the Kinetic energy ?

Solve:

Given,

$$m = 10 \text{ Kg}$$

$$v = 4 \text{ m/s}$$

We know,  $E_B = \frac{1}{2} mv^2$

$$= \frac{1}{2} \times 10 \times 4^2$$

$$= 5 \times 4^2 = 5 \times 16 = 80 \text{ J. (Ans)}$$

⑫ Motion is created in a body of mass 10kg by applying a force, if its kinetic energy becomes 80 J.

What is velocity?

Solve:

Given,

$$m = 10 \text{ Kg}$$

$$E_B = 80 \text{ J.}$$

We know,

$$E_K = \frac{1}{2} mv^2$$

$$\Rightarrow 80 = \frac{1}{2} \times 10 \times v^2$$

$$\Rightarrow 80 = 5 \times v^2$$

$$\Rightarrow 5 \times v^2 = 80 \Rightarrow v^2 = \frac{80}{5}$$

(22) 95

$$\Rightarrow v^2 = 16$$

$$\Rightarrow \sqrt{v^2} = \sqrt{16}$$

$$\Rightarrow v = 4 \text{ m/s}$$

(Ans.)

- ⑬ A 30kg object is lifted of 500 cm above the ground. What is the potential energy?

Solve:

Given,

$$M = 30 \text{ kg}$$

$$h = 500 \text{ cm} = (500 \div 100) \text{ m} = 5 \text{ m.}$$

We know,

$$E_p = mgh$$

$$= 30 \times 9.8 \times 5 \quad [g = 9.8]$$

$$= 1470 \text{ J.}$$

(Ans.)

- ⑭ If a machine does 500 J of work in 10 s. Its power output is?

Solve:

Given,

$$W = 500 \text{ J.}$$

$$t = 10 \text{ s.}$$

We know,

$$P = \frac{W}{t} = \frac{500}{10} = 50 \text{ W.}$$

Q9

\* Ex: 1 Horsepower = 746 W.

(22) If a machine, Power is 10 HP, which mass is 5000 Kg, it is lifted 500 m above from ground. What is time How much time is needed?

Solve:

Given,

$$P = 10 \text{ HP}$$

$$= (10 \times 746)$$

$$= 7460 \text{ W.}$$

$$M = 5000 \text{ Kg}$$

$$h = 500 \text{ m}$$

We Know,

$$P = \frac{W}{t}$$

$$t = \frac{W}{P} = \frac{Fs}{P} = \frac{mgh}{P}$$

$$= \frac{5000 \times 9.8 \times 500}{7460}$$

$$= 3284.18 \text{ s.}$$

(28) Ex:

②

## -: Biology:-

Q ① Biodiversity: — Biodiversity is the variety of life on earth, including all living things and their interactions.

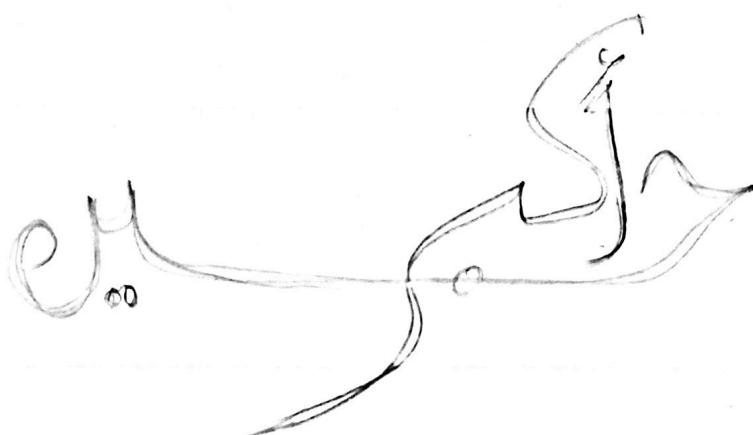
Q ② Ecosystem: — An ecosystem is a geographic area where plants, animals, and other organisms, as well as weather and landscape, work together to form a bubble life.

③

Q ③ Types of ecosystem :—

i) Terrestrial Ecosystem: Forest; Grassland; Desert.

ii) Aquatic Ecosystem:— Freshwater; Marine.



(6)

Q ④ Biotic:- Biotic refers to all the living components in an ecosystem. Like:- plants, animals, fungi, bacteria.

⑤ Type of Biotic Components:-

X ① Producers :- Organisms, plants, algae.

◎ ② Consumers:-

① Herbivores:- Rabbits, deer,

② Carnivores:- Lions, hawks.

③ Omnivores:- Human, Bears.

④ Decomposers:- Fungi, Bacteria.

Q ⑥ Abiotic: Abiotic refers to the non-living physical and chemical components of an ecosystem. Like: Water; Sunlight, Soil, temperature

⑦ Type of Abiotic Components:-

X ① Sunlight = Provides energy for photosynthesis in plants, influences temperature etc.

② Water = plays a key role in nutrient transport ...

③ Temperature = Affects seasonal cycle ...

④ Soil and minerals =

(8)

② Air and gases

③ Climate and weather

Q ⑧ Biomass:- Biomass is the total mass of living organisms in a specific area or ecosystem at a given time.

X ⑨ Types of Biomass:-

① Plant Biomass: Includes all plant materials.

② Animal " : The mass of all animals in an ecosys.

③ Microbial " : Bacteria and fungi,

Q ⑩ Ecosystem Conservation methods: —

i) Protected Area and Reserves:-

① National parks: Designated areas preserved for wildlife and national resources, where human activities is regulated.

② Wildlife Sanctuaries and reserves: — Provide habitats where hunting, logging and other activities are limited to protect species and ecosystem.

- o Marine protected areas:- Ocean zones with restrictions on fishing, mining to protect marine biodiversity.
- ii) Habitat restoration and reforestation:-
  - o Reforestation and afforestation: Planting trees in deforested areas or creating new forest to restore ecosystem, prevent soil erosion.
  - o Wetland restoration: Rehabilitating degraded wetlands to improve water filtration, flood control and habitat to aquatic species.
  - o Coral reef restoration:- Rebuilding damaged coral reefs.

Q:= Importance of Ecosystem Conservation: -

- Ecosystem conservation is important for many reasons:-
- o Climate change: Conservation efforts help mitigate climate change .

(B)

- ① Soil fertility:- Healthy ecosystem maintain soil fertility.
- ② Food:- It provide healthy food.
- ③ Protect biodiversity:- It helps sustain diverse species, which in turn supports ecosystem productivity.
- ④ Human well-being:- It provides clean air and water, which are essential for human survival.
- ⑤ Habitat destruction:- Conservation efforts help prevent habitat destruction.

→ Chemistry part →

Ques

Q-1 Atom:- Atoms are the smallest particles of elements that contain the characteristics of elements.

Q-2: Molecule: A molecule is a group of two or more atoms that are held together by chemical bonds.

Q-3: Symbol of elements: The abbreviated form of English or Latin name of elements is called its symbol.

There are three system of writing symbol:-

① The first letter of English name of an element is usually the symbol and it has to be written using capital letters. Like: Hydrogen — H  
Oxygen — O

② When the first letters of two or more elements is same, one of them is expressed by the first letters. The other

other element get first two letter.

Like: chlorine — Cl

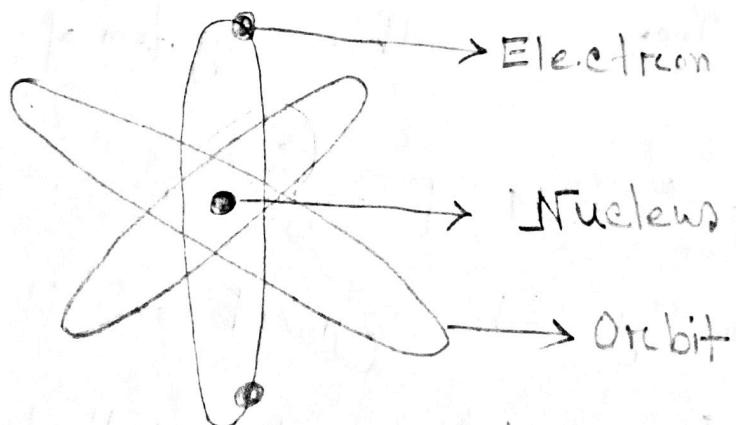
Calcium — Ca.

- Some elements have got their symbols from their latin name. Like:—

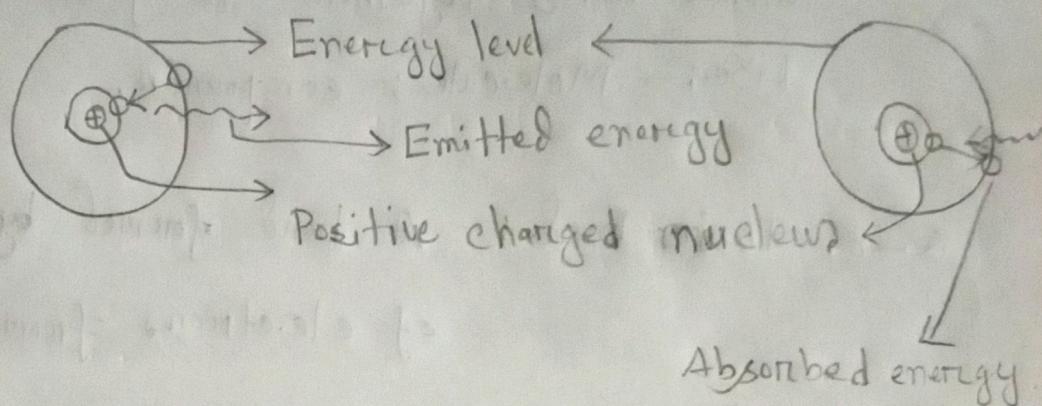
Sodium → Natrium → Na

Gold → Aurum → Au.

Q-4: Atomic Model:— Rutherford's Atomic Model



### Q-5: Bohr's Atomic Model:-



### Q-6: Difference between Rutherford and Bohr's Atomic model:-

#### Rutherford's Atomic Model

- 1) Electrons move randomly around the nucleus.
- 2) Didn't explain why electrons don't spiral into the nucleus due to attraction.
- 3) No concept of energy levels for electrons.

#### Bohr's Atomic Model.

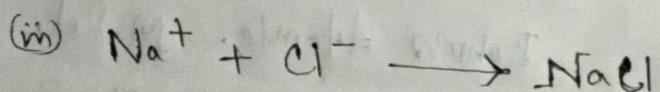
- 1) Electrons move in fixed circular orbits.
- 2) Explained stability using fixed energy orbits where electrons don't lose energy.
- 3) Introduced quantized energy levels.
- 4) successfully described the hydrogen atom's spectrum.

Q-7: Chemical Bonding:- Chemical bonding is the way atoms stick together to form larger structures. Like:- Molecule; compounds.

Q-8: Ionic Bond :- A bond formed by the transfer of electrons from one atom to another.

Example:- Sodium Chloride:-

- i) Sodium gives one electron to chlorine, sodium becomes  $\text{Na}^+$ , chlorine becomes  $\text{Cl}^-$ .
- ii) The positive and negative ions stick together to form table salt.



Q-9: Covalent Bond :- A bond formed by sharing of electrons between two atoms.

Example: Water:-

- i) Oxygen shares one electron with each of the two hydrogen atoms.
- ii) This completes the outer orbits for all the atoms.
- iii)  $\text{H} + \text{O}_2 \rightarrow \text{H}_2\text{O}$

⊕  
— : Chemistry : —

Q- ⑩ Solid :— A solid is a state of matter that has a definite shape and volume.

Like ; Ice, wood.

Q- ⑪ Liquid :— A liquid is a state of matter that has a definite volume but no fixed shape.

Like ; Water —

Q- ⑫ Gas :—

A gas is a state of matter that has no fixed shape or volume.

Like ; Air, Oxygen.