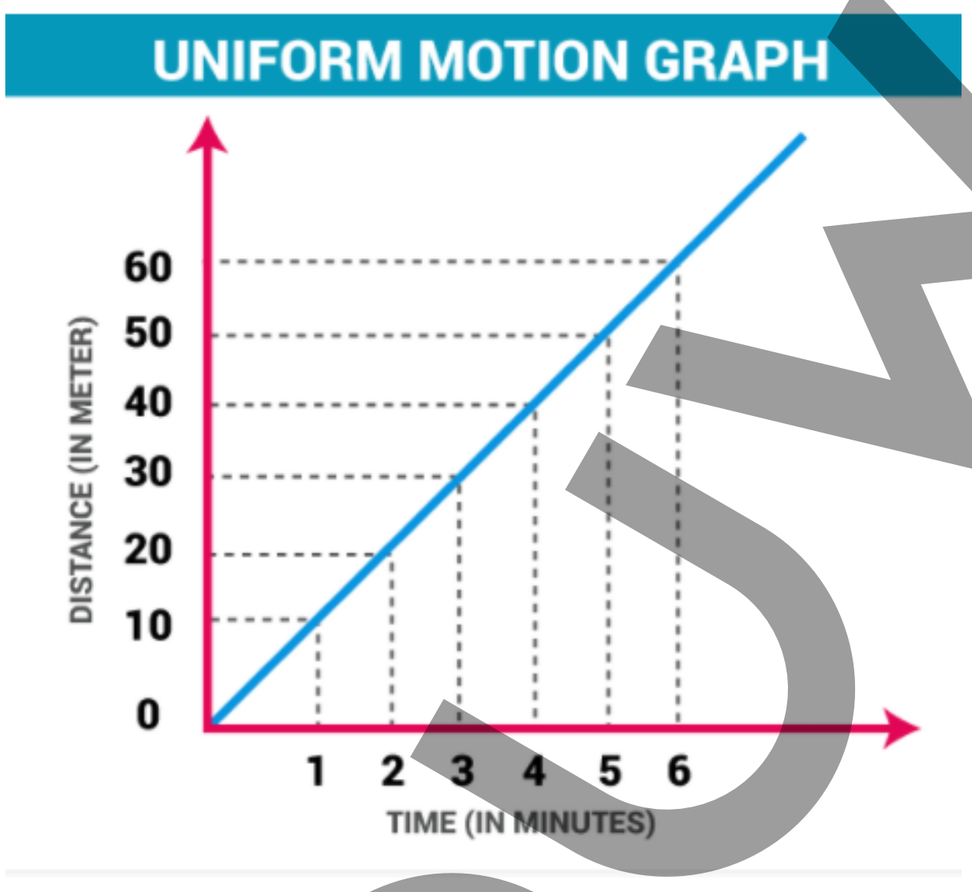
Science
Question bank

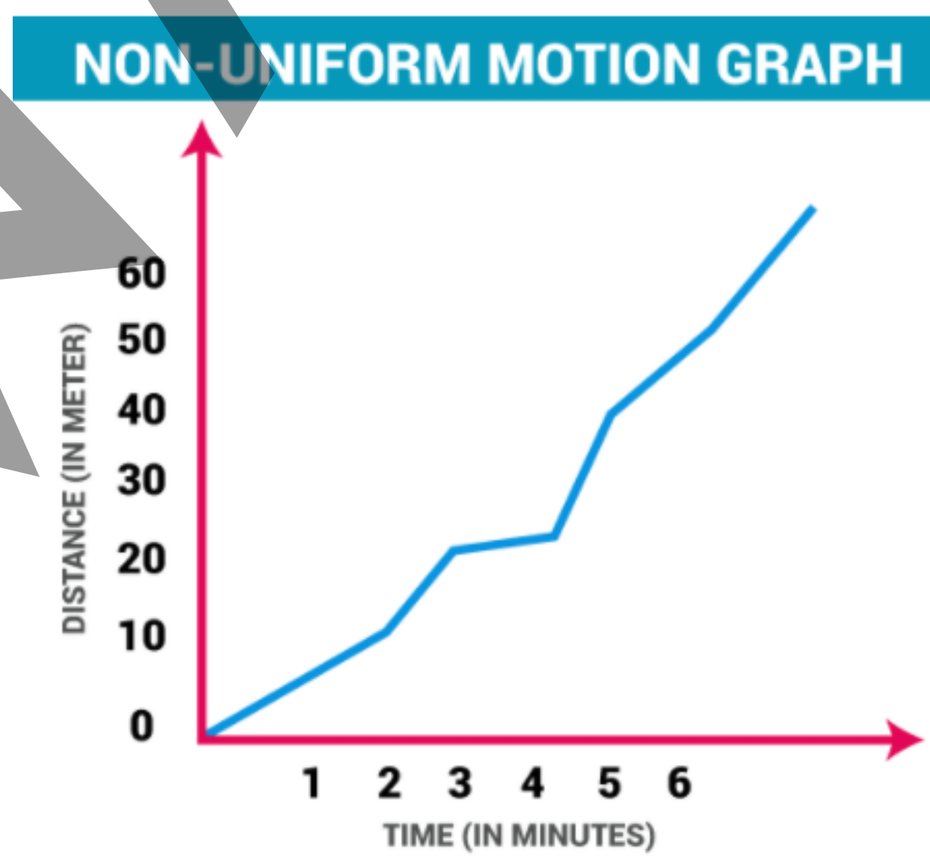
IX^Th

difference between uniform and non-uniform motions

Uniform motion	Non-uniform motion
Uniform motion has zero acceleration	The non-uniform motion has non-zero acceleration.
The uniform motion is identical to the actual speed of the object.	The non-uniform motion is different from the actual speed of the object.
Uniform motion covers equal distance at an equal time interval.	Non-uniform motion covers unequal distance at equal time interval.
In uniform motion, the distance to time graph shows a straight line.	In non-uniform motion, the distance to time graph shows a curved line.

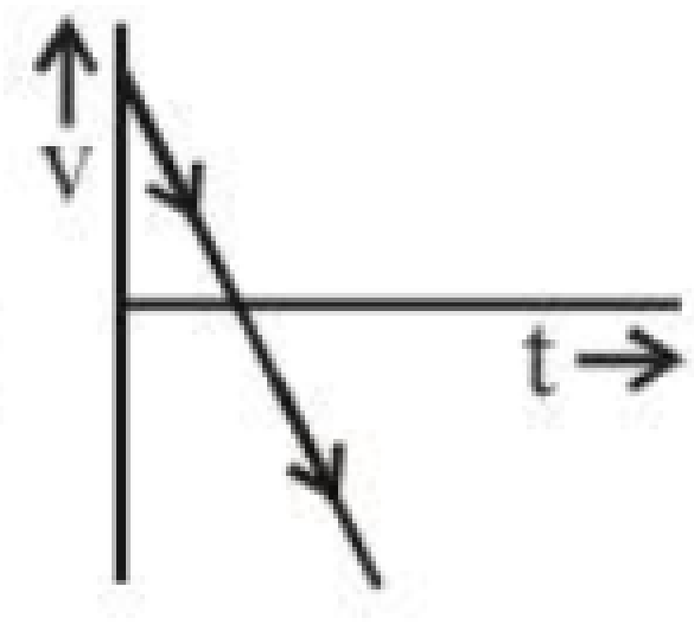
GRAPHS





OBJECT THROWN UPWARD AND COMES DOWN

Velocity will first decrease according to the equation v=u-gt where u is initial velocity(at t=0) so the graph can't start from origin because u is not zero as thrown with some velocity and v is final velocity. then t=u/g the v will become zero then it will start increasing in opposite direction , if the upward direction is taken as positive then the downward velocity will be negative.



Q3.

Parenchyma

1. Assimilation and storage of reserve food material (starch , fats , protein etc).
2. Parenchyma cells provide rigidity to plant body due to turgitidy and help to maintain shape and firmness of body .

Sclerenchyma

The main function of sclerenchyma is to give mechanical support to plant parts
It provides protecting covering around seeds and nuts.

Bone

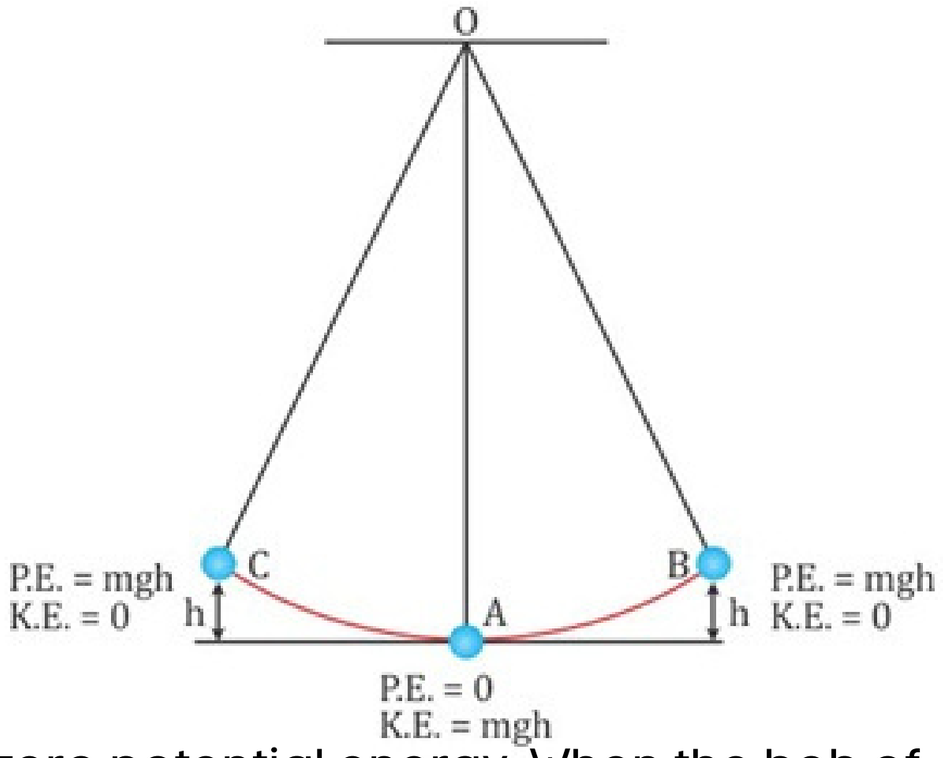
1. To serve as storage for minerals.
2. To provide structural support.
3. To protect the internal organs of the body.

Cartilage

Cartilage helps keep the trachea open and flexible. Cartilage in the weight-bearing joints such as the vertebrae, knees and hips absorb impact from movement, and help disperse the body weight. Cartilage cushions all the joints, allows gliding movement, and reduces friction between bones.

Q4.

Let A be the resting position of the bob when it has zero potential energy. When the bob of the pendulum is displaced to B from its resting position A, the bob gets raised by a vertical height h, so its potential energy increases by mgh if m is the mass of the bob.
On releasing the bob at B, it moves back to A. Its vertical height decreases from h to zero, so its potential energy decreases from mgh to zero, and it gets converted into kinetic energy, i.e. ½ mv^2 = mgh.



Let A be the resting position of the bob when it has zero potential energy. When the bob of the pendulum is displaced to B from its resting position A, the bob gets raised by a vertical height h, so its potential energy increases by mgh if m is the mass of the bob.
On releasing the bob at B, it moves back to A. Its vertical height decreases from h to zero, so its potential energy decreases from mgh to zero, and it gets converted into kinetic energy, i.e. ½ mv2 = mgh.
At the point B, the bob acquires a velocity , so it moves towards C. At the point C, when the bob reaches to a vertical height h above the point A, it again acquires potential energy mgh, and its kinetic energy becomes zero. So the bob momentarily comes to rest at the point C. However, due to the force of gravity, the bob moves back from C to A.
Thus during the entire process the total energy of the simple pendulum (sum of kinetic energy and potential energy) remains conserved

Q4.

Differences between Acute and Chronic Diseases

Acute Diseases	**Chronic Diseases**
These diseases occur suddenly.	They occur over a prolonged period.
They last for a shorter period.	They last longer, even for a lifetime.
They do not cause damage to the body.	They damage the body of the patient.
They are not usually fatal (however, other underlying conditions can also affect the outcome of the disease)	Chronic diseases usually end up causing long term damage to organs and organ systems. In some cases, it can become fatal
Eg., common cold, jaundice, typhoid, malaria	Eg., HIV, Elephantiasis, Cancer, Tuberculosis

Difference between Cell Wall and Cell Membrane

One of the fundamental differences between the plasma membrane and the cell wall is in the type of organisms that they are found. The cell wall is present only in plants and the cell membrane is present in every living organism including plants.

CELL WALL	CELL MEMBRANE
Present only in plants and in some fungi, bacteria, algae.	Present in all types of cells, in humans, animals, plants, bacteria, etc.
It is the outermost part of the plant cell	It is the outermost covering the animal cells
It is made up of pectin, chitin, lignin, glycoproteins, glycolipids, sugar, and cellulose.	It is a lipid bilayer. And is composed of lipoproteins and carbohydrates.
The cell wall is 0.1 µm to several µm in thickness	The cell membrane is 7.5–10 nm in thickness
It is the thick and rigid structure with a fixed shape.	It is a thin and delicate structure. It is flexible to change the shape as needed.
It protects the cell from the external environment.	It protects and maintains the internal environment of the cell.
The cell wall is metabolically inactive	The cell membrane is metabolically active.
The cell wall grows in thickness over time. Further, it occupies the whole cell in the plant as the cell ages and dies.	It is of the same thickness for the lifetime of the organism.
The cell wall is fully permeable to smaller molecules with the size of 30-60 kDa.	The membrane is selectively permeable and controls the movement of the substance into and outside the cell.
Functions include protection from the external environment.	Functions include permeability, signal reception, motility conduction, cell division, sexual reproduction, etc.

Q4.

The difference between balanced and unbalanced force

Balanced forces	Unbalanced forces
Equal in magnitude.	Unequal in magnitude.
Opposite in direction.	Can be in any direction but opposite.
Does not cause any change in the state of motion of the object.	Causes change in the state of motion of the object.

Difference Between Tendon and Ligament

Tendons and Ligaments are an integral part of locomotion in all higher organisms. The important differences between ligaments and tendons are summarized in the table below:

Tendons	Ligaments
Connects skeletal muscles to bones	Connects bones to bones
Tough and elastic	Elastic
Connects the end of the muscles to bones	Connects the end of the bones at joints
Each muscle contains only one tendon.	Each joint contains many ligaments
Proteoglycan content is low	Proteoglycan content is comparatively more
White in colour	Yellow in colour
Blood supply is poor	Blood supply is just as poor
Fibroblasts lie in a continuous row	Fibroblasts are scattered
The fibres are compact and present in parallel bundles	They are not arranged in parallel bundles but are compactly packed
No such classification	They are classified into three types, namely: Articular ligaments, Remnant ligaments and Peritoneal ligaments

Q4.

Potential energy is the energy held by an object because of its position relative to other objects, stresses within itself, its electric charge, or other factors.

Potential energy is the energy held by an object because of its position relative to other objects, stresses within itself, its electric charge, or other factors.

<u>formula</u>

$$W = m \times g \times h = mgh$$

Where,

- m is the mass in kilograms
- g is the acceleration due to gravity
- h is the height in meters

S.I. unit of potential energy is 'J' joules.

An **atomic unit of mass** is defined as accurately 1/12 the mass of a carbon-12 atom. The carbon-12 atom has six neutrons and six protons in its nucleus. The atomic unit mass is symbolized as AMU or amu.

Newton's **Law of Universal Gravitation** states that every particle attracts every other particle in the universe with a force that is directly proportional to the product of the masses and inversely proportional to the square of the distance between them.

$$F \propto \frac{m_1 m_2}{r^2} \Rightarrow F = G\frac{m_1 m_2}{r^2}$$

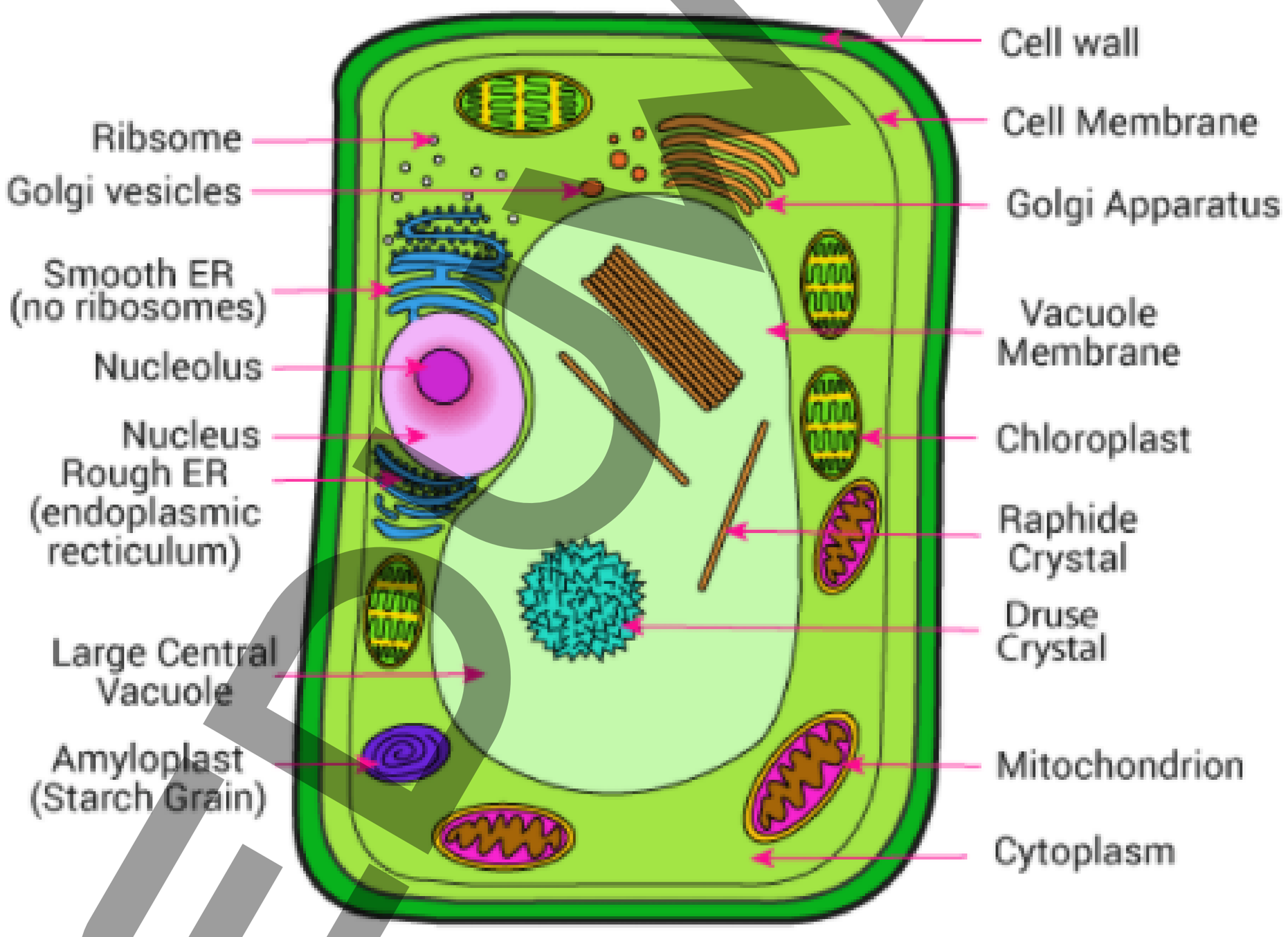
We can define **power** as the rate of doing work, it is the work done in unit time. The SI unit of power is Watt (W) which is joules per second (J/s). Sometimes the power of motor vehicles and other machines is given in terms of Horsepower (hp), which is approximately equal to 745.7 watts.

Q 13.

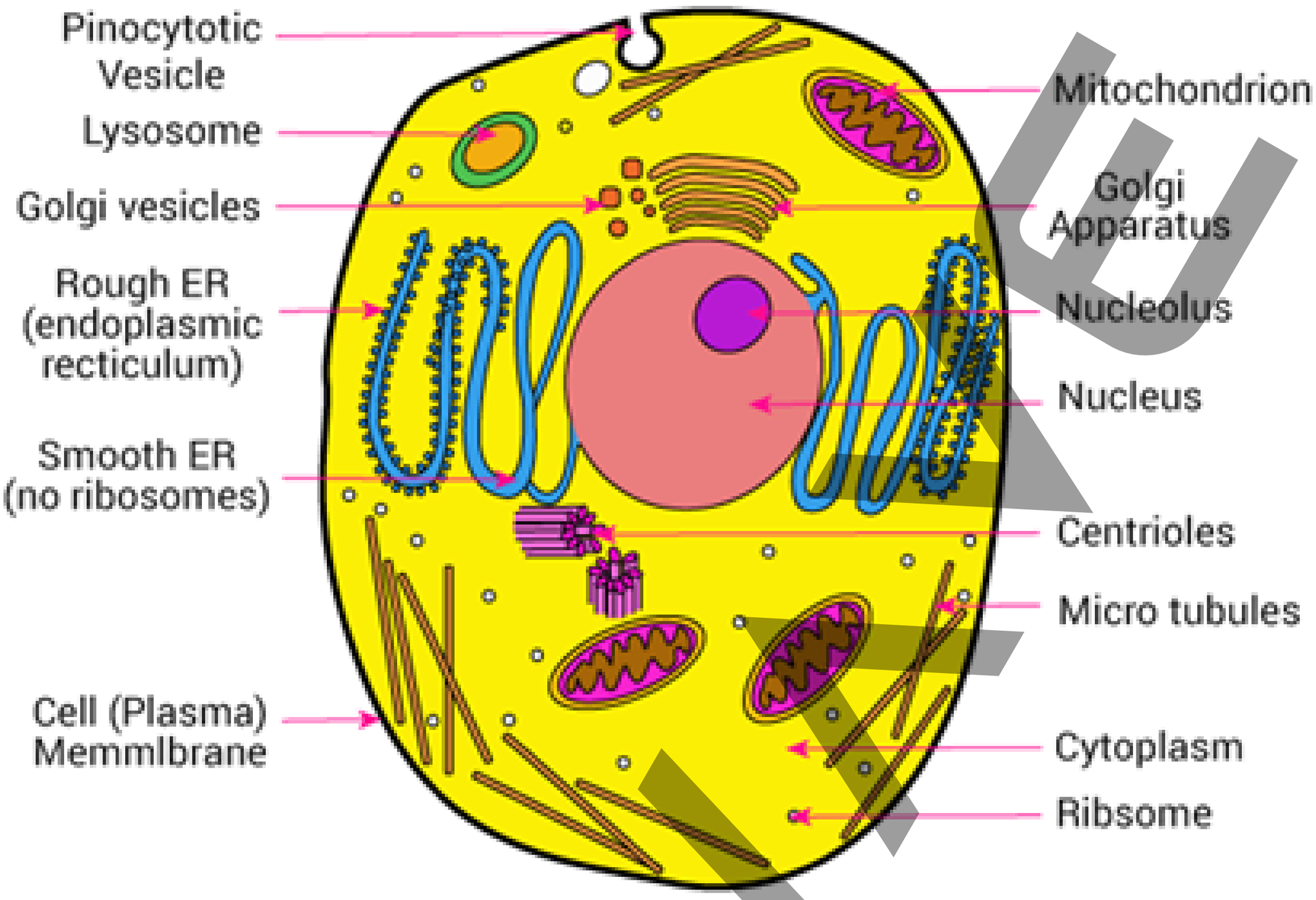
We can define **power** as the rate of doing work, it is the work done in unit time. The SI unit of power is Watt (W) which is joules per second (J/s). Sometimes the power of motor vehicles and other machines is given in terms of Horsepower (hp), which is approximately equal to 745.7 watts.

A body is said to have the power of **1 watt** if it does work at the rate of 1 joule in 1 s.
i.e. 1 W= (1 J)/(1 S)

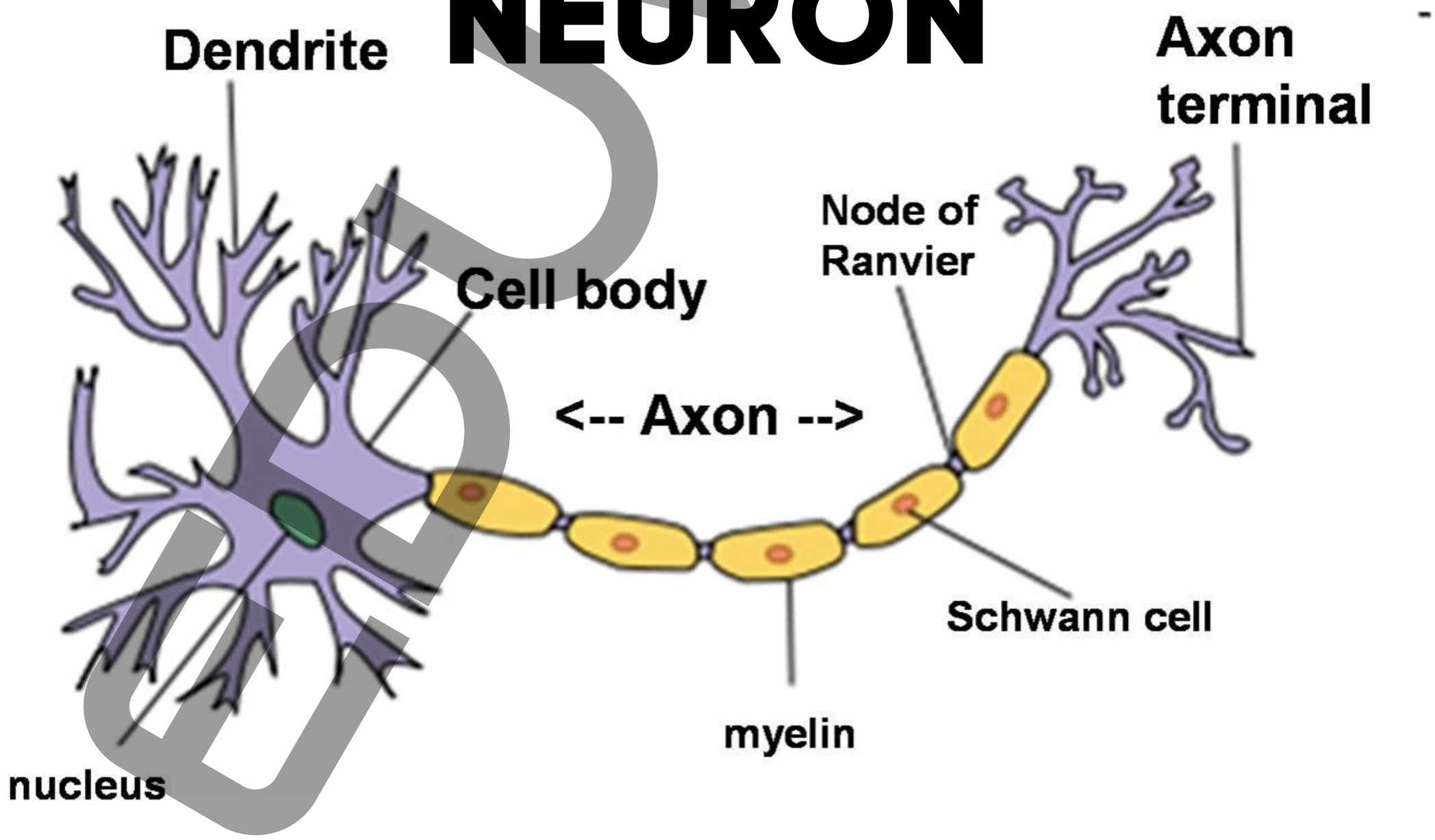
PLANT CELL



ANIMAL CELL



NEURON



Q 13.

tissue that connects muscle to bone in humans

Tendons

tissue that transports food in plants

PHLOEM

tissue that stores fat in our body

Adipose tissue

tissue present in brain

Nervous Tissue

Q 6.

Difference between Homogeneous and Heterogeneous Mixture

Homogeneous mixture	Heterogeneous mixture
It has a uniform composition	It has a non-uniform composition
It has only one phase	There are two or more phases
It can't be separated out physically	It can be separated out physically
'homo' means the same	'hetero' means different
Example: a mixture of alcohol and water	**Example:** a mixture of sodium chloride and sand

---

Q 7.

Sodium oxide	Na_2O
Aluminium chloride	$AlCl_3$
Sodium carbonate	Na_2CO_3
Ammonium chloride	NH_4Cl

Q 8. Postulates of Bohr's Model of an Atom

- In an atom, electrons (negatively charged) revolve around the positively charged nucleus in a definite circular path called orbits or shells.
- Each orbit or shell has a fixed energy and these circular orbits are known as orbital shells.
- The energy levels are represented by an integer (n=1, 2, 3...) known as the quantum number. This range of quantum number starts from nucleus side with n=1 having the lowest energy level. The orbits n=1, 2, 3, 4... are assigned as K, L, M, N.... shells and when an electron attains the lowest energy level, it is said to be in the ground state.
- The electrons in an atom move from a lower energy level to a higher energy level by gaining the required energy and an electron moves from a higher energy level to lower energy level by losing energy.

- In an atom, electrons (negatively charged) revolve around the positively charged nucleus in a definite circular path called orbits or shells.
- Each orbit or shell has a fixed energy and these circular orbits are known as orbital shells.
- The energy levels are represented by an integer (n=1, 2, 3...) known as the quantum number. This range of quantum number starts from nucleus side with n=1 having the lowest energy level. The orbits n=1, 2, 3, 4... are assigned as K, L, M, N.... shells and when an electron attains the lowest energy level, it is said to be in the ground state.
- The electrons in an atom move from a lower energy level to a higher energy level by gaining the required energy and an electron moves from a higher energy level to lower energy level by losing energy.

Limitations of Bohr's Model of an Atom

- Bohr's model of an atom failed to explain the Zeeman Effect (effect of magnetic field on the spectra of atoms).
- It also failed to explain the Stark effect (effect of electric field on the spectra of atoms).
- It violates the Heisenberg Uncertainty Principle.
- It could not explain the spectra obtained from larger atoms.

Q 9.

technique to separate butter from curd

Centrifugation

technique to separate salt from sea water

simple process of evaporation

technique to separate camphor from salt

Sublimation

Q 10.

Atomic Number

- The total number of protons in the nucleus of an atom gives us the atomic number of that atom.
- It is represented with the letter 'Z.'
- All the atoms of a particular element have the same number of protons, and hence the same atomic number.
- Atoms of different elements have different atomic numbers.
- For example, all carbon atoms have the atomic number of 6, whereas all atoms of Oxygen have 8 protons in their nucleus.

Pure substances are substances that are made up of only one kind of particles and has a fixed or constant structure.

A **suspension** is defined as a heterogeneous mixture in which the solid particles are spread throughout the liquid without dissolving in it.

Isobar is that element that differs in the chemical property but has the same physical property. So, we can say that isobars are those elements that have a different atomic number but the same mass number. Their chemical property is different because there is a difference in the number of electrons. It has the same atomic mass but a different atomic no. Because an additional number of neutrons compensates the difference in the number of nucleons.

An example of two Isotopes and Isobars is iron and nickel. Both have the same mass number which is 58 whereas the atomic number of iron is 26, and the atomic number of nickel is 28.

Isotopes are the atoms in which the number of neutrons differs and the number of protons is the same. From the above definition of atomic mass and the atomic number, we can conclude that isotopes are those elements having the same atomic number and different mass number.

Let us know something about the isotopes of hydrogen: There are three isotopes of hydrogen and these are protium, deuterium, and tritium. All three of them have the same number of protons, but the numbers of neutrons differ. In protium the number of neutrons is zero, in deuterium, it is one and in tritium, the number of neutrons is two.

Q 11.

It is the capacity of the body to produce an immune response either naturally, or through vaccines. Such approaches develop immunity or resistance to a specific illness.

Immunisation can be defined as the process by which a person is made resistant to a particular disease by the administration of a vaccine.

Direct Transmission– This occurs when the pathogen is transmitted directly from an infected person. For eg., if an open wound comes in contact with the blood of a Hepatitis B infected patient, the wounded person might contract the disease.

Indirect Transmission- When the pathogens are not transmitted directly from the infected person but through vectors such as flies, mosquitoes, ticks, dogs, etc., it is known as indirect transmission.

Inertia, property of a body by virtue of which it opposes any agency that attempts to put it in motion or, if it is moving, to change the magnitude or direction of its velocity. Inertia is a passive property and does not enable a body to do anything except oppose such active agents as forces and torques.
