



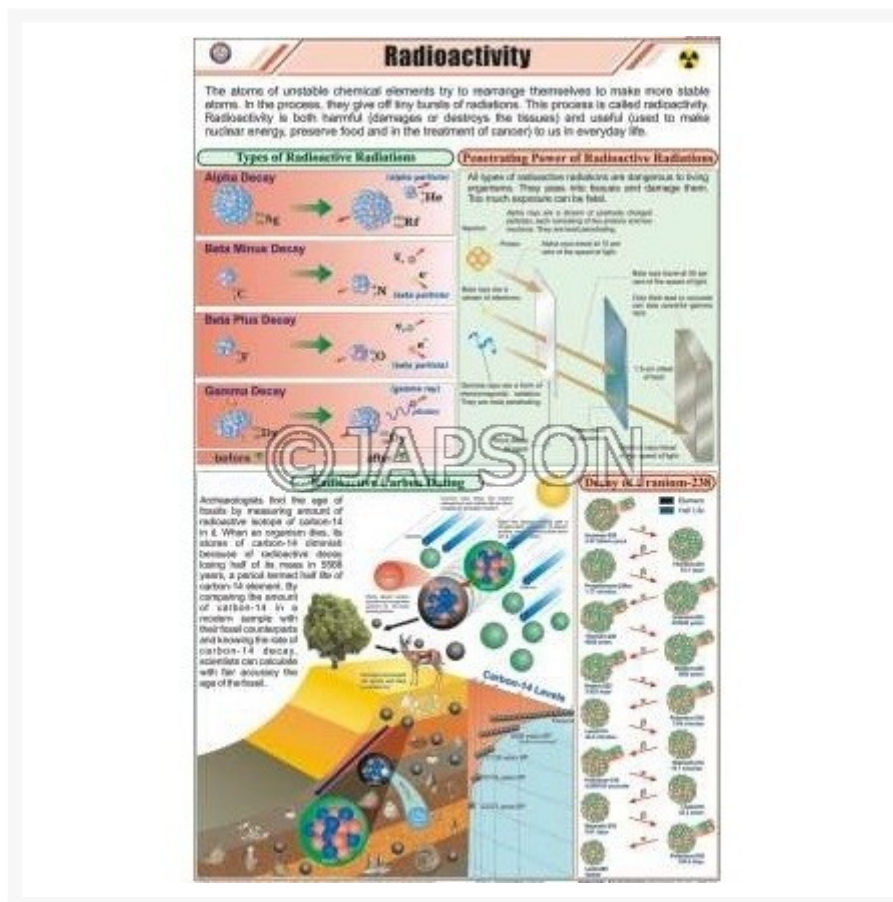
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Physics (III) Charts, School Education

Product Image



Description

Standard Size: 58x90cms

Language: English

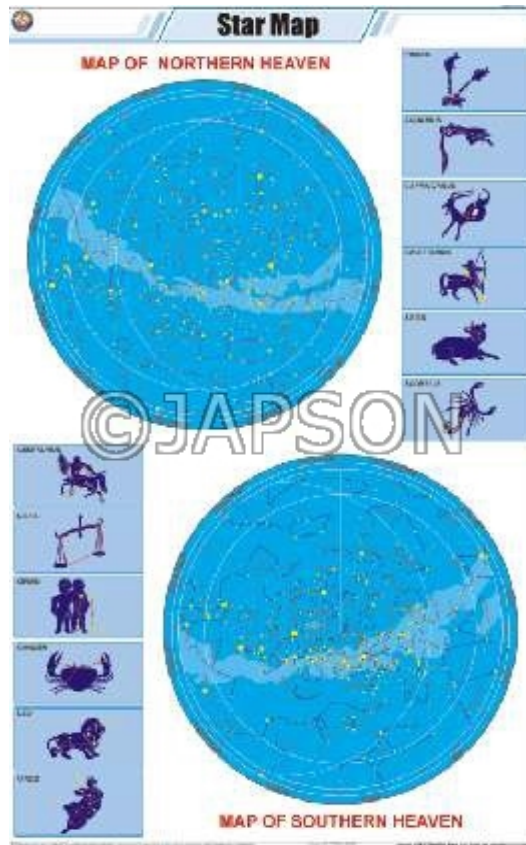
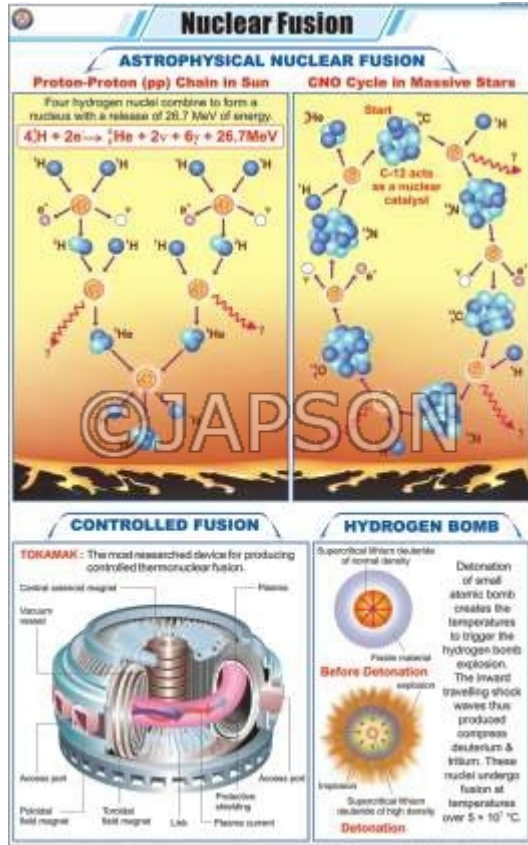
Laminated Paper Charts with Plastic Rollers. These Charts have technically accurate and

detailed description in vivid colours.

Note: Based on minimum order quantity conditions, Charts can be customized to your requirements in terms of CONTENT, LANGUAGE, SIZE, etc. Please write back to us for discussion.

A. Charts, Nuclear Fusion

B. Charts, Star Map



C. Charts, Universe II (Comets & Meteors)

D. Charts, Newton's Law of Motion

Universe II (Comets & Meteors)

Comets

A comet is an icy celestial body in solar system made of dust and ice mixed together.

Formation of Comet's Tail and Head

Meteoroids: A small solid piece of dust, rock, ice or metal moving through space.

Meteor: The incandescent streak caused by a meteoroid encountering Earth's atmosphere. It is commonly called a shooting star.

Meteorite: It is a meteor that has reached the Earth's surface.

Meteors

Types of Meteorites

- Achondrite
- Chondrite
- Iron
- Meteorite
- Plutonic

Most meteorites have their origin in Asteroid Belt.

Meteorite Strike

Newton's Laws of Motion

Newton's First Law of Motion

Every object continues to be in its state of rest or of motion unless acted upon by an external unbalanced force.

Newton's First Law of Motion defines that an object will remain at rest or in a state of uniform motion unless acted upon by an external force. Galileo's Law of Inertia.

Everyday Observations Based on Newton's First Law of Motion

1. A person is sitting on a rug. If the rug is pulled out from under them, they will remain stationary in their seat.

2. A passenger in a bus is leaning forward when the bus starts moving.

3. A tree is standing still. It will remain stationary unless an external force acts on it.

Newton's Second Law of Motion

The rate of change of momentum of a body is directly proportional to the applied force and takes place in the direction of the force.

Force \propto Change in Momentum / Time Taken = $F \propto \frac{m(v-u)}{t} = F \propto m \times a$

Newton's Third Law of Motion

Whenever one body exerts a force (action) on another body, the second body exerts an equal and opposite force (reaction) on the first body.

1. When a bullet is fired from a gun, the force exerted by the bullet is equal and opposite to the force exerted by the gun on the bullet.

2. When a person jumps, the force exerted by the feet on the ground is equal and opposite to the force exerted by the ground on the person.

3. Equal and opposite reaction force of the rocket's gases is equal to the upward force of the rocket.

E. Charts, Steam Engine

F. Charts, X-Rays

Steam Engine

A practical device which transforms heat energy of steam

Simple Steam Engine Working

Principle: — Steam occupies a larger space than occupied by the same amount of water. Therefore, it exerts greater pressure on the walls of the cylinder. Steam when expands, pushes the piston fitted with the cylinder. The motion of the piston can now be made to move any object by suitably connecting it to the piston.

The expanding steam loses its heat energy and condenses to water. The piston then falls back. Letting the cooled steam out of the cylinder, and reintroducing fresh hot steam into it, entire cycle could be made to repeat as long as desired.

One of The First Steam Locomotives (1825)

X-Rays

Stream of high energy photons having wavelength in the range from 0.01 to 10 nanometers are X-rays. X-rays are also called as Roentgen Radiations.

CHARACTERISTICS

- They are electromagnetic waves.
- They are not deflected by magnetic and electric fields.
- They affect photographic plate.
- They ionize the gases through which they pass.
- Depending on their wavelengths, X-rays penetrate through different depths.

PRODUCTION OF X-RAYS

Two different atomic processes produce X-ray photons.

- Bremsstrahlung radiation
- Characteristic radiation

Both processes involve a change in the energy state of electrons.

X-ray Tube

In an X-ray tube, the electrical potential up to 100 KV between the cathode and the anode heats the filament to generate thousand °C to create a source of free electrons. Electrons from the cathode are accelerated towards the target anode. X-rays are generated when these electrons give up some of their energy when they interact with the electrons in the target anode.

Work done W in transferring charge Q through p.d. V is $W = Q \times V$

This will impart the K.E. of the electrons hitting the anode. Less than 1% of the K.E. of the electrons becomes X-ray energy.

USES

Medical Imaging

Security Scanners

X-ray Crystallography

G. Charts, Universe-I (Life Cycle of a Star)

H. Charts, Nuclear Reactor

Petrol Engine

FOUR STROKE PETROL ENGINE

Four stroke petrol engine (internal combustion engine) is used in cars, motorcycles, trucks, aircraft, construction machinery and many others. The four stroke engine refers to intake, compression, combustion (power), and exhaust strokes.

The cycle begins at Top Dead Center, when the piston is farthest away from the axis of the crankshaft. A stroke refers to the full travel of the piston from Top Dead Center to Bottom Dead Center.

1 INTAKE STROKE

The intake valve opens and the piston moves down, drawing in a fresh charge of air and fuel mixture.

2 COMPRESSION STROKE

Both valves are closed and the piston moves up, compressing the fuel-air mixture.

3 POWER STROKE

The spark plug ignites the compressed mixture, forcing the piston down.

4 EXHAUST STROKE

The exhaust valve opens and the piston moves up, pushing out the exhaust gases.

Radioactivity

The atoms of unstable chemical elements try to rearrange themselves to make more stable atoms. In the process, they give off tiny bundles of radiations. This process is called radioactivity. Radioactivity is both harmful (damages or destroys the tissues) and useful (used to make nuclear energy, preserve food and in the treatment of cancer) to us in everyday life.

Types of Radioactive Radiation

- Alpha Decay:** ${}^4_2\text{He} \rightarrow {}^4_2\text{He} + \text{He}$
- Beta Minus Decay:** ${}^0_{-1}\text{e} \rightarrow {}^0_{-1}\text{e} + \text{e}^-$
- Beta Plus Decay:** ${}^0_{+1}\text{e} \rightarrow {}^0_{+1}\text{e} + \text{e}^+$
- Gamma Decay:** γ (gamma ray)

Penetrating Power of Radioactive Radiations

All types of radioactive radiations are dangerous to living organisms. They pass into tissues and damage them. The most dangerous is gamma rays.

- Alpha:** Alpha rays are a stream of positively charged particles. Each nucleus of the alpha source emits two such positively charged He⁺ ions.
- Beta:** Beta rays are a stream of electrons (beta minus) or positrons (beta plus).
- Gamma:** Gamma rays are a form of electromagnetic waves. They are the most penetrating.

Carbon-14 Dating

Archaeologists find the age of fossils by measuring amount of radioactive isotope of carbon-14 in it. When an organism dies, its stores of carbon-14 decrease because of radioactive decay. In a modern sample, the amount of carbon-14 is a constant. By comparing the amount of carbon-14 in a modern sample with their usual counterparts and knowing the rate of carbon-14 decay, scientists can calculate with fair accuracy the age of the fossil.

M. Charts, Nuclear Fission

N. Charts, Radio Telescope

Nuclear Fission

When a massive nucleus ($A > 230$) breaks apart into smaller nuclei, there is a slight loss of mass, which comes in the form of enormous energy according to Einstein's equation $E = mc^2$. Such a process is called Nuclear Fission. Uncontrolled nuclear fission chain reaction releases enormous energy as in atom bombs.

NEUTRON INDUCED NUCLEAR FISSION

When a neutron hits a nucleus, the nucleus breaks into two smaller nuclei, releasing energy and more neutrons.

$${}^1_0\text{n} + {}^{235}_{92}\text{U} \rightarrow {}^{141}_{54}\text{Xe} + {}^{92}_{38}\text{Kr} + 3{}^1_0\text{n} + \text{Energy}$$

CONTROLLED NUCLEAR FISSION

The source of energy in nuclear reactors is controlled nuclear fission.

BREEDING PLUTONIUM-239

${}^{238}_{92}\text{U}$ is first converted into ${}^{239}_{92}\text{U}$ by neutron capture to produce ${}^{239}_{94}\text{Pu}$, which serves as Pu-239 .

SPONTANEOUS FISSION

RADIOACTIVE DECAY
 ${}^{238}_{92}\text{U} \rightarrow {}^{234}_{90}\text{Th} + \alpha$
 ${}^{238}_{92}\text{U} \rightarrow {}^{234}_{91}\text{Pa} + \beta$

ENRICHMENT OF THE NUCLEAR FUEL

- Trailing uranium ore is used to form yellow cake (80% uranium).
- Uranium tetrafluoride is produced.
- Distillation separates uranium.
- Particles of enriched uranium are produced.
- Fuel rods containing uranium pellets are made.

Radio Telescope

Radio Telescope is an astronomical instrument consisting of a radio receiver and an antenna system that is used to detect radio frequency radiations emitted by extraterrestrial sources. Because radio wavelengths are much longer than those of visible light, radio telescopes must be very large in order to attain the resolution of

Astronomical Interferometers

Interferometers combine images from several radio telescopes to make one image that looks like it was taken from one large dish.

Only Radio Telescope (ORT)

Largest Radio Telescope (Arecibo, Puerto Rico)

O. Charts, Multistage Rocket

P. Charts, Windmill

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