Q: Explain the life cycle of a star. Discuss the different stages form its formation to its final fate, also the factors whether its become a white dwarf / black hole.

The life Cycle of Star

The life cycle of a star depends mainly on its mass. In simple words stars are born, live for billion of years and then die in different ways. A stars beginning its life in a nebula, which is a large clouds of dust and gas in space. Gravity pulls the gas and dust together.

Stages

main Sequence Stage:

A star spends 90% of its life in the main sequence stage.

It take one hydrogen then collied with another hydrogen and nuclei defuse to make helium.

$$^{1}_{1}H + ^{1}_{1}H = ^{2}_{2}He$$

During the phase the protons of hydrogen are converted into atoms of helium. This reaction is Exothermic it gives off more heat than it requires and so the core of a main sequence star release a tremendous amount of energy.

The Giant phase:

when a star finishes the hydrogen fuel in its center, it cannot longer

Produce energy in the same way. Then hydrogen starts burning in a layer around the helium core. Because of this change the outer parts of the star expand outward and become cooler. A this stage the star trun into a red giant.

Red gaint:

look red because their surface temperature is lower than that of main sequence stars, which usually appear yellow or white.

In about 5 billion years when the sun enters the helium burning phase. It will expand to a maximum radius of roughly 1 astronomical unit (250 times its present size).

At this point the sun will swallow the inner planets and may even engulf the earth. however there is no need to worry because humans will not be alive by then. Infact about one billion years from now, the earth surface become so hot that it will no longer be suitable for human life

Example:

Betelguese is the nearest red gaint star.

What happen after giant star phase:

After giant star phase two main process is happen.

The carbon burning process

When helium is enhausted at the core of a massive star, the core contracts and the temperature and Pressure rise enough to fuse carbon (Carbon burning Process).

The neon, oxygen and Silicon burning Process.

This process continues with the successive stages being fueled by neon, oxygen and Silicon.

use blue and black colors only.....

From here ownwards a star may adopt any of the two paths depending on its size.

Path 1

Supernova or black hole formation

- If a star is massive it will either burst and explode as supernova.
- After the supernova explosion the star's core is left behind.

Path :2

The white dwarf formation

when a star whose mass is not high enough to explode as a supernova and form a black hole.

when a white dwarf is very dense its mass is comparable to sun while its volume comparable to

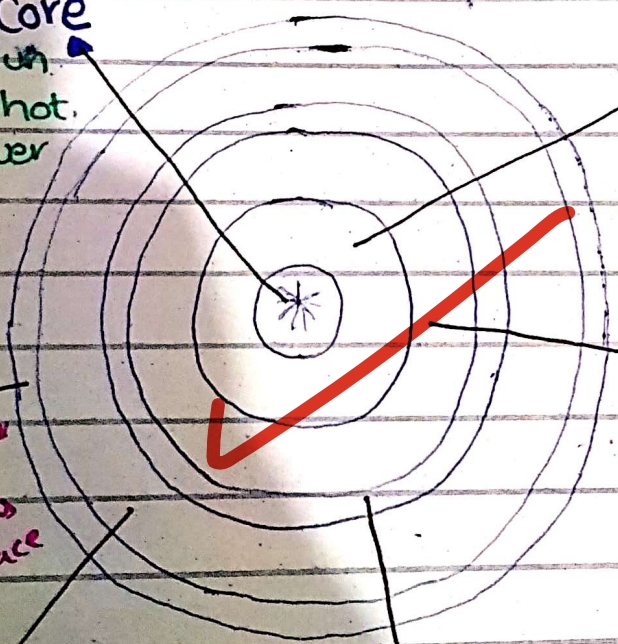
- The gravitational collapse of heavy star's nuclei is assumed to be responsible for the formation of Stellar mass black holes.
- once a black hole has formed it can continue to grow by absorbing additional matter. Any black hole will continually absorb gas and interstellar dust from its surroundings.

earth's
A white dwarf's faint luminosity comes from the emission of residual thermal energy. This includes over 97% of the other stars in the milky way

what are these? notes? a qs?

Atmosphere & Structure of A SUN

Attempt and upload proper questions for evaluation.....



Core
=> center of sun
=> extremely hot.
=> Nuclear Power occure where hydrogen is converted into helium.
=> Release energy & Power sun.

Corona
=> outer most layer
=> hot but thin
=> extends millions of km into space

Chromosphere
=> ~~outermo~~ lies above the Photosphere.
=> appears red during a Solar eclipse
=> Temperature increase.

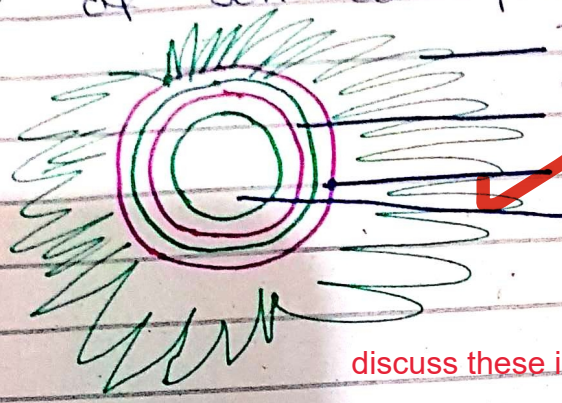
Photosphere
- sunspots appear
- its emits most of Sunlight we see.

Radiative zone
=> surrounds the core.
=> energy moves outward in the form of radiation
=> Photons take a very large to pass through this layer.

Convection zone
=> above radiative
=> Hot gas rise and cool gas sinks.
=> Energy is transferred by convection.

Atmosphere of sun

In the give diagram the photosphere, chromosphere, and corona all are parts of sun atmosphere.



discuss these in more detail...

Q: Explain Solar winds and what are their impacts and also discuss auroras?

Solar winds

define:

Solar wind is a stream of charged particles emitted from the sun's corona that flows outward through the solar system.

=> Its K.E is between 0.5 and 10kev.

=> Its particles can escape the sun's gravity because of their hight energy.

Impact of Solar winds:

=> It strips planet ~~here~~ of their atmosphere for example: e.g Cyratia, mercury.

-> **Solar Stromes** are the sudden and powerfu disturbance on the sun cause by the release of large amounts of energy from its surface & atmosphere. These stor send radiation and charged particle into space.

=> It can lead to power outage.

=> In 1859 **Carrigton event** was caused by an extremely intense solar flare and coronal mass ejection (CME) from the Sun.

=> It can disrupt radio transmission and communication.

=> 3 Polar light | Auroras

An aurora are also called polar lights.

two types of auroras

- Borealis → Northern lights → Common near the arctic circle e.g: Alaska, Canada Norway.
- Australis → Southern lights → Common near the antarctic region e.g: Norway, Australia New zealand.

=> The earth has a magnetosphere. when the highly charged particles of the solar ~~system~~ winds cuts through the earth's magnetosphere. It produces electricity that travels along the lines of earth's magnetic field. And as this electricity travels, it knocks and causes ionization of mainly oxygen and nitrogen. During this process, light is emitted which can be seen as polar lights or an aurora.

Q: What are asteroids and also discuss its origin, Location and importance?

ASTEROIDS

Asteroids are make nabulea debris

Define:

They are rocky (clay, Silicate) and matellic (gold, Platinum, Silver etc) in nature. It is being as big as dwarf planets like pluto and may be small as Pabbles and any size in between. It is irregular in Shape.

Theory of origin:

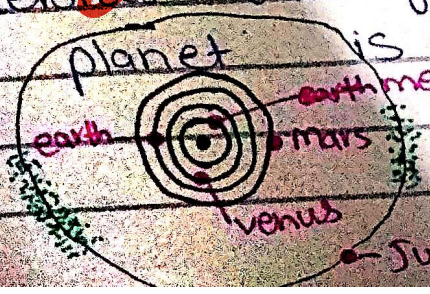
① In early solar system Some debris never came togather to form planets and dwarf planets. They remained out of the reach of gravity and are free floating Since in the form of astearids.

② In the early Chaotic Solar system large planetismals collied with one another and rocky chunks brake off forming astearicds.

Location of asteroids:

=> Asteroids belt in between mars and Jupiter (which is the home to dwarf planet is ceres) mainly as raughly a million.

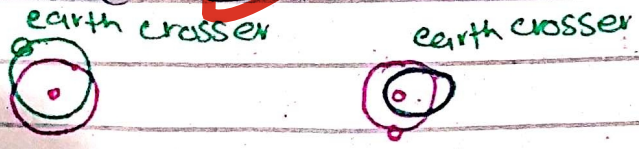
=> Any asteroids sharing its orbit with a larger planet is called trojan.



inner earth object: orbit is smaller than earth

outer earth object: orbit is larger than earth

earth crossers: when these near earth object cross earth's orbit during their revolutionary course they are called earth crossers.



Importance of astroids:

=> Pieces of asteroids breakdown and can be seen as a metear shower (phenomenon called shooting star)

=> Sometimes, they collide with earth wrecking havoc.

=> Some asteroids of intrest include asteriods Apophis, Benu and PTS mini moon.

↓ 2cd moon

↓ PTmoon

Conclusion:

it is vital remnants of the solar system that offer insight into cosmic history while also posing hazards to earth. understanding asteroids not only advances scientific knowledge but also strengthens planetary defense, highlighting their dual importance in astronomy and human safety.

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