19. Life Cycle of Stars

Q. 1 Search and you will find

a. Our galaxy is called.....

Ans. Milky Way

b. For measuring large distances ..... is used as a unit.

Ans. Light year

c. The speed of light is .....km/s.

Ans. 3,00,000

d. There are about ..... stars in our galaxy.

Ans. Billions

e. The end stage of the Sun will be.....

Ans. white dwarf

f. Stars are born out of ..... clouds.

Ans. Interstellar

g. Milky way is a ..... galaxy.

Ans. Spiral

h. Stars are spheres of ..... gas.

Ans. Hot

i. The masses of other stars are measured realtive to the mass of the.....

Ans. Sun

j. Light takes ..... to reach us from the Sun while it takes ..... to reach us from the moon.

Ans. 8mins, 1 sec

k. The larger the mass of a star the faster is its .....

Ans. Evolution

l. The number of fuels used in the life of a star depends on its.....

Ans. Mass

Q. 2 who is telling lies ?

a. Light year is used to measure time.

Ans. False (Light year is used to measure large distances)

b. End stage of a star depends on its initial mass.

Ans. True

c. A star ends its life as a neutron star when the pressure of its electrons balances its gravity.

Ans. True

d. Only light can emit from the blank hole.

Ans. False (Light does not get reflected from black hole but absorbed)

e. The sun will pass through the supergiant stage during its evolution.

Ans. False (The sun will pass through red giant stage during its evolution)

f. The sun will end its life as a white dwarf.

Ans. True

Q. 3 answer the following question.

a. How do stars form?

Ans.(i)The interstellar clouds, due to some disturbance undergo contraction.

(ii) As a result, their density and temperature begin to increase and a dense sphere of hot gas is formed from the cloud.

(iii) When temperature and density at the centre of sphere increase sufficiently, Thus at the centre of sphere, generation of nuclear energy begins.

(iv)Due to this energy generation, gas sphere becomes self luminous and a star is formed.

OR

(i) Huge clouds of gas and dust present in the empty spaces between stars in a galaxy are called interstellar clouds.

(ii) Scientist uses the unit of light year for measuring large distances.

(iii) A light year is the distance travelled by light in a year.

(iv)The size of interstellar cloud is about a few light years.

(v) Due to some disturbance the clouds start contracting.

(vi)The density increases and the temperature also increases with a dense sphere of hot gas formed from the cloud.

(vii)When the temperature and the density increase, the nuclear energy generation starts there.

(viii)Because of this energy generation the gas sphere becomes self-luminous and a star is formed.

(ix) In the sun the energy is generated by the fusion of hydrogen nuclei to form helium nuclei. The hydrogen at the center of the star acts as a fuel.

(x) Thus energy is generated by burning the fuel.

b. Why do stars evolve?

Ans. (i) Evolution of a star means change in its properties with time causing it to pass through different stages.

(ii) A star is stable as long as balance between gas pressure and gravitational force of the star is maintained.

(iii)To achieve this, temperature of the star must remain constant. This demands energy must be generated inside the star.

(iv)To generate this energy, fuel at the centre of the star is burnt.

(v) Continuous burning of fuel causes decrease in amount of fuel at the centre.

(vi)When the fuel at the centre is exhausted, temperature starts decreasing reducing the gas pressure.

(vii) This disturbs the balance between gas pressure and gravitational force and the star starts contracting under the

influence of gravitational force and the star starts contracting under the influence of gravitational force.

(viii) This causes another fuel present at the centre of sphere to start burning and energy generation restarts.

(ix) As several processes occur inside the star, star undergoes series of changes, i.e., a star evolves.

(x) Evolution of a star continues until all possible fuels at the centre of the star are exhausted.

c. What are the three end stages of stars?

Ans. The three end stages of stars are:

(i) Initial mass less than 8 times the mass of the sun. ($M_{star} < 8M_{sun}$)

(ii) Initial mass between 8 and 25 times the mass of the sun. ($8M_{sun} < M_{star} < 25M_{sun}$)

(iii) Initial mass larger than 25 times the mass of the sun ($M_{star} < 25M_{sun}$)

d) Why was the name black hole given?

Ans. (i) During evolution of stars whose initial mass is greater than 25 times the mass of the sun, they go through the supernova explosion stage.

(ii) These stars continue to contract forever.

(iii) As their size becomes smaller, their density and their gravitational force increase tremendously.

(iv)As all the nearby objects get attracted towards the stars, nothing comes out of them, not even light.

(v) Any light falling on these stars does not get reflected and gets absorbed inside the star.

(vi)Thus we cannot see the star but a minute black hole at its place. Hence, these stars are given the name black hole.

OR

(i) When supergiant stars undergo supernova explosion, their size becomes smaller and gravitational force increases tremendously.

(ii) The pull of gravitational force is so strong that any light falling on these stars cannot escape out.

(iii) Hence, light is not reflected from these stars but is absorbed inside the stars.

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