42295

Section - I

Question # 2.

(a) 1. In a nebula, which is composed of dust and particulate matter, over time mass collects for billions of years. This dense mass becomes unstable and a spark causes this dense mass to explode in a blast creating a star. A new star is born with its stellar remnants revolving around it which ~~their~~ some of them collides to become planets and dwarf planets. Stellar remnants also contains asteroids, comets and satellite

2. Star at this stage enters a **main sequence stage** where two hydrogen molecules collides to become in a exothermic reaction of fusion.

$$^1H + {}^1H \rightarrow {}^2He$$

3. Over billion of years. Star runs out of Hydrogen. Then it enters **triple alpha phase** where the accumulated helium fuses together to produce Carbon. This forms a Red giant star whose size starts growing to engulfs planets and other bodies around it.

4. When the star uses it Helium; all the helium is used up — the star enters the **carbon burning phase** which fuses the produced carbon in previous phase to produce neon.

$^{4}C + ^{4}C \rightarrow ^{8}Ne$

5. After all the carbon is burnt the star will entre the **neon burning phase** where it will ~~start~~ burning neon produced in previous phase to produce oxygen. $^{8}Ne + ^{8}Ne \rightarrow ^{16}O$
6. When Neon is finished oxygen will start burning in **oxygen burning phase** to produce silicon. which is also burnt later in silicon burning phase.
7. Depending of a mass of a star if it is big with dense mass it will explode in a **supernova** or hypernova blast and the core ~~will~~ of the star will make a black hole.

Nebula → The main sequence stage → Triple alpha phase → Carbon burning phase → neon burning phase → oxygen burning phase → silicon burning phase $\xrightarrow{\text{supernova}}$ Black hole

Star vs Planet.

A star is a giant body of a galaxy which is made up of gases. Those gases fuses to produce intense heat and light in an exothermic reaction. A star is made from nebula. Whereas a planet is stellar remant of a star revolving around it. Planets are of two types planets and dwarf planets.

According to IAU— "A planet is a body which must be revolving around a star. It is spherical in shape and has clear its orbit around a star is is not a satellite".

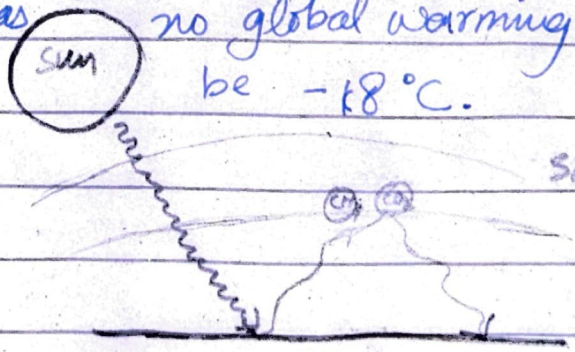
(b). Semiconductors are materials whose conductivity lies in between a conductor i.e conductingelectricitygmetal and insulators i.e non-conductor of electricity e.g rubber. Material such as Silicon & germanium are semiconductors.
Semiconductors are modified externally by introducing impurities in them to get different charge on them. Based on charge semi-conductors are classified as n-type (negative charge) and p-type (positive charge).
In p-type semiconductors an electron is removed from its valence shell (outermost shell) to create a hole for outside ~~at~~ electron to come hence giving it a positive charge.
Whereas in n-type semiconductor an external electron is added to destablize the valence shell. This additional electron creates a negative charge on the atom.
They have diverse applications (i) Silicon semiconductors are used in solar panels to produce electricity

from light.

② Semiconductors are used in chip manufacturing such as transistors in a motherboard of a computer and processors.

(c) Global warming is increase in temperature of the earth due to anthropogenic as well as natural phenomena by trapping the heat coming from the sun.

Naturally sun emits wavelength that are short and it passes through earths atmosphere to strike the land. Some ~~other~~ of the energy is absorbed by the earth and partially is released by the surface in form of shorter wavelength. These wavelengths are deflected by greenhouse gases such as **carbondioxide, methane, Chlorofluorocarbon** and N_2O. Increasing the earth temperature. If there was no global warming earth temperature would have be -18 °C.



Natural warming is important to keep temperature warm Carbondioxide and other GHGS are produced naturally by human breathing or live stock. However, the unprecendented human activities like fossil

burning release extensive amount of these greenhouse gases which raises the temperature of earth unprecedentedly.

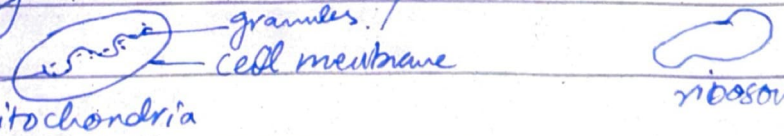
(d).

Due to displacement of water in sea, at sea bed because of earthquake in sea or volcanic eruption, the water in sea rises in form of large waves. These waves travel over large areas to accumulate big enough to cause a tsunami.

When these large waves of tsunami falls on the coastal areas of land it destroys infrastruce, causes flooding and disturbance of life in coastal area by water.

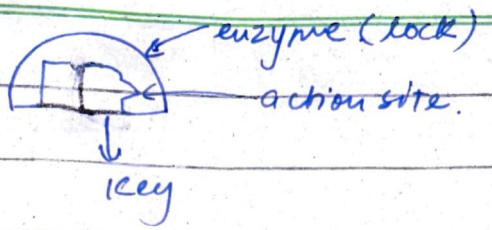
Question # 3.

(a). Mitochondria is a powerhouse of a cell providing energy to the cell for doing its functions whereas ribosomes produce building blocks of cell that is protein.



(b).

Enzymes are proteins in a human body that alter the rate of chemical reaction by increasing it without itself getting used in the process.



In a lock and key model enzymes act as a lock providing active sites for two different molecules (acting as key) to combine together. Shape of the enzymes determine which type of molecules can come and combine. After reaction the keys are separated from the lock without altering the active sites. Two factors that effect the activity of enzyme are following because the affect the shape of active site.

1. Temperature
2. PH.

(c) Non-Renewable are energy resources which after producing the energy are not recoverable and are utilized in the process. Whereas renewable energy resources are sources which can be recovered after the produce the required electrical energy. e.g. Wind, solar, water, tidel, hydel etc.
Non-renewable energy sources types are coal burning.
Wind energy is a renewable energy source type that convert the potential energy in the air to a kinectic energy of a rotor in wind mills

However, wind is not available with large speed and potential energy all over the world and the speed of wind also varies so it is a fluctuating source of energy. However, for a sustainable future it is a clean source of energy if more technological advancement is done.

(d) Dengue fever is caused by a virus called dengue virus. However this virus needs to be transported from an affected person to a normal living thing. which is done by vector Dengue mosquito. This vector feeds on blood. So when it bites a human being with virus it carries that virus and takes it to someone who is normal when it bites it for blood. The vector itself is not harmed by the virus.

- Common symptom of the virus are high temperature fever, vomiting, coughing.
- Preventive measures: By eliminating the vector itself this disease can be stopped from spreading. One main measure is stop breading of the mosquito. This mosquito lays its egg on fresh water. By covering water we can prevent the egg formation. Secondly, by using nets or mosquito repellant spray we can keep the mosquito away from our skin.

Section II

QUESTION # 6

(a) $T_A = 10\ hr \rightarrow Rate_A = 1/10$

$T_B = 15\ hr \rightarrow Rate_B = 1/15$

$T_C = -30\ hr. \rightarrow Rate_C = -1/30$

$$Rate_{Total} = R_A + R_B + R_C$$

$$= \frac{1}{10} + \frac{1}{15} - \frac{1}{30}$$

$$= \frac{3+2-1}{30} = \frac{4}{30} = \frac{2}{15}$$

$$T_{total} = \frac{1}{Rate_{total}} = \frac{15}{2} = 7.5 \text{ hours}$$

(b) Total ratio $= 4+5+7 = 16$ parts. Assuming combine sum $= x$

$$X = \frac{4}{16} \times x = \frac{x}{4}$$

$$Y = \frac{5}{16} \times x = \frac{5x}{16}$$

$$Z = \frac{7}{16} \times x = \frac{7x}{16}$$

Y increased by 10%, Z decreased by 25%

$$Y_{new} = 1.1 \times \frac{5}{16}x = \frac{11}{10} \times \frac{5}{16}x = \frac{11}{32}x$$

$$Z_{new} = 0.75 \times \frac{7x}{16} = \frac{75}{100} \times \frac{7}{16}x = \frac{105}{320}x$$

New Total sum combined = 169500

$$X_{new} + Y_{new} + Z_{new} = 169500$$

$$\frac{x}{4} + \frac{11}{32}x + \frac{105}{320}x = 169500$$

$$\frac{80x + 110x + 105x}{320} = 169500$$

$$\frac{295x}{320} = 169500$$

$$x = 169500 \times \frac{64}{59}$$

$$X_{original} = \frac{x}{4} = 169500 \times \frac{64}{59} \times \frac{1}{4}$$

$$\boxed{X_{orig} = Rs.45966.1}$$

(c)

work	days	Men
3/5 ↓	60 ↑	x
2/5	20	x+10 ↓

$$\frac{x}{x+10} = \frac{20}{60} \times \frac{3}{2}$$

$$2x = x + 10$$

$$\boxed{x = 10 \text{ men}}$$

(d) $\frac{\Sigma Score_{old}}{\text{Total students}} = 78 \Rightarrow \Sigma Score_{old} = 78 \text{ Students}$

$$\frac{\Sigma Score_{old} - (98+95+92+90+85)}{\text{Total students} - 5} = 75$$

$$\Sigma Score_{new} = \Sigma Score_{old} - 460$$

$$\Sigma Score_{new} = 78 \times \text{students} - 460$$

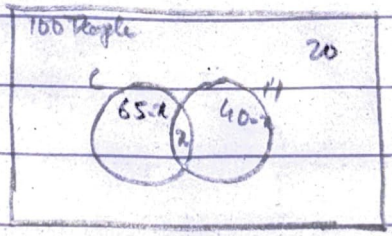
$$78 \times \text{students} - 460 = 75 \times \text{Student} - 375$$

$$3 \times \text{students} = 460 - 375$$

$$\boxed{\text{students} = 28.33}$$

Question # 7.

(a)

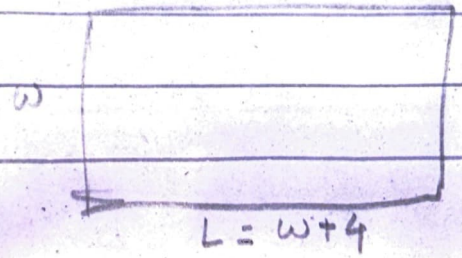


$$(65-x) + x + (40-x) + 20 = 100$$

$$125 - x = 100$$

$\boxed{x = 25 \text{ people watch both cricket \& Hockey}}$

(b)



P = 7.2
height.

$2(L+W) = 72$

$2(W+4+W) = 72$

$2W + 4 = 36$

$2W = 40$

$\boxed{W = 20m}$ $\quad L = W + 4 \Rightarrow \boxed{L = 24m}$

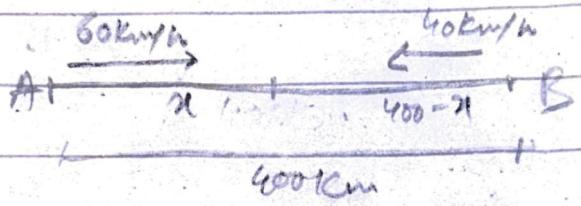
Height $= 2.5m$.

Volume $= L \times W \times h$

$= 24 \times 2.5 \times 20$

$\boxed{V = 1200\ m^3}$

(c).



$T_A = T_B$

$\frac{x}{60_3} = \frac{400-x}{40_2}$

$2x = 1200 - 3x$

$5x = 1200$

$\boxed{x = 240\ km}$

$T_A = \frac{240}{60} = 4\ hr$

They will meet at 12pm