

Mock Exam
General Science & Ability

Part - II

Section-I

~ (Q. No. 2) ~

~ (A) ~

Difference between Star
and Planet :

Following are
the differences between star
and planet :

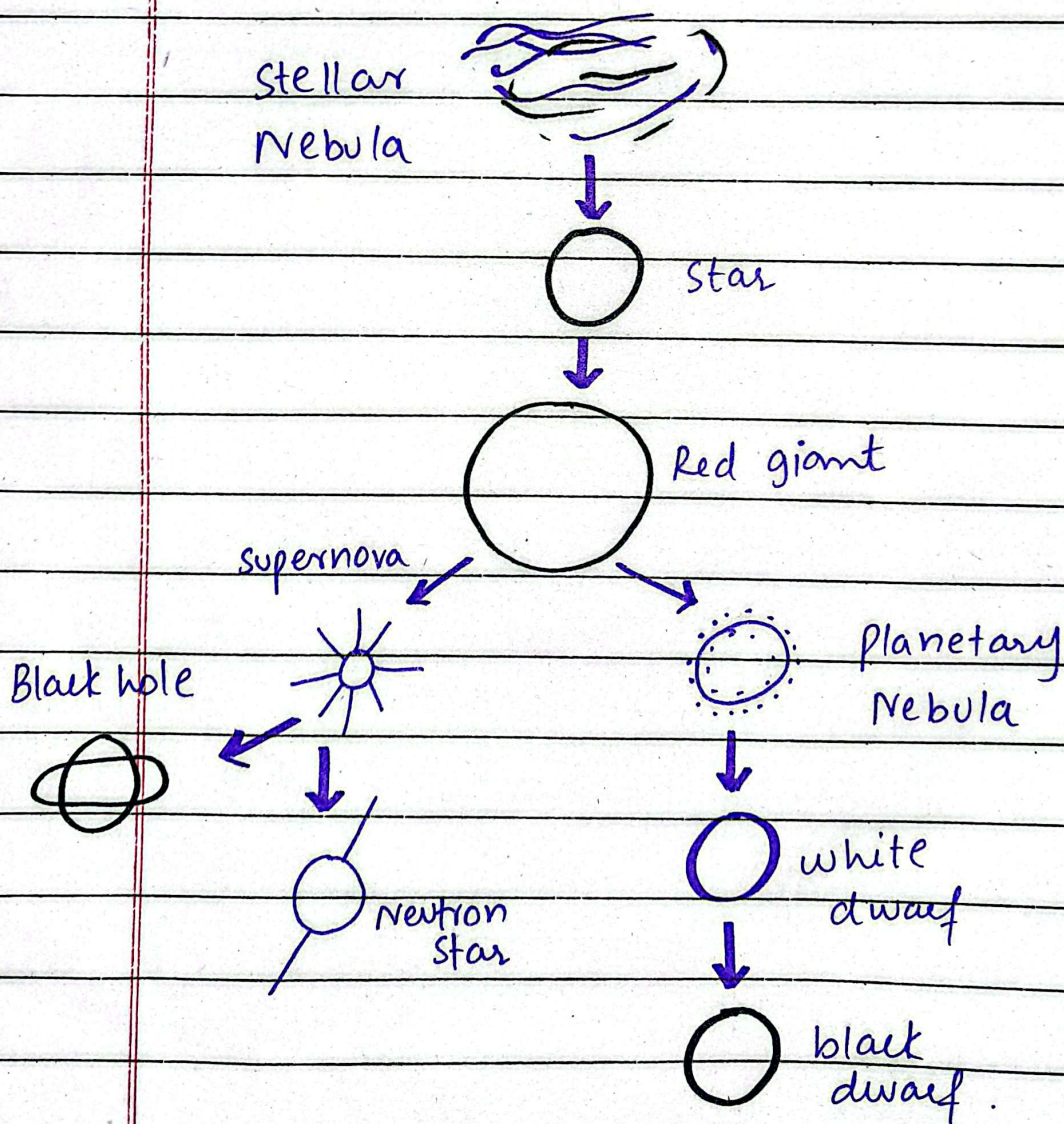
- 1) Stars generate energy via nuclear fusion. Planets on the other hand does not generate energy.
- 2) Stars emit light and shine on its own. While planets reflects light from a star.
- 3) Stars are mostly composed of hydrogen and helium. Planets are composed of

rocks or gasses.

4) Stars are extremely high in temperature. While planets are cooler compared to stars.

5) Stars are Sun, Sirius. While planets includes Earth, Jupiter.

Life cycle of a Star:



(B)

Semiconductors:

These are the materials with conductivity between conductors and insulators.

For example: Silicon, Germanium.

Difference between n-type and p-type:

<u>N-Type</u>	<u>Feature</u>	<u>P-Type</u>
Pentavalent e.g. Phosphorus	<u>Doping Element</u>	Trivalent e.g. Boron
Electrons (Negative)	<u>Charge Carriers</u>	Holes (positive)
Due to Electrons	<u>Conductivity</u>	Due to holes

Modern Applications:

Following are the modern applications

of n-type and p-type semiconductors:

→ 1. Diodes, transistors, ICs.

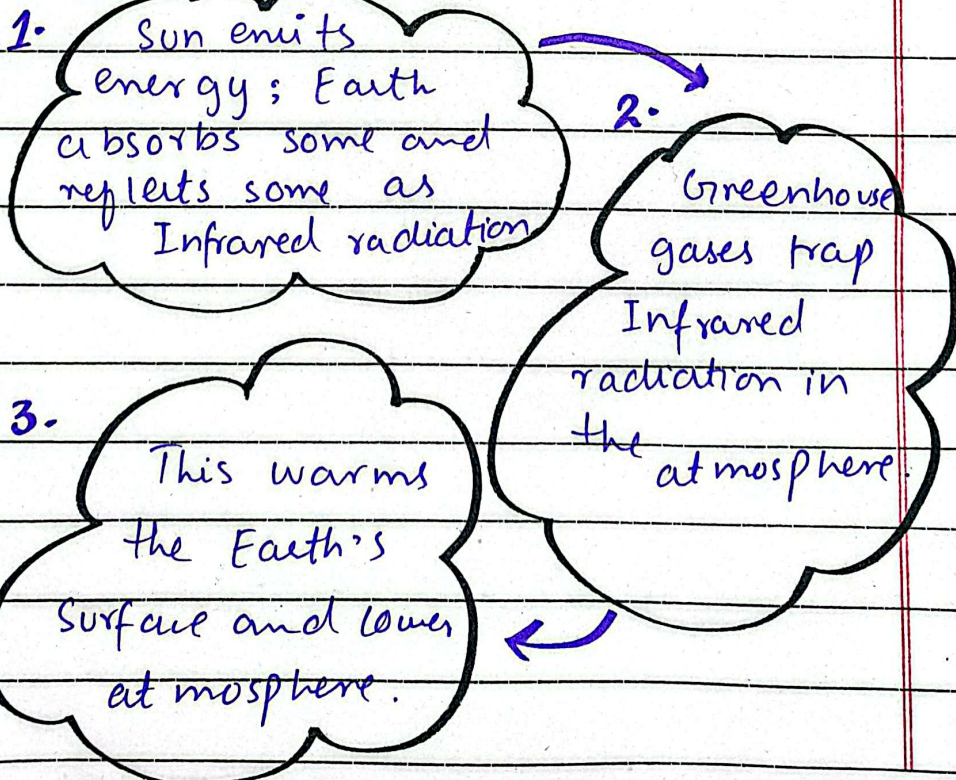
→ 2. Solar cells, LEDs.

~ (C) ~

Global Warming :

Global warming is gradual increase in Earth's average temperature due to greenhouse gases trapping heat.

Mechanism of Greenhouse Effect :



Major Greenhouse Gases:

1. Carbon dioxide (CO_2)
2. Methane (CH_4)
3. Nitrous Oxide (N_2O)



Tsunami:

A series of large ocean waves caused by sudden displacement of water.

Natural Triggers:

Following are the natural triggers.

1. Underwater earthquakes.
2. Volcanic eruptions.
3. Landslides into the ocean.
4. Meteorite impacts.

Potential Impact on Coastal Areas:

Following are the potential impacts on coastal areas:

(b)

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1. Flooding and destruction of infrastructure.
2. Loss of human life.
3. Soil erosion and salinization of farmland.
4. Economic and environmental damage.

Q.3

A

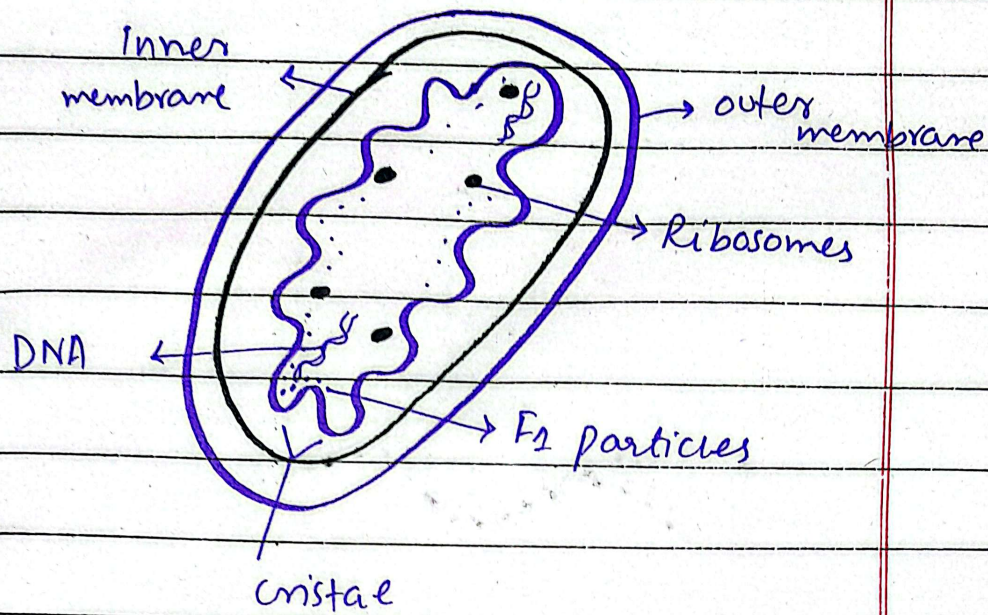
Mitochondria:

Mitochondria are very important organelles found only in Eukaryotic cells. The structure of mitochondria maybe a rod or a filament like structure. Consists of two membranes. Outer is smooth, inner membrane consists of many infolding called Cristae. There are also small particles F₁ present inside the matrix.

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= Mitochondria

Why called "Powerhouse" of the cell:

Mitochondria called the powerhouse of the cell because it is involved in manufacturing and providing energy to cells.

Ribosomes:

These are small, spherical, non-membrane-bound, can be free in cytoplasm or attached to rough endoplasmic reticulum.

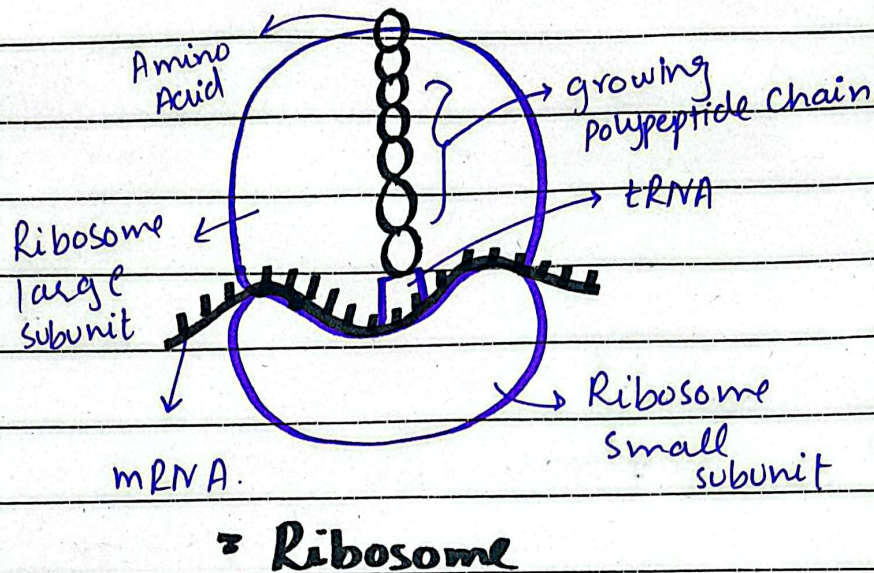
Function:

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Protein Synthesis by translating mRNA into polypeptides.



(B)

Enzymes:

Enzymes are biological catalysts that speed up chemical reactions without being consumed.

Example:

Amylase found in saliva, pancreas breaks down Starch into sugar.

Lock and Key Model :

Lock and key model explains how enzymes catalyze chemical reactions by binding specifically to their substrate.

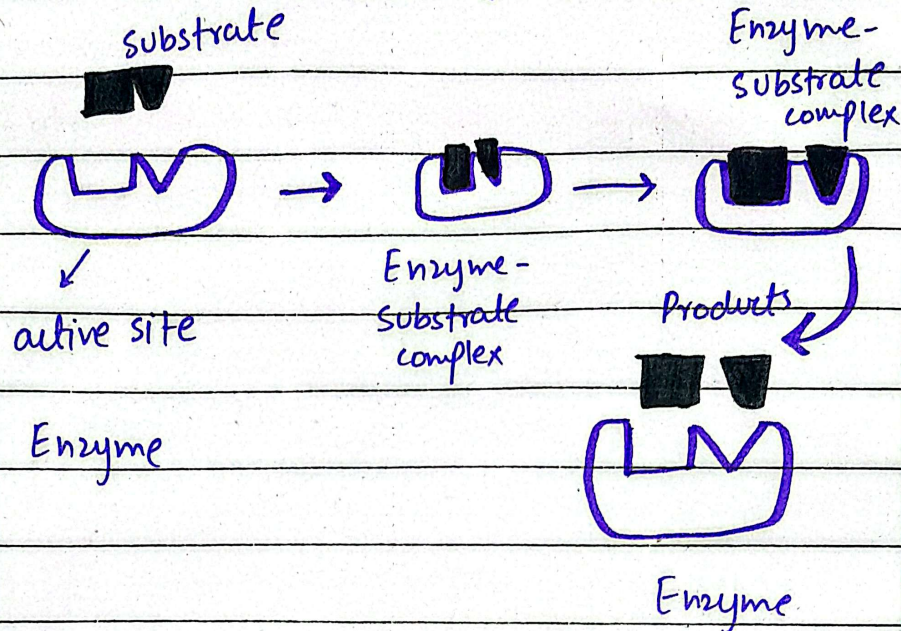
Key points :

1. Enzyme as lock has a specific active site
2. Substrate as key fits exactly into enzyme's active site.
3. When substrate binds, it forms a temporary complex.
4. Enzyme helps convert the substrate into products.
5. The product leaves the active site and the enzyme is free to act again.

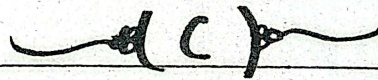
Factors Affecting Enzyme Activity :

1. Temperature - high or low can denature enzyme.

2. PH - extreme acidity or alkalinity reduces activity.



= Lock and Key Model



Difference between Renewable and Non-Renewable Energy:

1. Renewable energy is naturally replenished. On the other hand non-renewable energy is finite, cannot be replaced easily.
2. Examples of renewable energy is solar, wind, hydro.

While non-renewable energy sources are coal, oil, natural gas.

3. Renewable energy has low impact on the environment. While non-renewable energy has high impact on environment such as pollution, greenhouse gases.

Wind Energy as Sustainable Source:

Wind energy converts wind kinetic energy into electricity using turbines. It has a potential as sustainable source for the future:

- 1) Abundant and renewable
- 2) Low carbon footprint
- 3) Can reduce dependency on fossil fuels.
- 4) Especially effective in coastal and high-altitude regions.

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(D)

Dengue Fever:

It is a viral disease transmitted by mosquitoes.

Vector:

Aedes aegypti mosquito.
(a day-biting, black with white markings).

Symptoms:

Headache, high fever, joint/muscle pain, rash, nausea.

Preventive Measures:

Following are the preventive measures:
Eliminate mosquito breeding sites.

Use mosquito nets and repellents.
Community sanitation and fogging campaigns.

Public awareness about early

symptoms and treatment.

Section-II

Q. No-6

(A)

A fills tank in 10 hrs rate = $\frac{1}{10}$

B fills tank in 15 hrs rate = $\frac{1}{15}$

C empties tank in 30 hrs = $-\frac{1}{30}$

combined rate:

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

$$\frac{30, 10, 15}{+}$$

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

Time to fill tank:

$$\text{Time} = \frac{1}{\text{Rate}} = \frac{1}{\frac{2}{15}} = \frac{15}{2} =$$

$$= 7.5 \text{ hours}$$

$$= 7 \text{ hours } 30 \text{ mins.}$$

$$= 46000$$

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(C)

let the number of original
workers = W .

Total work = 1 unit

work done in 60 days = $\frac{3}{5}$

Remaining work = $\frac{2}{5}$

work rate per day = $\frac{\text{work}}{\text{days}}$

$$\text{Rate} = \frac{3/5}{60} = \frac{3}{5 \times 60} = \frac{3}{300} = \frac{1}{100}$$

Now,

Remaining work = $\frac{2}{5}$

Days taken = 20

Total work done = $\frac{W+10}{100W5} \times 20$

$$= \frac{W+10}{5W}$$

This must equal remaining
work

$$\frac{W+10}{5W} = \frac{2}{5}$$

$$W+10 = 2$$

$$W = 8$$

$$5W = 5$$

$$W = 5/5$$

$$W = 1$$

(D)

let total students = n

Total marks = $78n$

Top 5 scores = $98 + 95 + 92 + 90 + 85$
 $= 460$

Remaining students = $n - 5$

75 total remaining average

So,

$$= 75(n - 5)$$

$$= 75n - 375$$

subtract top 5 from total.

$$78n - 460 = 75n - 375$$

$$78n - 75n = -375 + 460$$

$$3n = 85$$

$$n = \frac{85}{3}$$

$$n = 28.33$$

$$n \approx 29$$

total number of students
in the class 29.

$$\begin{array}{r} 460 \\ - 375 \\ \hline 85 \end{array}$$

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Qno-7A

$$\text{Total} = 100$$

$$\text{cricket} = 65$$

$$\text{Hockey} = 40$$

$$\text{Neither} = 20$$

$$\begin{aligned} \text{People who watch either} &= 100 - 20 \\ &= 80 \end{aligned}$$

$$\text{Cricket} + \text{Hockey} - \text{Both} = 80$$

$$65 + 40 - \text{Both} = 80$$

$$105 - \text{Both} = 80$$

$$\text{Both} = 105 - 80$$

$$\text{Both} = 25$$

B

$$\text{length} = \text{width} + 4$$

$$\text{Perimeter} = 2(\text{length} + \text{width}) = 72$$

$$= L + W = \frac{72}{2}$$

$$\Rightarrow L + W = 36$$

$$\text{Since length} = \text{Width} + 4$$

So,

$$W + 4 + W = 36$$

$$2W = 36 - 4$$

$$2W = 32$$

$$W = \frac{32}{2} = 16$$

$$W = 16$$

Since length = 20 So,

$$\text{Depth} = 2.5 \text{ m.}$$

$$\text{Volume} = L \times W \times H$$

$$V = 20 \times 16 \times 2.5$$

$$V = 800 \text{ m}^3$$

~~~~~ (d) ~~~~~

$$\text{let father} = F$$

$$\text{Son} = S$$

$$F + S = 75$$

$$F = 75 - S$$

10 years ago,

$$F - 10 = 4(S - 10)$$

$$75 - S - 10 = 4S - 40$$

$$65 - S = 4S - 40$$

$$105 = 5S$$

$$S = \frac{105}{5}$$

$$S = 21$$

So,

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$$F = 75 - S$$

$$F = 75 - 21$$

$$F = 54.$$

Father = 54 years

Son = 21 years.

$$\begin{array}{r} 75 \\ - 21 \\ \hline 54 \end{array}$$

~~~~~(C)~~~~~

Distance = 400 km

Speed = 60 + 40 = 100 km/h

Time to meet = $\frac{400}{100} = 4 \text{ hours}$

Departure = 8:00 AM

So, will meet at 12:00 PM

The End!