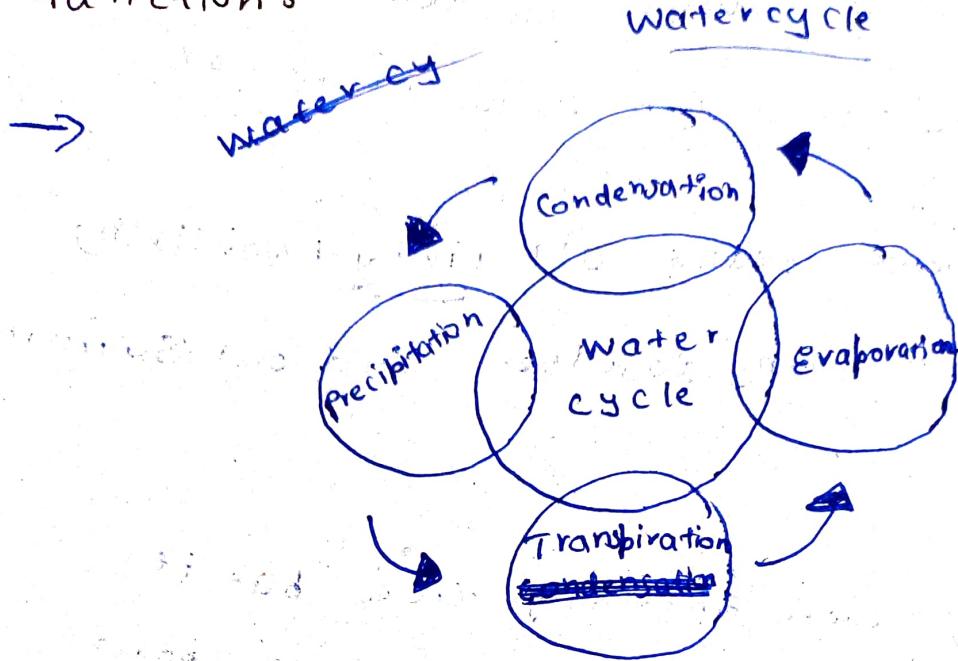


2) Discuss how the water cycle & ecosystems functions

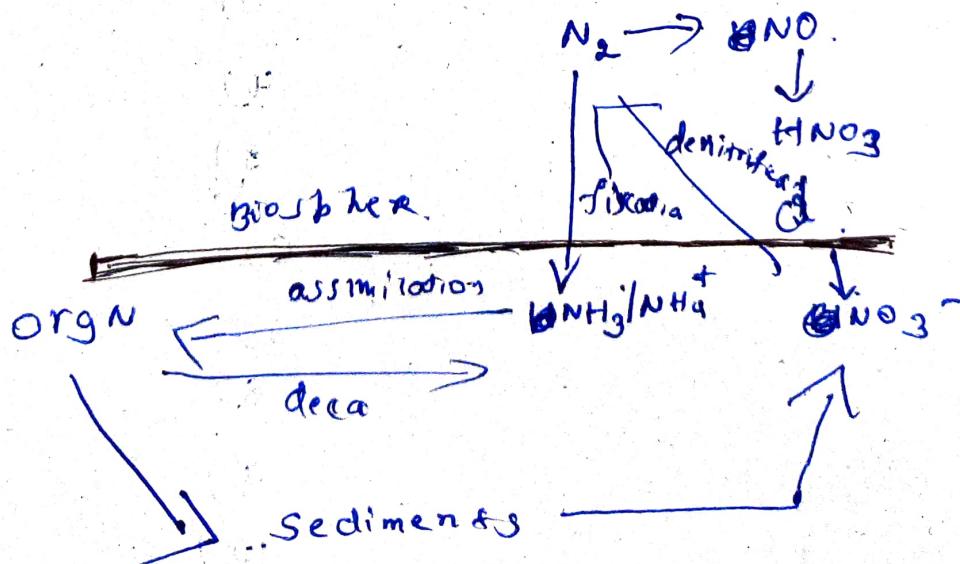


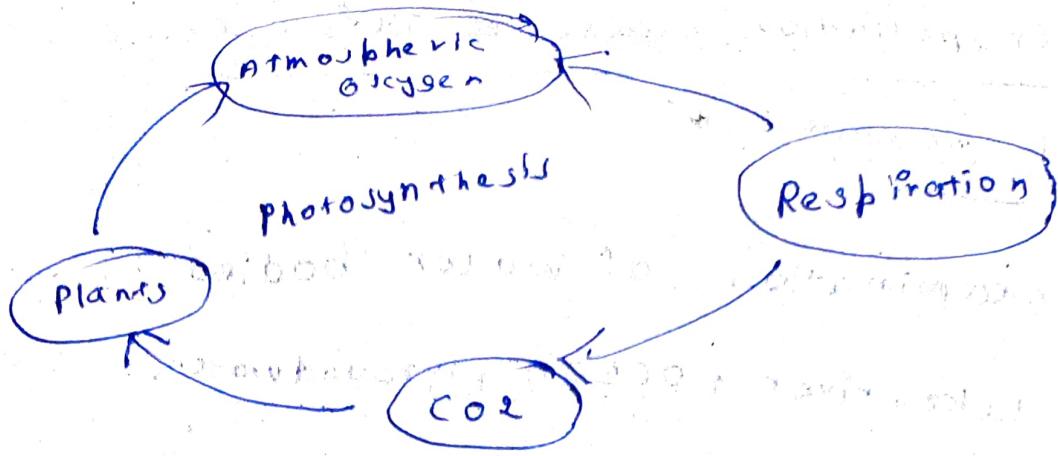
3) nitrogen cycle ✓

4) oxygen cycle

5) carbon cycle

Nitrogen cycle





Module 4

1) causes, effects & control measures of air pollution.

→ presence of undesirable solid or gaseous particle in air in quantity that are harmful to human health and the environment.

effects of air pollution:

- 1) Living organism → cancer, asthma, ai, cancer
- 2) Plants → water loss & damage to leaves
- 3) Materials → Tajmahal

control measures:

preventive: Scrubber, collection system.

effluent: chimney, precipitator.

Q) Water pollution causes & its effects.

control measures.

→ contamination of water bodies like lake, river, ocean, groundwater.

Causes:

- disease causing pathogen like bacteria, virus
- oxygen depleting waste
- inorganic plant nutrient causes growth of algae. → Nitrate
- soluble inorganic chemicals → acid

Effect:

Control measure

effluent treat plants, reusing for gardening, washing, litter don't throw in water.

3) Elaborate causes, effects, control measures of i) Soil pollution

- ii) noise pollution
- iii) water → Thermal pollution

Soil Pollution

- Thin layer on land consists of:
 - minerals + organic matter
 - water + air
- movement of top soil from one place to other due to human activity, deforestation.

Effects:

- 1) Industrial Activity →
- 2) Agricultural activity
- 3) water disposal
- 4) oil spill
- 5) Acid Rain

Control

- Area treatment.
- Drainage line treatment.
- Bund constructed by stones
- Live check dams.

P1) Noise pollution:

→ undesirable or unwanted sound.

causes

(80-130dB) fine level of pollution.

(above 150dB) dangerous

Factory, vehicle, loudspeaker, music pollution

effects:

physical health,

mental health

control

rogatenfield

P1) Thermal pollution:

Act of altering temperature of natural

water body.

→ discharge of warm water in river

causes:

Source and return of heated water.

effect

control measure

heated water to a cooling pond.

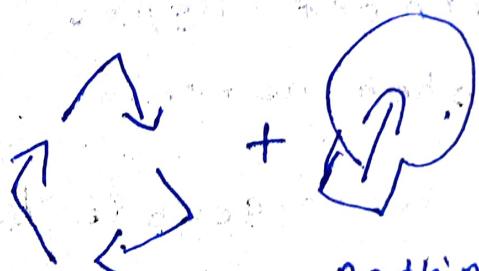
Cooling towers

4) Solid waste Management techniques

→ waste which comes from city + town + village domestic or biomedical waste is termed as solid waste.

~~effect~~ unchecked leads to health hazard.

everyone is involved everyone should involved.



Rethink.

Reduce

Recycle

Reuse

technique



1) Source Reduction: Designing, packagings

• Reductional Recycling:- Reuse

2) Disposal: dispose

Incineration: burning municipal solid wastes

vermi composting: dead and dry leaves

IV

Industry visit

5) Role of individual in prevention of pollution.

- - Respect all forms of life
 - furniture don't buy it made from wood.
 - reduce fossil fuel
 - Turn off lights vehicles when not in use
 - use rechargeable batteries
 - Do not litter roadsides

6) Discuss any case study related to pollution of environment.

i) Bhopal Gas Tragedy

ii) Love Canal Tragedy

→ i) Bhopal Gas Tragedy

2-3 December 1984

→ Union Carbide Company

→ Methyl Isocyanite

→ Accidental entry of water in process tank → overheat → failure of cooling system →

safety device dint work → blast

M ± C

→ 40 ton s of

1000 kobar

→ lungs & eye & skin

blind

→ 570 \$ to \$ 10C.

ii) William love built love
Canal

Dump Steel drums of chemical
waste by Hookee Chemical

1953 clay and top soil
sold to city board of education

→ 1976 resident complain

four smell and chemical burn.

soil contaminated

→ family relocate

→ waste were moved

Target of the day

March 7

Modules

~~Absolute~~

problems

Module 2

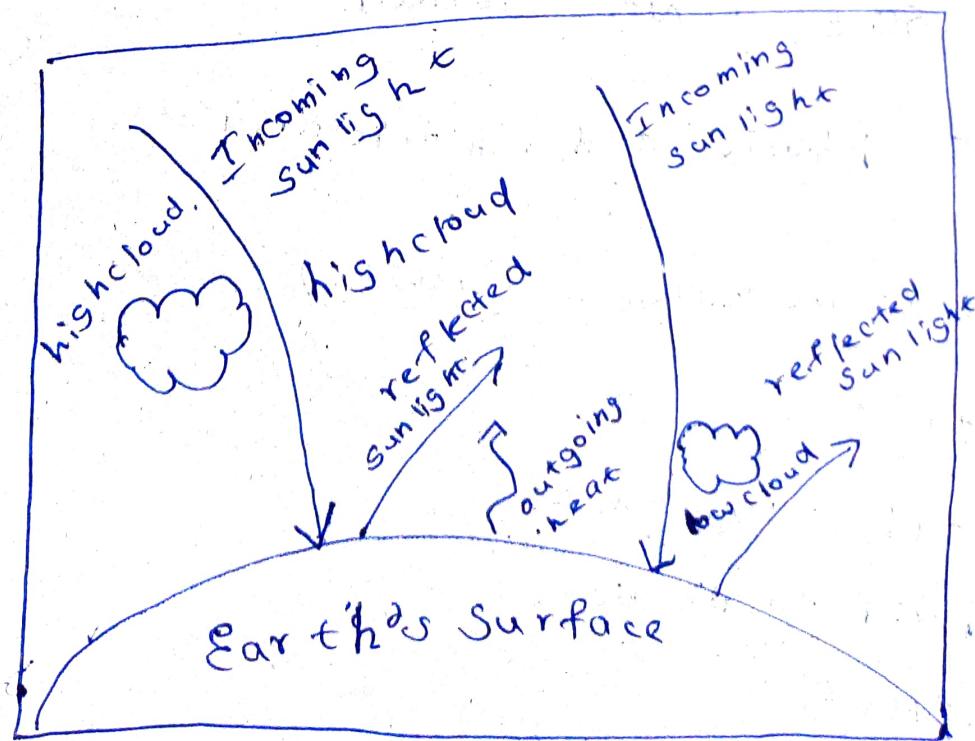
Mod 1
title

2:43 PM

1) how climate change is affecting human race.

- • Temperature is increasing
- Increase in rainfall
- Change in weather make it extra hard for mankind to survive.
- 1.4°C to 5.8°C surface temperature
- food, shelter, potable water dependence
- diseases

2) Enumerate impact of global warming on our mother nature.



- 75% of sun is absorbed by Earth
- some heat trapped by greenhouse gas

3) What is Acid rain? what are its effects.



coal + oil + natural gas

→ —

$\text{SO}_2 + \text{NO}$ formed

→

Sulphuric acid, nitric acid

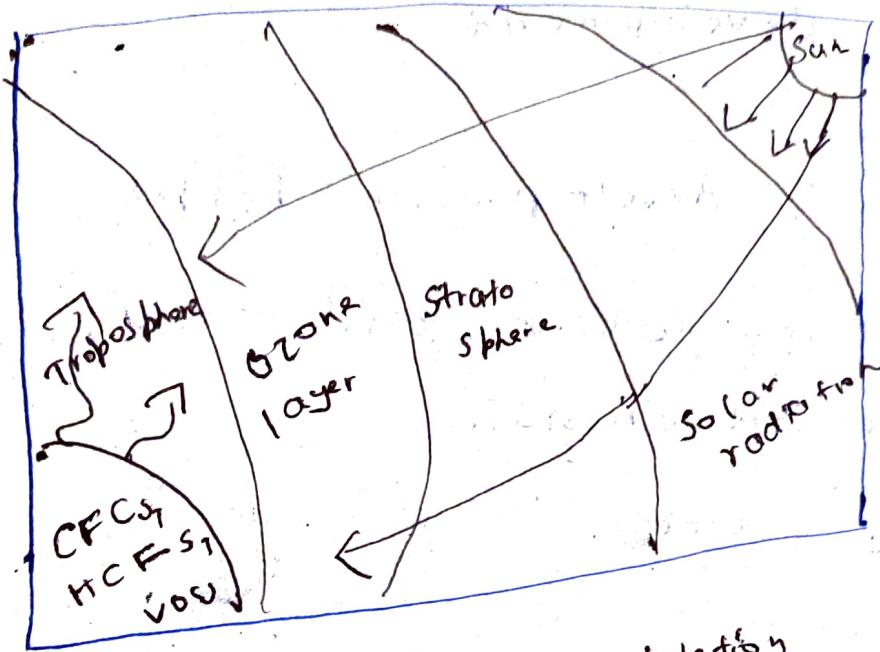
→

corrosive nature (crust)

effects?

- soil Vitamin
- river to Acidic
- Taj Mahal

4) write a note on ozone layer depletion



Ozone layer Depletion

- Ozone is made by action of daylight on O_2 .
- Ozone layer depletion is made by action of CFCs, HCFCs, and HOs.
- Ozone is present over Earth at 20 to 50 km s with powerful odour.
- Ozone is extremely toxic.
- Chlorofluorocarbon spray are threat to ozone.
- CFCs a refrigerant, aerosol

5) Express the need for reclaiming the wasteland development.

→ Wasteland development helps

• delivery of gas, fodder and wood.

• prevent soil erosion.

• planting trees.

6) Discuss environmental protection act and its features.

→ March 1986 - November 19

• 96 sections.

improvement of human environment

— Act last amended in 1991

1) Govrn harrt

2) No emit of pollutants

3) No hazard material

7) Explain the salient features of

Air pollution Act.

→ 8) Wildlife Protection Act

a) Forest Conservation Act

→ → Air Pollution 1981

central board : air quality

state board : follows and support

central board

Penalty : 3 month or 10000 ₹

• create central and state board,

• assign work

Penalty

wild life

1972.

→ wild life regularly monitored.

→ list of endangered species

→ ban on trade of animals

penalty

₹ 25000 or 6 years

Forest conservation Act

- Reserved forest : Government supervision
no public entry.
 - protected forest : Govt. but local bpl are
allowed to collect
 - Village forest: village people
 - private protected forest : Ind. individuals
- Penalty: ₹ 5000 or 6 months

Problems

i) A thermal plant of 210M W capacity has the maximum load of 160 MW. Its annual load factor is 0.6. Coal consumption is 1kg per kWh of energy generated and the cost of coal is Rs 450 per tonne.

calculate

- a) Annual revenue earned if energy is sold at Re 1 per kWh
- b) the capacity factor of the plant

$$\rightarrow \text{Average load factor} = \frac{\text{average load}}{\text{peak load}}$$

Energy generated per year

Average loadfactor

$$\text{Average load} = 0.6 \times 160$$

$$= \underline{\underline{96 \text{ MW}}}$$

This is a
constant
to convert
power

$$\text{Energy generated per year} = 96 \times \underline{\underline{8760 \text{ MWh}}}$$

$$= \underline{\underline{840960 \times 10^3 \text{ kWh}}}$$

Coal req per year

$$= 840960 \times 10^3 \text{ kg}$$

$$= 840960 \text{ tonnes}$$

Cost of coal per year

$$\text{Cost} = 840960 \times 450$$

$$= 378432 \times 10^6$$

Cost of energy sold = Rs 840960×10^3

$$= 840.96 \times 10^6$$

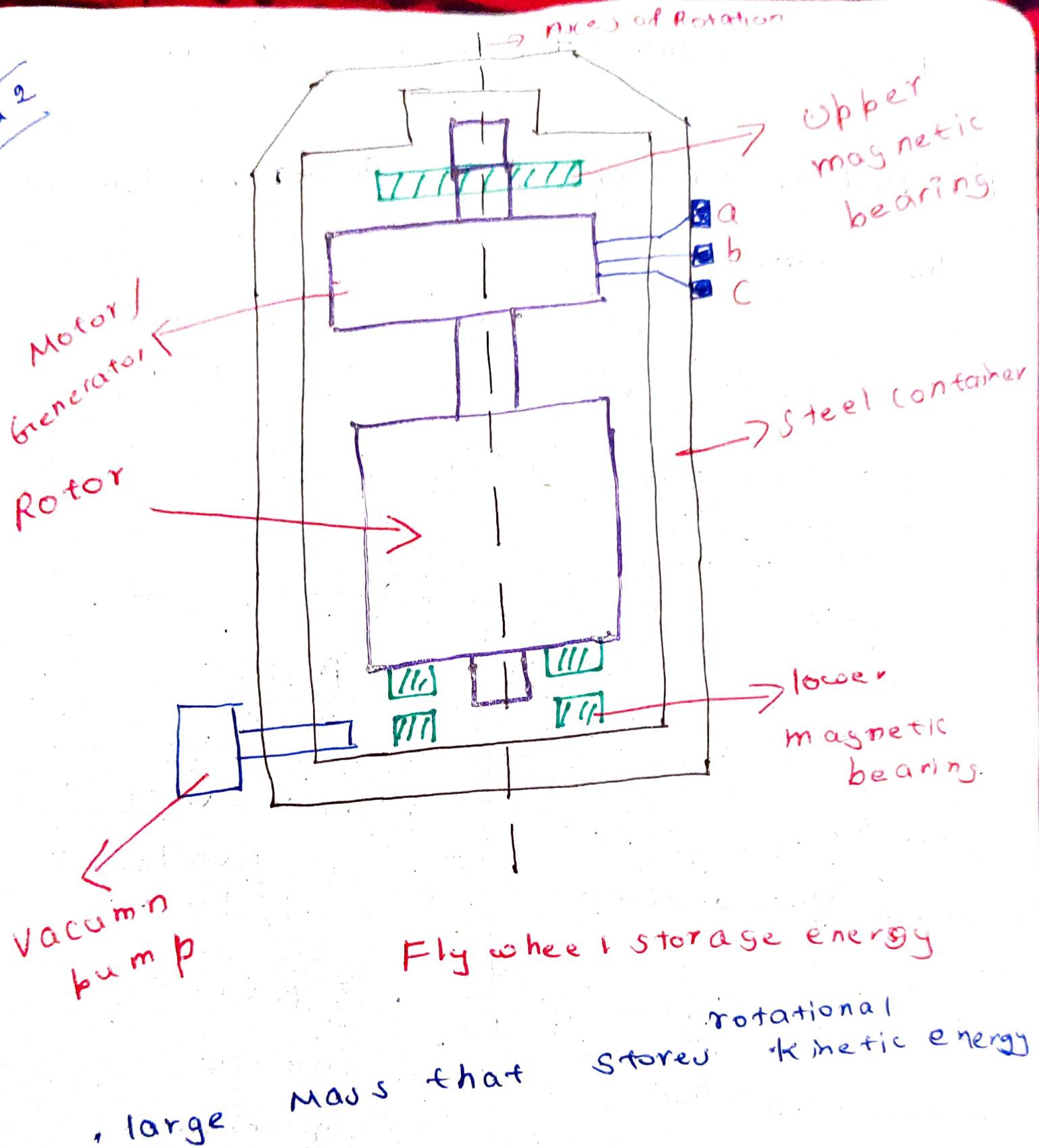
Revenue earned per year by power plant

$$\text{Revenue} = \text{Rs. } 840.96 \times 10^6 = \text{Rs. } 378.432 \times$$

$$= 462.528 \times 10^6$$

$$= 46.25 \text{ crores}$$

Mod 2



, large

mass that

rotational
stored kinetic energy

1) Define energy and Power. Differentiate the same.

→ Energy is the capacity to do work.

- Power is rate at which work is done.

Energy



Power

• unit is watt

joule / second

• unit is

joule = Newton-meter

• power

can be

generated or
transformed.

• Energy can be
transformed from
one form to other

2) Define world scenario of energy with respect to production and consumption using statistics.

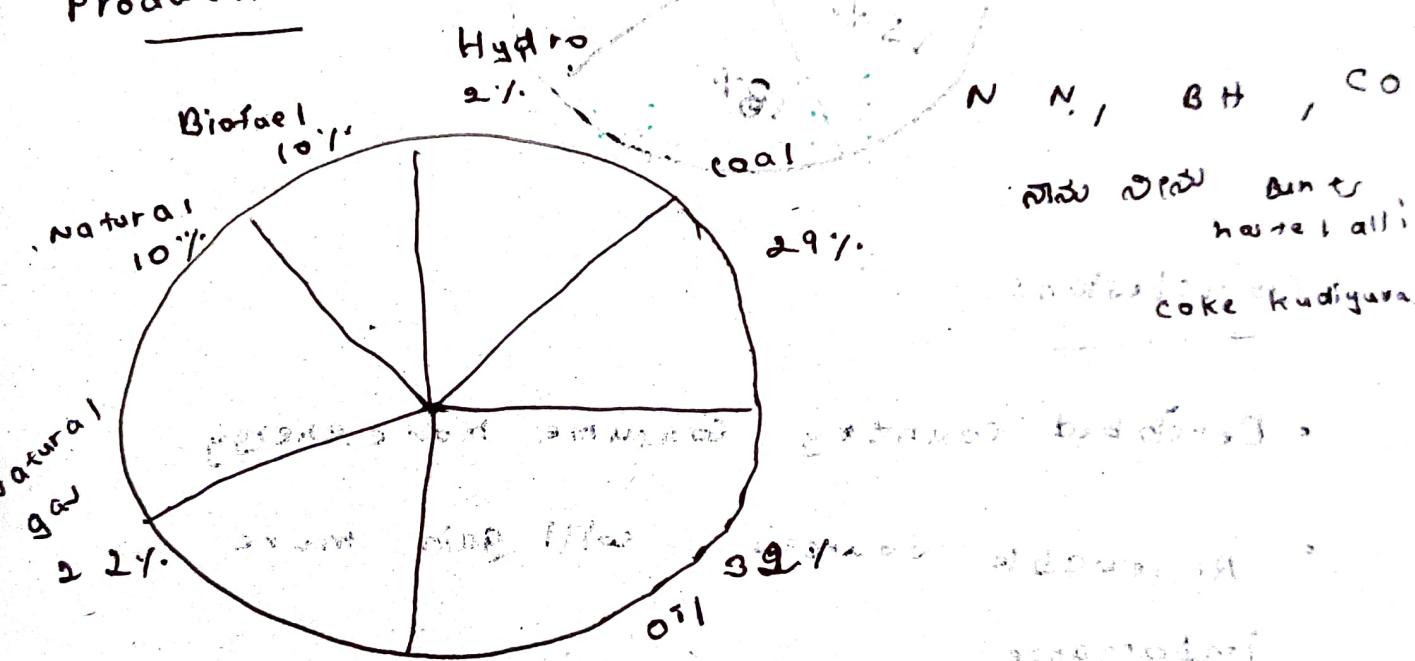


primary sources: nature ex: coal, oil
secondary sources: converted ex: electric energy,
petrochemicals.

world energy scenario?

- Interest in energy throughout world is ↑

Production



- Global Production 14000 Million Tonnes

Natural Gas: Natural materials

Biofuel: renewable fuel

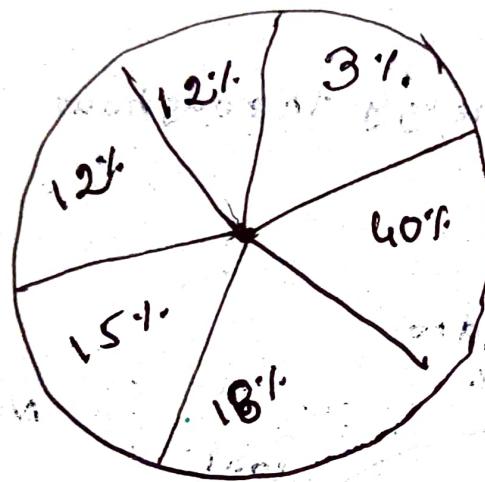
Hydro power: using water

coal: used for steam engine

oil: used for everything.

Consumptions

- Developed country high energy consumption



Conclusion:

- Developed country consume more energy
- Renewable sources will gain more importance.
- Investment should be huge focused on

3) Explain various key trends in India.

→ EEAD

(energy and environment advertise)

• Energy production and trade { explain

• Electricity

• Access to Modern Energy

• Demand:

1) Demand:

100% rise in energy demand

2) Electricity:

3) Access to Modern Energy:

20% population no electricity.

(RGGVY) Rajiv Gandhi Gramin Vidyutikaran Yojana.

4) Energy production & Trade:

i) oil and oil products

ii) natural gas

5) outline factors that affect India's energy development.

→ EE, PSI

- 1) Energy Demographics
- 2) Energy Process and Affordability
- 3) Policy and Institutional Framework
- 4) Social and Environmental Aspects
- 5) Investment

Module 2

Storage Methods ✓

1) Energy

2) Types of thermal storage systems ✓

3) Solar pond ✓

4) Energy management and Audit

5) Ten step Methodology

6) Energy audit

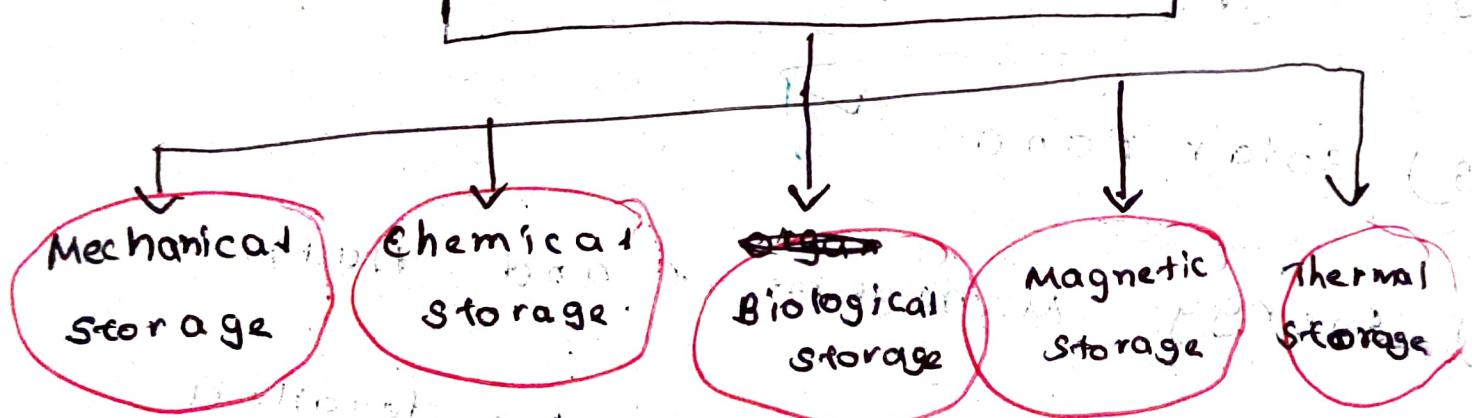
7) Energy management

8) Numericals

9)

1) Energy Storage Methods

Energy storage Method



• Hydrostorage

• flywheel

• compressed air storage

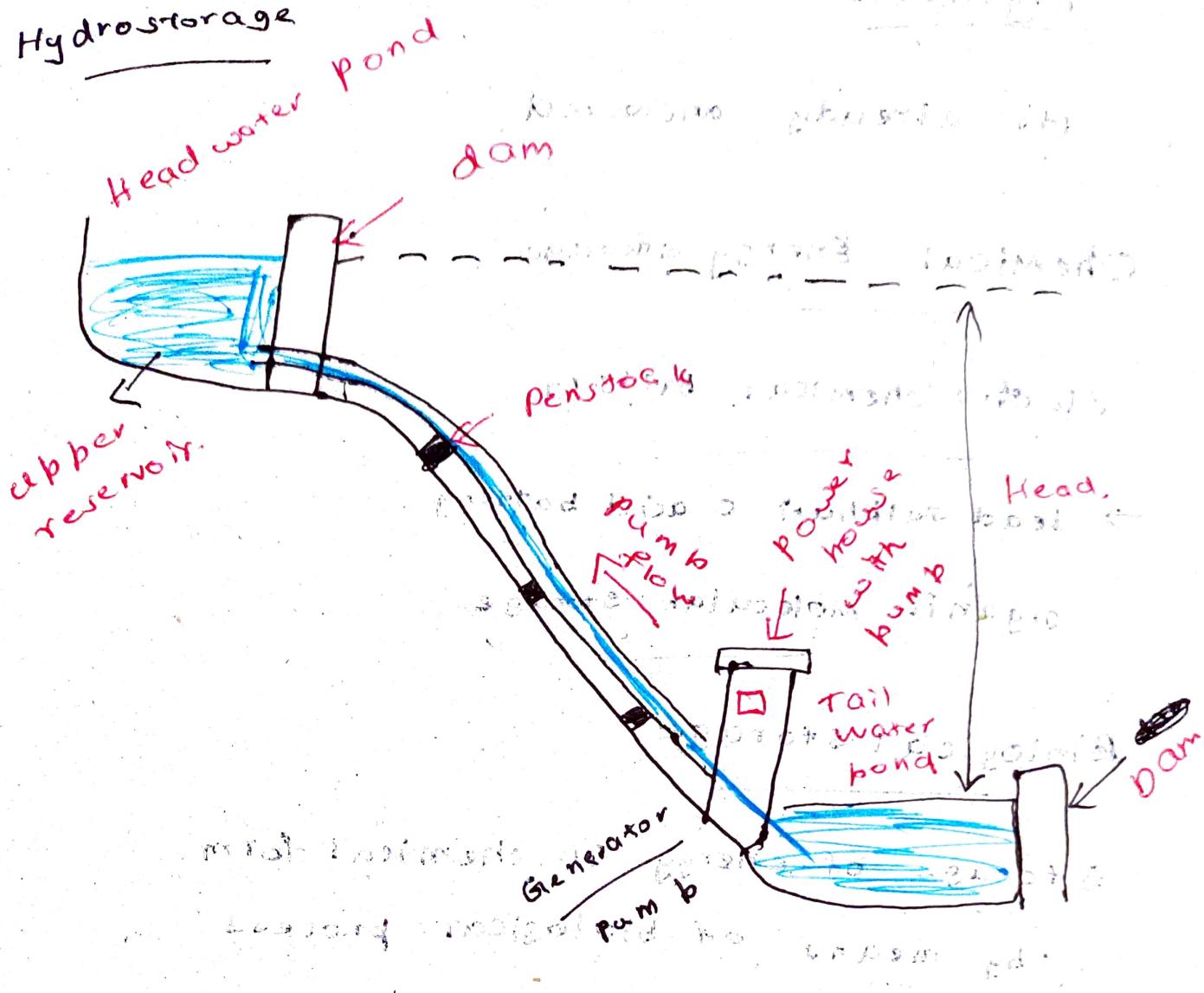
• Electrochemical battery

• organic molecular storage

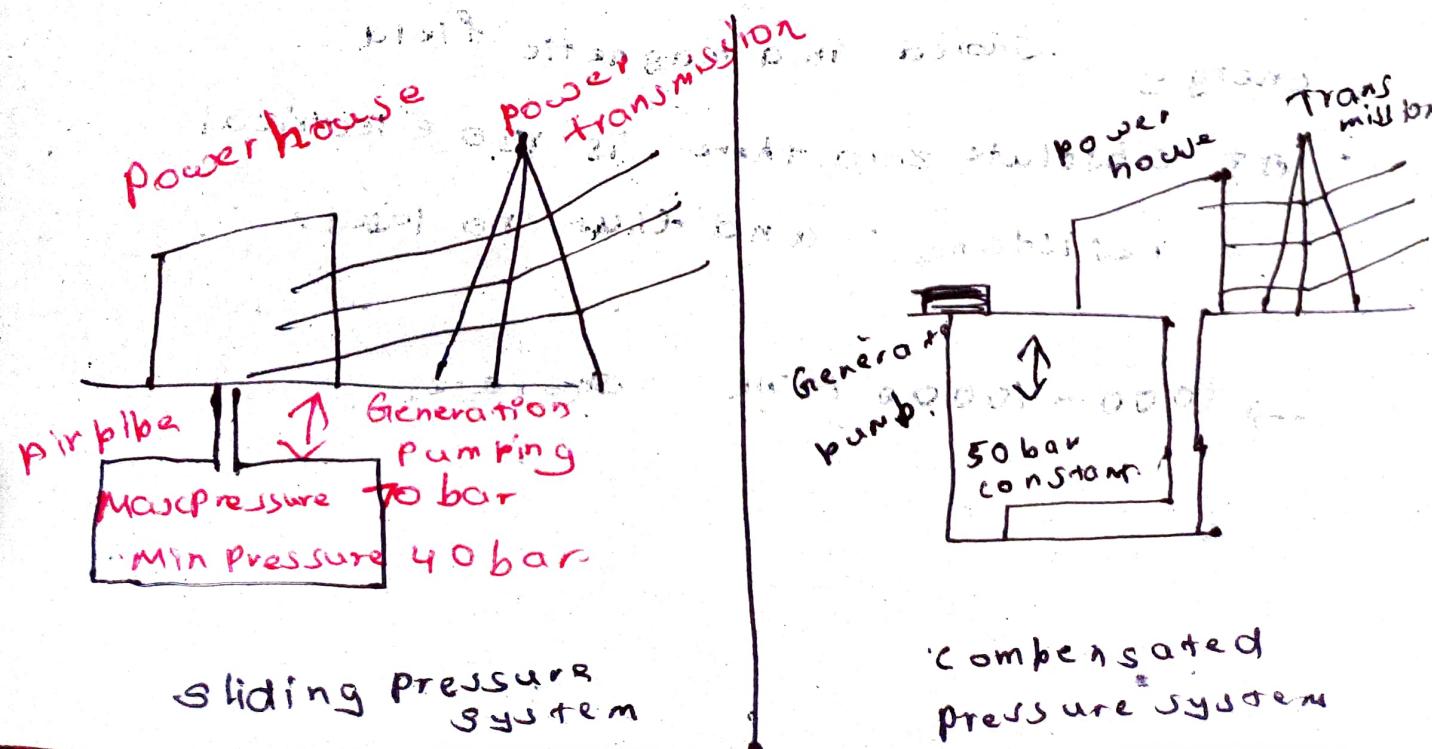
~~• Sensible heat storage~~

• Latent heat storage

Hydrostorage



compressed Airstorage



Flywheels

gives already answered.

Chemical Energy storage

Electrochemical battery

→ lead sulphuric acid battery

Organic molecular storage

Biological storage

Storage of energy in chemical form
by means of biological process

Magnetic storage

Stored in a magnetic field.

At absolute zero there is no electrical resistance. and thus no losses.

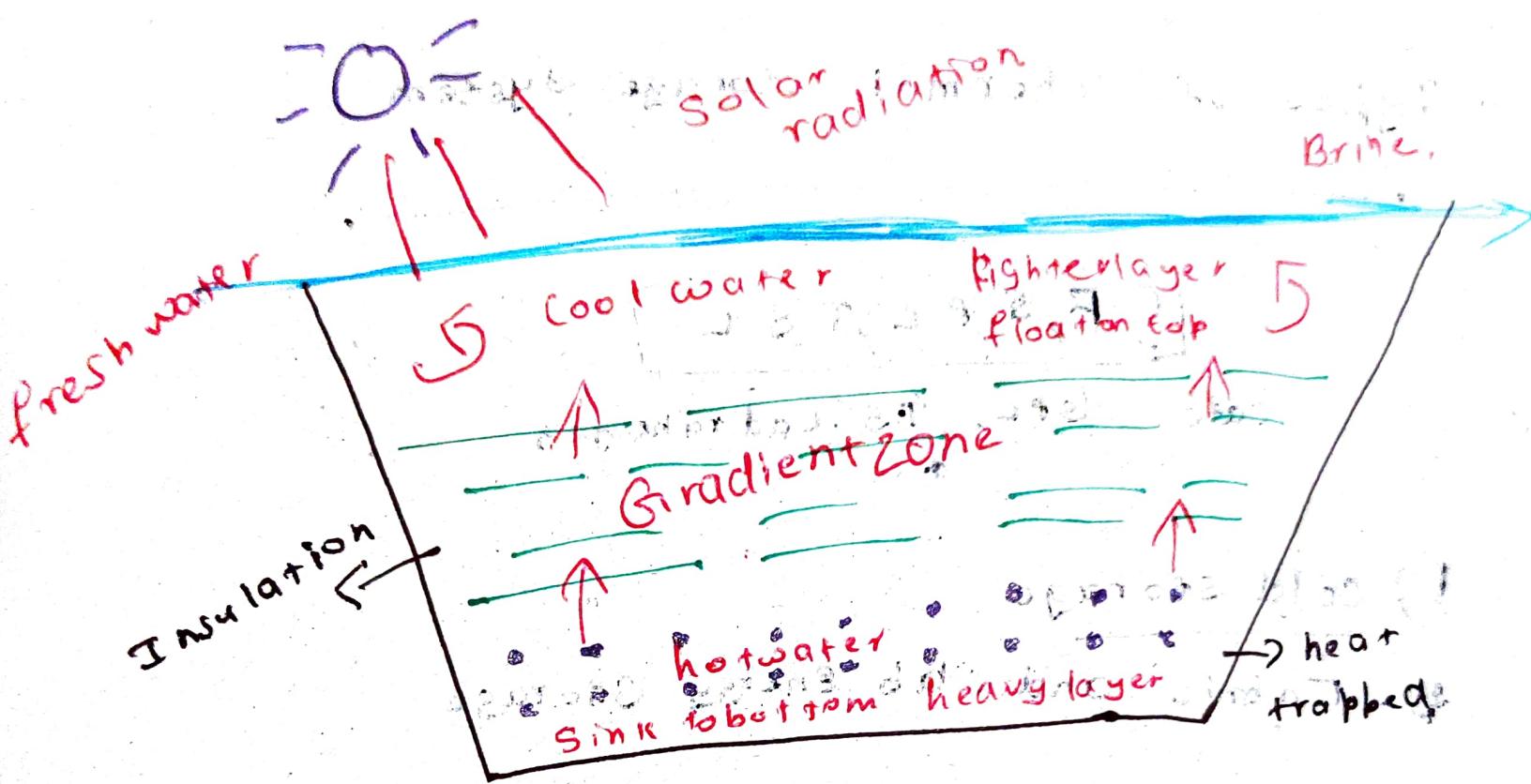
→ 1000 - 10000 MWh storage.

Thermal Energy storage (TES)

- Storing energy as heat or cold in storage medium to be used later
- Storage material with high density
 - a) Storage material
 - b) Insulated material
 - c) Storage material chemically stable

1) Sensible heat storage
This deals with mild increase or decrease in temperature

2) Latent heat storage
. deals with phase change
q. . . Li ion



Solar Pond

Collects and stores solar energy
 →

Types of Thermal Storage System

CF, SPL, TSL

cafe SPL TS Ladra tehs

- 1) Cold storage
- 2) Fabric and slab energy storage

- 3) Solar storage

- 4) Packed Rock beds

- 5) Low temp CO₂ storage

- 6) Thermo chemical energy storage

- 7) Sensible heat

- 8) Latent heat

- 9) Refrigeration plant

- 10) building material absorb heat

- 11) Solar collector

- 12) Packed Rock Bed utilized thermal energy

- 13) CO₂ is used to cool

- 14) alcohol and ketone are used

Ten Step Methodology for Energy Audit

Plan Of Action

Purposes/Results

Phase I - preaudit phase

• scoping workshop

Step 1: • Plan and organise

• walk through Audit

• Informal Interview

with Energy manager

with other department heads

and staff.

Step 2: conduct a

meeting with

all division head

• Build cooperation

• Issue questionnaire

to each

division

b. Phase II - Audit phase

Step 3: primary Data gathering

• history data analysis.

• prepare flow chart

Step 4: conduct Survey

• confirm and

compare data.

Step 5: conduct trials experiment

Step 6: analysis results to audit

Step 6: Analysis of energy efficiency Energy and

energy use

material balance

relationships

audit demand follow

strategies

Step 7: Identify

identification of opportunities

Energy conservation

agencies extend vendor

opportunity

contact vendor

for efficient

options

+ technology

cost reduction

at the earliest

standard

best practice

optimization cost benefit

Access technical

Step 8: options

feasibility

multi analysis

Step 9: report and

issues + the scope of

presentation to

Documentation

auditor

existing and rework

Top management

planning

Step 10: post audit phase

phase post Audit phase

Step 10: implementation

assist and

implement

audit conclusion

follow up

implementation