

[1.]

- (B) Microbial Fuel Cell - sources of renewable and unconventional source of energy.
- Oxidation process of microbes harnessed to create energy.
  - still long way to go.
- (E) Satish Dhawan space centre - situated in state Andhra Pradesh
- number of space research & development work held and launching of satellite missions
- (H.) Dark matter - universe existence is invisible but great energy source and gravitational force.
- India is also researching on it
  - Basic matter of Black hole.
- (O) National coral reef research Centre locate in Andaman and Nicobar islands.
- study & research on depletion of coral life
- (L) Carbon Index - List of carbon producing countries according to their carbon emissions per year.
- (M) Wildlife Board of India - Regulate & monitor existence of wildlife and prepare their vulnerability indexes

- (A) Mission on Nano science and technology -
  - Creating positive environment for innovation on nano technology
  - Ministry of science and technology under Department of Biotechnology.
  - Infrastructure development and public private partnership promoting

(G) SWAYAM - A initiative to entrepreneurs - to be self reliant nation.

(K) EPCO - An organisation to monitor environment assessment for any project and coordination among its management agencies

(C) PINACA - A space related program. for innovative or digital india.

(F) VSAT - Satellite launched from Satish dhawan space centre.

(I.)

Effect of climate change on Himalayas

- melting Ice-caps
- number of Avalanches will increase
- Biodiversity will reduce.
- flow of river will be more turbulent due to more water released by ice melting.
- Plains areas might be submerged & heavy flooding
- more greenery during summers.

Effects on Seaside & Region -

- water level of ocean increase.
- small island will be submerged.
- lyk - Indira point of <sup>Andaman</sup> Nicobar island
- Submergence of marine ecosystem.
- more cyclones will affect inner inhabitated areas around sea.

Conclusion - After looking so much effect it's really important to work on climate change. It's responsibility of every people to be responsible & to be energy efficient.

[J]

(4)

Radiactive pollution - It can be termed as hazardous pollution. where

radioactive element emits harmful radiation affect both human and animal life more than any pollution.

- Pollution happens when mined, inefficiently production & manufacturing and after using its disposal method not used properly.

Effect - Number of disease - Skin cancer, lungs (respiratory diseases), organ failure, birth defects.

- Air pollution by slow releasing undisposed electronic item

- Mercury, Cadmium, Arsenic, Berellium and many more element are component of e-waste.

- water pollution - during mining water polluted while seeping gases or mineral into groundwater mixed.

Conclusion - When using it as important to dispose well until repercussion have to be faced.

Artificial Intelligence - A technology which develops such type of machine who get thinking and learning ability by analysing its pattern. It can reduce repetitive work & efficient.

E.g. → In iPhone 'Siri' works on your voice instructions

→ websites have their chatbox, when we surf any website

### Application -

i) Education - Surfing any educational video online will result you with same type of video you want.

ii) Robotics - Robot are preprogram to do such job which reduces human labour & safety for human also.

'indigenous' India developed - Vyommitra - space Robot

iii) Boarder Security - Great help in reducing human life at wars.

iv) Technology & Research - Can solve very extreme difficult problem on snap of fingers save time of human. Can develop such programs human can solve it.

Conclusion - AS it's important for today's requirement to be efficient in less time. It's also important that human can't run without feeling. All work should have ethics in them.

[D]

Gene Engineering - Gene - contained in DNA (6)  
have information of inheritance.

- and it engineering means using technology in gene we can solve no. of problem of diseases which human not resolved yet.
- Editing humans gene & cut its information particular set and replaces with another set can change human's inheritance or characteristics.

- Useful
- human contain number of Inherited disease from their parent's genes.
  - hereditary diseases can be treat by editing the infected information set.
  - Pregnant women who dont want this disease to be transport to their child they can edit their gene.
  - Modified vegetables who are resisted from particular disease can Edited by gene engineering

Conclusion - ethical concept of nature law shouldnt be breached. It's useful could be harmful if people use it for their personal gains. goverment should Regulate these activities

[H]

Wetland are those areas having higher quantity of water contained in soil or land. which is habitat of number of micro and ~~and~~ macro organism as well the animal who are dependendent on these ecosystems.

marshy area, are 'habitate' by many flora and faunal organisms.

E.g- Mangroves, lakes, (oxbow), area around river valley.

MP- Bhojtal lake is famous wetland site of india.

Ramsar Convention → It's first convention was held in (Iran) area named ramsar.

- It regulate and monitor illegal activities near wetlands sites which is recognised by it.
- protects all such site have listed from climate change or human activities
- Around, 32 sites in india listed in it.

Conclusion- wetland are as important of balancing human existence as our land area is. With water resources can be protect by promoting its objective & water is as essential for all Biodiversities.

[E].

(8)

Nanotechnology - Nano means 'Small'

- 1 by billionth part of 1 meters is nanoscale.

$$[1 \text{ Nm} = 10^{-9} \text{ m.}]$$

- Such type technology manipulates atoms and molecules at this nanoscale and uses its nano properties for human needs

21<sup>st</sup> century - In this century people want effective things in less time

Hence, Nano-tech. give more compact, effective light weight, strong, tough, flexible properties of any product like small transistors etc

Atoms behave different at nanoscale. Fiber becomes more light weight, sport equipment become more strong, Instruments become compact and light weight. Hence why not human uses such good properties for their life.

Conclusion - Great thing can be more heavy and more maintainance instead we can use this technology and have benefited from it. Great initiative is Nano-mission of India.



[B] Remote Sensing - Remote means Far and Sensing means observing. (9)

(Far) Remotely any object is observed by satellites and analysed & data created and managed at location to have used for better human life & easier life.

Indian remote sensing systems →

- great example could be (NAVCC) Indian regional navigation system. All Indian and around countries uses it to have locational information.
- India Security on boarder are greatly influence by its regional location system. we don't have to be dependent on other country to act on security issue for its real time data
- Agriculture, mining, water resources, Urban planning, disaster management all have better information by this technology.
- Number of mission launches for India as well as for SAARC Nation to help other countries By ISRO (India space Research organisation).

[A] International Space station-

(10)

- A station in space established to monitor and research activities of artificial satellites remain in ~~earth~~ space all the time.

India :- India's First ASTROSAT - space station is developing.

[F] Digital signature - A document (electronic) is authentic or created by legal user signaturred by him called its digital signature.

feature - It recognize its legal authorizes  
- protect from illegal manipulation of document.

P.T.O

[K] Biodiversity hotspots - An ecosystem of area

having wide variety of organisms of that area is vulnerable to get degraded. Such area is defined as biodiversity hotspots.



Indian Biodiversity hotspots -

- Bay of Bengal has hotspots of - Sundarban deltas, (Orinoco tiger), Andaman & Nicobar island.
- Arabian Sea has Lakshadweep islands has coral island (mangroves forests)
- Himalaya - has number of parks and sanctuaries protect Biodiversity
- MP is have Achanakmar Biosphere reserve has wide biodiversity
- Western Ghats has maximum biodiversity of ecosystems. Recently number of new butterfly species found
- Eastern Ghats, Assam and many places are recognised as biodiversity hotspots.

(2) Project Tiger - 1<sup>st</sup> Project Tiger 1973-1975  
to protect Tiger population day  
by day. Indira Gandhi's government worked  
for protecting these population and it  
started from their Birthday anniversary.

First Park Jim Corbett National Park designated  
to Project Tiger.

Madhya Pradesh play great role in tiger's population  
it First state having largest no. of tiger's

Numerous Tiger Reserve to protect them  
eg- Panna Tiger Reser., Satpuda N.P.,

Madhav Park and in Umaria district

it has bandhargesh Park which had  
white tiger in past. (Rule of Martand  
Singh captured it & kept it with them)

(12)

Project Tiger run to increase and  
conserve the population by using

P.T.O

technological advancement (spy cameras to  
record their number in Panna Tiger Reserve)

[3.7]

(13)

(c) Science and technology has great importance in ~~life~~ today life its evident from, we can not produce grains, live without water, study not possible without <sup>the</sup> electricity which is given by science. All are working from electricity.

- Good health, education, Quality of life, food all would possible only with science and technology

### Role of science in Health →

- New technology are building to be more diagnostic and treating newly developed disease like -
  - Tissue Engineering
  - Biotechnology -
  - Medicines & diagnostic kit

• Bharat Biotech - Great example of indigenous company work on Biotechnology

### Role of science in Education -

- Distance learning, Smart classes are results of science and technology.

Program STRIVE - To connect indian & foreign based teachers learning program.

## Role of science in Urban development -

(124)

- Using Remote sensing, spatial pattern of geographical area can be analysed and better cities planning can be done.

## Role of Science in Mining →

- mining areas identified and extract<sup>n</sup> done due to remote sensing technology

In Sports → Strength, resistance, low tensile, flexible and strong equipment made via Nanotechnology.

## Socio-economic development →

- Sustainable life via good food security health infrastructure, energy efficient industries
- only possible via science
- Poverty can be reduced.
- economic development leads to increase investment by electronic technology
- high bandwidth network produced by Telecommunication inclusive development of All sectors

Agriculture → genetic engineering

- Biotechnology
- tissue culture
- BT-crops
- strong renewable infrastructure of energy needs.
- Irrigation system & green revolution
- possible by technology implementation

of science field.

Conclusion - If we want overall development of human kind in fast economies of countries. we need infrastructure of technology and implementation of wise uses in respect of security concerns of countries. The Right direction of development lead to health and sustainable life for future generation.

[B]

(16)

Nuclear Energy - Energy created from radioactive elements using nuclear reactors are called nuclear energy

- Natural occurring element like Uranium, Thorium and their isotopes are used to harness their energy into nuclear plants to generate electricity.

Demand of Nuclear Energy increasing due to its regional availability in particular countries and its carbon free emission, being less polluting environment its widely using now a day at large scales.

Number of importance - Use efficient use of element.

"It burn less and produce high amount of energy. as compare to 1 ton of ~~carb~~ coal

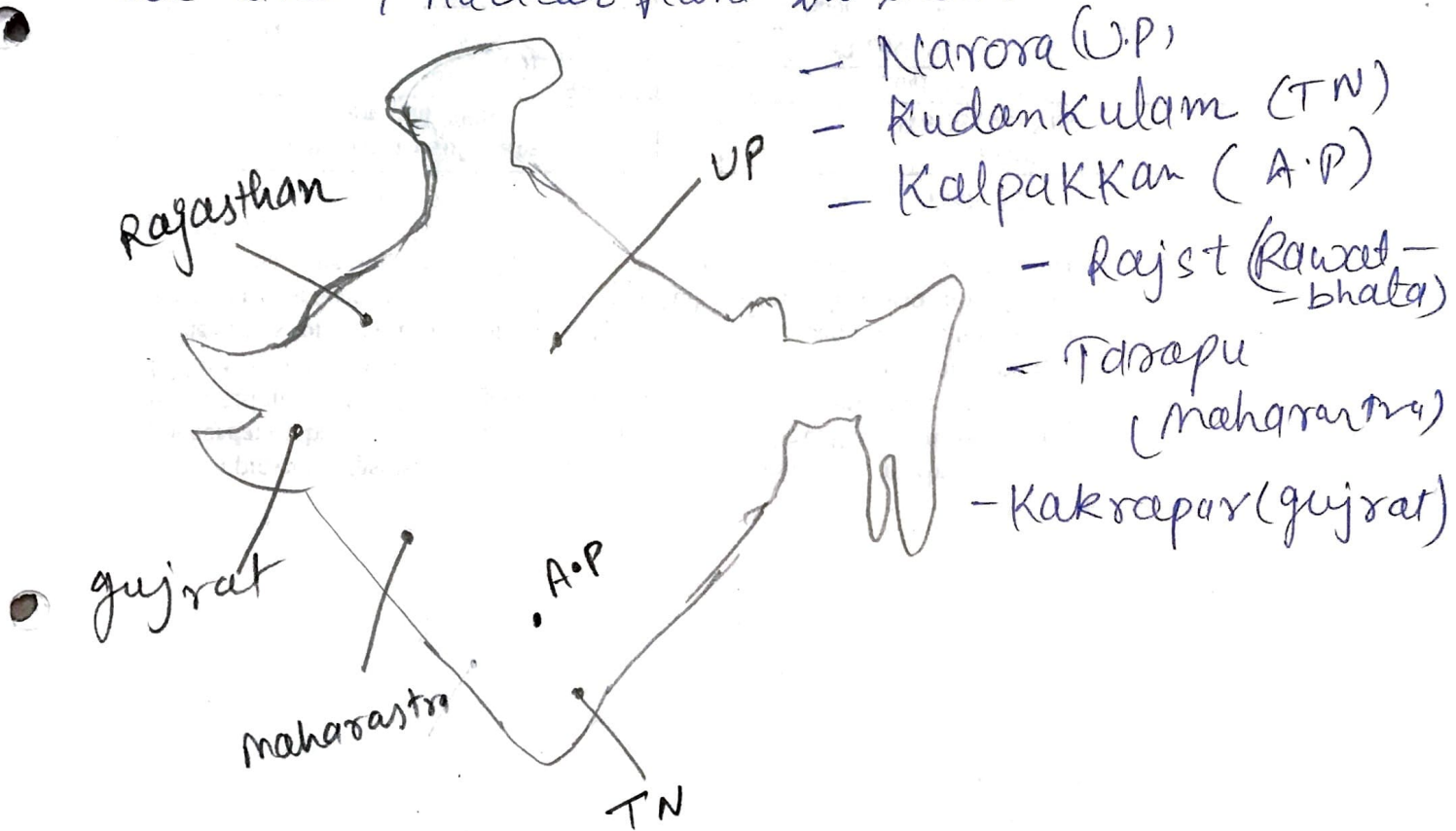
- Non-polluting
- Long time running plant  
Just need maintenance time to time.



- (7)
- Mining sites discovered can ~~not~~ stop import energy from other source if we have local availability of nuclear energy resources

News - India is also building new nuclear plants as we have just commissioned (unit-I) 1000 MW of Kudankulam nuclear power plant & UNIT-II with another 1000 MW.

we have 7 nuclear plant in india -



- Advantages -
- Non-polluting
  - Energy efficient
  - Runs long time
  - Can harness regional resource
  - Employment to various sectors (Science, Mining, Telecommuni etc)

## Disadvantages →

(10)

- highly hazardous pollution by waste
- if blast, can effect number of life
- Past happened, numerous accident  
like (Japan nuclear plant)  
Fukushima hit by Tsunami
- Coastal based have danger from sea current too
- Birth defect by Radioactivity of elements

Conclusion - Every coin has 2 phase, if have pros you have to cons also if we have more benefit then we can use it by properly management so that accident happening can be removed.

## [D] Biotechnology -

(19)

Technology used to harness  
the living organism potential  
to create new opportunities to  
solve human problems and issue.

= living cell + technology = Biotechnology

Modern world have ~~grege~~ great example of  
Biotechnology -

- genetic engineering
- vaccination
- diagnostic kits
- Tissue culturing

"India" developed it 1<sup>st</sup> Artificial <sup>live</sup> tissue  
Indigenous technology.

- created Pseudomonas Bacterium which  
feed oil to protect sea, oceans from oil  
Spills.
- Bharat Biotech is company of india  
working in covid-19 vaccination mission  
in it III<sup>rd</sup> stage.
- have build zicavirus 'zicavac' vacc'n  
possible by Biotechnology.

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## Application → & its Achievement also → (20)

→ health → BT-crops (BT-brinjal), BT-cotton  
Agriculture (Bacterium resistance from certain pest of crops)

- Biopesticides. not harmful for soil

→ Health - vaccines for various diseases  
Polio, (2014) eradicate from india

- ZIKAVAC

- ELISA program (Aids Test Kits)

- corona kit (mylab india) RTPCR Test  
indigenous kits (Covid-19)

- human hormones (growth)

- gene-editing

→ Medical Infrastructure → ~~USA~~ AYUSH Ministry  
promoting Ayurvedic  
medicine e.g. - CoronaKit

→ Food → Bio-food packaging vapour film

→ Animal husbandry - Embryo transplant in cattles

→ Environment - Biofuels, ethanoldmixfuels, hydrogen  
fuels, electric vehicles etc.  
Zero carbon pollution.

conclusion → Bio-technology leads to a sustainable future for our generations where energy can be green, more ways to find disease diagnosis, green food production and Environmental benefits are unlimited. (21)

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