

End Semester Examination-Dec 2022
B.Tech. ECE/CHE/CSE(AI)-IV Sem II Year (2K21)

Environment Science (EVS S101)

Time: 3 h

Maximum marks: 40

A. Multiple choice questions (Attempt all the questions)

1*10=10

1. Which one of these has greatest biodiversity on Earth?

- 1) Neil Delta, Egypt 2) African Grasslands 3) **Amazonian Rain Forest** 4) Western Ghat India.

2.occurs when the death of the last individual in a species occurs.

- 1) Adaptation 2) Evolution 3) Speciation 4) **Extinction**

3. is defined as an ecological state of s species being unique to a specific geographic location.

- 1) Vulnerable species 2) **Endemism** 3) Speciation 4) diversity

4. is the forest cover to be maintained as per the National Forest Policy (1988).

- i) **67% for hills & 33% for plants** 2) 25% for hills & 15 % for plants
3) 15% for hills & 25% plants 4) None of the above

5.is an example of Ex situ conservation

- 1) Sacred groves 2) Wild Life Sanctuary 3) **Seed bank** 4) **National Park**

6. Which one of these is the most effective means of conserving biodiversity?

- 1) **Preserve habitat** 2) translocation of plants & animals
3) National parks 4) Seed banks

7. Coniferous Forest are-----

- 1) Broad leaved forest with Jamun, ficus, Fern, Oak as flora and Tiger, elephant as fauna.
2) **Narrow leaved with Pinus, Quercus, barberis as flora and Himalayan goat, black bear, and sheep as fauna**
3) Minimum Flora and Fauna 4) None of the above

8. In Food Chain Energy is transferred from one trophic level to another, which is approximately

- 1) 20 % 2) 25% 3) **10%** 4) 15 %

9. Nandan Kanan Zoo is popular for its.....

- 1) Nilgiri Tahr 2) Whale 3) **White Tiger** 4) Hippo

10. If The acid chemicals in the air are blown into areas where the weather is wet, the acids can fall to the ground in the form of

- 1) Send 2) **Rain, snow, Fog** 3) Air 4) Soil

End Semester Examination-Dec 2022

B.Tech. ECE/CHE/CSE(AI)-IV Sem II Year (2K21)

Environment Science (EVS S101)

Section B (Conceptual Knowledge- attempt any 4 questions). 4x4 Page 2 of 2

1. Draw Food web using interconnection of food chain by arranging all the organism in order of Food Chain

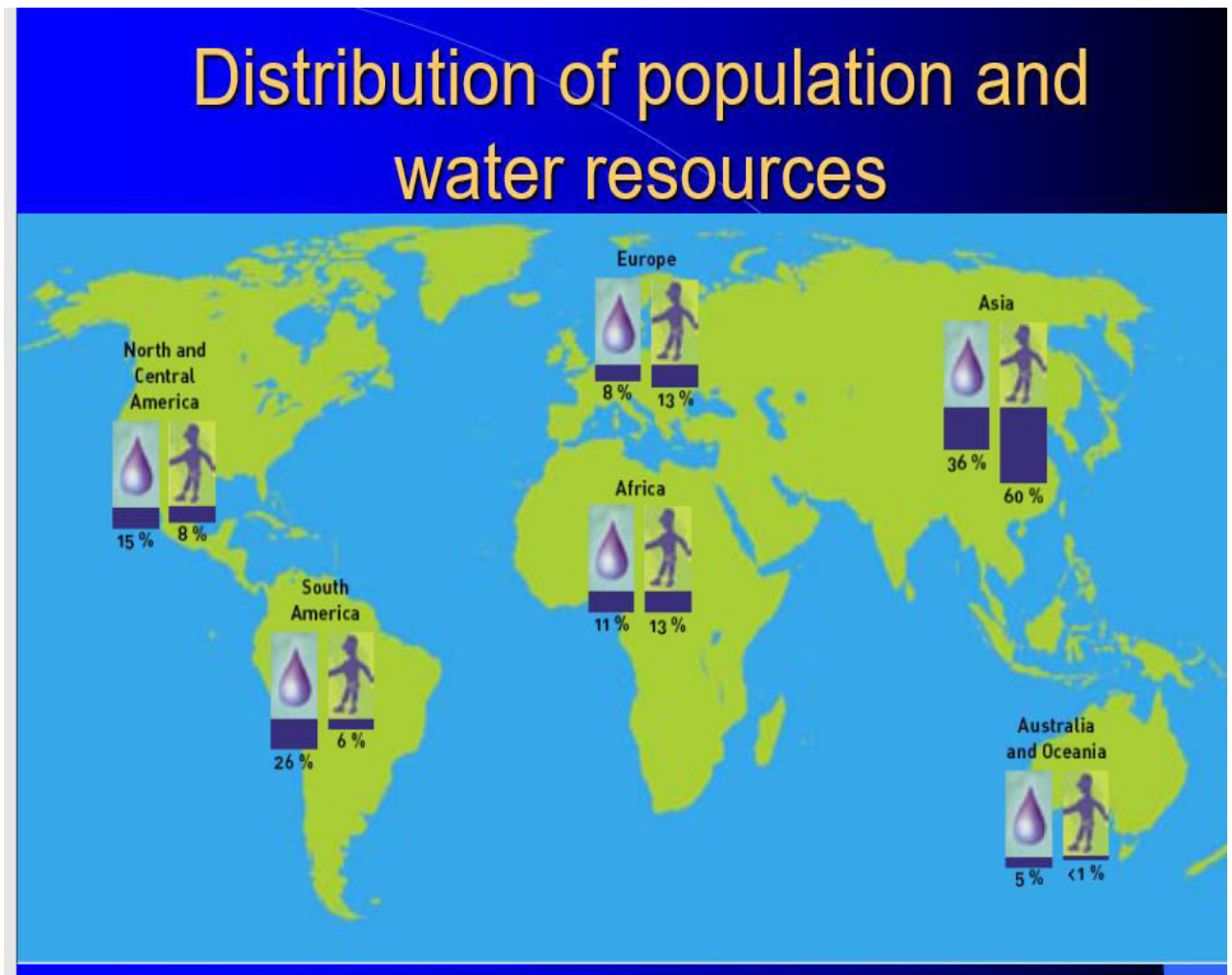
Insects, Aquatic Plants, Small Birds, Grass, Grasshopper, snake, Peacock

Plant flower, Phytoplankton, lizard, Grass, Dragonfly Larva Tadpole, Bees, Big Birds, Eagle

2. Show distribution of population & water resources on Map. Locate all the spots on World Map. Name of Countries are given here

1. North America
2. South America
3. Europe
4. Africa
5. Asia
6. Australia & Oceania

Ans



3. Define Ecosystem Biodiversity & Explain role of speciation in Biodiversity.

Ecosystem biodiversity refers to the variety of ecosystems and ecological processes that exist within a given area. An ecosystem is a community of living organisms (plants, animals, and microorganisms) interacting with each other and their physical environment (such as air, water, soil, and climate). Ecosystems can range in size from a small pond or forest patch to an entire biome, such as a tropical rainforest or a coral reef.

or

Ecosystem biodiversity includes the variety of different ecosystems present within a region, such as forests, grasslands, wetlands, deserts, and oceans, as well as the diversity of ecological processes that occur within those ecosystems, such as nutrient cycling, energy flow, and ecological succession. It also includes the diversity of species that inhabit those ecosystems, from the smallest microorganisms to the largest mammals.

Speciation, an evolutionary process by which new species form, is ultimately responsible for the incredible biodiversity that we observe on Earth every day. Such biodiversity is one of the critical features which contributes to the survivability of

Environment Science (EVS S101)

biospheres and modern life. Oparin proposed that the diverse coacervates, or different species, would undergo natural selection based on their stability in given environments. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7922636/>

21. Guttenberg N., Virgo N., Chandru K., Scharf C., Mamajanov I. Bulk measurements of messy chemistries are needed for a theory of the origins of life. *Philos. Trans. A Math. Phys. Eng. Sci.* 2017;375:20160347. doi: 10.1098/rsta.2016.0347. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

4. Explain method of Rainwater harvesting system.

5. Discuss about wind Energy, Geothermal Energy & Tidal Energy Conversion Methods.

Energy is defined as ‘the capacity to do work’. Sun is the primary source of energy.

Wind Power:

Wind was the earliest energy source used for transportation by sailing ships. Wind energy produces electricity at low cost; capital costs are moderate and there are no emission. The power in wind is a function of the wind speed and Wind speed increases with height.

Tidal and Wave Power:

The energy of waves in the sea that crash on the land of all the continents is estimated at 2 to 3 million megawatts of energy. Water flows from a higher level to lower level, greater the difference

between high and low tides more energy can be extracted. Tidal power is tapped by placing a barrage across an estuary and forcing the tidal flow to pass through turbines.

Geothermal Energy: It is the energy stored within the earth (“geo” for earth and “thermal” for heat). Core of the earth is very hot – as high as 60000C, temperature rises with depth @ 300C per Km. Geothermal energy starts with hot, molten rock (called magma) deep inside the earth which surfaces at some parts of the earth’s crust (volcanoes). With modern technology, wells are drilled deep below the surface of the earth to tap into geothermal reservoirs

6. Mention water distribution on China.

The areas south of the Yangtze River, China's longest, which account for only 36.5 per cent of the country's total territory, have 80.9 per cent of its total water resources. However the areas north of the Yangtze, which make up 63.5 per cent of China, possess only 19.1 per cent of total water resources.

7. What is Ecosystem & Biome. Discuss about the Design, Recreate & Restore in for any Ecosystem. In 1935 essay the English biologist Arthur Tansley proposed the concept of an energy model involving “ecosystems” and “energy”.

Environment Science (EVS S101)

Tansley (1935) described an ecosystem as a group of biotic communities of species interacting with one another and with their non-living environment exchanging energy and matter.

The flow of energy, the cycling of materials and community are the components for making an ecosystem functional.

The living community of plants and animals in any area together with the non-living components of the environment such as soil, air and water, constitute the ecosystem.

8. Discuss about major environmental movements.

Major Environmental Movements in India

Some of the major environmental movements in India during the period 1700 to 2000 are the following.

1. Bishnoi Movement

Year: 1700s

Place: Khejarli, Marwar region, Rajasthan state.

Leaders: Amrita Devi along with Bishnoi villagers in Khejarli and surrounding villages.

Aim: Save sacred trees from being cut down by the king's soldiers for a new palace.

What was it all about: Amrita Devi, a female villager could not bear to witness the destruction of both her faith and the village's sacred trees. She hugged the trees and encouraged others to do the same. 363 Bishnoi villagers were killed in this movement.

2. Chipko Movement

Year: 1973

Place: In Chamoli district and later at Tehri-Garhwal district of Uttarakhand.

Leaders: Sundarlal Bahuguna, Gaura Devi, Sudesha Devi, Bachni Devi, Chandi Prasad Bhatt, Govind Singh Rawat, Dhoom Singh Negi, Shamsheer Singh Bisht and Ghanasyam Raturi.

Aim: The main objective was to protect the trees on the Himalayan slopes from the axes of contractors of the forest.

What was it all about: Mr. Bahuguna enlightened the villagers by conveying the importance of trees in the environment which checks the erosion of soil, cause rains and provides pure air. The women of Advani village of Tehri-Garhwal tied the sacred thread around trunks of trees and they hugged the trees, hence it was called the 'Chipko Movement' or 'hug the tree movement'.

3. Save Silent Valley Movement

. Jungle Bachao Andholan

Year: 1982

Place: Singhbhum district of Bihar

Leaders: The tribals of Singhbhum.

Aim: Against government's decision to replace the natural sal forest with Teak.

What was it all about: The tribals of the Singhbhum district of Bihar started the protest when the government decided to replace the natural sal forests with the highly-priced teak. This move was called by many "Greed Game Political Populism". Later this movement spread to Jharkhand and Orissa.

Appiko movement

Year: 1983

Place: Uttara Kannada and Shimoga districts of Karnataka State

End Semester Examination-Dec 2022

B.Tech. ECE/CHE/CSE(AI)-IV Sem II Year (2K21)

Environment Science (EVS S101)

Leaders: Appiko's greatest strengths lie in it being neither driven by a personality nor having been formally institutionalised. However, it does have a facilitator in Pandurang Hegde. He helped launch the movement in 1983.

Aim: Against the felling and commercialization of natural forest and the ruin of ancient livelihood.

What was it all about: It can be said that the Appiko movement is the southern version of the Chipko movement. The Appiko Movement was locally known as "Appiko Chaluvali". The locals embraced the trees which were to be cut by contractors of the forest department.

6. Narmada Bachao Andholan (NBA)

Year: 1985

Place: Narmada River, which flows through the states of Gujarat, Madhya Pradesh and Maharashtra.

Leaders: Medha Patker, Baba Amte, Adivasis, farmers, environmentalists and human rights activists.

Aim: A social movement against a number of large dams being built across the Narmada River.

What was it all about: The movement first started as a protest for not providing proper rehabilitation and resettlement for the people who have been displaced by the construction of the Sardar Sarovar Dam.

7. Tehri Dam Conflict

Year: 1990's

Place: Bhagirathi River near Tehri in Uttarakhand.

Leaders: Sundarlal Bahuguna

Aim: The protest was against the displacement of town inhabitants and the environmental consequence of the weak ecosystem.

Tehri dam attracted national attention in the 1980s and the 1990s. The major objections include seismic sensitivity of the region, submergence of forest areas along with Tehri town etc.

<https://www.clearias.com/environmental-movements-in-india/>

Section C (based on Procedural Knowledge- Attempt any 2 questions).

Attempt Any two question

7 x2

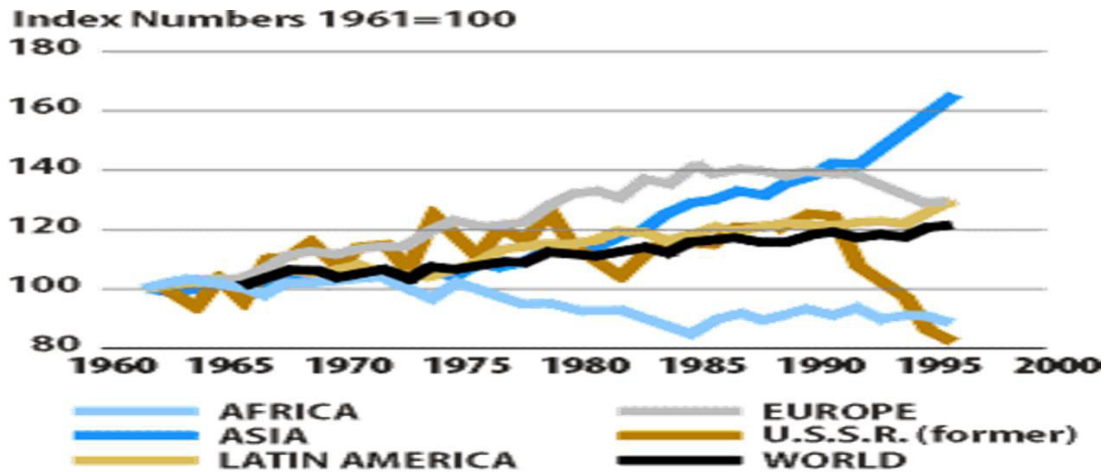
1. Discuss about factors affecting Global Food Production. Mention annual loss & gain according to FAO (Projection for 2025)

Ans: Sustainable Agricultural-Method of growing crops and raising livestock based on organic fertilizers, soil conservation, water conservation, biological control of pests, and minimal use of nonrenewable fossil fuel energy

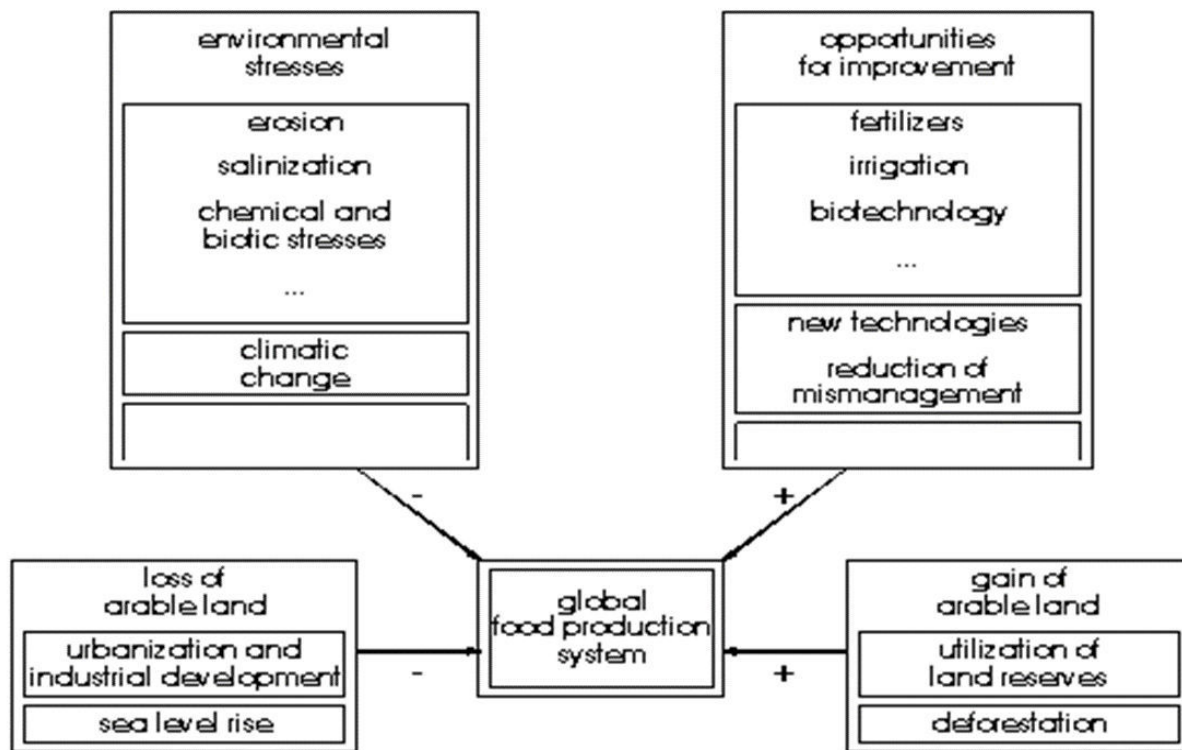
End Semester Examination-Dec 2022

B.Tech. ECE/CHE/CSE(AI)-IV Sem II Year (2K21)

Environment Science (EVS S101)

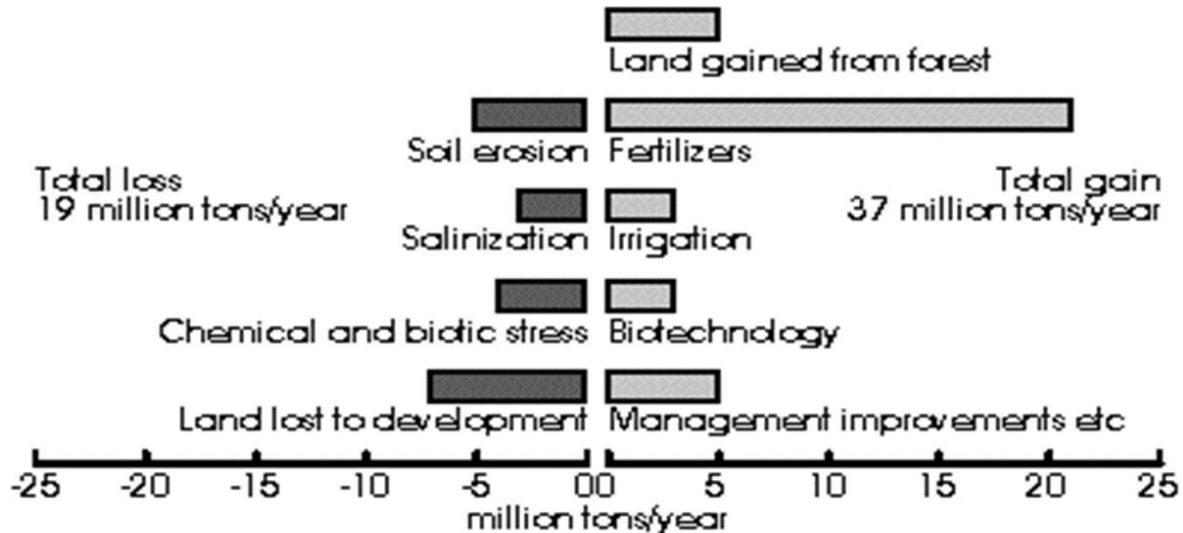


Trends in per capita food production



Factors affecting global food production system

Environment Science (EVS S101)



Annual loss & gain in Global food production

2. What is Resettlement & Rehabilitation issues of Indigenous/Tribal population. Discuss about problems & concerns.

RESETTLEMENT AND REHABILITATION ISSUES:

Various development projects often lead to displacement of native or tribal people who are poor and very often not educated. Their rehabilitation is a major socio economic issue.

Problems and concerns:

Displacement problems due to dams:

- The big river valley projects have one of the most serious socio economic impacts due to large scale displacement of local people from their ancestral home and loss of their traditional profession or occupation.
- In India due to big dam construction, more than 20 million people are estimated to have been directly or indirectly affected by these dams
- The Hirakund dam has displaced more than 20,000 people residing about 250 villages.
- The Bhakra Nangal dam was constructed during 1950's and till now it has not been possible to rehabilitate even half of the displaced persons.
- Tehri dam and Sardar sarovar dam also have same issues.

Displacement due to mining:

- Mining is another developmental activity which causes displacement of the native people.
- Several thousands of hectares of land area is covered in mining operation and the native people are displaced.
- Sometimes displacement of local people is due to accidents occurring in mined areas like subsidence of land that often leads to shifting of people.
- Jharia coal fields, Jharkhand have been posing big problems to the residents due to underground fires and they are asked to vacate the area.
- According to latest estimation, about Rs.18,000 crores will be spent for shifting the population while the cost of extinguishing the fire would be around 8,000 crore.

Environment Science (EVS S101)

Displacement due to creation of national parks:

When some forest area is covered under a national park, it is welcome step for conservation of natural resources.

However it also has a social aspect associated with it.

A major portion of the forest is declared as core area where the entry of local people is restricted.

So they start destruction activities

The major issues related to displacement and rehabilitation are

Tribals are usually most affected amongst the displaced who are already poor

Break up of families and women are the worst affected.

The tribals are not familiar with market policies and trends

Kinship systems, marriages, social and cultural functions, their folk songs, dances and activities vanish with their displacement

Loss of identity and loss of intimate link between the people

3. Discuss about management of resources (a) renewable resource of energy (b) nonrenewable resource of Energy.

Energy Resources

All energy sources ultimately come from the sun, the moon or the earth.

Sources of Energy

Solar energy drives the following:

The global climate system which give as wind power.

Wave power

Hydroelectric power

Solar heating and Solar lighting

The global ecosystems which give as biomass power such as wood or muscle.

The ancient ecosystem whose energy is now stored as fossil fuels.

The moon's gravitational energy is responsible for the tidal effect, which give rise to tidal power.

The earth itself is the key source of energy such as the following:

Gravitational energy for hydroelectric power

Chemical energy for nuclear power, electro- chemical reaction and hydrogen fuel cells.

Geothermal power from the heat of lower crust.

Other exciting energy sources are currently untapped, such as energy in the earth's magnetic field, the energy potential caused by temperature differences in different layers of the ocean and the energy contained in combustible deposits of methyl hydrates in the sediments of the continental shelves.

Non Renewable Energy Sources:

Environmental Impacts of fossil fuels in general

Fossil fuels- (coal, oil, gas, peat, lignite, etc.)

Extraction of fuel by mining, drilling, quarrying and/ or excavation leads to significant impacts on the surrounding environment and landscape (habitat modification and

End Semester Examination-Dec 2022

B.Tech. ECE/CHE/CSE(AI)-IV Sem II Year (2K21)

Environment Science (EVS S101)

destruction, pollution etc.)

Spoil and solid wastes from mining and extraction have both visual and environmental impacts.

Wastewater and leachates from mining, drilling and excavation, and gas leaks from pipelines can pollute surrounding waters, air and land.

Purification or modification of raw products for use as fuels requires energy, and may lead to secondary sources of pollution.

Transportation of fuels to energy production sites uses fuel (causes air pollution) and possibly a pollution risk, eg. oil tankers are at risk from accidents and may lead to oil spills at sea.

Combustion of fuels to produce energy leads to air pollution (carbon, nitrogen and sulphur oxides) and in some cases, the production of solid wastes (in the form of ash).

Renewable Energy:

Renewable energy systems use resources that are constantly replaced and are usually less polluting. Ex: hydropower, solar, wind, and geothermal (energy from the heat inside the earth). We also get renewable energy from burning trees and even garbage as fuel and processing other plants into biofuels. Renewable energy technologies will improve the efficiency and cost of energy systems. We may reach the point when we may no longer rely mostly on fossil fuel energy.

Hydroelectric Power:

This uses water flowing down a natural gradient to turn turbines to generate electricity known as 'hydroelectric power' by constructing dams across rivers. Between 1950 and 1970, Hydropower generation worldwide increased seven times.

Advantages:

- o The long life of hydropower plants,
- o the renewable nature of the energy source
- o very low operating and maintenance costs, and
- o absence of inflationary pressures as in fossil fuels

Environmental impact / Drawbacks: Although hydroelectric power has led to economic progress around the world, it has created serious ecological problems.

To produce hydroelectric power, large areas of forest and agricultural lands are submerged. These lands traditionally provided a livelihood for local tribal people and farmers. Conflicts over land use are inevitable.

Silting of the reservoirs (especially as a result of deforestation) reduces the life of the hydroelectric power installations.

The reservoir drowns large areas of farm land, wild life habitats and places of historical & cultural importance

Water is required for many other purposes besides power generation. These include domestic requirements, growing agricultural crops and for industry. This gives rise to conflicts.

The use of rivers for navigation and fisheries becomes difficult once the water is

Environment Science (EVS S101)

dammed for generation of electricity.

Resettlement of displaced persons is a problem for which there is no ready solution.

The opposition to many large hydroelectric schemes is growing as most dam projects have been unable to resettle people that were affected and displaced.

Solar Energy:

Sun is the primary source of energy. Sun's energy each day is 600 times greater than produced from all other sources (1/5 of known reserves of fossil fuels). If it was possible to harness this colossal quantum of energy, humanity would need no other source of energy. Several methods were developed for collecting this energy for heating water and generating electricity. Solar energy is Readily available source of energy and is free;

Is PV cells are environment friendly? PV cells are environmentally benign, i.e. they do not release pollutants or toxic material to the air or water, there is no radioactive substance, and no catastrophic accidents. Some PV cells, however, do contain small quantities of toxic substances such as cadmium and these can be released to the environment in the event of a fire. Solar cells are made of silicon which, although the second most abundant element in the earth's crust, has to be mined. Mining creates environmental problems. PV systems also of course only work when the sun is shining, and thus need batteries to store the electricity.

Biomass Energy:

Biomass is organic material which has stored sun light in the form of chemical energy. Because plants and trees depend on sunlight to grow, biomass energy is a form of stored solar energy. Although wood is the largest source of biomass energy, we also use agricultural waste, sugarcane wastes, and other farm by products to make energy. Half a kilo of dry plant tissue – produce as much as 1890 Kcal of heat – equivalent to quarter kilo of coal A typical biogas sample contains 68% methane, 31% CO₂, 1% Nitrogen and calorific value is 5871 Kcal/m³ (i.e. 80% natural gas).

Biogas is produced from plant material and animal waste, garbage, waste from households and some types of industrial wastes, such as fish processing, dairies, and sewage treatment plants. It is a mixture of gases which includes methane, carbon dioxide, hydrogen sulphide and water vapour. In this mixture, methane burns easily.

With a ton of food waste, one can produce 85 Cu. M of biogas. Once used, the residue is used as an agricultural fertilizer.

4. Write down the key concept & goal of Sustainable development. (a) Write down the method of sustainable development? (b) Discuss about problems, Challenges Role of Engineering solutions for sustainable development.

Sustainable development meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

It comprises the two key concept

- a. the concept of Need: in particular the essential need of the world's poor to which overriding priority should be given and

End Semester Examination-Dec 2022

B.Tech. ECE/CHE/CSE(AI)-IV Sem II Year (2K21)

Environment Science (EVS S101)

- b. The idea of Limitations: imposed by state of Technology & social organization on the environment's ability to meet the present & future needs.
5. (a) What is GPS? (b) Explain How GPS works? (c) Describe the application of GPS.
 6. (a) What is GIS? (b) How GIS works with other navigation system? (c) discuss about various application of GIS.
 7. (a) What is IUCN? (b) How IUCN categorized different species to signify their conservation status?
 8. (a) What are pollution reducing devices? (b) Discuss about role of computers in their designing using a suitable example. (c) What are new technologies used for metal removal from waste?
 9. (a) What is Solar energy? Discuss about Photovoltaic device & its application
 10. Discuss about Special powers of the President of India/Governors of States in respect to protect Scheduled Tribes' population, Water, Forest & Land resources.

Article 39 contains critical obligations on the state to direct its policy towards what has come to be known as 'distributive justice', with respect to adequate means of livelihood, ownership and control of material resources, minimisation of concentration of wealth in the economic system, and so on.

In addition, Article 46 contains an obligation on the state to promote the education and economic interests of weaker sections, in particular the Scheduled Tribes, and also to protect them from social injustice and all forms of exploitation.

Therefore, the constitutional provisions relating to Scheduled

10 Safai Karamchari Andolan & Ors. vs. Union of India & Ors. (2014) 11 SCC 224.

Part I: The Fifth Schedule and its Provisions

07

11 (1997) 8 SCC 191.

Tribes under Article 244 and the Fifth Schedule must always be placed within this larger constitutional perspective, before undertaking any textual analysis with regard to a specific fact situation or issue. When read together, these constitutional provisions create a distinct dispensation for tribal homelands which have been recognised as such through the process of scheduling of such areas, based on the recognition that tribal or indigenous peoples have historically suffered at the hands of people from the 'mainland', including the colonisers, and require special protections at a constitutional level to ensure that these historical wrongs are not repeated, and are reversed.

This aspect of the law relating to special constitutional protections to Scheduled Tribes and Scheduled Areas has also seen some important developments. A leading decision on the subject was passed by the Supreme Court in *Samatha vs. State of Andhra Pradesh*¹¹ (see Box 1 ahead). The Court was asked to rule on whether the grant of a mining lease, in a Scheduled Area to a non-tribal was in violation of laws preventing alienation of Adivasi lands. The specific context for the case was the Andhra Pradesh

End Semester Examination-Dec 2022
B.Tech. ECE/CHE/CSE(AI)-IV Sem II Year (2K21)

Environment Science (EVS S101)

Scheduled Areas Land Transfer Regulation 1 of 1970, which explicitly prohibits any person in a Scheduled Area from transferring lands to anyone other than a Scheduled Tribe. The premise of the regulation is that all land in Scheduled Area is presumed to have been Adivasi land; hence, not only should no land now pass into the hands of non-Adivasis, but any land presently owned by non-tribal should, if being transferred, come back to the hands of Scheduled Tribes. The question before the Court was whether the grant of a mining lease on government land to a non-tribal violated this principle.

The Court did not rely purely on the specific clauses of the Regulation and instead held that the Constitution itself requires that land in Scheduled Areas should remain with the Adivasis to preserve their autonomy, culture and society. The Regulation, hence, should be interpreted 'expansively' in order to fulfill this mandate.

Specifically, this paragraph empowers the Governor to make regulations with regard to:

- (i) Prohibition and restriction of transfer of land from and between Scheduled Tribes – almost every State in the country, and certainly all States with Scheduled Areas, have enacted legislations relating to prevention/prohibition of land transfer in Scheduled Areas by tribals to non-tribals, and in some cases, even the transfer of land between tribals inter-se is restricted.
- (ii) Regulation of allotment of land to tribals in Scheduled Areas;
- (iii) Regulation of moneylending in Scheduled Areas to tribals.

Laws made under paragraph 5 by the Governor require prior consultation with the TAC, and the assent of the President is necessary for them to be brought into force.

In large part, the Governors have failed to use their powers. As an official committee found:

'The Governors, on their part, remained oblivious about the state of the tribal people. Even the mandatory annual Reports by the Governors to the President regarding the administration of Scheduled Areas under Para 3 of the Fifth Schedule are irregular. They comprise largely stale narrative of departmental programmes without even an allusion to the crucial issues in administration, the main thrust of the Fifth Schedule.'³¹

<https://tribal.nic.in/downloads/FRA/5.%20Land%20and%20Governance%20under%20Fifth%20Schedule.pdf>