UNIVERSITY INSTITUTE OF ENGINEERINGAND TECHNOLOGY, CSJM UNIVERSITY, KANPUR

End Semester Examination-Dec 2022

B.Tech. CSE/MEE -IV Sem

Environment Science (EVS S101)

Semester: Odd Semester-III **Year: II Year (2K20)**

Time: 3 h **Maximum marks: 40**

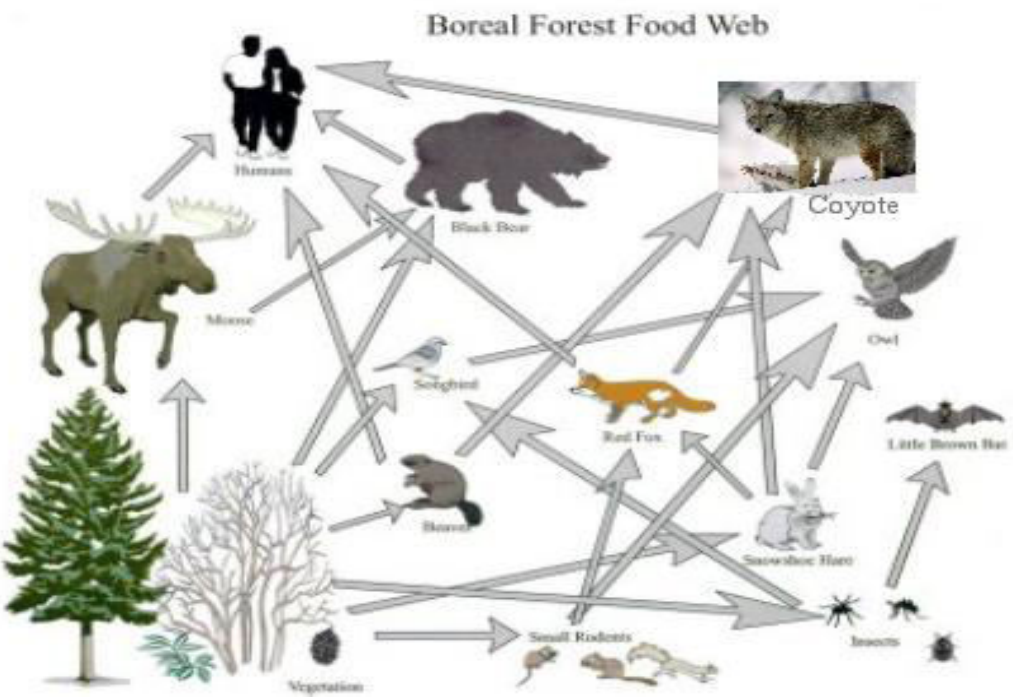
A. Multiple choice questions (Attempt all the question) **1*15=15**

1. The main objective of UNESCO is to contribute to peace and security in the world by promoting
(1) Education & Communication (2) Science (3) Culture (4) All of these
2. Which one of the following is an example of nonrenewable resource?
(1) Water (2) Vegetation (3) Wind (4) Coal and minerals
3. Water balance is maintained by the other continuous interchange of water between Earth and atmosphere via
1) Precipitation 2) Evaporation 3) Transpiration4) All of the above
4. Presence of the fertilizers in soil leads to
i) Loss of fertility ii) Higher Growth of Floura & Fauna iii) Algal bloom iv) Net Primary Productivity
5. What is the rate at which solar energy is converted and stored by the producers per unit area over a time period called?
(i) Primary Productivity ii) Secondary Productivity iii) Gross Primary Productivity iv) Resources
6. Respiration involves
7. 1) Inhaling O2 and exhaling Co2 and Food Oxidation 2) Oxidation of Food 3) Inhaling Oxygen
3) Inhaling O2 and exhaling Co2 4) None of these
8. Pick the right combination of terms which has no fossil fuel.
1) Wind, ocean and coal ii) Kerosene, wind and tide iii) Wind, wood, sun iv) Petroleum, wood, sun
9. 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
10. Physical Elements of Environment includes
1) Space, landforms, and water bodies 2) climate, soils 3) Rocks minerals 4) All of these
11. In Food Chain Energy is transferred from one trophic level to another, which is approximately
1) 20 % 2) 25% 3) 10% 4) 15 %
12. According to Kurt Lewin, environment is of three types which influence the personality of an individual as under
1) Physical Environment 2) Social and Cultural Environment, and 3) Psychological Environment d) All of these
13. 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) Sand 2) Rain, snow, Fog 3) Air 4) Soil
14. Fox is an example of
(1) Primary Consumer (2) Secondary Consumer (3) Tertiary Consumer (4) Top Carnivore
15. Aquatic Animal die because of
(1) Air Pollution (2) Water & thermal Pollution by industrial effluents (3) Noise (4) polluted soil

Section B (Conceptual Knowledge- attempt any 3 questions). 3x3

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

Foxes Yellow Perch Aquatic Plants Grass Grasshooper Zooplankton snake Peacock Plant flower, Phytoplankton lizard , Grass Dragonfly Larva Tadpole Eagle



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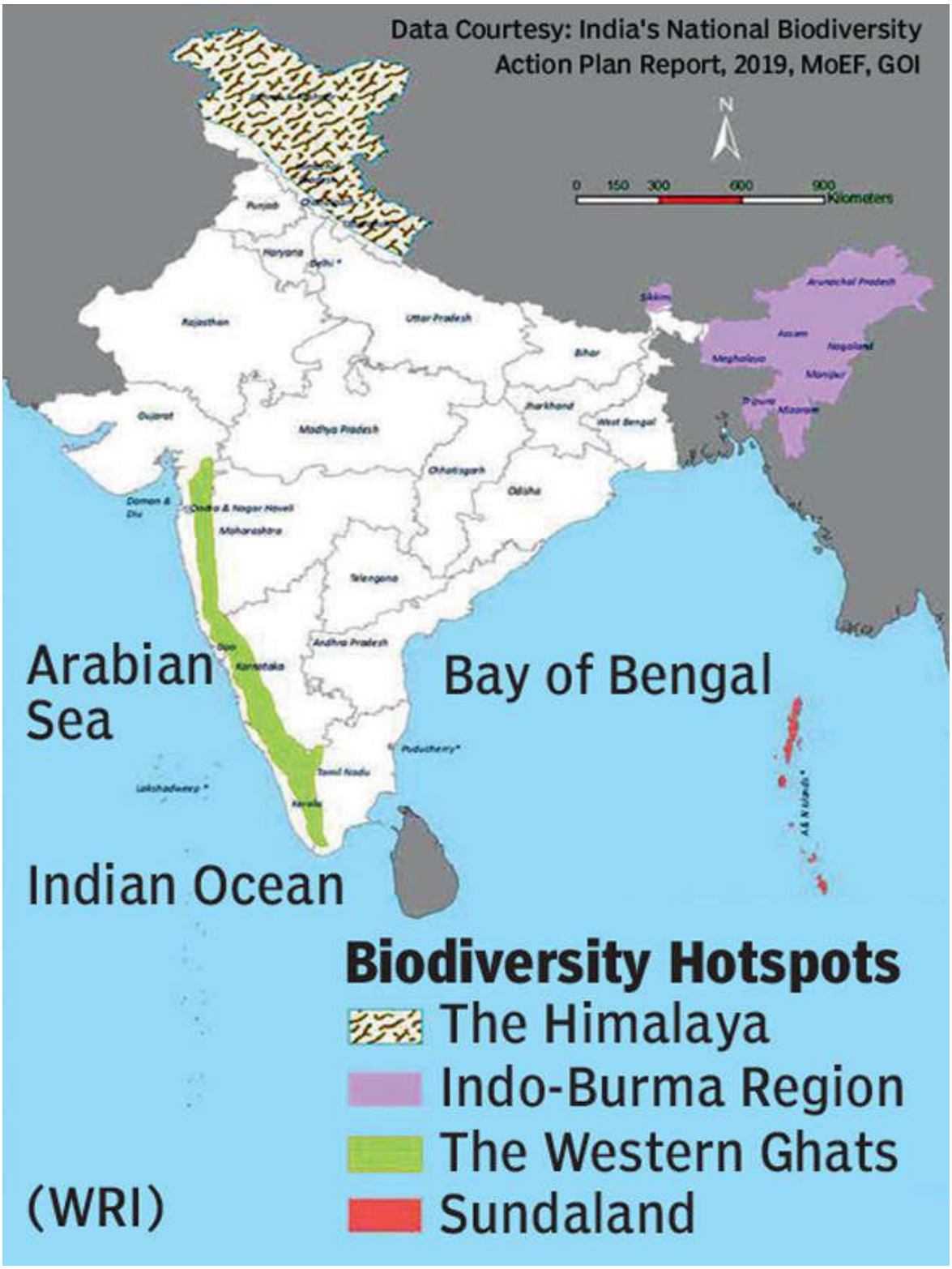
2. Match the list I wish list II and choose the correct answer. Draw an Indian Map and locate all these hotspot on Map.

Hostspot

1 Himalaya
2 Indo-Burma
3 Sundaland
4 Western Ghat



3. Define Species Biodiversity & Explain role of evolution in Biodiversity.

Species Diversity: The number of species of plants and animal that are present in a region constitute its species diversity is a group of closely related, interbreeding organisms.

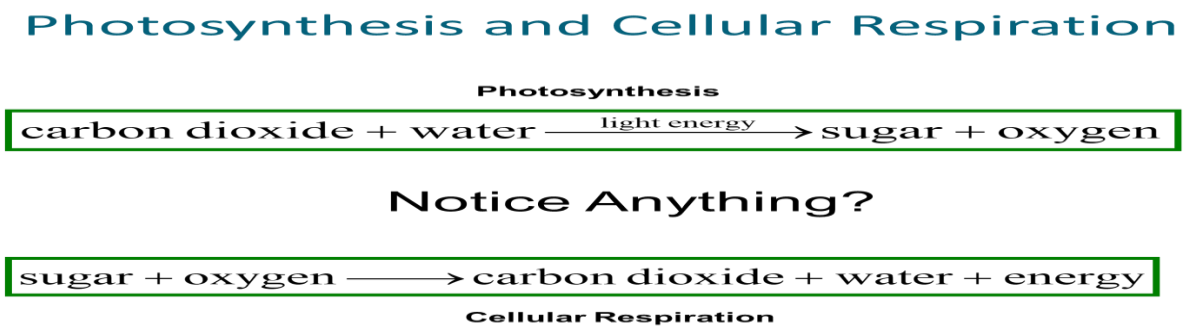
Species diversity is measured by indices known as Shanon Wiener index and Simpson Index Areas that are rich in species diversity are called “hotspots” of diversity.

P.T.O.

Populations evolve when genes mutate and give some individuals genetic traits that enhance their abilities to survive and to produce offspring with these traits (natural selection).

Genes mutate, individuals are selected, and populations evolve such that they are better adapted to survive and reproduce under existing environmental conditions.

4**. "Describe energy flow in Ecosystems.**



The organism uses this energy to do everything. All the organism are connected via food chain Energy is derived from sun & used by plants(Producer) then transferred to Consumers.

5. Write down the key concept & goal of 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 priority should be given and
b. The idea of **Limitations**: imposed by state of Technology & social organization on the environment's ability to meet the present & future needs.

6. Write down the objectives of Environmental Studies, given by UNESCO

In support of this objective, UNESCO's principal functions are:

to promote intellectual cooperation and mutual understanding among people through all means of mass communication

to give fresh impulse to popular education and to the spread of

culture

to maintain, increase and diffuse knowledge

to encourage scientific research and training

to apply sciences to ensure human development and the rational management of natural resources.

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

Attempt Any two question **8 x2**

1. **What is renewable energy Discuss about wind Energy, Geothermal Energy & Tidal Energy Conversion Methods.**

P.T.O.

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 drown 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 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.
In certain regions large dams can induce seismic activity which will result in earthquakes. There is a great possibility of this occurring around the Tehri dam in the Himalayan foothills. With large dams causing social problems, there has been a trend to develop small hydroelectric generation units. Multiple small dams have less impact on the environment. The development of small hydroelectric power units could become a very important resource in India, which has steeply falling rivers and the economic capability and technical resources to exploit them.

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; Non conventional source of energy and non polluting. The major problem with solar energy is its intermittent nature, during day less in cloudy weather. Hence, supplementary source of energy is essential. It needs people's initiatives and high initial expenses. After dramatic rise in oil prices during 1970's several countries started research and developmental programmes to exploit the solar energy.

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. Denmark produces a large quantity of biogas from waste and produces 15,000 megawatts of electricity from 15 farmers' cooperatives. London has a plant which makes 30 megawatts of electricity a year from 420,000 tons of municipal waste which gives power to 50,000 families. In Germany, 25% of landfills for garbage produce power from biogas. Japan uses 85% of its waste and France about 50%.

Biogas plants have become increasingly popular in India in the rural sector. These biogas plants use cow dung (Gobar gas), which is converted into a gas which is used as a fuel – for lighting/cooking. It is also used for running dual fuel engines.

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. Some 2000 years ago, windmills were developed in China, Afghanistan and Persia to draw water for irrigation and grinding grain. Most of the early work on generating electricity from wind was carried out in Denmark, at the end of the last century. Five nations (Germany, USA, Denmark, Spain and India) produce 80% of world's wind energy capacity. Today, Denmark and California have large wind turbine cooperatives which sell electricity to the government grid. Wind Farms – cluster of wind turbines

(aero generators) to charge large batteries. The power in wind is a function of the wind speed and therefore the average wind speed of an area is an important determinant of economically feasible power. Wind speed increases with height.

Environmental Impacts: Wind power has few environmental impacts, as there are virtually no air or water emissions, or radiation, or solid waste production. The principal problems are bird kills, noise, effect on TV reception etc. Although large areas of land are required for setting up wind farms, the amount used by the turbine bases, the foundations and the access roads is less than 1% of the total area covered by the wind farm. The rest of the area can also be used for agricultural purposes or for grazing. Setting windmills offshore reduces their demand for land and visual impact. Wind is an intermittent source and the intermittency of wind depends on the geographic distribution of wind. Wind therefore cannot be used as the sole resource for electricity, and requires some other backup or stand-by source (as in solar system).
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. From the 1970s, several countries have been experimenting with technology to harness the kinetic energy of the ocean to generate electricity. 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. In a one-way system the incoming tide is allowed to fill the basin through a sluice, and the water so collected is used to produce electricity during the low tide. In a two way system
power is generated from both the incoming as well as the outgoing tide.
Environmental impact: Tidal power stations bring about major ecological changes in the sensitive ecosystem of coastal regions and can destroy the habitats and nesting places of water birds and interfere with fisheries. A tidal power station at the mouth of a river blocks the flow of polluted water into the sea, thereby creating health and pollution hazards in the estuary. Other drawbacks include offshore energy devices posing navigational hazards. Residual drift current could affect spawning of some fish, whose larvae would be carried away from spawning grounds. They may also affect the migration patterns of surface swimming fish.
Thermal Energy:
Ocean collects and store huge quantities of solar radiations in the form of heat. This is another developing concept to harnesses energy due to the differences in temperature between the warm upper layers of the ocean and the cold deep sea water.
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. This is called direct use of geothermal energy, and it provides a steady stream of hot water that is pumped to the earth’s surface. Geothermal energy is nearly as cheap as hydropower and will thus be increasingly

utilised in future.
Environmental impact: Water from geothermal reservoirs often contains minerals that are corrosive and polluting and they may be toxic to fishes. Steam contains H2S gas which gives rotten egg smell and cause air pollution. Geothermal fluids are a problem which must be treated before disposal.
Methods to solve energy crisis
Avoid fossil fuels
Smokeless stoves
Use solar energy extensively
7/17/2020 Environmental Science: LESSON 18. Energy Resources
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Environmental Science
Biogas – (500kg litter gives 50m3/day)
Trees should be planted.

2. Discuss about management of resources (a) renewable resource of energy (b) nonrenewable resource of Energy.
3. What is Ecosystem & Biome. Discuss about the Design, Recreate & Restore in for any Ecosystem.
4. (a) Write down the method of sustainable development? (b) Discuss about problems, Challenges Role of Engineering solutions for sustainable development.
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.