

45

## SCHEME OF EVALUATION

(Scoring Indicator)

Page: 15  
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Course Title: ENVIRONMENTAL SCIENCE AND DISASTER MANAGEMENT				
Qst No.	Scoring Indicator	Split Up score	Sub Total	Total
I.1	In most parts of the world, water is a scarce resource. That might seem strange, because there is so much water on Earth. Almost all of the water on Earth, more than 97 percent of it, is seawater in the oceans. The rest is called fresh water, because it does not have a high salt content. Most of the world's fresh water is frozen solid in large glaciers in Antarctica and Greenland. Almost all of the fresh water that is available for human use is either contained in soil and rock below the surface, called groundwater, or in rivers and lakes.	2	2	
		2	2	
I.2	Ecosystems are functional units consisting of living things in a given area, non-living chemical and physical factors of their environment, linked together through nutrient cycle and energy flow.	2	2	
I.3	Air pollution is the introduction into the atmosphere of chemicals, particulates, or biological materials that cause discomfort, disease, or death to humans, damage other living organisms such as food crops, or damage the natural environment or built environment.	2	2	
I.4	Municipal Waste , Residential Waste, Commercial Waste, Garbage, Rubbish, Institutional Waste, Ashes, Street Sweeping, Dead Animals, Construction and Demolition Wastes, Industrial Wastes, Hazardous Wastes, Sewage Wastes, Biomedical/Hospital Waste, Plastics.	0.5x 4	2	
I.5	Vulnerability can be defined as the diminished capacity of an individual or group to anticipate, cope with, resist and recover from the impact of a natural or man-made hazard.	2	2	10
II.1	Indispensability of water and its unequal distribution has often led to interstate or international disputes. Issues related to sharing of river water have been largely affecting our farmers and also shaking our governments. Many countries are engaged in bitter rivalries over this precious resource. For instance, Argentina and Brazil, dispute each other's claims to the La Plata river, India and Pakistan fight over the rights to water from the Indus, Mexico and USA have come in conflict over the Colorado river, India and Bangladesh are fighting for Bhrahmaputra river, and Iran and Iraq contest for the water from Shatt-Al- Arab River. Within India, water conflicts are still being continues between the states. For Eg. Sharing of Krishna water between Karnataka and Andhra Pradesh, Sharing of Siruvani water between Tamilnadu and Kerala, and others. Sharing of Cauvery between Karnataka and Tamilnadu.	6	6	6

II.2	<p><b>landslides</b></p> <ol style="list-style-type: none"> <li>1. Removal of vegetation:-In the sloppy area creates soil erosion, which leads to landslides.</li> <li>2. Underground mining:-Cause subsidence of the ground.</li> <li>3. Transport:-Due to the movement of buses and trains in the unstable sloppy region cause landslides.</li> <li>4. Addition of weight:-Addition of extra weight (or) construction on the slope areas leads to landslide.</li> <li>5. Ground water level:-Over exploitation of ground water also leads to landslides.</li> </ol> <p><b>Soil erosion</b></p> <ol style="list-style-type: none"> <li>1. The misuse of an ecosystem leads to loss of valuable soil through erosion by the monsoon rains and, to a smaller extent, by wind.</li> <li>2. The roots of the trees in the forest hold the soil. Deforestation thus leads to rapid soil erosion.</li> <li>3. Soil is washed into streams and is transported into rivers and finally lost to the sea.</li> <li>4. The linkage between the existence of forests and the presence of soil is greater than the forest's physical soil binding function alone.</li> </ol>	3	6	6
II.3	<p><b>FOOD CHAIN</b></p> <p>In an ecosystem one can observe the transfer or flow of energy from one trophic level to other in succession.</p> <p>A trophic level can be defined as the number of links by which it is separated from the producer, or as the position of the organism in the food chain.</p> <p>The patterns of eating and being eaten forms a linear chain called food chain which can always be traced back to the producers.</p> <p><b>FOOD WEB</b></p> <p>In nature simple food chains occur rarely. The same organism may operate in the ecosystem at more than one trophic level i.e. it may derive its food from more than one source. Even the same organism may be eaten by several organisms of a higher trophic level or an organism may feed upon several different organisms of a lower trophic level. Usually the kind of food changes with the age of the organism and the food availability. Thus in a given ecosystem various food chains are linked together and interested each other to form a complex network called food Web.</p>	3	6	6
II.4	<p>The biotic components of ecosystems include the plants, animals and microbes i.e., total living community. They can be classified into two main groups of organisms</p> <ol style="list-style-type: none"> <li>(i) The autotrophs (producers)</li> <li>(ii) The heterotrophs (consumers and decomposers)</li> </ol> <p>The abiotic components that form the physical environment of an ecosystem include factors such as energy, elements, inorganic compounds, dead organic matter and climate.</p>	3	6	6

II.5	<p>Water pollution can be defined as the contamination of water bodies. Water pollution is caused when water bodies such as rivers, lakes, oceans, groundwater, and aquifers get contaminated with industrial and agricultural effluents. When water gets polluted, it adversely affects all lifeforms that directly or indirectly depend on this source. The effects of water contamination can be felt for years to come.</p> <p>Water bodies in the vicinity of urban areas are extremely polluted. This is the result of dumping garbage and toxic chemicals by industrial and commercial establishments.</p> <p>Water pollution drastically affects aquatic life. It affects their metabolism, behaviour, causes illness and eventual death. Dioxin is a chemical that causes a lot of problems from reproduction to uncontrolled cell growth or cancer. This chemical is bioaccumulated in fish, chicken and meat. Chemicals such as this travel up the food chain before entering the human body.</p> <p>The effect of water pollution can have a huge impact on the food chain. It disrupts the food-chain. Cadmium and lead are some toxic substances, these pollutants upon entering the food chain through animals (fish when consumed by animals, humans) can continue to disrupt at higher levels.</p> <p>Humans are affected by pollution and can contract diseases such as hepatitis through faecal matter in water sources. Poor drinking water treatment and unfit water can always cause an outbreak of infectious diseases such as cholera etc.</p> <p>The ecosystem can be critically affected, modified and destructured because of water pollution.</p>	6	6	6
II.6	<p>Transport Emergency Cards (TREM Cards) are cards that workers carry at all times when their work involves transporting hazardous wastes. These cards are provided by the occupier or operator of a facility and must be kept in the cab of any vehicle transporting dangerous goods, unless they are in sufficiently low quantities. TREM Cards carry information about the particular goods being transported and provide instructions to the driver or emergency responders in the event of an incident. TREM Cards list the nature of the carried substances, associated hazard(s), and what actions should be taken in the event of an emergency. They also include a contact name and telephone number for the relevant emergency services in the event of an accident.</p> <p>Transport Emergency Cards must be visible in the vehicle at all times during the transportation of hazardous substances. Upon delivery, TREM Cards are removed from view. The consignor is required under regulations to either supply the cards or give enough information for the operator to obtain the correct ones. However, the carrier also has a legal obligation to ensure that cards are appropriate to the load.</p>	6	6	6

II.7	<p>A <b>hazard</b> is a natural event while the disaster is its consequence.  A hazard is a perceived natural event which threatens both life and property. A disaster is the culmination of such hazard.  A hazard is a potential for a disaster.  A hazard becomes a disaster when it hits an area affecting the normal life system. If a hazard like a cyclone hits an unpopulated area, say an unpopulated coast, it need not be considered as a disaster.  However, it will be considered a disaster if life and property are seriously damaged. A hazard may be regarded as pre-disaster situation, in which some risk of disaster exists, because the human population has placed itself in a situation of risk.</p> <p><b>Disasters</b> are extreme events which cause great loss of life and/or property and create severe disruptions to human activities.  They can be created by human actions, e.g., transport accidents and industrial explosions or natural processes like earthquakes.</p> <p><b>Risk</b> is the expected losses (lives lost, persons injured, damages to property and disruption of economic activity) due to a particular hazard. Risk is the product of hazard and vulnerability. Risk is the probability that a person will experience an event in a specified period of time.</p> <p>Risk as a function of hazard and vulnerability, a relationship that is frequently illustrated with the following formula, although the association is not strictly arthematic:  Risk = hazard x vulnerability.</p>	2	2	6
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III a	<p>Man depends heavily on forests for food, medicine, shelter, wood and fuel. With growing civilization the demands for raw material like timber, pulp, minerals, fuel wood etc. shot up resulting in large scale logging, mining, road-building and clearing of forests. Our forests contribute substantially to the national economy. The international timber trade alone is worth over US \$ 40 billion per year. The devastating effects of deforestation in India include soil, water and wind erosion, estimated to cost over 16,400 cores every year.</p> <p>Deforestation refers to the loss of forest cover; land that is permanently converted from forest to agricultural land, golf courses, cattle pasture, home, lakes or desert.</p> <p>Deforestation means destruction of forests. The total forests area of the world in 1900 was estimated to be 7,000 million hectares which was reduced to 2890 million ha in 1975 fell down to just 2,300 million ha by 2000.</p>	8		
III b	<p>The construction of large dams completely change the relationship of water and land, destroying the existing ecosystem balance, which in many cases, has taken thousands of years to create. Currently there are around 40,000 large dams which abstract the World's rivers, completing changing their circulation system this is not going to occur without dire environmental impacts.</p> <p>Throughout the past few years, the negative impacts of dams have become so well known that most countries (including India) have stopped building them altogether and are now forced to invest their money into fixing the problems created by existing dams.</p> <p>Some environmental problems caused by dams are as follow:</p> <p>Soil Erosion, Species Extinction, Spread of Disease, Changes to Earth's Rotation, Sedimentation, Siltation, Water logging, Salinisation etc.</p>	7	6	6
IV a	<p>Water is essential for all forms of life. Virtually, all of human uses, require fresh water. No plant or animal species can survive without water. If water in our body drops by 1% we feel thirst, if it drops by 10% we face death. Most people use more water than they really need. Most of us waste water during a bath by using a shower or during washing of clothes. Many agriculturists use more water than necessary to grow crops. There are many ways in which farmers can use less water without reducing yields such as the use of drip irrigation systems.</p>	8	8	8

IV b	<p>Mining is the process of removing deposits of ores from substantially very well below the ground level.</p> <p>Mining is carried out to remove several minerals including coal.</p> <p>These mineral deposits invariably found in the forest region, and any operation of mining will naturally affect the forests.</p> <p>More than 80,000 ha of land of the country are presently under the stress of mining activities. Large scale deforestation due to mining has been reported nowadays.</p> <p>The forest area has declined upto 33% due to mining activities.</p> <p>The environmental impact of mining includes erosion, formation of sinkholes, loss of bio-diversity, and contamination of soil, groundwater and surface water by chemicals from mining processes.</p> <p>Mining operation require removal of vegetation along with underlying soil mantle and overlying rock masses. This results in destruction of landscape in the area.</p> <p>Large scale of deforestation has been reported in Mussorie and Dehradun valley due to mining of various areas.</p> <p>Indiscriminate mining in Goa since 1961 has destroyed more than 50,000 ha of forest land.</p> <p>Mining of radioactive mineral in Kerala, Tamilnadu and Karnataka are posing similar threats of deforestation.</p>	7	7	7
V a	<p>The community begins with relatively few pioneering plants and animals and develops through increasing complexity until it becomes stable or self-perpetuating as a climax community. The "engine" of succession, the cause of ecosystem change, is the impact of established organisms upon their own environments. A consequence of living is the sometimes subtle and sometimes overt alteration of one's own environment.</p> <p>It is a phenomenon or process by which an ecological community undergoes more or less orderly and predictable changes following a disturbance or the initial colonization of a new habitat. Succession may be initiated either by formation of new, unoccupied habitat, such as from a lava flow or a severe landslide, or by some form of disturbance of a community, such as from a fire, severe windthrow, or logging. Succession that begins in new habitats, uninfluenced by pre-existing communities is called primary succession, whereas succession that follows disruption of a pre-existing community is called secondary succession.</p>	8	8	8

V b	<p>A forest ecosystem is a natural woodland unit consisting of all plants, animals and micro-organisms (<u>Biotic components</u>) in that area functioning together with all of the non-living physical (<u>abiotic</u>) factors of the environment.</p> <p>Approximately 30 percent of the earth's surface is covered in forests. The forests plays a crucial role in maintaining a healthy planet, such as controlling the water cycle and stabilizing soils, assisting in leveling the climate by saturating and storing carbon dioxide, providing a habitat for wildlife and supplying wood, food and medicines. Across the world there are several different types of forest ecosystems.</p> <p>1. Tropical Rain Forest</p> <p>Days usually last 12 hours, temperatures averaging around 25 degrees C, surplus of rain and high insolation (sunlight) are all attributes of a tropical rain forest year-round. Tropical rain forests cover the Amazon region, as well as equatorial regions in Africa, Southeast Asia, the east coast of Central America and elsewhere along the equator. These areas are characterized by broadleaf evergreen trees, vines, tree ferns and palms.</p> <p>2. Temperate Forest</p> <p>Temperate forests correspond to forest concentrations formed in the northern and southern hemisphere, or in <u>temperate</u> regions. Main characteristics include: wide leaves, large and tall trees and non seasonal vegetation. Temperate forests can be further distinguished by <u>weather</u> patterns and geographical features that favor the predominance of certain kinds of trees.</p> <p>3. Boreal Forest</p> <p>The boreal forest, also known as the needle leaf forest, covers most of the subarctic climate areas located in Canada, Alaska, Siberia, Russia and Europe. "Taiga" is a broader term used for boreal forest in order to encompass areas transitioning to arctic climate conditions.</p>	7	7	7
VI a	<p>Aquatic ecosystems include oceans, lakes, rivers, streams, estuaries, and wetlands. Within these aquatic ecosystems are living things that depend on the water for survival, such as fish, plants, and microorganisms. These ecosystems are very fragile and can be easily disturbed by pollution.</p> <p>Main functions of an ecosystem are recycle of nutrients, energy flow, purification of water, attenuate floods, recharge of ground water and provide verities of microhabitats.</p> <p>Freshwaters</p> <p>Freshwater ecosystems cover 0.8% of the earth's surface and contain 0.009% of its total water. They generate nearly 3% of its net primary production. Freshwater ecosystems contain 41% of the world's known fish species.</p> <p>fsd</p> <p>Freshwater is naturally occurring water on the earth's surface in ponds, lakes, rivers and streams and underground as groundwater in aquifers and underground streams. Freshwater is characterized by having low concentrations of dissolved salts and other total dissolved solids.</p>			

	<p>Freshwater can be defined as water with less than 5 (ppt) of dissolved salts.</p> <p>Health of an aquatic ecosystem is degraded as result of physical, chemical or biological alterations of the environment.</p> <p>Physical alterations - Changes in water temperature, water flow and light availability.</p> <p>Chemical alterations - Changes in the loading rates of bio stimulatory nutrients, oxygen consuming materials and toxins.</p> <p>Characteristics of freshwaters.</p> <p>The river ecosystems are characterized by the river bed's, gradient or by the velocity of the current. Fast moving turbulent water typically contains greater concentrations of dissolved oxygen, which supports greater biodiversity than the slow moving water of pools. Eg. Rivers and streams.</p> <p>There are different types of freshwater systems viz. ponds and lakes, streams and rivers, and wetlands. Based on the movement of water, it is generally grouped into lentic and lotic water systems. The lentic water bodies include all standing water systems such as ponds, lakes and wet lands or swamps, whereas the lotic systems include all flowing water systems such as small streams and rivers.</p> <p>Types of freshwater</p> <ul style="list-style-type: none"> <li>• Lentic: slow-moving water, including pools, ponds, and lakes.</li> <li>• Lotic: rapidly-moving water, for example streams and rivers.</li> </ul> <p>Ponds and lakes are bodies of standing freshwater surrounded by land and are not having continuity or connection with the sea. Lakes tend to be larger and deeper, while ponds are often shallow enough that sunlight can reach the bottom allowing rooted plants to grow. There is no clear cut difference between the lakes and ponds except for the size, but they very well behave differently in their ecology.</p> <p>Lakes are bigger than ponds and too deep to support rooted plants except near the shore. Some lakes are deep enough and wide enough for waves to form. For example, the Lake Superior is the largest freshwater lake in the world, with a water spread area of 31,000 square miles. Similarly, the Lake Baikal in the Southern Siberia, is the deepest lake in the world, which has a depth of 1,700 meters.</p>	8	8	8
VI b	<p>Global warming is a phenomenon of climate change characterized by a general increase in average temperatures of the Earth, which modifies the weather balances and ecosystems for a long time. It is directly linked to the increase of greenhouse gases in our atmosphere, worsening the greenhouse effect.</p> <p>he world's leading climate scientists believe that human activities are very likely the main cause of global warming since the mid-twentieth century, mostly because of:</p> <ol style="list-style-type: none"> <li>1. The massive use of fossil fuels is obviously the first source of global warming, as burning coal, oil and gas produces carbon dioxide - the most important greenhouse gas in the atmosphere - as well as nitrous oxide.</li> <li>2. The exploitation of forests has a major role in climate change.</li> <li>3. Another cause of global warming is intensive farming, not only with the ever-increasing livestock, but also with plant protection products and fertilizers.</li> </ol>			

	<p>4. Waste management methods like landfills and incineration emit greenhouse and toxic gases - including methane - that are released into the atmosphere, soil and waterways, contributing to the increase of the greenhouse effect.</p> <p>5. MINING: Modern life is highly dependent on the mining and metallurgical industry.</p> <p>6. OVERCONSUMPTION: Finally, overconsumption also plays a major role in climate change.</p> <p><b>Effects</b></p> <p>1. The increase of temperatures and the climate upheavals disturb the ecosystems, modify the conditions and cycles of plant reproduction. The scarcity of resources and climate change are changing life habits and migratory cycles of animals.</p> <p>2. Because of global warming, permafrost and ice are melting massively at the poles, increasing the sea level at a rate never known before. In a century, the increase reaches 18 cm (including 6 cm in the last 20 years). The worst case scenario is a rise of up to 1m by 2100.</p> <p>3. Human beings are not spared by these upheavals. Climate change is affecting the global economy. It is already shaking up social, health and geopolitical balances in many parts of the world. The scarcity of resources like food and energy gives rise to new conflicts.</p> <p>4. For decades now, meteorologists and climatologists around the world have been watching the effects of global warming on the weather phenomena.</p>	7	7	7
VII a	<p>Sources of air pollution</p> <p>Human activity</p> <p>"Stationary Sources" include smoke stacks of power plants, manufacturing facilities (factories) and waste incinerators, as well as furnaces and other types of fuel-burning heating devices.</p> <p>Mobile Sources" include motor vehicles, marine vessels, aircraft etc.</p> <p>Chemicals, dust and controlled burn practices in agriculture and forestry management.</p> <p>Fumes from paint, hair spray, varnish, aerosol sprays and other solvents.</p> <p>Waste deposition in landfills, which generate methane. Methane is not toxic; however, it is highly flammable and may form explosive mixtures with air.</p> <p>Military, such as nuclear weapons, toxic gases, germ warfare and rocketry</p> <p>Natural sources</p> <p>Dust from natural sources, usually large areas of land with little or no vegetation.</p> <p>Methane, emitted by the digestion of food by animals, for example cattle.</p> <p>Radon gas from radioactive decay within the Earth's crust. Radon is a colorless, odorless, naturally occurring, radioactive noble gas that is formed from the decay of radium.</p> <p>Smoke and carbon monoxide from wildfires.</p> <p>Volcanic activity, which produce sulfur, chlorine, and ash particulates</p> <p><b>Effects of Air Pollution on Human Health</b></p> <p>Air pollution is a significant risk factor for multiple health conditions</p>	4		

	<p>including respiratory infections, heart disease, and lung cancer etc. The health effects caused by air pollution may include difficulty in breathing, wheezing, coughing and aggravation of existing respiratory and cardiac conditions.</p> <p>The World Health Organization states that 2.4 million people die each year from causes directly attributable to air pollution, with 1.5 million of these deaths attributable to indoor air pollution.</p> <p>A ground-level ozone concentration of 65 parts per billion, would avert 1,700 to 5,100 premature deaths nationwide in 2020 compared with the current 75-ppb standard.</p> <p>Exposure to PM<sub>2.5</sub> was also associated with an increased risk of mortality from lung cancer (range: 15% to 21% per a 10 microg/m<sup>3</sup> increase) and total cardiovascular mortality (range: 12% to 14% per a 10 microg/m<sup>3</sup> increase).</p> <p>Around the world, children living in cities with high exposure to air pollutants are at increased risk of developing asthma, pneumonia and other lower respiratory infections</p> <p><u>Effects of Air Pollution on the Plants</u></p> <p>Damage to leaves.  Reduced photosynthesis.  Reduced nutrient uptake.  Killing of microorganisms in the soil.  Injury to foliage may be visible in a short time and appear as necrotic lesions (dead tissue), or it can develop slowly as a yellowing or chlorosis of the leaf.</p>	4	8	8
VII b	<p><b>Landfill.</b> Disposing of waste in a landfill involves burying the waste, and this remains a common practice in most countries.</p> <p><b>Incineration.</b> Incineration is a disposal method in which solid organic wastes are subjected to combustion so as to convert them into residue and gaseous products.</p> <p><b>Recycling.</b> Recycling refers to the collection and reuse of waste materials such as empty beverage containers</p> <p><b>Biological reprocessing ( COMPOSTING).</b> Waste materials that are organic in nature, such as plant material, food scraps, and paper products, can be recycled using biological composting and digestion processes to <u>decompose</u> the organic matter.</p> <p><b>Energy recovery.</b> The energy content of waste products can be harnessed directly by using them as a direct combustion fuel, or indirectly by processing them into another type of fuel.</p> <p><b>Avoidance and reduction methods.</b> An important method of waste management is the prevention of waste material being created, also known as waste reduction. Methods of avoidance include reuse of second-hand products, repairing broken items instead of buying new, designing products to be refillable or reusable (such as cotton instead of plastic shopping bags).</p>	7	7	7

VIII a	<p><b>Causes</b></p> <ul style="list-style-type: none"> <li>•Thermal pollution is the degradation of water quality by any process that changes ambient water temperature.</li> <li>•Elevated temperature typically decreases the level of dissolved oxygen of water.</li> <li>•A common cause of thermal pollution is the use of water as a coolant, storm water by power plants and industrial manufacturers.</li> <li>•When water used as a coolant is returned to the natural environment at a higher temperature, the change in temperature decreases oxygen supply, and affects ecosystem composition.</li> <li>•When a power plant first opens or shuts down for repair or other causes, fish and other organisms adapted to particular temperature range can be killed by the abrupt change in water temperature known as "thermal shock."</li> <li>•Nuclear power plants use water as a cooling agent.</li> <li>•After the water is used, it is put back into a water supply at 9-20oC warmer.</li> <li>•The decrease in vegetation increases the amount of light that hits the water, which increases the temperature of the water.</li> <li>•Soil Erosion makes the water muddy, which increases the light absorbed.</li> </ul> <p><b>Effects</b></p> <p>Elevated temperature typically decreases the level of dissolved oxygen f water.</p> <p>This can harm aquatic animals such as fish, amphibians and other aquatic organisms.</p> <p>Thermal pollution may also increase the metabolic rate of aquatic animals, as enzyme activity, resulting in these organisms consuming more food in a shorter time than if their environment were not changed.</p> <p>An increased metabolic rate may result in fewer resources; the more adapted organisms moving in may have an advantage over organisms that are not used to the warmer temperature.</p> <p>As a result, food chains of the old and new environments may be compromised. Some fish species will avoid stream segments or coastal areas adjacent to a thermal discharge.</p> <p>Biodiversity can be decreased as a result.High temperature limits oxygen dispersion into deeper waters, contributing to anaerobic conditions. This can lead to increased bacteria levels when there is ample food supply. Many aquatic species will fail to reproduce at elevated temperatures.</p>	4		
		4	8	8

VIII b	<ul style="list-style-type: none"> <li>• Try to plant trees wherever you can and more importantly take care of them. They reduce air pollution.</li> <li>• Reduce the use of wood and paper products wherever possible. Manufacturing paper leads to pollution and loss of forests which releases oxygen and takes up carbon dioxide. Try to recycle paper products and use recycled paper wherever possible.</li> <li>• From the mail you receive reuse as many envelopes that you can.</li> <li>• Do not buy furniture, doors, window frames made from tropical hardwoods such as teak and mahogany. These are forest based.</li> <li>• Help in restoring a degraded area near your home or join in an afforestation program.</li> <li>• Use pesticides in your home only when absolutely necessary and use them in as small amounts as necessary. Some insect species help to keep a check on the populations of pest species.</li> <li>• Advocate organic farming by asking your grocery store to stock vegetables and fruits grown by an organic method. This will automatically help to reduce the use of pesticides.</li> <li>• Reduce the use of fossil fuels by either walking up a short distance using a car pool, sharing a bike or using public transport. This reduces air pollution.</li> <li>• Shut off the lights and fans when not needed.</li> <li>• Don't use aerosol spray products and commercial room air fresheners. They damage the ozone layer.</li> <li>• Do not pour pesticides, paints, solvents, oil or other products containing harmful chemicals down the drain or on the ground.</li> <li>• Buy consumer goods that last, keep them as long as possible and have them repaired as far as possible instead of disposing them off. Such products end up in landfills that could pollute ground water.</li> <li>• Buy consumer goods ages in refillable glass containers instead of cans or throwaway bottles.</li> <li>• Use rechargeable batteries.</li> <li>• Try to avoid asking for plastic carry bags when you buy groceries or vegetables or any other items. Use your own cloth bag instead.</li> <li>• Use sponges and washable cloth napkins, dish towels and handkerchiefs instead of paper ones.</li> <li>• Don't use throwaway paper and plastic plates and cups when reusable versions are available.</li> </ul>	1X7	7	7
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IX a	<p><b>Causes of flood</b></p> <p>There are several causes of floods and they differ from region to region. The causes may vary from a rural area to an urban area. Some of the major causes of floods in India are given below.</p> <p><b>Heavy rainfall:</b> It is the primary cause for floods in India. Especially, rainfall in a short span of time is of much concern as they are leading to flash floods.</p> <p><b>Siltation of the Rivers:</b> Heavy siltation of the river bed reduces the water carrying capacity of the rivers and streams leading to flooding.</p> <p><b>Blockage in the Drains:</b> Blocked drains are the primary cause for the floods in urban areas, especially in metros.</p> <p><b>Landslides:</b> They are the major reason behind floods in hilly areas of the north and northeast.</p> <p><b>Consequences of flood</b></p> <p>Recurrent floods impact the agriculture sector adversely. Due to recurrent floods, fields get submerged and lead to the loss of harvest increasing the vulnerability of farmers to indebtedness. The loss is not only for the farming community but also the common man is hit hardly due to persistent inflation. Besides, the threat to life of milch animals impact the farming community adversely.</p> <p>Moreover, floods may also affect the soil characteristics. The land may be rendered infertile due to erosion of top-layer.</p> <p><b>Damage to infrastructure:</b> Recurrent floods cause severe damage to economic infrastructure like transportation networks, electricity generation and distribution equipment, etc.</p> <p><b>Outbreak of diseases:</b> Lack of proper drinking water facilities, contamination of water (well, ground water, piped water supply) leads to outbreak of epidemics like diarrhoea, viral infection, malaria and many other infectious diseases.</p>	4	4	8
IX b	<p>A hazard map is a map that highlights areas that are affected by or are vulnerable to a particular hazard. They are typically created for natural hazards, such as earthquakes, volcanoes, landslides, flooding and tsunamis. Hazard maps help prevent serious damage and deaths.</p> <p>Hazard maps are created and used in conjunction with several natural disasters. Different hazard maps have different uses. For instance, the hazard map created by the Rizal Geological Survey is used by Rizalian insurance agencies in order to properly adjust insurance for people living in hazardous areas. Hazard maps created for flooding are also used in insurance rate adjustments. Hazard maps can also be useful in determining the risks of living in a certain area. Hazard maps can help people become aware of the dangers they might face from natural disasters in a specific area.</p>	7	7	7

X a	<p>An earthquake is a sudden shaking movement of the surface of the earth. It is known as a quake, tremblor or tremor. Earthquakes can range in size from those that are so weak that they cannot be felt to those violent enough to toss people around and destroy whole cities. The seismicity or seismic activity of an area refers to the frequency, type and size of earthquakes experienced over a period of time.</p> <p><b>Causes of Earthquake.</b></p> <p>Earthquakes are caused by sudden tectonic movements in the Earth's crust. The main cause is that when tectonic plates, one rides over the other, causing orogeny collide (mountain building), earthquakes. The largest fault surfaces on Earth are formed due to boundaries between moving plates.</p> <p>The stress increases when they stick, relative motion between the plates. This continues until the stress rises and breaks, suddenly allowing sliding over the locked portion of the fault, releasing the stored energy as shock waves. Such faults are San Andreas fault in San Francisco, Rift valley in Africa etc.</p> <p><b>Effects of Earthquake.</b></p> <p>The effects of an earthquake are terrible and devastating. Many building, hospitals, schools, etc are destroyed due to it. A lot of people get killed and injured. Many people lose their money and property. It affects the mental health and emotional health of people.</p> <p>The environmental effects of it are that including surface faulting, tectonic uplift and subsidence, tsunamis, soil liquefaction, ground resonance, landslides and ground failure, either directly linked to a quake source or provoked by the ground shaking.</p>	8	8	8
X b	<p>The Bhopal disaster, also referred to as the Bhopal gas tragedy, was a gas leak incident on the night of 2–3 December 1984 at the Union Carbide India Limited (UCIL) pesticide plant in Bhopal, Madhya Pradesh, India. It is considered to be the world's worst industrial disaster. Over 500,000 people were exposed to methyl isocyanate (MIC) gas. The highly toxic substance made its way into and around the small towns located near the plant.</p> <p>Estimates vary on the death toll. The official immediate death toll was 2,259. The government of Madhya Pradesh confirmed a total of 3,787 deaths related to the gas release. A government affidavit in 2006 stated that the leak caused 558,125 injuries, including 38,478 temporary partial injuries and approximately 3,900 severely and permanently disabling injuries. Others estimate that 8,000 died within two weeks, and another 8,000 or more have since died from gas-related diseases. The cause of the disaster remains under debate. The Indian government and local activists argue that slack management and deferred maintenance created a situation where routine pipe maintenance caused a backflow of water into a MIC tank, triggering the disaster. Union Carbide Corporation (UCC) argues water entered the tank through an act of sabotage.</p>			

	<p>The Bhopal UCIL facility housed three underground 68,000-liter liquid MIC storage tanks: E610, E611, and E619. In the months leading up to the December leak, liquid MIC production was in progress and being used to fill these tanks. UCC safety regulations specified that no one tank should be filled more than 50% (here, 30 tons) with liquid MIC. Each tank was pressurized with inert nitrogen gas. By early December 1984, most of the plant's MIC related safety systems were malfunctioning and many valves and lines were in poor condition.</p> <p>During the late evening hours of 2 December 1984, water was believed to have entered a side pipe and into Tank E610 whilst trying to unclog it, which contained 42 tons of MIC that had been there since late October. The introduction of water into the tank subsequently resulted in a runaway exothermic reaction, which was accelerated by contaminants, high ambient temperatures and various other factors, such as the presence of iron from corroding non-stainless steel pipelines.</p> <p>bout 30 tonnes of MIC escaped from the tank into the atmosphere in 45 to 60 minutes. This would increase to 40 tonnes within two hours time. The gases were blown in a south easterly direction over Bhopal.</p>	7	7	7
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