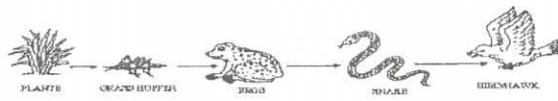
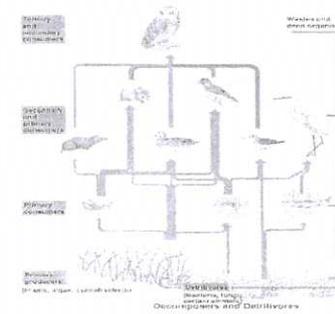


REVISION : 2015

COURSE CODE : 3001

**COURSE TITLE: ENVIRONMENTAL SCIENCE AND DISASTER
MANAGEMENT**

Question no	Scoring indicators	Split up score	Sub total	Total
PART A				
I (1)	Deforestation is the removal of a forest where the land is thereafter converted to a non-forest use. Problems: Ecological imbalance, increasing CO ₂ , floods	2		10
(2)	Biological magnification - Many of the pesticides are not biodegradable and keep on accumulating in the food chain, this process is called as biomagnifications	2		
(3)	a) long-term environmental damage b) damage plants and make the area unsuitable	2		
(4)	.. 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	2		
(5)	Elevated temperature typically decreases the level of dissolved oxygen (DO) in water. 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.	2		
PART B				
II (1)	<ul style="list-style-type: none"> ● Effects due to adoption of modern agricultural technology ● i) Impacts related to high yielding varieties:- The use of high yielding varieties encourage monoculture. ● ii) Fertilizer related problems:- Micronutrient Imbalance. ● iii) Nitrate Pollution :- Nitrogenous fertilizers applied in the fields often leach deep into soil and ultimately contaminate the ground water ● iv) Eutrophication :-Eutrophication means over nourishment .Due to eutrophication lakes get invaded by algal blooms; ● v) Pesticide related problems:- Creating resistance in pests and producing new pests. ● vi)Death of nontarget organisms - Many insecticides are broad spectrum poisons which not only kill the target species but also several nontarget species which are useful to us 	6x1	6	
(2)	<ul style="list-style-type: none"> • Abiotic Component:- The abiotic components that form the physical environment of an ecosystem include factors such as energy, elements, inorganic compounds, dead organic matter and climate. • Biotic Component • 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 	6x1	6	

	<ul style="list-style-type: none"> ● Land Degradation 										
<p>V(a)</p>	<ul style="list-style-type: none"> ● FOOD CHAIN <p>In an ecosystem one can observe the transfer or flow of energy from one trophic level to other in succession. 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. The patterns of eating and being eaten forms a linear chain called food chain which can always be traced back to the producers.</p> <div style="text-align: center;">  <p>PLANTS → GRASSHOPPER → FROG → SNAKE → HAWK</p> <table border="1" data-bbox="367 638 949 728"> <thead> <tr> <th>Producer</th> <th>Primary Consumer</th> <th>Secondary Consumer</th> <th>Tertiary Consumer</th> </tr> </thead> <tbody> <tr> <td>Grass</td> <td>Grasshopper</td> <td>Frog</td> <td>Snake</td> </tr> </tbody> </table> <p>A simple food chain</p> <p>Food Web</p> <ul style="list-style-type: none"> •A food web is a representation of all of the <u>interconnected food chains</u> in an ecosystem •Food webs show multiple feeding relationships <div style="text-align: center;">  </div> </div>	Producer	Primary Consumer	Secondary Consumer	Tertiary Consumer	Grass	Grasshopper	Frog	Snake	<p>4</p> <p>4</p>	
Producer	Primary Consumer	Secondary Consumer	Tertiary Consumer								
Grass	Grasshopper	Frog	Snake								
<p>VI(a)</p>	<ul style="list-style-type: none"> • Grasslands cover areas where rainfall is usually low and/or the soil depth and quality is poor. • • The low rainfall prevents the growth of a large number of trees and shrubs, but is sufficient to support the growth of grass cover during the monsoon. • Many of the grasses and other small herbs become dry and the part above the ground dies during the summer months. • In the next monsoon the grass cover grows back from the root stock and the seeds of the previous year. • This change gives grasslands a highly seasonal appearance with periods of increased growth followed by a dormant phase <p>Grassland ecosystem has the following features:</p> <ul style="list-style-type: none"> • Types of Grasslands • 1.Xerophilous grasslands :-These are found in the dry regions of North- West India under semi-desert conditions. • 2. Mesophilous grasslands:- It is termed as Savannas, include the extensive grassy banks typical moist deciduous forest of Utter Pradesh • 3. Hygrophilous grass lands • Characteristics of Grassland ecosystem 	<p>7</p>									
		<p>8</p>									

	<p>Biodiversity may be defined as the variety and variability of living organisms and the ecological complexes in which they exist. In other words, biodiversity is the occurrence of different types of ecosystems, different species of organisms with the whole range of their variants and genes adapted to different climates, environments along with their interactions and processes. The biodiversity has the following importance's:</p> <p>1. Productive values: Biodiversity produces a number of products harvested from nature and sold in commercial markets. Indirectly it provides economic benefits to people which include water quality soil protection, equalisation of climate, environmental monitoring, scientific research, recreation etc.</p> <p>2. Consumptive value: The consumptive value can be assigned to goods such as fuel woods, leaves, forest products etc. which may be consumed locally and do not figure in national and international market.</p> <p>3. Social value: The loss of biodiversity directly influences the social life of the country possibly through influencing ecosystem functions (energy flow and biogeochemical cycle). This be easily understood by observing detrimental effects of global warming and acid rain which cause an unfavorable alteration in logical processes.</p> <p>4. Aesthetic value: Aesthetic values such as refreshing fragrance of the flowers, taste of berries, softness of mossed, melodious songs of birds, etc. compel the human beings to preserve them. The earth's natural beauty with its colour and hues, thick forest, and graceful beasts has inspired the human beings from their date of birth to take necessary steps for its maintenance. Similarly botanical and zoological gardens are the means of biodiversity conservation and are of aesthetic values.</p> <p>5. Legal values: Since earth is homeland of all living organisms, all have equal right to coexist on the surface of earth with all benefits. Unless some legal value is attached to biodiversity, it will not be possible to protect the rapid extinction of species.</p> <p>6. Ethical value: Biodiversity must be seen in the light of holding ethical value. Since man is the most intelligent amongst the living organisms, it should be prime responsibility and moral obligation of man to preserve and conserve other organisms which will directly or indirectly favour the existence of the man.</p> <p>7. Ecological value: Biodiversity holds great ecological value because it is indispensable to maintain the ecological balance. Any disturbance in the delicately fabricated ecological balance maintained by different organisms, will lead to severe problems, which may threaten the survival of human beings.</p> <p>8. Economic value: Biodiversity has great economic value because economic development depends upon efficient and economic management of biotic resources. In the day to day life, human beings are maintaining their lifestyle at the sacrifice of surrounding species which come from diversity of plants and animals struggling for their existence. So, it is highly essential for the human beings to take care of their surrounding species and make optimum use of their service, for better</p>			15
--	---	--	--	----

VI(b)	<p>economic development. Thus, it is rightly told, survival of the man depends upon the survival of the biosphere.</p> <p>4. Uses of Biodiversity:</p> <p>Biodiversity has the following uses for the development humanity:</p> <p>(i) It provides food of all types. (ii) It provides fibers, sources for the preparation of clothes. (iii) It provides different types of oil seeds for the preparation of oils. (iv) It provides new varieties of rice, potato etc. through the process of hybridization. (v) It provides different drugs and medicines which are based on different plant products. (vi) It is very essential for natural pest control, maintenance of population of various species, pollination by insects and birds, nutrient cycling, conservation and purification of water, formation of soil etc. All these services together are valued 16.54 trillion dollars per year.</p> <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>Almost 100% of the observed temperature increase over the last 50 years has been due to the increase in the atmosphere of greenhouse gas concentrations like water vapour, carbon dioxide (CO₂), methane and ozone. Greenhouse gases are those gases that contribute to the greenhouse effect (see below). The largest contributing source of greenhouse gas is the burning of fossil fuels leading to the emission of carbon dioxide.</p>	7	
VII(a)	<p>Air pollution is a release into the atmosphere of any substances, ex. chemicals or airborne particles, which are harmful both to the human and animal health as well as the health of the wider environment</p> <p>major forces behind the dramatic levels of air pollution worldwide.</p> <ul style="list-style-type: none"> • industrialization • population growth • globalization <p>Main Sources of air pollution</p> <ul style="list-style-type: none"> • Industries • Petroleum • Mining industries • Power plants • Automobiles <p>Agrochemical based industries</p>	8	15
VII(b)	<p>Marine pollution occurs when harmful effects, or potentially harmful effects, can result from the entry into the ocean of chemicals, <u>particles</u>, industrial, agricultural and residential <u>waste</u>, noise, or the spread of <u>invasive organisms</u>.</p> <p>The pollutants dumped into the streams, canals and rivers ultimately reach the ocean because most of the rivers drain into the sea.</p> <p>The Indian Ocean near the coast is polluted by the fourteen major rivers which drain their run-off into it.</p> <p>Like rivers and lakes, oceans can dilute, disperse and break down</p>	7	

	<p>organic matter but their capacity is not infinite</p> <p>Sources of marine pollution</p> <ol style="list-style-type: none"> 1. Municipal waste & sewage from residences and hotels in coastal towns are directly discharged into sea 2. Pesticides and fertilizers from agriculture which are washed off by rain enter water courses & finally to sea.. 3. Petroleum & oil washed off from roads normally enter sewage system & finally into seas 4. Ship accidents & accidental spillage at sea can therefore be very damaging to the marine environment. 5. Off shore oil exploration also pollute the sea water to a large extent. 6. Dry docking: All ships periodic dry docking servicing; cleaning the hulls etc. during this period when cargo compartments are emptied, residual oil goes into sea. 7. Pollution due to organic wastes. <ol style="list-style-type: none"> 8. Pollution due to oil: Crude oil is transported by sea after a tanker has unloaded its cargo of oil; it has to take on sea water ballast for return journey. 9. Tanker accidents: In the natural process, a large no of oil tanker accidents happen every year. Sometimes this can results in major disasters. 10. Volcanic eruptions in the sea. 11. Deep sea mining is a relatively new mineral retrieval process that takes place on the ocean floor. <p>Sources of marine pollution</p> <p>Control measures of marine pollution</p>			
VIII(a)	<p>Nuclear Pollution:Any undesirable effect caused to the environment due to radioactive substances or radiations is called nuclear pollution. Major source is the Nuclear power plants. If traces of the radioactive substances are present in the water that is released from the plant, it will cause nuclear pollution. Emission of radiations can also cause this kind of pollution.</p> <p>Describe causes of nuclear pollution</p> <p>Nuclear power plants</p> <p>Nuclear experiments</p> <p>Nuclear weapons</p> <p>Describe the effects of nuclear pollution</p>	2	8	15
VIII(b)	<p>Solid waste management:According to the American Public Works Association the solid waste is classified in twelve categories as, garbage, rubbish, ashes, Street sweepings, dead animals, abandoned vehicles, construction/demolition waste, industrial refuse, special waste such as hospital waste, bulky waste, animal and agricultural waste, and sewage treatment residue (semi solid fraction known as sludge).</p> <p>Solid waste includes domestic waste, municipal waste, commercial waste, garbage (animal and vegetable waste), rubbish (inorganic excluding ashes), ashes and industrial waste, sludge from wastewater treatment plants etc</p> <ul style="list-style-type: none"> • The most common methods of energy recovery and disposal for non hazardous solid waste are incineration, composting and landfill. • The final disposal of waste should be done in such a way that it remains a waste in actual sense, i.e. nothing can be recovered out of it and it could not be used any where. 	6	7	

	<ul style="list-style-type: none"> • So before putting it on land for land filling if it has a substantial portion of biodegradable fraction then compost (organic manure) should be made out of it. • This shall reduce the final volume of the waste to be disposed on land and shall give us money in terms of the manure. • The organic manure is environment friendly and also provides us micronutrients that increase the fertility of the soil. • If this work is done more effectively by some special worms this is known as vermi-composting 			
IX(a)	<p>. Hazard : Phenomena that pose a threat to people, structures or economic assets and which may cause a disaster. They could be either man made or naturally occurring in our environment.</p> <p>Disaster The occurrence of a sudden or major misfortune that disrupts the basic fabric and normal functioning of a society.</p> <p>Vulnerability: Vulnerability is the degree of loss resulting from a potentially damaging phenomenon</p> <p>Risk : It 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.</p>	4x2	8	
IX(b)	<p>Classifications of hazards</p> <ol style="list-style-type: none"> a. Endogenic Hazards <ul style="list-style-type: none"> o Volcanic o Earthquake b. Exogenic Hazards <ul style="list-style-type: none"> o Atmospheric Hazards <ol style="list-style-type: none"> i. Drought i. Rainfall i. Snowfall i. Winds i. Hailstorm o Hydrospheric Hazards <ol style="list-style-type: none"> a. Wave Currents b. Tsunamis c. Floods o Lithospheric Hazards <ol style="list-style-type: none"> a. Landslides b. Weathering c. Erosion 	7		
X(a)	<p>The use of Earth observation (EO) products and geographic information systems (GIS) has become an integrated approach in disaster-risk management</p> <p>GPS is particularly useful during disasters because it operates in any weather, anywhere and at all times. While it functions simply to give the location of the receiver, the level of precision of GPS</p>	8		15

X(b)	<p>makes it quite useful in disaster management</p> <p>Management information systems (MIS) are important instruments used to improve the efficiency and effectiveness of disaster-handling activities in companies. Furthermore, information systems support companies in their efforts to regain trust, reestablish reputation, and sustain their ability to operate</p> <p>Pre-disaster stage</p> <p>This stage includes preparedness and mitigation for the disaster. The preparedness for disaster in general consists of :</p> <ul style="list-style-type: none"> Preparing hazard zonation maps, predictability/forecasting and warning. Preparing disaster preparedness plan Land use zoning. Preparedness through IEC. 	7		
------	--	---	--	--

