SCHEME OF VALUATION

(Scoring Indicators)

Revision: 2015 Course Code: 3001

Course Title: ENVIRONMENTAL SCIENCE AND DISASTER MANAGEMENT

| Qst. No. | Scoring Indicator | Split up score | Sub Total | Total |
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| I | PART A | | | |
| 1 | Forest, wind energy, solar energy, hydropower, wildlife (any 2) | 2 | 2 | |
| 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 | 10 |
| 3 | Pollution is the effect of undesirable changes in our surroundings that have harmful effects on plants, animals and human beings | 2 | 2 | |
| 4 | Hurricanes ,Tornadoes ,flood, Wildfires (any 2) | 2 | 2 | |
| 5 | Factories act, Petroleum act | 2 | 2 | |
| II . | PART B | | | |
| 1 | Soil erosion, expansion of deserts, Decrease in rainfall, Effect on climate, Lowering of Water table, Economic Losses, Loss of biodiversity. (any 6) | 6*1 | 6 | |
| 2 | Ground water pollution , Surface water pollution, Air pollution, Land subsidence, De-vegetation ,defacing of landscape, Occupational health hazards (any 6) | 6*1 | 6 | |
| 3 | Ecological Pyramid is the graphical representation to show the number of organisms, biomass, and productivity at each trophic level. There are three types of pyramids.<br>1. Pyramid of Biomass shows the amount of biomass present per unit area at each trophic level. It is drawn with the producers at the base and the top carnivores at the tip.<br>2. Pyramid of Numbers- It is the graphic representation of number of individuals per unit area of various trophic levels.<br>3. Pyramid of Energy- An energy pyramid represents the amount of energy at each trophic level and loss of energy at each is transferred to another trophic level. | 3*2 | 6 | 30 |
| 4. | Industrialization, Deforestation, Consumerism, Overuse of Electricity, Overfishing, Use of Aerosols, Inability to Change (any 6) | 6*1 | 6 | |
| 5. | Effect on human health- The air pollutants attack various parts of the respiratory system, Oxide of nitrogen that exhaust from vehicles causes eye and lung irritation, High concentration CO slow down physical and mental activities<br>Effect on plants- Damage to leaves, Inhibition of photosynthesis, reduced nutrient uptake, Killing of essential micro organism in the soil<br>Effect on materials- $SO_2$ dissolved in water it forms sulphuric acid, $SO_2$ with aluminium metal form aluminium sulphate and lime stone and marble can form calcium sulphate, $SO_2$ affects leather and plastic<br>Effect on weather - Dust, smoke and other suspended matter reduce visibility, Fly-ash affects visibility by interception and scattering solar radiation (any 6) | 6*1 | 6 | |
| 6 | Incineration- burning of waste in open fields in controlled conditions and results in the production of ash, flue gas and heat. Incineration is an option especially where other better options of processing of waste are not feasible and land for land filling and other waste processing methods is scarce.<br>Land fill- Sanitary landfills are facilities for final disposal of Municipal Solid Waste on land, designed and constructed with the objective of minimizing impacts to the environment. Sanitary land filling is not allowed for the following waste streams in the municipal solid waste: dry recyclables, hazardous wastes | 3*2 | 6 | |

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| | | Composting- Composting is a controlled aerobic process of biologically "digesting" the municipal solid waste, so it may be recycled for other purposes – plant nutrient, stabilization of soil in remediation process or soil amendment for recovery of poor soils. | | | |
| 7. | | 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.<br>Hazard maps help prevent serious damage and deaths<br>Hazard maps can also be useful in determining the risks of living in a certain area.<br>Hazard maps can help people become aware of the dangers they might face from natural disasters in a specific area<br>It helps in planning and execution of any environment friendly development activity (any 6) | 6*1 | 6 | |
| III | (1) | Advantages<br>Dams ensure a year round supply of water for domestic use and provide extra water for agriculture, industries and hydropower generation<br>River valley projects with big dams play role in the development process due to their multiple uses<br>These dams aim at providing employment for tribal people and raising the standard and quality of life (any 5) | 5 | 15 | |
| | | Disadvantages:<br>Displacement of tribal people, Loss of forests flora and fauna, Dam construction and submersion leads to significant loss of farmland and forest and land submergence, Siltation of reservoir, water logging and salination in surrounding lands reduce agricultural productivity, Serious impact on ecosystem, Dislodging animal populations (any 4) | 4 | | |
| | (2) | Flood<br>Flood can be defined as an overflow of large quantities of water onto a normally dry land. Flooding happens in many ways.<br>Rains, River overflow, Hurricanes, Strong winds in coastal areas, Dam breaking, Ice and snow-melts: (brief note on any 3) | 3 | | |
| | | Drought<br>Drought is defined as a prolonged period of abnormally low rainfall, leading to a shortage of water. The following are the reasons for drought<br>Lack or insufficient rainfall, Changes in climate, Human activities (Over-farming), Overexploitation of surface water resources: (brief note on any 3) | 3 | | |
| IV | (1) | Land is considered an important resource because it is being used by human beings for several purposes such as agriculture, forestry, mining, building houses and roads, and setting up industries. Also, it provides habitation to a variety of flora and fauna.<br>Land act as<br>store of wealth for individuals, groups, or a community, Production of food, fibre, fuel or other biotic materials for human use, Provision of biological habitats for plants, animals and micro-organisms, Co-determinant in the global energy balance and the global hydrological cycle, which provides both a source and a sink for greenhouse gases, Regulation of the storage and flow of surface water and groundwater, Storehouse of minerals and raw materials for human use, Provision of physical space for settlements, industry and recreation, Storage and protection of evidence from the historical or pre-historical record, Enabling movement of animals and plants, between one area and another (any 9) | 9*1 | | |

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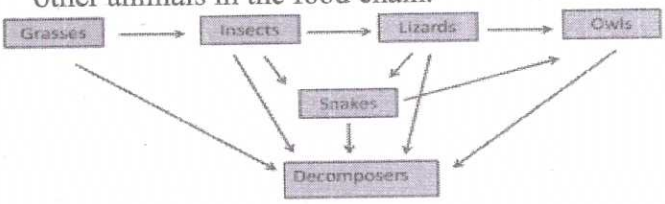
| | (2) | Soil erosion is a natural process which occur when there is loss of or removal of top layer of soil to due to rain, wind, deforestation or any other human activity. (2)<br>Causes : Soil Texture, Ground Slope, Intensity and amount of rainfall, Mismanaged utilization of soil resources, Distribution of rainfall and landscape, Deforestation: (any 4) | 2<br>+<br>4 | 15 |
| V | (1) | The sequence of eating and being eaten in an ecosystem is known as food chain<br>A food chain shows how each living thing gets its food. It shows who is eating who. The arrow means "is eaten by" .<br>1. Grazing food chain – Starts with green plants and ends with carnivores.<br>Grass → Rabbit→ Fox<br>2. Detritus food chain – Starts with dead organic matter and ends with predators.<br>Significance of food chain<br>Food chains maintain energy flow and nutrient cycling., and ecological balance by regulating population size., Food chains biologically magnify toxicity of some chemicals<br>Food Web: A food web consists of many food chains.<br>eg: A hawk might also eat a mouse, a squirrel, a frog or some other animal. The snake may eat a beetle, a caterpillar, or some other animal. And so on for all the other animals in the food chain.<br>  <br><br>(4) | 5<br><br>4 | 15 |
| | (2) | Ecological succession is the gradual process by which ecosystems change and develop over time. Nothing remains the same and habitats are constantly changing.<br>There are two main types of succession, primary and secondary.<br>Primary succession is the series of community changes which occur on an entirely new habitat which has never been colonized before. For example, a newly quarried rock face or sand dunes<br>Secondary succession is the series of community changes which take place on a previously colonized, but disturbed or damaged habitat. For example, after felling trees in a woodland, land clearance or a fire. | 2<br><br>2<br><br>2 | |
| VI | (1) | Grassland Ecosystem is an area where the vegetation is dominated by grasses and other non-woody plants.<br>The components of the Grassland Ecosystem are :<br>1. Abiotic Components: These are non-living thing components consist of carbon, hydrogen, sulphur, nitrogen and phosphorous<br>2. Biotic Components: These are living components and its sub-components<br>1. Producers: grasses, herbs and shrubs etc.<br>2.Consumers: (a) Primary consumers: herbivores (b) Secondary consumers (c) Tertiary consumers<br>3.Decomposers: microbes like actinomycetes, fungi aerobic and anaerobic soil bacteria etc.<br>Functions of the Grassland Ecosystem: The primary function of an ecosystem is productivity. It provides forage for livestock, protection and conservation of soil and water resources, furnishing a habitat for wildlife, both flora and fauna<br>Nutrient cycle in an ecosystem. Grass lands biomes are important to maintain the crop of many domesticated and wild herbivores ( any 4) | 5<br><br>4 | 15 |

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| | (2) | Biological diversity has direct consumptive value in food, agriculture, medicine, industry.<br>It also has aesthetic and recreational value.<br>Biodiversity maintains ecological balance and continues evolutionary process.<br>The indirect ecosystem services provided through biodiversity are photosynthesis, pollination, transpiration, chemical cycling, nutrient cycling, soil maintenance, climate regulation, air, water system management (any3)<br><u>Conservation of Biodiversity</u><br>Conservation Biology – study and implementation of methods to protect biodiversity, Legal Protections of species, Preserving habitats, Habitat corridors Captivity, Protecting plant species (any 3) | 3<br>3 | | |
| VII | (1) | natural:<br>These seeps are natural springs where liquid and gaseous hydrocarbons leak out of the ground<br>Natural oil seeps are used in identifying potential petroleum reserves<br>sea-based<br>Operational discharges,<br>Accidental discharges, Accidental oil spills from tankers; other commercial vessels, grounded and abandoned vessels; oil platforms (blowouts); pipelines.<br>Deliberate, operational discharges of oil from all kinds of commercial vessels, oil platforms, pipelines.<br>Other ship-related activities (dry docking, scrapping).<br>Other activities (dumping of oily waste, etc.)<br>Land-based sources.<br>Discharges of untreated or insufficiently treated municipal sewage and storm water Discharges with rivers.<br>Discharges of untreated waste water from coastal industries.<br>Accidental or operational discharges of oil from coastal refineries, oil storage facilities, oil terminals, and reception facilities.<br>Emissions of gaseous hydrocarbons from oil-handling onshore facilities (terminals, refineries, filling stations) and from vehicles exhausts (any 9) | 9*1 | 15 | |
| | (2) | Oil penetrates into the structure of the plumage of birds and the fur of mammals reducing its insulating ability<br>Some of the many effects on animals coming into contact with crude oil include:<br>Hypothermia and drowning of birds as the oil breaks down the insulating capabilities of feathers, makes them heavier and compromises flying ability<br>Hypothermia in some seal pups as the oil destroys insulating fur<br>If oil is ingested, it can either poison the animal outright, make them extremely sick or create a level of toxins in their system that then causes poisoning further up the food chain.<br>Damage to the airways of birds and animals.<br>Damage to animal immune systems<br>Interruption of breeding and fouling of breeding grounds<br>Thinner bird and turtle egg shells and also damage to fish larvae, causing deformities (any 6) | 6*1 | | |

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| VIII | (1) | There are 2 kinds of noise pollution.<br>A. Community Noise/ Environmental Noise (*non industrial noise pollution).*<br>B. Occupational Noise (industrial noise pollution)<br>Sources of noise pollution<br>Street traffic, Rail, Roads, Airplanes, Constructions, Noise in Industry, Noise in building, Noise from Consumer products, Loud Speakers / Public Address Systems, Firecrackers (note on any 5)<br>Control measure<br>Noise mitigation is a set of strategies to reduce noise pollution."<br>Construction of sound proof rooms for noisy machines in industries.<br>Every motor vehicle shall be fitted with a device (silencer).<br>Noise producing industries, aerodromes, and railway stations to be shifted away from the inhabited areas.<br>Proper law should be enforced to check the misuse of loudspeakers and public announcements systems. Loud speakers are banned from 10pm to 6am.<br>Growing green plants/trees along roadside to reduce noise pollution as they absorb sound. (any 4) | 5<br><br>4 | 15 |
| | (2) | Sewage disposal is the main cause of water pollution in big cities. One should take care of proper disposal of sewage.<br>Industrial effluents should be released into water bodies only after proper treatment.<br>Use of chemical pesticides, insecticides etc. should be minimized.<br>Promote the use of bio-pesticides, fertilizers etc.<br>Proper checking of super tankers in the sea in order to prevent oil spillage.<br>Use the minimum amount of detergent.<br>Use only phosphate free soaps and detergents. (any 6) | 6*1 | |
| IX | (1) | (a) Population Growth, (b) Poverty, (c)Lack of rapid response epidemic control and containment mechanism., (d) Low public awareness., (e) Poor health and malnutrition., (f) Poor state of health care system, (g) Congestion in urban areas., (h) Bioterrorism., (i) Modern means of transport and communication (any 9) | 9*1 | 15 |
| | (2) | Disasters set back development programming, destroying years of development initiatives.<br>Rebuilding after a disaster provides significant opportunities to initiate development programmes<br>Development programmes can increase an area's susceptibility to disasters<br>Development programmes can be designed to decrease the susceptibility to disasters and their negative consequences<br>Partnership-close collaboration among donors, governments, communities, nongovernmental organizations, the private sector, and universities<br>Flexibility-. Development agencies must be efficient and flexible; adaptable to local environments and capable of adjusting to changing conditions and seizing opportunities when they arise.<br>Selectivity-resources are the public asset that must be invested prudently to achieve maximum impact. (any 6) | 6*1 | |
| X | (1) | People should evacuate buildings and stay in open until the time, tremors have ceased.<br>In case people are unable to get out of the buildings, they should try and stay in corners of the rooms.<br>People using transport should stop vehicles and wait for tremor to subside.<br>Buildings should be made by using construction material that is recommended by authorities<br>Design of the houses and buildings must be approved by authorities. Rectangular | 9*1 | 15 |

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| | | building design is most effective design that can withstand earthquake.<br>People should help each other and provide first aid to the victims and not just wait for disaster management teams to arrive.<br>Temporary relief camps and rehabilitation centres should be provided to people who have been affected.<br>Compensation should be given to people who lost their house and livelihood.<br>People should be made aware and trained through campaigns to tackle adversities as it is not possible for disaster management teams to reach everywhere (any 9) | | | |
| | (2) | Transport Emergency Cards (TREM Cards) are cards that workers carry at all times when their work involves transporting hazardous material. 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.<br>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. | 3<br>3 | | |

**FORM 9**

*[See rule 18 (2)]*

**TRANSPORT EMERGENCY (TREM) CARD**

[To be carried by the transporter during transportation of hazardous and other wastes, provided by the sender of waste]

1. Characteristics of hazardous and other wastes:

| S. No. | Type of waste | Physical properties/ | Chemical constituents | Exposure hazards | First Aid requirements |
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| | | | | | |

2. Procedure to be followed in case of fire :
3. Procedure to be followed in case of spillage/accident/explosion :
4. For expert services, please contact :
   (i) Name and Address
   (ii) Telephone No.

*(Name, contact number and signature of sender)*

Date.....

Place.....

(This format not necessary)