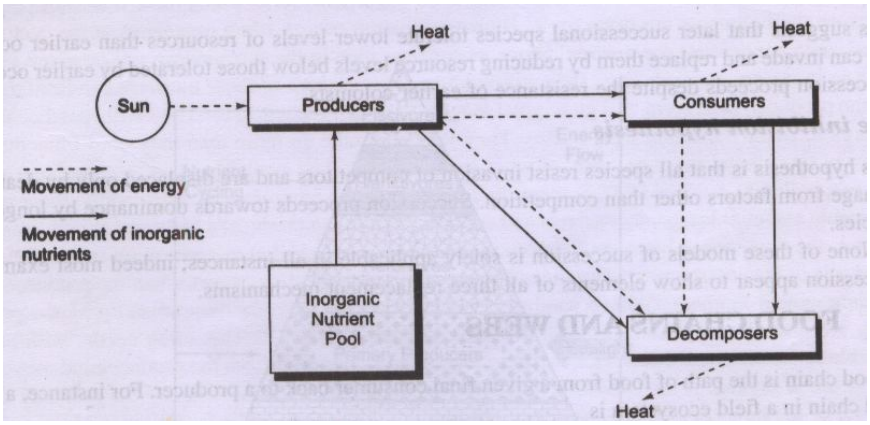
BAPATLA ENGINEERING COLLEGE:BAPATLA

I/IV B.TECH DEGREE I SEM EXAMINATIONS,NOV-2016

14ES105/115/125: ENVIRONMENTAL STUDIES

SCHEME OF EVALUATION

Q.No		Important Points/Answer		Total marks
1	(a)	It is based on the principle of 'live and let others live'. Ethical values related to biodiversity conservation are based on the importance of protecting all forms of life. All forms of life have the right to exist on earth. Man is only a small part of the Earth's great family of species.		1M
	(b)	Lion Tailed Macaque, Asiatic Lion,Bengal Tiger, Black Buck,Nilgiri Tahr,Snow Leopard	Any 2	1M
	(c)	Ecosystem:a biological community of interacting organisms and their physical environment. Eco-Ecological sphere, system-Surroundings		1M
	(d)	Sustainable development defined as "meeting the needs of the present without compromising the ability of future generation to meet their own needs". [OR] Development without destruction		1M
	(e)	Commercial uses, production of oxygen, reducing global warming, wildlife habitat,regulation of hydrological cycle, soil conservation	Any 2 points	1M
	(f)	Silver Iodide, Potassium iodide, dry ice, liquid propane etc	Any 1	1M
	(g)	Cyclone separator, Elotrostatic precipitator, Bag filter, Wet scrubber, Absorber, Adsorption etc	Any 1	1M
	(h)	Reduce-Reuse-Recycle		1M
	(i)	Refrigerators, Air Conditioners, Aerosols	Any 2	1M
	(j)	Acid rain, Presence of sulfur and nitrogen oxides in the atmosphere released from Mathura Refinery.	Any 2 causes	1M
	(k)	Water act – 1974		1M
	(l)	Stockholm conference - 1972		1M
UNIT – I				
2		**Note: 1) Answer should be in general view as given below (OR) by taking any ecosystem type as case.** ****Definitions of Producers, Consumers, Decomposers, Abiotic Components**** 1. Ecosystem comprises two components, biotic and abiotic components. 2. Biotic components are living organisms.	3M	

		3. Abiotic components are non living things. 4. Producers are called autotrophs. They are self nourishing organisms. 5. Consumers depend on producers. Based on dependence, consumers are divided into primary, secondary and tertiary consumers. 6. Decomposer decompose the death matter of both producers and consumers and returns the nutrients to the soil. **Diagram**  **Flow of Nutrients(2M)+1 Biogeochemical cycle briefly(2M)** **1.** Producers produce food through photosynthesis step. The food is stored in plant organs. **2.** By eating plant organs, nutrients are transferred to consumers and decomposers. **3.** After death of producers and consumers, the decomposers break the strong bonds and return the nutrients to the soil pool. **4.** Again from the soil, plant gets required nutrients for growth. **5.** The flow of nutrients in an ecosystem is recyclable. **6.** The flow of nutrients through geological, biological world. Therefore it is called biogeochemical cycle. **7.** Example for biogeochemical cycles Water cycle, carbon cycle, nitrogen cycle, sulfur cycle etc. **Flow of Energy** 1. Producers get required energy for photosynthesis reaction from the sun. The producer produced food in the form of fruits, plant organs. 2. For the sustenance of producer, some amount of energy utilized, and the remaining energy transferred to next level organisms like consumers through food. 3. At the level of consumers, some amount of energy used for	2M 2+2M	12M

		respiration and metabolic activities. Therefore, less energy available to the next level organisms. 4. After death, both producers and consumers become food for decomposers. At decomposer level also, some energy used for metabolic activities and remaining energy released into atmosphere. 5. Since energy is used for sustenance of organism at each level, total energy not conserved, i.e., energy is not a recyclable quantity in an ecosystem.	3M	
3		**HOTSPOTS OF BIODIVERSITY---4M** **Definition and Criteria:** • Norman Myers defined '***hotspots are those regions that harbor a great diversity of endemic species and at the same time have been significantly impacted and altered by human activities***.' • 'Richest and most threatened reservoirs of plant and animal life on earth.' • Criteria for determining a hotspot: i. Number of endemic species ii. Degree of threat. **Hotspots in India:** World has 25 terrestrial hotspots. All the hotspots together occupy 1.4 % of earth's land area. And 20% of the human population lives here. • India figured with two hotspots - the Western Ghats and the Eastern Himalayas. **INDIA AS A MEGA DIVERSITY NATION---8M** **Points 9 compulsory,---------- >> 2M** **(Any 6 points with description/examples-6M)** 1. The distribution of BD is not uniform across the geographical regions of the earth. 2. Certain regions of the world harbor very large species. These regions are called ***Mega diversity zones.*** 3. 12 countries has been identified as mega diversity countries 4. These contain 60-70 % of the world's BD. 5. India is the one of the mega biodiversity country, which contributes approximately 8% species to the global diversity, but accounts for only 2.4 % of the land area of the world. 6. All most all climates experienced in India from tropical to alpine & form desert to humid. 7. On the basis of temperature, the land mass of India can be	2M 2M 8M	12M

		broadly classified in to 4 zones mentioned below *1.tropical zone (very hot)* *2.subtropical zone (hot is more than cold)* *3.temperate zone (winter is more than summer)* *4.arctic or alpine zone (short summer & more winter)* 8. One among the 12 mega diverse countries of the world 9. India comprises 2% of the worlds land mass & 8% of the BD of the world *Biogeographical zones :10* *Biotic provinces : 26* *There are botanical gardens :33* *National parks :89* *Zoos :275* *Sanctuaries :504* *Biosphere reserves :12* *Plant species :47000* *Animal species :81000* 10. Which represent the all the major ecosystems of the world 11. Its flora comprises 15,000 flowering plants, representing 6% of the world total, some 33% of which are endemic. 12. Its 1,178 bird species represent 14% of the world total. 13. About 90% of all medicines in India come from plant species		
		UNIT – II		
4		**<u>NUCLEAR POLLUTION—6M</u>** **Definition:** • Special form of physical pollution of air, water and soil with radioactive materials. • Radioactivity- Property of certain elements like Ra, Th, U etc to spontaneously emit alpha, beta & gamma rays by disintegration of atomic nuclei. **Effects:** ➢ The effects vary from organism to organism and from level of radioactivity of nuclear isotopes. The radiations destroy the cells in human body and causes cancer. ➢ A longer exposure to radioactive radiations can damage the DNA cells that results in cancer, genetic defects for the generations to come and even death. ➢ Kills foetus in the womb ➢ Affects animals, some species preferentially accumulate	2M 4M	12M

		specific radioactive materials- oysters deposit Zn-65, fish Fe-55, marine animals Sr-90. **CHERNOBYL DISASTER—6M** **Place & date:** "Saturday, April 26, 1986, Ukraine-Belarus" **About disaster:** ➢ Reactor 4 was undergoing a test to test the backup power supply in case of a power loss. ➢ The power fell too low, allowing the concentration of xenon-135 to rise. ➢ The workers continued the test, and in order to control the rising levels of xenon-135, the control rods were pulled out. ➢ The experiment involved shutting down the coolant pumps, which caused the coolant to rapidly heat up and boil. ➢ Pockets of steam formed in the coolant lines. When the coolant expanded in this particular design, the power level went up. ➢ All control rods were ordered to be inserted. As the rods were inserted, they became deformed and stuck. The reaction could not be stopped. ➢ The rods melted and the steam pressure caused an explosion, which blew a hole in the roof. A graphite fire also resulted from the explosion. ➢ To save money, the reactor was constructed with only partial containment, which allowed the radiation to escape. 13%-30% of the material escaped. **After disaster:** – 100% increase in the incidence of cancer and leukemia – 250% increase in congenital birth deformities – 1,000% increase in suicide in the contaminated zones – "Chernobyl AIDS"--the term doctors are using to describe illnesses associated with the damage done to the immune system. – heart and circulatory diseases, malignant tumors, and disorders of the nervous system, sensory organs, of the bone, muscle and connective tissue system	1M 3M 2M	
5		**Definition of solid waste** Any material which is not needed by the owner, producer or processor. **Classification/Types of solid waste(Any 4 points)**	1M	

		• Domestic waste • Industrial waste • Waste from oil factory • E-waste • Construction waste • Agricultural waste • Food processing waste • Bio-medical waste • Nuclear waste **Solid waste management(description with/without example)** **[point 2,3&4 compulosry—3points with descriptionx2=6M]** **[If 6 points written, 6points with descriptionx1 = 6M]** **1.** Avoid **2.** Reduce----R **3.** Reuse------R **4.** Recycle---R **5.** Recovery **6.** Disposal **Disposal methods-Any 3 (with description)** **1.** Composting: A *biodegradable* material is capable of being completely broken down under the action of microorganisms into carbon dioxide, water and biomass. **2.** Vermicomposting: is composting utilizing various species of worms, specifically red wigglers, white worms, and earthworms creating the heterogeneous mixture of decomposing vegetable or food waste, bedding materials, and pure vermicast produced during the course of normal vermiculture operations 3. Landfilling: Disposing of waste in a landfill involves burying the waste.Landfills were often established in abandoned or unused quarries, mining voids or borrow pits. 4. Inceneration: It involves combustion of waste material. Incinerators convert waste materials into heat, gas, steam, and ash.	2M 6M 3M	12M
UNIT – III				
6		**<u>Definitions</u>** 1. Development without destruction. (Sustain means - keep alive or in existence).	1M	

		2. World commission on Environment and Development 1987, defined as "**meeting the needs of the present without compromising the ability of future generation to meet their own needs**". **<u>Types and Description (1+1+1)</u>** 3. Sustainable development is a multi dimensional concepts aiming at benefits derived from interactions between Economy, civil society, culture, environment and living system 4. Sustainability may be divided in to three types: 1)social. 2)ecological. 3)economic.  **EQUITABLE USE OF RESOURCES FOR SUSTAINABLE LIFESTYLE** **<u>**Write any points under any three resource types**</u>** **ENERGY:** 1. Stay at a place closer to your workplace, home to reduce pollution. 2. As far as possible walk or use cycle. 3. As far as possible use less electricity. 4. Prefer rechargeable batteries especially solar power. 5. Reduce air conditioning in summer install planting trees outside. **Water**: 1. Adopt rainwater harvesting in all building 2. Repair leaky pipes 3. Turn the water tap off after our daily use. 4. Don't water plants during the day because more water evaporate. **Food**: 1. Eat lower on food chain, like meat , eggs and dairy products	3M 2M 2M	6M 6M

		2. Buy fruits and vegetables that are grown in our locality. 3. Start a community garden in an unused open space. 4. As far as possible avoid fast food. **Consumables**: 1. Use non toxic cleaning chemicals borax ,vinegar ,salt ,lemon ,etc. 2. Use non toxic alternatives to household pesticides. 3. Avoid cosmetics that are animal tasted 4. Use cloth naphkins instead of paper ones.	2M 2M 2M	
7	(a)	**<u>Definition and Formation</u>** i. Precipitation that has a pH of less than that of natural rainwater (which is about 5.6 due to dissolved carbon dioxide). ii. It is formed when sulphur dioxides and nitrogen oxides, as gases or fine particles in the atmosphere, combine with water vapour and precipitate as sulphuric acid or nitric acid in rain, snow, or fog. iii. When water vapour condeses, or as the rain falls, they dissolve in the water to form sulphuric acid (H_2SO_4) and nitric acid (HNO_3). iv. While the air in cleaned of the pollutants in this way, it also causes precipitation to become acidic, forming acid rain **<u>Sources</u>** **i. Natural Sources** ✓ Emissions from volcanoes and from biological processes that occur on the land, in wetlands, and in the oceans contribute acid-producing gases to the atmosphere ✓ Effects of acidic deposits have been detected in glacial ice thousands of years old in remote parts of the globe ii. The principal cause of acid rain is from **human sources** a. Industrial factories, power-generating plants and vehicles b. Sulphur dioxide and oxides of nitrogen are released during the fuel burning process (i.e. combustion) **<u>Effects and Prevention(2 points+2points)</u>** ◆ Harmful to aquatic life ◆ Harmful to vegetation ◆ Accelerates weathering in metal and stone structures ◆ Affects human health **Prevention:**	1M 2M 1M	6M

		1. Reduce amount of sulphur dioxide and oxides of nitrogen released into the atomosphere 2. Use cleaner fuels 3. Flue Gas Desulphurisation (FGD) 4. Use other sources of electricity (i.e. nuclear power, hydro-electricity, wind energy, geothermal energy, and solar energy)		
	(b)	**Definition and Purpose** The world's worst recorded food disaster happened in 1943 in British-ruled India. Known as the Bengal Famine, an estimated **four million** people **died** of hunger that year alone in eastern India The term "Green Revolution" is a general one that is applied to successful agricultural experiments in many Third World countries. It is NOT specific to India. But it was most successful in India. **Methods of Green Revolution(with description)(1+1+1)** There were three basic elements in the method of the Green Revolution: (1) Continued expansion of farming areas; (2) Double-cropping existing farmland; (3) Using seeds with improved genetics. **Success of Green Revolution** The Green Revolution resulted in a record grain output of 131 million tons in 1978-79. This established India as one of the world's biggest agricultural producers. The crop area under HYV varieties grew from seven per cent to 22 per cent of the total cultivated area during the 10 years of the Green Revolution. Yield per unit of farmland improved by more than 30 per cent between 1947 (when India gained political independence) and 1979	1M 2M 1M	6M
	(c)	**Impacts of Dams: (Any 8 points)** 1. Dams are extremely expensive to build and must be built to a very high standard. 2. The high cost of dam construction means that they must operate for many decades to become profitable. 3. The flooding of large areas of land means that the natural environment is destroyed. 4. People living in villages and towns that are in the valley to be	8x0.5	

		flooded, must move out. This means that they lose their farms and businesses. In some countries, people are forcibly removed so that hydro-power schemes can go ahead. 5. The building of large dams can cause serious geological damage. 6. Although modern planning and design of dams is good, in the past old dams have been known to be breached (the dam gives under the weight of water in the lake). This has led to deaths and flooding. 7. Dams built blocking the progress of a river in one country usually means that the water supply from the same river in the following country is out of their control. This can lead to serious problems between neighbouring countries. 8. Building a large dam alters the natural water table level. 9. Water logging and salinity due to over irrigation 10. Reduced water flow and silt deposition in rivers 11. Salt intrusion at river mouth 12. Since the sediments carrying nutrients gets deposited in the reservoir, the fertility of the land along the river gets reduced 13. Due to structural defects or faulty design of the dam may cause sudden dam failure leading to collapse and destruction to life and property.	4M	4M
UNIT – IV				
8	(a)	**About Tehri Dam** 1. Tehri Dam is the primary dam of the Tehri Development Project, a major hydroelectric project centered near Tehri Town in the state of Uttaranchal state in India. 2. Located on the Bhagirathi River, the principal tributary of the sacred River Ganges, the Tehri Dam has a height of 855 feet (261 m), making it the 5th tallest dam in the world. 3. The Tehri Dam on India's Bhagirathi River, the main tributary of the Ganges, is the 5th world's largest and most controversial hydroelectric projects. 4. Tehri is located 200 miles north east of Delhi, in the state of Uttaranchal. With a height of 260 meters (855 feet), the dam will be the fifth tallest in the world. Its reservoir will completely submerge Tehri Town and 40 villages, and partially submerge 72 villages **Benefits of Dams** ****4 points****	2M	6M

		Dams are built to control flood and store flood water 1. Sometimes dams are used for diverting part or all of the water from river into a channel. 2. Dams are used mainly for drinking and agricultural purposes. 3. Dams are built for generating electricity 4. Dams are used for recreational purposes 5. Navigation and fishery can be developed in the dam areas **Controversies/problems of Dams** ****ANY 4 POINTS**** 1. Submergence of forest lands 2. Faster rate of reservoir sedimentation or siltation 3. Socio-economic implications due to relocation and rehabilitation of people 4. Increased seismic risk 5. Soil erosion 6. Loss of Biodiversity 7. Loss of flora and fauna 8. High capital cost 9. Water logging and salinity 10. Sharing of benefits 11. Location 12. Resettlement and rehabilitation 13. Displacement of population	2M 2M	
	(b)	**<u>Purpose/Objective of movement</u>** i. The Chipko movement was started to prevent the cutting of trees. ii. Against those people, who were destroying the natural resources of the forests iii. Chipko Movement aimed at protection and conservation of trees and forests from being destroyed **<u>About Movement(4 points)</u>** iv. First Chipko action in March 1974 in Reni village v. Spread throughout the Uttaranchal Himalayas by the end of the decade. vi. Based on the Gandhian philosophy vii. The name of the Chipko moment originated from the word 'embrace' viii. Women formed human chains across roads to prevent contractors from reaching the forest area. ix. Women have fought against the deforestation. They have	2M 2M	6M

		prevented the contractors from felling the trees. **<u>Persons involved(any 2) & Success of Movement(2 points)</u>** x. Village women Amrita Devi Gaura Devi Chandi Prasad Bhatt Sundarlal Bahuguna xi. Ban on cutting the trees for the 15 years in the forests of Uttar Pradesh in 1980. xii. Later on the ban was imposed in Himachal Pardesh, Karnataka, Rajasthan, Bihar, Western Ghats and Vindhayas. xiii. More than 1,00,000 trees have been saved from excavation. xiv. It generated pressure for a natural resource policy which is more sensitive to people's needs and ecological requirements.	2M	
9	(a)	**<u>Purpose and Objectives of Act</u>** In the wake of Bhopal Tragedy, The Government of India enacted this act under article 235 of the constitution in 1986 **Objectives:** This act has been passed to provide for the following objectives a) Protection and improvement of environment (water, air, land) b) Prevention of hazards to all living creatures (humans, plants, animals) and property c) Maintenance of harmonious relationship between human beings and their environment **Definitions and Features(Any 4 points:2+2points)** Environment – includes water, air and land and the inter relationship which exists among them and property Environment pollution – means the presence of any environmental pollutant in the environment. **Features:** a) Restricting area in which industries, operation or processes shall not be carried out. b) Laying down procedures and safeguards for handling of hazardous substances. Emissions and Effluent standards in respect of 61 categories of industries have been evolved and notified so far. d) The standards in respect of pollutants are to be achieved with in a period of one year from the date of their notification. d) Those industries which require consent under the water act, Air act or both or authorization under the Hazardous waste (Management and	2M 2M	6M

		Handling) rules 1989 are required to submit an Environmental audit report to the concerned pollution control board. **<u>Powers and Penalities</u>** **Powers:** a) Power to take samples b) Power of entry and inspection c) Power of prohibition on disposal of polluting matter into environment d) Power to obtain information – regarding process, treatment, quantity, test etc **Penalties:** A person violating any provision of this act, shall be punished with imprisonment upto five years or a fine of Rs. 1, 00,000/- or both.	2M	
	(b)	**About Ralegaon Sidhi(before 1975)** i. In 1975, the village was suffering from drought, poverty, debt and unemployment. ii. During the summer months, People had to walk 2-3 Kms to fetch water. **About Anna Hazare** iii. Anna Hazare, a retired army man decided to mobilize the people and, with the collective support of all the villagers, he began to introduce changes iv. Today ralegaon Siddhi is being taken as a role model for other villages by the Maharashtra government and by other states too. **About Ralegaon Sidhi(After 1975)** **(Any four points)** v. Massive <u>tree plantation</u> has been undertaken, and hills have been terraced to check erosion vi. Large canals with ridges on either side have been dug to <u>retain rainwater</u>. Water table in this area is now considerably higher and the wells and tube wells are never dry, making it possible to <u>raise three crops a year</u> where only one was possible before vii. The village's biggest achievement is undoubtedly in the area of <u>non-conventional energy.</u> viii. All the streets in the village are lit by <u>solar lights</u>, each with a separate panel. ix. There are four large community <u>biogas plants</u> and one of them is fitted to the community toilets. x. There is a large wind mill used for pumping water	2M 2M 2M	6M

		xi. A number of households have their own biogas plants xii. The village is self sufficient		

Scheme prepared by : **K.Sambasiva Rao, Asst. Professor, Dept. of Chemical Engg.**

9642653815

Approved

External Examiners:

Name	Signature	Phone No.

Class teachers: (I/IV B.Tech)

Class	Staff Name	Dept.	Signature
Chem/EIE	Prof.N.R.Gopal	Chemical	
CSE-A	Mr.K.S.B.Reddy	Chemical	
CSE-B	Mrs.N.S.Rani	Chemical	
CSE-C	Mr.K.Sambasiva Rao	Chemical	
IT-A		Chemistry	
IT-B		Chemistry	
ME-A	Mr.T.Mohan Rao	Chemical	
ME-B	Mrs.M.M.Kalyani	Chemical	

Chief of Subject Valuation board :

Heads of Department:

Dr.V.Madhava Rao **Dr.J.S.Rao**

Head **Head**

Dept. of Chemistry **Dept. of Chemical Engg.**