



MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)
Rasipuram - 637 408, Namakkal Dist., Tamil Nadu.



MUST KNOW CONCEPTS

MKC

CHEMISTRY

2021-22

Course Code & Course Name : 21BSS12 / ENVIRONMENTAL SCIENCE AND ENGINEERING

Year/Sem/Sec :

S.No.	Term	Notation (Symbol)	Concept / Definition / Meaning / Units / Equation / Expression	Units
Unit-I : Ecosystem & Biodiversity				
1.	Ecosystem	-	A group of organisms interacting among them and with environment is known as ecosystem.	-
2.	Ecology	-	Study of interactions among organisms, with their environment.	-
3.	Abiotic components	-	Non- living groups are collectively called as abiotic components	-
4.	Biotic components	-	Living groups are collectively called as abiotic components	-
5.	Autotrophic components	-	Members are producers, get energy from sunlight Ex. All green plants, trees	-
6.	Heterotrophic components	-	Members are consumers, can't prepare their own food & depend on producers	-
7.	Primary consumers	-	Called herbivores/plant eaters- depend on plants for food. Ex. Insects, rat, goat, deer, cow, horse etc	-
8.	Secondary consumers	-	Called primary carnivores /meat eaters Depend on herbivores for food Ex. Frog, cat, snakes, foxes etc.	-
9.	Tertiary consumers	-	Called Secondary carnivores, feed on secondary consumers. Ex. Tigers, lions	-
10.	Ist law of thermodynamics	-	Energy can neither be created, nor be destroyed, but it can be converted from one form to another	-
11.	IInd law of thermodynamics	-	Whenever energy is transformed, there is a loss of energy through the release of energy in the form of heat.	-
12.	Food chain	-	The sequence of eating & being eaten in an ecosystem is food chain	-
13.	Food web	-	The interlocking pattern of various food chains in an ecosystem is food web.	-

			Many food chains are interconnected	
14.	Ecological pyramids	-	Graphical representation of structure and function of trophic levels of an ecosystem is ecological pyramid.	-
15.	Pyramid of numbers	-	Represents the number of energy individual organisms present in each trophic levels	-
16.	Pyramid of energy	-	Represents the amount of energy individual organisms present in each trophic levels.	-
17.	Pyramid of biomass	-	The amount of living or organic matter present in a particular environment is called biomass.	-
18.	Ecological succession	-	The progressive replacement of one community by another till the development of stable community in a particular area is ecological succession	-
19.	Primary succession	-	involves gradual establishment of biotic communities on a lifeless ground	-
20.	Secondary succession	-	Involves establishment of biotic communities in an area, where biotic community already present there.	-
21.	Biodiversity	-	The variety and variability among all groups of living organisms and the ecosystem	-
22.	Genetic diversity	-	Diversity within the species is genetic diversity.(ex) teak wood varieties, Indian, Burma, Malaysian	-
23.	Species diversity	-	diversity between different species. (ex) plant species apple, mango	-
24.	Community/ecosystem diversity	-	Diversity at the ecological or habitat level is ecosystem diversity. Ex. River ecosystem.	-
25.	Hot- spots of biodiversity	-	The hot spots are the geographic areas which possess high endemic species.	-
Unit-II : Natural Resources				
26.	Recycle	-	It is the reprocessing of the discarded materials into new useful products	-
27.	Renewable resources	-	Resources that can be regenerated at a reasonable time	-
28.	Non-renewable resources	-	Resources that cannot be regenerated at a reasonable time	-
29.	Evaporation	-	Heat energy from the sun evaporates water from oceans, rivers, streams, lakes, ponds etc.	-
30.	Condensation & precipitation	-	Precipitation (rainfall) occurs due to the condensation of water & falls to earth.	-
31.	Transpiration	-	Plants absorb water through their roots	-

			& loose water through their leaves to the atmosphere & this process is transpiration	
32.	Respiration	-	Animals & plants break down sugars and produce energy with liberation of CO ₂ & H ₂ O is respiration.	-
33.	Hydrological cycle:	-	Thus the process of evaporation, condensation & transpiration is called hydrological cycle	-
34.	Deforestation	-	Deforestation means destruction or removal of forests due to natural or man-made activities.	-
35.	Causes of deforestation	-	Developmental projects, Mining operations, Raw materials for industries, Fuel requirements	-
36.	Global warming	-	Cutting & burning of forest trees increase CO ₂ content in atmosphere	-
37.	Soil erosion	-	Forest trees act as natural barrier to reduce the wind velocity & reduce soil erosion.	-
38.	Loss of genetic diversity	-	Destroy the genetic diversity on earth which provides food & medicines for entire world.	-
39.	Loss of biodiversity	-	When plants does not exist, animals that depend on them for food & habitat become extinct.	-
40.	Loss of food grains	-	Due to soil erosion, the countries loose the food grains.	-
41.	Mining	-	Mining is the process of extracting of metals from the mineral deposit.	-
42.	Blue baby syndrome:	-	When the nitrate concentration exceeds 25 mg/lit, they cause serious health problem called "Blue Baby syndrome"	-
43.	Eutrophication:	-	A large proportion of N & P fertilizers used in fields is washed off & causes over nourishment of the lakes. This process is known as Eutrophication.	-
44.	Ist generation pesticides	-	Sulphur, arsenic, lead or mercury are used to kill the pests.	-
45.	IInd generation pesticides	-	DDT - dichlorodiphenyl trichloromethane is used to kill the pests	-
46.	Water logging:	-	Water logging is the land where water stand for most of the year	-
47.	Salinity	-	This process of accumulation of salts is called salinity of soil.	-
48.	Ground subsidence	-	When the groundwater withdrawal is more than recharge rate ground subsidence occur.	-

49.	Chain reaction	-	This process of propagation of the reaction by multiplication in threes at each fission is called chain reaction	-
50.	Nuclear fusion	-	Lighter nuclei are combined together at extremely high temperatures to form heavier nucleus and a large amount of energy is released	-
Unit-III : Environmental Pollution				
51.	Air pollution	-	The presence of one or more contaminants like dust, smoke, mist and odour in the atmosphere which are injurious to human beings, plants and animals	-
52.	Sources of air pollution	-	Natural pollution - volcanic eruptions, forest fires, biological decay. Man - made activities	-
53.	Water pollution	-	It may be defined as "the alteration in physical, chemical and biological characteristics of water which may cause harmful effects on human and aquatic life.	-
54.	Infectious agents: in H ₂ O	-	Example: Bacteria, viruses, protozoa and parasitic worms.	-
55.	Point sources	-	These are discharged pollutants at specific locations through pipes, ditches or sewers eg: factories, sewage treatment plants	-
56.	Non-point sources	-	They are usually large areas or air shed that pollute water by runoff Eg: runoff of chemical from cropland to surface water.	-
57.	Dissolved oxygen (DO)	-	It is the amount of oxygen dissolved in a given quantity of water at a particular pressure & temperature.	-
58.	Biochemical oxygen demand (BOD)	-	It is the amount of oxygen required for the biological decomposition of organic matter present in the water	-
59.	Chemical oxygen demand (COD)	-	It is the amount of oxygen required for chemical oxidation of organic matter using oxidizing agent like K ₂ Cr ₂ O ₇ & KMnO ₄	-
60.	Soil pollution	-	It may be defined as "the contamination of soil by human and natural activities which may cause harmful effects on living beings".	-
61.	Industrial wastes	-	Pulp and paper mills, chemical industries, oil refineries, sugar factories, tanneries, textile, steel,	-

			fertilizers etc.	
62.	Urban wastes	-	Plastics, Glasses, metallic cans, fibers, papers, rubbers, street sweepings, and other discarded manufactured products	-
63.	Marine pollution	-	It may be defined as “the discharge of waste substances into the sea resulting in harm to living resources	-
64.	Noise pollution	-	It may be defined as “the unwanted, unpleasant or disagreeable sound that causes discomfort for all living beings”	-
65.	Thermal pollution	-	It may be defined as the addition of excess of undesirable heat to water that makes it harmful to man, animal or aquatic life	-
66.	Nuclear hazard	-	The radiation hazard in the environment comes from ultraviolet, visible, cosmic rays & microwave radiation	-
67.	Floods	-	The magnitude of water flow exceeds the carrying capacity of the channel within its banks the excess of water overflows on the surroundings	-
68.	Cyclones	-	It is a meteorological process, intense depressions forming over the open oceans and moving towards the land.	-
69.	Land slides	-	The movement of earthy materials like coherent rock, mud, soil and debris from higher to lower region to gravitational pull is called land slides.	-
70.	Earth quakes	-	An earthquake is a sudden vibration caused on earth surface with the sudden release of tremendous energy stored in rocks under the earth’s crust.	-
71.	Tsunami	-	A tsunami is a large wave that is generated in a water body when the seafloor is deformed by seismic activity.	-
72.	Hazardous wastes	-	Wastes like toxic chemicals, radioactive or biological substances which increase in mortality or serious illness to human health & environment are called hazardous wastes.	-
73.	Noise pollution	-	The sound intensity is measured in decibel. Noise beyond 120 dB causes noise pollution	-
74.	Photochemical smog	-	The brownish smoke like appearance that forms on sunny days in large cities during automobile traffic	-
75.	Solid waste	-	Any garbage, refuse, sludge from waste treatment plants, & other discarded	-

			material including solid, liquid, from mining, agriculture, commercial are called solid wastes.	
Unit-IV : Social Issues and the environment				
76.	Overgrazing	-	It is a process of "eating away the forest vegetation without giving it a chance to regenerate".	-
77.	Soil leaching	-	The process in which materials in or on the soil gradually dissolve and are carried by water seeping through the soil.	-
78.	Sustainable development	-	Meeting the needs of the present, without compromising the ability of future generations, to meet their own needs.	-
79.	Water conservation	-	The process of saving water for future utilization is known as water conservation.	-
80.	Rainwater harvesting	-	It is technique of capturing & storing of rainwater for further utilization	-
81.	Water shed management	-	The management of rainfall and resultant run-off is called watershed management.	-
82.	Resettlement	-	It is simple relocation / displacement of human population.	-
83.	Rehabilitation	-	Involves making the system to work again by replacing the lost economic assets, employment, land for building, repair damaged building etc.	-
84.	Environmental ethics	-	Environmental ethics refers to the issues, principles and guidelines relating to human interactions with their environment.	-
85.	Green house effect	-	The progressive warming of earth surface due to blanketing effect of man made CO ₂ in the atmosphere	-
86.	Acid rain	-	Thermal power plants, industries, & vehicles release nitrous oxide & sulphur dioxide into atmosphere	-
87.	Waste land:	-	The land which is not in use - unproductive, unfit for cultivation another economic uses.	-
88.	Types of waste land	-	1. Uncultivable waste land 2. Cultivable waste land	-
89.	Environment act	-	The act empowers the officers of Central Government to inspect the site / plant / machinery for preventing pollution.	-

90.	Environmental audit	-	Environmental audits are to quantify environmental performance & environmental position. It aims to improve the performance & position of the environment.	-
91.	Environmental impact assessment	-	EIA is used to identify the environmental, social & economic impacts of the prior to decision making.	-
92.	Objectives of environmental act	-	To protect & improvement of the environment To prevent hazards to all living creatures & property	-
93.	Objectives of wild life act	-	To maintain ecological process & life supporting system, To preserve biodiversity	-
94.	Objectives of air act	-	To prevent, control & abatement of air pollution To maintain the quality of air	-
95.	Sources of wastes	-	Glass, papers, garbage's, food waste, automobile waste, dead animals etc.	-
96.	E - waste	-	Computers, printers, mobile phones, Xerox machines, calculators etc	-
97.	Methods of waste land reclamation	-	Drainage, Leaching	-
98.	Nuclear holocaust	-	The release of large amounts of nuclear energy and radioactive products into the atmosphere.	-
99.	Ozone depleting chemicals	-	Chloro Fluro carbon (CFC), Hydro chloro fluoro carbon (HCFC, Bromo fluoroCarbon (BFC)	-
100.	Population growth	-	The rapid growth of the global population for the past 100 years from the difference between the rate of birth and death	-

Unit-V : Human Population

101.	Doubling time	-	The number of years needed for a population to double in size.	-
102.	Value education	-	It is nothing but learning about the particular thing through knowledge. We can identify our values and ourselves with the help of knowledge and experience.	-
103.	Formal education	-	Self related learning process, all will read, write, get jobs, tackle any problem with formal education	-
104.	Value education	-	Analyze our behavior, provide proper direction to youth, know right & wrong	-
105.	Value-based environment education	-	Knowledge about principles of ecology, biodiversity, care for natural resources, know to safe and clean	-

			environment	
106.	HIV	-	Human Immune deficiency Virus	-
107.	Remote sensing	-	Gathering information about an object without coming in contact with it is called remote sensing	-
108.	Data base	-	Collection of inter related data on various subjects.	-
109.	Geographical information system (GIS)	-	It is a technique of superimposing various thematic maps using digital data on a large number of inter-related aspects.	-
110.	Nimby syndrome	-	Opposition of residents nearby undesirable factors, ex. Airport, Tower, prison	-
111.	Population density	-	No of individuals of the population per unit area / unit volume is population density	-
112.	Population equilibrium	-	Balance between birth rate and death rate in a population is population equilibrium.	-
113.	Pyramid shape	-	India, Bangladesh, and Ethiopia. [Large no of young people enter into reproductive age group, hence Population growth increases	-
114.	Bell shape	-	France, USA, and UK. [pre-productive age group population & reproductive age group population are almost equal, hence population growth is stable.	-
115.	Urn shape	-	Germany, Italy, and Japan pre-productive population is less than reproductive age group, hence population growth decreases	-
116.	Physical hazards	-	Radioactive and UV radiations, affects the body cell, causes skin cancer	-
117.	Biological hazards	-	Bacteria, Viruses, Parasites = Diarrhoea, malaria, parasitic worms, cholera	-
118.	Article 14	-	provides equality	-
119.	Article 16	-	equal opportunity for all citizens	-
120.	Value education	-	It is nothing but learning about the particular thing through knowledge	-
121.	Major greenhouse gases	-	Carbon- di-oxide, Nitrogen oxide	-
122.	AIDS	-	Acquired Immuno Deficiency Syndrome	-
123.	Decomposers	-	The organisms which feed on dead organisms and excreta of living organisms	-

124.	Biotic environment	-	Which includes producers, composers and decomposers	-
125.	Abiotic environment	-	Does not include Plants	-
Placement Questions				
126.	CFC	-	This is responsible for Ozone hole	-
127.	Stomata	-	Which evaporates the water from plants	-
128.	Non-luminous	-	Moon	-
129.	Odum	-	Energy flow in the Ecosystem	-
130.	Carbohydrate	-	Sugar is a form of Carbohydrate	-
131.	Ecology	-	The science that deals with the relationship of various organisms with their environment	-
132.	Ecosystem consists	-	A biotic community and its non-living elements	-
133.	Ecological balance	-	The perfect equilibrium existing in the biosphere between the various organisms	-
134.	In a food chain humans	-	Primary and secondary consumers	-
135.	Herbivores	-	Organisms who directly feed on producers	-
136.	World environmental day	-	World Environmental Day' is celebrated every year on 5th June	-
137.	'Earth's day'	-	'Earth's Day' is celebrated every year on April 22nd	-
138.	An ecosystem is a region	-	Living organism interact with their environment	-
139.	A.G. TANSLEY	-	The term ecosystem was first proposed by A.G. Tansley	-
140.	Consumer	-	An animal that feeds upon another animal is consumer	-
141.	A food web consists of	-	Interlocking of food chains	-
142.	Bio magnification	-	Tendency of pollutants to become concentrated in successive tropic levels	-
143.	Mud flow	-	The type of mass movement characterized by a slow and gradual down slope movement	-
144.	Smog is combination of	-	Smoke and fog	-
145.	Deforestation	-	Decreased soil fertility through rapid leaching of the essential mineral nutrients	-
146.	Mining means	-	Process of extracting ores to obtain the metal of interest	-
147.	Ecosystem	-	A group of organisms interacting among themselves and with environment is known as ecosystem.	-

148.	Ecology	-	Study of interactions among organisms, with their environment.	-
149.	Abiotic components	-	Non- living groups are collectively called as abiotic components	-
150.	Biotic components	-	Living groups are collectively called as abiotic components	-

Faculty Team Prepared

Signatures

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HoD

