Roll No.													

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST 1

Sem & AY: Odd Sem 2019-20 | Date: 01.10.2019

Course Code: CIV 102 | Time: 9.30 AM to 10.30 AM

Course Name: ENVIRONMENTAL SCIENCE & DISASTER MGMT. | Max Marks: 30

Program & Sem: B.Tech (Chemistry Cycle) & I | Weightage: 15%

Instructions:

(i) Read all the questions carefully before answering.

(ii) Choose only one answer for multiple choice questions, multiple options answered will not be awarded any marks.

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries one marks.

(6Qx1M=6M)

1. Environment is derived from the French word 'Environner', which means
   a) Atmosphere b) Neighbor c) Encircle d) Nearby
   (C.O.NO.1) [Knowledge]

2. In India urban water supply systems are designed for a daily consumption of ____ litres/person/day.
   a) 150 b) 135 c) 145 d) 155 (C.O.NO.1) [Knowledge]

3. The process of separating and purifying the metal from other impurities in the ore is called as,
   a) Mining b) Distillation c) Smelting d) Dredging
   (C.O.NO.1) [Knowledge]

4. Major chemical nutrients present in common fertilizers are
   a) Nitrogen, Phosphorous & Potassium (NPK)
   b) Nitrogen, Potassium & Sulphur (NKS)
   c) Phosphorous, Potassium & Calcium (PKCa)
   d) Nitrogen, Phosphorous & Sodium (NPNa) (C.O.NO.1) [Knowledge]

5. Which of the following is not a water induced soil erosion type.
a) Sheet erosion b) Gully erosion c) Slip erosion d) Saltation
(C.O.NO.1) [Knowledge]

6. Which of the following is a non-renewable form of energy resource.
a) Solar power b) Fossil fuels c) Wind power d) Tidal power
(C.O.NO.1) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each Question carries four marks. (3Qx4M=12M)

7. Briefly explain any four benefits or uses of forest resources.
(C.O.NO.1) [Comprehension]

8. Define Water Footprint. List any three benefits and ill effects of constructing dams across a river. (C.O.NO.1) [Comprehension]

9. Define Bio Magnification. List any three ill effects on environment because of excessive usage of pesticides in modern agriculture. (C.O.NO.1) [Comprehension]

Part C [Problem Solving Questions]

Answer both the Questions. Each Question carries six marks. (2Qx6M=12M)

10. List and explain any four types of scientific farming methods to control Soil erosion.
(C.O.NO.1) [Comprehension]

11. What is the difference between renewable and non-renewable resources. List any four renewable sources of energy. Explain any two advantages and disadvantages of solar power. (C.O.NO.1) [Comprehension]

SCHOOL OF ENGINEERING

Date: 01-10-2019

Semester: 1st

Time: 09:30 AM to 10:30 AM

Course Code: CIV 102

Max Marks: 30

Course Name: ENVIRONMENTAL SCIENCE & DISASTER MGMT.

Weightage: 15%

Extract of question distribution [outcome wise & level wise]

Q.NO	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1	1	1	1									1
2	1	1	1									1
3	1	1	1									1
4	1	1	1									1
5	1	1	1									1
6	1	1	1									1
7	1	1				4						4
8	1	1				4						4
9	1	1				4						4
10	1	1				6						6
11	1	1				6						6

	Total Marks		6			24						30

K =Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

I here certify that All the questions are set as per the above lines Ahamed Sarif]

Annexure- II: Format of Answer Scheme

SCHOOL OF ENGINEERING

SOLUTION

Semester: 1st | Date: 01-10-2019

Course Code: CIV 102 | Time: 09:30 AM to 10:30 AM

Course Name: ENVIRONMENTAL SCIENCE & DISASTER MGMT. | Max Marks: 30 | Weightage: 15%

Part A (6Q x 1M = 6 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	Option C	Right option = 1 mark	1 min
2	Option B	Right option = 1 mark	1 min
3	Option C	Right option = 1 mark	1 min
4	Option A	Right option = 1 mark	1 min
5	Option D	Right option = 1 mark	1 min
6	Option B	Right option = 1 mark	1 min

Part B (3Q x 4M = 12 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
7	i. Watershed protection: Reduce the rate of surface run-off of water, prevent flash floods, Produces prolonged gradual run-off and thus prevent effects of drought. ii. Atmospheric regulation: Absorption of solar heat, maintaining carbon dioxide	Any four points out of six should be awarded full four marks with 1 mark for each point. 1 + 1 + 1 + 1 + = 4	8 min

	levels, maintaining the local climatic conditions iii. Erosion control: Holding soil by preventing rain from directly washing soil away iv. Land bank: Maintenance of soil nutrients and structure. v. Local use: Food, fodder, building homes, sericulture etc. vi. Market use: Fuel wood, furniture, fruit, industrial use, paper pulp etc.		
8	"Water foot print is an indicator that measures both direct and virtual water use of a consumer or producer." Benefits of Constructing Dams: • Control flood & store water • Used for drinking & agricultural purposes • Built for generating electricity • Used for recreational purposes • Navigation & fishery can be developed in dam areas • Used for irrigation during dry seasons • Prevent drought Effects of dam on Environment: • Thousands of hectares of forest are cleared for river valley projects • Dam construction kills wild animals & aquatic life • Hydroelectric projects spread water borne diseases. • Water logging leads to salinity & reduces the fertility of land. • Displacement of tribal people • Cultural change affects the tribal people mentally & physically	Definition of water foot print 1 mark, Any 3 benefits and 3 ill effects should be awarded full marks. 1 + 3 + = 4	8min
9	Bio magnification is the increasing concentration of a substance, such as a toxic chemical, in the organisms at successively higher levels in a food chain. Effects on environment because of excessive usage of pesticides are,	Definition of Bio magnification 1 mark, Any 3 effects on environment because of use of pesticides should be awarded full marks. 1 + 3 + = 4	8 min

	• Development of pest resistance and producing super pests. • Death of non- target beneficiary organisms. • Bio magnification of toxic chemicals in food chain. • Pesticides can contribute to air pollution. • Pesticides get into water bodies and pollute streams, wells.		

Part C (2Q x 6M =12 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
10	Scientific farming techniques to control Soil erosion are i. **Conservation till farming / no till farming:** In traditional method land is ploughed and the soil is broken up. This disturbs soil and cause soil erosion. But, in conservational till farming causes minimum disturbance to the top soil. Here special tillers break up and loosen the subsurface soil without turning over the topsoil. ii. **Contour Farming:** On gentle slopes, crops are grown in rows across is known as contour farming. Each row planted horizontally along the slope of the land acts as a small dam to hold soil and slow down loss of soil through run-off water. iii. **Terrace farming:** Steeper slopes are converted into a series of broad terraces which run across the contour. Terracing retains water for crops at all levels and cuts down soil erosion by controlling run off. iv. **Strip Cropping:** Strips of crops are alternated with strips of soil saving cover crops like grasses or grass-legume	Explanation of any four techniques should be awarded six full marks with 1.5 marks for each technique. 1.5 + 1.5 + 1.5 + 1.5 + = 6 marks	15 min

	mixture. Whatever run-off comes from the cropped soil is retained by the strip of cover crop and this reduces soil erosion. v. **Alley cropping/ Agro foresting:** It is a form of inter-cropping in which crops are planted between rows of trees or shrubs. Even when the crop is harvested, the soil is not fallow because trees and shrubs still remain on the soil holding the soil particles and prevent soil erosion. vi. **Wind breaks or shelter belts:** They help in reducing erosion caused by strong winds. The trees are planted in long rows along the cultivated land boundary so that wind is blocked. The wind speed is substantially reduced which helps in preventing wind erosion of soil. vii. **Grassed Waterways:** Grassed waterways are broad, shallow channels designed to move surface water across farmland without causing soil erosion. Vegetative cover in waterway slows water flow and protects channel surface from rill and gully erosion.		
11	Renewable resources are the resources which can be revived, through the natural process, over a short period of time. Whereas, non-renewable resources are the natural resources which are not going to be replenished or revived, shortly. Renewable sources of energy are i. Solar energy ii. Wind energy iii. Tidal energy iv. Biomass v. Geothermal energy	Difference between renewable and non renewable resources 1 mark. Any four types of renewable sources 1 mark Any two Advantages and disadvantages each of solar energy 4 marks. 1 + 1+ 4 = 6	15 min

	Advantages of solar power are • Solar energy is free - it needs no fuel and produces no waste or pollution. • In sunny countries, solar power can be used where there is no easy way to get electricity to a remote place. • Handy for low-power uses such as solar powered garden lights and battery chargers • Can be used in solar water heating systems and solar furnaces. Disadvantages of solar power are • Doesn't work at night. • Very expensive to build solar power stations. Solar cells cost a great deal compared to the amount of electricity they'll produce in their lifetime. • It can be unreliable unless they are installed in a very sunny climate.		

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GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST - 2

Semester: Odd Sem 2019-20 **Date:** 19.11.2019

Course Code: CIV 102 **Time:** 9.30 AM to 10.30 AM

Course Name: ENVIRONMENTAL SCIENCE & DISASTER MANAGEMENT **Max Marks:** 30

Programme & Sem : B.Tech (Chemistry Cycle) & I **Weightage:** 15%

Instructions:

(i) Choose only one answer for multiple choice questions, multiple options answered will not be awarded any marks.

Part A [Memory Recall Questions]

Answer the Question. Each sub question carries one mark. **(4Qx1M=4M)**

1. **a)** The science that deals with the relationship of various organisms with their environment is known as

   a) Economics b) Geology c) Ecology d) Anthropology

   (C.O.NO.2) [Knowledge]

   b) The term ecosystem was first proposed by

   a) Jacob Van Verkul b) A.G. Tansley c) Costanza d) Tyler Miller

   (C.O.NO.2) [Knowledge]

   c) Upper shallow water zone is called

   a) Littoral zone b) Limnetic zone c) Profundal zone d) All the these

   (C.O.NO.2) [Knowledge]

   d) Smog is combination of

   a) Smoke and fog b) Snow and fog c) Smoke and snow d) All the these

   (C.O.NO.3) [Knowledge]

Part B [Thought Provoking Questions]

Answer both the Questions. Each Question five mark. **(2Qx5M=10M)**

2. Define Biodiversity and List the various levels of Biodiversity.

   (C.O.NO.2) [Comprehension]

3. Define Air Pollution and Classify Air pollutants with an example for each type.

   (C.O.NO.3) [Comprehension]

Part C [Problem Solving Questions]

Answer both the Questions. Each Question eight marks. **(2Qx8M=16M)**

4. Discuss the causes and remedial measures for Man-Animal conflict.

(C.O.NO.2) [Comprehension]

5. Explain with a neat flow diagram or sketch the process of Ecological Succession.

(C.O.NO.2) [Comprehension]

SCHOOL OF ENGINEERING

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

Semester: 1st

Course Code: CIV 102

Course Name: **Environmental Science & Disaster Management**

Date: 19/11/2019

Time: 1 Hour

Max Marks: 30

Weightage: 15%

Extract of question distribution [outcome wise & level wise]

Q.NO	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels	Thought provoking type [Marks allotted] Bloom's Levels	Problem Solving type [Marks allotted]	Total Marks
			K	C	C	
1	2,3	2,3	4	-	-	4
2	2	2	-	5	-	5
3	3	3	-	5	-	5
4	2	2	-	8	-	8
5	2	2	-	8	-	8
	Total Marks		**4**	**26**		**30**

SCHOOL OF ENGINEERING

SOLUTION SCHEME

Semester: 1st

Course Code: CIV 102

Course Name: Environmental Science & Disaster Management

Date: 19/11/2019

Time: 1 Hour

Max Marks: 30

Weightage: 15%

Part A **(4Q x 1M = 4 Marks)**

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1 A	Option C	1 Mark for the Right Option	1 Min
B	Option B	1 Mark for the Right Option	1 Min
C	Option A	1 Mark for the Right Option	1 Min
D	Option A	1 Mark for the Right Option	1 Min

Part B **(2Q x 5M = 10Marks)**

Q No	Solution	Scheme of Marking	Max. Time required for each Question
2	**Biodiversity** or **biological diversity** is the variation of taxonomic life forms within a given ecosystem, biome (a large naturally occurring community of flora and fauna occupying a major habitat) or for the entire Earth. **LEVELS OF BIODIVERSITY** Genetic Diversity Species Diversity Ecosystem Diversity	Definition 2 Mark Listing 3 Marks	6 Mins
3	Presence of certain substances in air in high concentrations and for long duration to cause undesirable effects. These substances include 1.Gaseous pollutants-oxides of sulphur (mostly SO_2, SO_3) oxides of nitrogen (mostly NO and NO_2 or NOx), carbon monoxide (CO), volatile organic compounds (mostly hydrocarbons) etc. 2. Particulate matter- Particulate pollutants include smoke, dust, soot, fumes, aerosols, liquid droplets, pollen grains etc. 3.Radioactive substances- radon-222, iodine-131, strontium-90, plutonium-239 etc.	Definition 2 Mark Classification and Example (one) 1Mark Each	6 Mins

Part C **(2Q x 8M = 16 Marks)**

Q No	Solution	Scheme of Marking	Max. Time required for each Question
4	**Causes for Man-Animal Conflict** • Dwindling habitat of tigers, elephants, rhinos and bears due to shrinking forests. • Usually the ill and weak animals have tendency to attack humans. • Insufficient food supply. • Encroachment of wild-life corridors. • The cash compensation paid by the government in lieu of the damage caused to the farmers is not enough. The agonized farmer therefore gets revengeful and kills wild animals. **Remedial Measures to Curb the Conflicts** • Tiger conservation project has made provisions for making available vehicles, tranquillizer guns, binoculars and radio sets etc... to tactfully deal with any imminent danger. • Adequate crop compensation and cattle compensation scheme must be started, along with substantial cash compensation for loss of human life. • Solar powered fencing should be provided along with electric current proof trenches to prevent animals from straying into fields. • Cropping pattern should be changed near the forest borders and adequate fodder, fruit and water should be made available to the elephants within the forest zone. • Wild-life corridors(should be provided for mass migration of animals during unfavorable periods.	Any 4 Causes – 1 Mark for Each Cause Any 4 remedial Measures – 1 Mark for each measure	10 Mins

5	• **Nudation** • **Invasion** • **Competition** • **Reaction** • **Stabilization (Climax)** **NUDATION:** It is the development of a bare area without any life form. The bare area may be caused due to Topographic factor, Climatic factor, Biotic factors **INVASION:** It is the successful establishment of one or more species on a bare area through dispersal or migration, followed by ecesis or establishment. **COMPETITION AND COACTION:** As the number of individuals grows there is inter and intra-specific competition, for space, water and nutrition. They influence each other in a number of ways, known as coaction. **REACTION:** The living organisms grow, use water and nutrients from the substratum, and in turn, they have a strong influence and modified the environment is known as reaction. **STABILIZATION:** The succession ultimately culminates in a more or less stable community called climax which is in equilibrium with the environment.	Flow Diagram or sketch – 3 Mark Brief Explanation of each terminologies – 1 Mark Each	10 Mins

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PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Semester: Odd Semester: 2019 - 2020 | **Date:** 2 January 2020

Course Code: CIV 102 | **Time:** 1:00 PM to 4:00 PM

Course Name: ENVIRONMENTAL SCIENCE AND DISASTER MANAGEMENT | **Max Marks:** 100

Program & Sem: B.Tech (Chemistry. Cycle) & I | **Weightage:** 50%

Instructions:

(i) Read the all questions carefully and answer accordingly.

(ii) Question paper consists of 3 parts.

(iii) Scientific and Non-programmable calculators are permitted.

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries 5 marks. **(5Qx5M=25M)**

1. Define Environment? Explain the concept of environment with Figure? (C.O.No.1) [Knowledge]
2. Define food chain and ecological pyramids? (C.O.No.2) [Knowledge]
3. Define global warming? List any four greenhouse gases. (C.O.No.3) [Comprehension]
4. Define sustainability? List the key elements of sustainable development. (C.O.No.4) [Knowledge]
5. List any five physical and chemical characteristics of water quality parameters. (C.O.No.3) [Comprehension]

Part B [Thought Provoking Questions]

Answer all the Questions. Each Question carries 10 marks. **(3Qx10M=30M)**

6. List and explain any five soil erosion control measures. (C.O.No.1) [Knowledge]
7. Discuss any six lake types and organisms with examples. (C.O.No.2) [Knowledge]
8. Discuss any six human population characteristics. (C.O.No.4) [Knowledge]

Part C [Problem Solving Questions]

Answer all the Questions. Each Question carries 15 marks. **(3Qx15M=45M)**

9. a) Write any four indoor air pollutants and their sources. [5M]

   b) Explain control measures of air pollution [10M]

(C.O.No.3) [Comprehension]

10. a) What is carrying capacity of a system? Explain the basic components of carrying capacity. [5M]

    b) Discuss problems and solutions in achieving sustainable development. [10M]

(C.O.No.4) [Knowledge]

11. a) List the objectives and salient features of Forest conservation act. [5M]

    b) List any ten Govt. Schemes on women empowerment and child health. [10M]

(C.O.No.4) [Knowledge]

SCHOOL OF ENGINEERING

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

END TERM FINAL EXAMINATION

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO (% age of CO)	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels	Thought provoking type [Marks allotted] Bloom's Levels	Problem Solving type [Marks allotted]	Total Marks
			K	C	A	
1	1	1	5			5
2	2	2	5			5
3	3	3		5		5
4	4	4	5			5
5	4	3		5		5
6	1	1	10			10
7	2	2	10			10
8	3	4	10			10
9	3	3		15		15
10	4	4	15			15
11	4	4	15			15
	Total Marks					100

K =Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

I hereby certify that all the questions are set as per the above guidelines.

Faculty Signature:

Reviewer Commend:

Answer Scheme

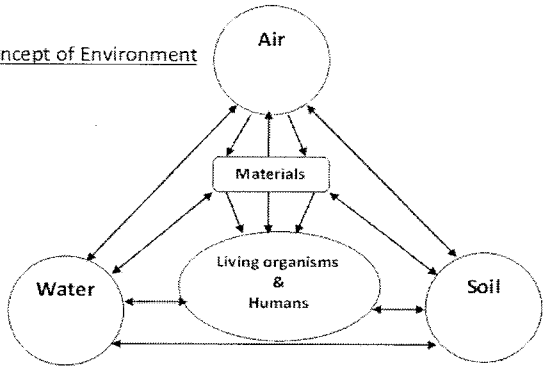
SCHOOL OF ENGINEERING

SOLUTION

Semester : Odd Semester: 2019 - 2020
Course Code: CIV 102
Course Name: ENVIRONMENTAL SCIENCE AND DISASTER MANAGEMENT
Program & Sem: B Tech (Civil) 1st Sem

Date: 2 JANUARY 2020
Time: 1:00 PM to 4:00PM
Max Marks: 100
Weightage: 50 %

Part A (5Q x 5M = 25Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	Environment is defined as "the sum total of water, air and land, the inter-relationships that exist among them and with the human beings, other living organisms and materials" (**Environment Act – 1986**). Fig. Concept of Environment  	**2M** **3M**	**10**
2	**FOOD CHAIN:** A food chain is sequence of eating and being eaten in an ecosystem. **ECOLOGICAL PYRAMID:** Graphic representation of trophic structure and function of an ecosystem, starting with producers at the base and successive trophic levels forming the apex is knows as an ecological pyramid.	**2.5M** **2.5M**	**10**
3	**Global warming**: Increasing global ideal temperature due to greenhouse effect is called as global warming: **Greenhouse Gases** • Carbon dioxide, • ozone, • methane, • nitrous oxide, • chlorofluorocarbons (CFCs) • Sulfur hexafluoride and • Water vapor.	**1M** **4M**	**10**
4	**Sustainability:**Meeting the needs of the present without compromising the ability of future generations to meet their own needs.---World Commission on Environment and Development (1987) (Brundtland Commission's) : *Our Common Future* **Elements of sustainability**	**2M**	**10**

	• **ENVIRONMENT** ➢ *biodiversity* ➢ *materials* ➢ *energy* ➢ *biophysical interactions* • **ECONOMY** ➢ *money and capital* ➢ *employment* ➢ *technological growth* ➢ *investment* ➢ *market forces* • **SOCIETY** ➢ *human diversity (cultural, linguistic, ethnic)* ➢ *equity (dependence / independence)* ➢ *quality of life*	**3M**	
5	**Physical characteristics:** EC, TDS, Suspended solid (SS), color, taste, odour, temp. Turbidity. pH, **Chemical characteristics :**Alkalinity, hardness, fluoride, heavy metal, organic compound, nutrient (nitrogen & phosphorus), biochemical oxygen demand (BOD), chemical oxygen demand (COD). Sulfates.	**2.5M** **2.5M**	**10**

Part B (3Q x 10M = 30Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
6	**Control of soil erosion** • Conservational till farming/ No-till-farming • Contour farming • Terracing • Strip farming • Alley cropping or Agro forestry • Wind breaks or shelterbelts • Grassed waterways **1.Conservation till farming / no till farming:** • In traditional method: land is ploughed and the soil is broken up and smoothed to make a planting surface. This disturbs soil and cause soil erosion. • Conservational till farming causes minimum disturbance to the top soil. Here special tillers break up and loosen the subsurface soil without turning over the topsoil. **2.Contour Farming:** • On gentle slopes, crops are grown in rows across is known as contour farming. • Each row planted horizontally along the slope of the land acts as a small dam to hold soil and slow down loss of soil through run-off water. **3.Terrace farming:** • Still steeper slopes are converted into a series of broad terraces which run across the contour. • Terracing retains water for crops at all levels and cuts down soil erosion by controlling run off. **4.Strip Cropping:** • Strips of crops are alternated with strips of soil saving covercrops like grasses or grass-legume mixture.	**2M** **2x4=8M**	15

	• Whatever run-off comes from the cropped soil is retained by the strip of cover crop and this reduces soil erosion **5.Alley cropping/ Agro foresting:** • It is a form of inter-cropping in which crops are planted between rows of trees or shrubs. • Even when the crop is harvested, the soil is not fallow because trees and shrubs still remain on the soil holding the soil particles and prevent soil erosion **6.Wind breaks or shelter belts:** • They help in reducing erosion caused by strong winds. • The trees are planted in long rows along the cultivated land boundary so that wind is blocked. • The wind speed is substantially reduced which helps in preventing wind erosion of soil **7.Grassed Waterways:** • Grassed waterways are broad, shallow channels designed to move surface water across farmland without causing soil erosion. Constructed in natural depressions where water collects and flows to outlet. • Vegetative cover in waterway slows water flow and protects channel surface from rill and gully erosion.		
7	**TYPES OF LAKES:** (a) Oligotrophic lakes which have low nutrient concentrations. (b) **Eutrophic lakes** which are overnourished by nutrients like nitrogen and phosphorus, usually as a result of agricultural run-off or municipal sewage discharge. They are covered with "algal blooms" e.g. Dal Lake. (c) **Dystrophic lakes** that have low pH, high humic acid content and brown waters e.g. bog lakes. (d) **Endemic lakes** that are very ancient, deep and have endemic fauna which are restricted only to that lake e.g. the Lake Baikal in Russia; the deepest lake, which is now suffering a threat due to industrial pollution. (e) **Desert salt lakes** that occur in arid regions and have developed high salt concentrations as a result of high evaporation. e.g. great salt lake, Utah; Sambhar lake in Rajasthan. (f) **Volcanic lakes** that receive water from magma after volcanic eruptions e.g. many lakes in Japan. They have highly restricted biota. (g) **Meromictic lakes** that are rich in salts and are permanently stratified e.g. lake Nevada. (h) **Artificial lakes** or impoundments that are created due to construction of dams e.g. Govindsagar lake at Bhakra-Nangal. **Lake organisms:** (a) Planktons that float on the surface of waters e.g. phytoplanktons like algae and zooplanktons like rotifers. (b) Nektons that swim e.g. fishes. (c) Neustons that rest or swim on the surface. (d) Benthos that are attached to bottom sediments e.g. snails. (e) Peri-phytons that are attached or clinging to other plants or any other surface e.g. crustaceans	**5MX1M=5M** **5MX1M=5M**	15
8	**1.Linear and Exponential growth:** When a quantity increases by a constant amount per unit time e.g. 1, 3, 5, 7 etc. it is called linear growth. But, when it increases by a fixed percentage it is known as exponential growth e.g. 10, 100, 1000, 10000, or 2, 4, 8, 16, 32 etc. **2. Doubling time:** The time needed for a population to double its size at a constant annual growth rate is known as doubling time.	**5MX2M=10M**	15

	3. Total Fertility rates (TFR) : It is one of the key measures of a nation's population growth. TFR is defined as the average number of children that would be born to a woman in her lifetime if the age specific birth rates remain constant. • The value of TFR varies from 1.9 in developed nations to 4.7 in developing nations. • In 1950's the TFR has been 6.1. However, due to changes in cultural and technological set up of societies and government policies, the TFR has come down which is a welcome change. • **4. Infant mortality rate:** It is the percentage of infants died out of those born in a year. • Although this rate has declined in the last 50 years, but the pattern differs widely in developed and developing countries. **5. Replacement level:** This is an important concept in population dynamics or demography. Two parents bearing two children will be replaced by their offspring. But, due to infant mortality this replacement level is usually changed. **6. Zero population growth (ZPG):** When birth plus immigration in a population are just equal to deaths plus emigration, it is said to be zero population growth. **7. Male-Female ratio:** The ratio of boys and girls should be fairly balanced in a society to flourish. ▪ However, due to female infanticides and gender-based abortions, the ratio has been upset in many countries including India. ▪ In China, the ratio of boys to girls became 140:100 in many regions which led to scarcity of brides. **8. Life expectancy:** It is the average age that a newborn infant is expected to attain in a given country. • The average life expectancy, over the globe, has risen from 40 to 65.5 years over the past century. • In India life expectancy has increased to 60.3 years and 60.5 years, respectively for the Indian males and females. • In Japan and Sweden, life expectancy is quite higher, being 82.1-84.2 for females and 77-77.4 for males, respectively.		

Part C (3Q x 15M = 45Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question

9	a)	**5M**	25

Sl.No	Indoor air pollutants	Sources
1	Radon gas	Building materials which are derived from soil containing radium, groundwater and natural gas
2	Sulphur dioxide	Coal burning
3	Black soot	Fossil fuel burning
4	Carbon monoxide	Incomplete combustion of Fuels
5	Benzo (a) pyrene	Fuel wood and Cigarette smoke

10M

9b) Control of Air Pollution: Air pollution can be minimized by the following methods:

- Siting of industries after proper Environmental Impact Assessment studies.
- Using low sulphur coal in industries
- Removing sulphur from coal (by washing or with the help of bacteria)
- Removing particulate from stack exhaust gases by employing electrostatic precipitators, bag-house filters, cyclone separators, scrubbers etc.
- Vehicular pollution can be checked by
    1. regular tune-up of engines
    2. replacement of more polluting old vehicles
    3. installing catalytic converters ; by engine modification to have fuel efficient (lean) mixtures to reduce CO and hydrocarbon emissions
    4. slow and cooler burning of fuels to reduce NOx emission (Honda Technology).
- Using mass transport system, bicycles etc.
- Shifting to less polluting fuels (hydrogen gas).
- Using non-conventional sources of energy.
- Using biological filters and bio-scrubbers.
- Planting more trees.

10	10 a) **carrying capacity:**	**2M**	25

- Any system can sustain a limited number of organisms on a long term basis which is known as its carrying capacity.

	▪ Sustainability of a system depends largely upon the carrying capacity of the system. If the carrying capacity of a system is crossed (say, by over exploitation of a resource), environmental degradation starts and continues till it reaches a point of no return. ▪ In case of human beings, the carrying capacity concept becomes all the more complex. It is because unlike other animals, human beings, not only need food to live, but need so many other things to maintain the quality of life. **Basic components of carrying capacity:** **1. Supporting capacity - i.e. the capacity to regenerate** **2. Assimilative capacity- i.e. the capacity to tolerate different stresses.** • In order to attain sustainability it is very important to utilize the resources based upon the above two properties of the system. • Consumption should not exceed regeneration and changes should not be allowed to occur beyond the tolerance capacity of the system. 10.b) **Sustainability: PROBLEMS** • **Depletion of finite resources** o fuels, soil, minerals, species • **Over-use of renewable resources** o forests, fish & wildlife, fertility, public funds • **Pollution** o air, water, soil • **Inequity** o economic, political, social, gender • **Species loss** o endangered species and spaces **Sustainability: SOLUTIONS** • **Cyclical material use** o emulate natural cycles; 3 R's • **Safe reliable energy** o conservation, renewable energy, substitution, interim measures • **Life-based interests** o health, creativity, communication, coordination, appreciation, learning, intellectual and spiritual development	**3M** **5M** **5M**	
11	**11 a)WOMEN EMPOWERMENT SCHEMES** • Beti Bachao Beti Padhao Scheme • One Stop Centre Scheme • Women Helpline Scheme • UJJAWALA : A Comprehensive Scheme for Prevention of trafficking and Rescue, Rehabilitation and Re-integration of Victims of Trafficking and Commercial Sexual Exploitation • Working Women Hostel • Ministry approves new projects under Ujjawala Scheme and continues existing projects • SWADHAR Greh (A Scheme for Women in Difficult Circumstances) • Support to Training and Employment Programme for Women (STEP) • NARI SHAKTI PURASKAR	**10M**	25

	• Awardees of Stree Shakti Puruskar, 2014 & Awardees of Nari Shakti Puruskar • Awardees of Rajya Mahila Samman & Zila Mahila Samman • Mahila Shakti Kendras (MSK) • NIRBHAYA • Mahila police Volunteers • Mahila E-Haat **SCHEMES FOR CHILD WELFARE** • Anganwadi Services Scheme • Pradhan Mantri Matru Vandana Yojana • National Creche Scheme • POSHAN Abhiyaan • Scheme for Adolescent Girls • Child Protection Scheme 10 b) **FOREST ACT 1980** ▶ Provides conservation of forests & related aspects. ▶ Arrest deforestation **Objectives:** ▶ To protect & conserve the forest ▶ To ensure judicious use of forest products **Important Features of the Forest Act:** ▶ Forests are not diverted without the prior permission of the Central Government ▶ Land registered for forest may not be used for non-forest purposes ▶ Any illegal activity in a forest area can be stopped immediately ▶ Clearance of forest land for re-afforestation is forbidden ▶ One who violates the forest law is punishable.	**5M**	