

|  |  |
| --- | --- |
| **ASSIGNMENT** | |
| **Course Code** | MCC102A |
| **Course Name** | ENVIRONMENTAL STUDIES |
| **Programme** | B.TECH |
| **Department** | COMPUTER SCIENCE AND ENGINEERING |
| **Faculty** | FET |

|  |  |
| --- | --- |
| **Name of the Student**  **KUNAL GOSWAMI** |  |
| **Reg. No: 17ETCS002086** |  |
| **Semester/Year: 1st** |  |
| **Course Leader/s** |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Declaration Sheet** | | | | | | | | |
| Student Name | Kunal Goswami | | | | | | | |
| Reg. No | 17ETCS002086 | | | | | | | |
| Programme | B.TECH | | | | | Semester/Year | 1st | |
| Course Code | MCC102A | | | | | | | |
| Course Title | ENGINEERING CHEMISTRY | | | | | | | |
| Course Date | 21-07-17 | | To | | 20-11-17 | | | |
| Course Leader |  | | | | | | | |
| **Declaration**  The assignment submitted herewith is a result of my own investigations and that I have conformed to the guidelines against plagiarism as laid out in the Student Handbook. All sections of the text and results, which have been obtained from other sources, are fully referenced. I understand that cheating and plagiarism constitute a breach of University regulations and will be dealt with accordingly. | | | | | | | | |
| Signature of the Student | |  | | | | | Date |  |
| Submission date stamp  (by Examination & Assessment Section) | |  | | | | | | |
| Signature of the Course Leader and date | | | | Signature of the Reviewer and date | | | | |
|  | | | |  | | | | |

# **Contents**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[**Declaration Sheet** ii](#_Toc397599945)

[**Contents** iii](#_Toc397599946)

[**List of Tables** v](#_Toc397599947)

[**List of Figures** vi](#_Toc397599948)

[**List of Symbols** vii](#_Toc397599949)

[**Question No.A1**…………………………………………………………………………………………………….…..………8-10](#_Toc397599950)

A[1.1 Advantages and disadvantages of concrete :…………………………………….…………………...8](#_Toc397599951)-9

A[1.2 Effect of concrete on the Environment…………………………………………..……………………..9-10](#_Toc397599952)

A[1.3Justification of the stance taken. :………………………………………..………..…………………….……10](#_Toc397599953)

[**Question No. B1**](#_Toc397599955)……………………………………………………………………………………………..………….....10-11

[B1.1 Effects of Fracking on soil and ground water table ………………………………………………10-11](#_Toc397599956)

[B1.2 Methods to overcome the effects due to Fracking………………..…………………………………..11](#_Toc397599957)

[**Question No. B.2**…………………………………………………………………………………………………………….11-12](#_Toc397599960)

[B2.1. Impact of mobile phones on flora and fauna:………………………..……………………..……..11-12](#_Toc397599961)

[B2.2 Effect of Electromagnetic radiation on Sparrows …………………………………………………….12](#_Toc397599962)

[**Question No.B3**……………………………………………………………………………………………………………….12-13](#_Toc397599965)

[B3.1 Role of Genetic Engineering the development of a country. ……….…………….……….12-13](#_Toc397599966)

[B3.2 Effect of Genetically Modified Crops on human hea…………………………..........................13](#_Toc397599967)

[**Question No.B4**](#_Toc397599970) 13-14

[B4.1. Causes for change in climate 13](#_Toc397599971)-14

[B4.2 Methods to create awareness among people about climatic change 14](#_Toc397599972)

# **List of Tables**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |
| --- | --- | --- |
| **Table No.** | **Title of the table** | **Pg.No.** |

< The table numbers have to be based on the chapter number>

# **List of Figures**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| **Figure No.** | **Title of the figure** | **Pg.No.** |
|  |  |  |
|  |  |  |
|  |
|  |

< The Figure numbers have to be based on the chapter number>

# **List of Symbols**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Description** | **Units** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

< Arrange in alphabetical order>

# **Question No. A1**

**Solution to Question No. A1:**

**“Concrete is boon or bane to the Environment”**

**A1.1 Advantages and disadvantages of concrete**

There are many advantages and disadvantages of this given topic.

**The advantages are –**

**1.Concrete is Economical:** The production rate of cement concrete is very low. It is cheap and widely available around the world when compared to steel, polymers and other construction materials.

**2.Ability to be Cast into Shape:** Fresh concrete is in liquid state so it can flow. For this reason it can poured into different formworks to form desired shapes and sizes at wherever needed.

**3.Concrete Hardens at Ambient Temperature:** Concrete sets, hardens, gain its [strength](https://civildigital.com/hardened-concrete-properties/)at regular room temperature or ambient temperature. This is because cement is a low-temperature bonded inorganic material.  Thus concrete can be used irrespective of weather conditions and optimized with [mixtures](https://civildigital.com/chemical-admixtures-in-concrete/)if required.

**4. Energy Efficiency in Production:** The amount of energy required for production of [concrete](https://civildigital.com/curing-concrete-purpose-curing-curing-methods/)is low compared with steel. For plain concrete only 450–750 kWh/ton energy is required and that of reinforced concrete is 800–3200 kWh/ton. Production of structural steel demands 8000 kWh/ton or more to make which is almost 3-10 times the energy consumption.

**5. Excellent Water Resistance Characteristics:** Though chemical in water can induce [corrosion](https://civildigital.com/carbonation-concrete-various-failure-mechanisms-concrete/)in concrete and reinforced concrete. Compared to wood and steel, [concrete](https://civildigital.com/concrete-and-its-properties-take-a-quiz-for-interview/)can withstand in water without corroding. Due to this property, it is ideal to underwater and submerged applications like for building structures, pipelines, dams, canals, linings and waterfront structures Pure water is not the cause for corrosion in concrete and not even to reinforced concrete, chemicals dissolved in water such as sulfates, [chlorides](https://civildigital.com/freeze-thaw-damage-concrete-effects-preventive-measures/)and carbon dioxide causes corrosion.

**6. High-temperature resistance:** Concrete can withstand high temperatures better than wood and [steel](https://civildigital.com/advantages-steel-box-girders-bridges-disadvantages/). Calcium silicate hydrate, C-S-H, which mainly binds the concrete can withstand until 910◦C. Concrete is a bad conductor of heat it can store considerable amount of heat from the environment. Concrete can withstand heat for 2–6 hours enabling sufficient time for rescue operations in case of fire. It is used to fireproof [steel](https://civildigital.com/6-reasons-why-mild-steel-is-most-commonly-used-metal-in-civil-engineering-for-reinforced-concrete/)and used in high temperature.

**7. Ability to Consume and Recycle Waste:** Many industrial wastes can be recycled as a substitute

for cement or aggregate. This includes fly ash, slag also known as GGBFS or ground granulated blast-furnaces slag, waste glass, and even ground vehicle tires in concrete. Thus[concrete production](https://civildigital.com/cement-and-manufacture-of-cement-quiz/) can significantly reduce environmental impacts due to [industrial](https://civildigital.com/effects-of-industrial-waste-on-streams/)waste. Using these wastes improves the [properties](https://civildigital.com/concrete-and-its-properties-take-a-quiz-for-interview/)of concrete as well thus quality of the structure is not compromised.

**8. Application in Reinforced Concrete:** Concrete has comparable coefficient of thermal expansion to steel. “steel 1.2 × 10−5 and concrete 1.0–1.5 × 10−5”. Concrete protects the steel in corrosive environments due to existence of CH and other alkalis. Moreover, concrete contributes to compressive strength of reinforced concrete members and structures.

**9. Low or Zero Maintenance Required:** Concrete structures do not require coating or painting for regular applications as protection for [weathering](https://civildigital.com/weather-resistant-steel-advantages-use-restrictions/)compared to steel or wooden structures where corrosion is inevitable. Coating are to be replaced and redone on a routine basis making the maintenance cost for concrete much lower than that for steel or wood.

**10. Multi-Mode Application:** One of the major advantage of concrete is its ability to be used in different application methodologies. Concrete is hand applied, poured, pumped, [sprayed](https://civildigital.com/repair-using-sprayed-concrete-sprayed-concrete-considerations-applications/), grouted and also used for advanced [applications](https://civildigital.com/techniques-rehabilitation-repair-structures/)like [short crating](https://civildigital.com/shotcrete-concrete-repairing-techniques/)in [tunnels](https://civildigital.com/tunnel-excavation-tunnel-boring-machine-tbm/).

The **disadvantages** are –

1.**Carbon dioxide emission and climate change:** The concrete industry is one of two largest producers of **CO2**. Creating up to **5%** of worldwide man made emissions of the gas, of which **50%** is from the chemical process and **40%** from burning fuel. The carbon dioxide produced or the manufacture of one ton of structural concrete is estimated at **410 Kg/m3**. Cement manufacture contributes greenhouse gases both directly through the production of **CO2**.

**2.Concrete dust:** Building demolition and natural disasters such as earthquakes often release a large amount of concrete dust into the local atmosphere. Concrete dust was concluded to be the major source of dangerous air pollution.

**3. Concrete has Low Toughness:** Ability of a material to consume impact energy is called toughness. It is the area under the load displacement curve. Another limitation of concrete is that compared to steel, the concrete has significantly low toughness. Toughness of concrete is only

1-2% of steel. Fiber provide better toughness to concrete.

**4. Concrete has Low specific strength:** The ratio of strength to density is called specific strength. Specific strength of normal grade concrete is half that of steel, i.e. 20. Specific strength is controlled by decreasing density and increasing strength.

**5. Framework is Required:** Fresh concrete is liquid. [Framework](http://civildigital.com/formwork-construction-types-applications-shuttering/)is required to mould it in a shape and to support its self-weight. [Shuttering](http://civildigital.com/concrete-formwork-types-of-formwork/)can be of plastic, steel or wood. The [framework](http://civildigital.com/select-formwork-system/)is expensive to install . Installation requires intensive labor and time. [Pre-cast](http://civildigital.com/segmental-construction-bridge-seminar/)and [Pre-fabrication](http://civildigital.com/prefabricated-structures-prefabrication-concept-components-advantages-ppt/)techniques are adopted to overcome these limitations of concrete.

**6. Long curing time:** Concrete attains strength in 28-days after casting and [curing](http://civildigital.com/curing-concrete-purpose-curing-curing-methods/). Full strength development requires a particular temperature controlled over a month time. This is another disadvantage of concrete.

**7. Working with cracks:** Tension face of concrete has a cover to protect the reinforcing steel bars. If tensile stress at extreme fiber exceeds the [tensile capacity](http://civildigital.com/early-thermal-cracking-concrete-explained-solved-example/) of concrete, it cracks and leads to [corrosion](http://civildigital.com/weather-resistant-steel-advantages-use-restrictions/). Normal reinforced concrete is assumed to be cracked in service loads for design. To overcome this limitation of concrete, third generation concrete, [pre-stressed](http://civildigital.com/5-reasons-prestressed-concrete-required-advantages-psc/)concrete is introduced.

**8. Demands Strict Quality Control:** Concrete demands strict quality control and skilled labor during mixing, placing and curing of concrete. This is important for superior quality of concrete. If not, concrete is viable to poor strength, [durability](http://civildigital.com/hardened-concrete-properties/)and performance issues.

**A1.2** **Effect of concrete on the Environment**

Concrete is the most used building material today for it’s strength and durability. So it has many effects on the Environment. The effects are-

**1.Co2 emissions:** The most difficult issue with our industry is that it is a noteworthy CO2 producer causing a worldwide temperature variation. Almost a ton of **Co2** is emitted with every ton of cement produced. About 0.5 tons comes from the decomposition of the limestone and the balance is generated by the power plant supplying the electricity to turn the kiln and ball mills to grind the cement plus the fuel burned to fire the kiln.

**2.Nitrous oxide emissions:** Nitrous oxide emissions come from burning gasoline, coal or other fossil fuels. Ozone is formed when nitrogen oxides and volatile organic compounds mix in sunlight. The volatile organic compounds come from sources ranging from industries. Ozone near the ground can cause a number of health problems such as asthma attack, sore throat, coughing and other health difficulties.

**3.Causes soil erosion:** Concrete causes surface runoff of the water. This might result in soil erosion, water pollution and flooding.

**4.Rise in temperature:** Concrete is a major contributor of urban heat because of the massive rise in temperatures since concretized surface gets heated up much faster and also loses heat at night at faster rate.

**5.Emits harmful rays:** Concretized surface emits / radiates harmful Ultraviolet-B rays, which are hazardous to human / animal health. Further, concrete has presence of many substances which might causes toxicity and health problems.

**6.Leads to radioactive pollution:** Concrete can also lead to radioactive pollution because of presence of various natural radioactive elements (K, U and Th) in concrete dwellings. However, it depends on the type of raw material used for the creation of the concrete.

**A1.3** **Justification of stance taken**

However, despite of various impacts listed above, planned use of concrete can help us to have many sustainable benefits. For example, concretization is used in creation of dams, diversion and deflection of flood water; so it is a valuable tool for flood control. Concrete is a friend of the environment in all stages of its life span, from raw material production to demolition, making it a natural choice for sustainable home construction. Concrete also produces **minimal waste** concrete can be produced in the quantities needed for each project, reducing waste. After a concrete structure has served its original purpose, the concrete can be crushed and recycled into aggregate for use in new concrete pavements or as backfill or road base. Concrete also helps to builds durable, long-lasting structures that will not rust, rot, or burn. Concrete materials can also be recycled. Therefore, concrete is a boon to the society.

**Solution to Question No B1:**

**B1.1 Effects of Fracking on soil and ground water table**

**1**. Soil acidity increases in the vicinity of oil and gas pipelines where fracking occurs, reducing the amount of usable essential nutrients in the soil such as carbon, nitrogen, and phosphorous.

**2**.Fracking reduces nutrients such as carbon, nitrogen and phosphorous which makes it much more difficult for plants to grow and produce healthy vegetables and fruits.

**3**. Fracking reduces a plant’s ability to fix nitrogen, create cellulose and also limits a plant’s ability to maintain proper hydration.

**4**.The combination of soil acidification and deoxygenation disrupts plant cell growth, which makes it difficult to grow even the crops.

**5**.Each fracking well requires between two and five million gallons of locally sourced fresh water.

**6**. Fracking wells also produce millions of gallons of waste water, which needs to be disposed of which directly reduces the amount of clean water available to surrounding residents.

**7**. The waste water is either taken away to be treated, resulting in dozens of HGV journeys each day, or it is re-injected back into underground layers of rock.

**8**. Water contamination could also reduce the overall water supply of regional fracking areas, as the chemicals that are used in the process have the tendency to leak back into local water supplies.

**9**.Waste water is also an issue at fracking sites. Between 20% and 40% of the water used for fracking that is returned to the ground surface consists of toxic contaminants. The presence of wastewater has harmful [consequences on the environment](https://www.investopedia.com/stock-analysis/2010/will-the-epa-crack-down-on-fracking-hal-apc-nbl-cog-eog-chk-upl-xom0712.aspx), as it cannot be easily treated and returned to usable water for purposes other than fracking.

**10**.Well water (taken from much shallower depths) has been contaminated, not directly as a result of fracking but as a result of the waste pits from previous oil and gas drilling activities in the area.

**B1.2** **Methods to overcome the effects due to Fracking**

**1.Water free fracking:**

A potential alternative fracking system would involve the usage of gelled fluid and propane.

In addition to eliminating the need for water, this method also has other advantages. Because the gel absorbs sand way better than water, companies hope to achieve the same results with just one-eighth the liquid.

Pumping at a slower rate would also increase the efficiency of the process. The amount of hydrocarbon present in the gel is similar to what’s in the ground, which is why the fluid can simply be fused into the flow extracted from the ground.

Thus, the need to drain toxic wastewater is eliminated, as well as the need to pull it away for disposal. This water-free fracking technique also gets rid of deep-well injection sites, minimizing the carbon footprint of the entire process.

**2.Using recycled brine or water:**

Fracking usually uses freshwater, but eco-conscious industry researches have perfected friction-lowering additives that allow operators to flow recycled “gray” water in the underground pumps. The system called Unistim, it can take any kind of water and create a highly viscous fluid for fracking.

The water’s quality doesn’t matter. One producer in northeastern Canada has successfully tapped into a deep subsurface saline water aquifer, managing to use just a small part of its supplies for hydraulic fracturing.

**Solution to Question No B2:**

**B2.1 Impact of mobile phones on flora and fauna**

Cell phone technology is the most common telecommunicationin India. Due to its advantages, cell phone technology has grown exponentially in the last some years. Currently there are about 50 Crore cell phone users and 4.4 lakh cell phone towers in India. Radiation emitted from cell phone give a harmful effect on both plants and animals.

**Impact on flora**

Cell phone emits the microwave radiation. A cell phone transmits 1-2 watt of power in the frequency range of 824-1780 MHz A cell phone has a specific absorption rate. Plants, animals and human need nitrogen for their growth and metabolism. Nitrogen is a part of nucleic acid and has a very important role. Plants are not able to use nitrogen as present in the atmosphere because of the N≡N. They use nitrogen in the form of nitrate. Legumes are the special plants which have ability to fix nitrogen because of their nature of symbiosis with Rhizobium bacteria. In bacteria bacteroids were responsible for the formation of nodule in the root.  Radiation emitted from cell phone give a harmful effect on both plants and animals. It has been shown that the radiations emitted from mobile phone are carcinogenic. Beside this they also have harmful effect on the plants. plant seeds, when set near mobile phone-strength wi-fi modems stunt the growth.

**Impact on Fauna**

**The effects of high levels of radiation on organisms include:**

1. Chromosomal aberrations, defined as visually observable changes in chromosome structure.

2. DNA damage, defined as any damage to DNA molecules, including DNA sequence "inversion" (TCAG now GACT) as well as sections of sequences being "deleted".

3. Growth reduction, defined as a reduction in the rate of growth of organisms.

4. Reproduction effects, including sterility, reduction in reproduction rate, and occurrence of developmental abnormalities or reduction in viability of offspring.

5. Reduced seed germination.

6. Mortality, including both acute lethality and long-term reduction in life span.

7. Direct burn damage to exposed tissue.

**B2.2 Effect of Electromagnetic radiation on Sparrows**

Radiation from Electromagnetic radiationis not only taking a toll on human health but is also blamed for sparrows vanishing into thin air.

All mobile phone towers emit microwave radiation, which is radio frequency radiation (RFR), part of the spectrum of electromagnetic waves. Long-term exposure to low level RFR has damaging effects on the nervous system and immune system of small animals. Studies indicate that short-term exposure of pulsed mobile phone radiation with carrier frequency 900 MHz reduced the reproductive capacity of insects by 60%.

Birds are good ecological indicators for low-intensity electromagnetic radiation, they have thin skulls and their feathers can act as dielectric receptors of microwave radiation. Many species use magnetic navigation and micro-waves can interfere with their sensors and misguide them while navigating and preying.

Various other reasons are cited for the disappearance of house sparrows such as introduction of unleaded petrol - combustion of which produces compounds such as methyl nitrite which is highly toxic for insects that form a major part of young sparrow's diet- widespread use of garden pesticides, vanishing open grasslands, rising air temperature.

**Solution to Question No B3:**

**B3.1 Role of Genetic Engineering the development of a country**

Pest infestations, diseases and poor weather conditions may all significantly lower crop yields in

developing countries. Genetically manufactured crops could address these problems, where other breeding techniques have failed.

**1.Insect / pest resistance:**

Half the cotton grown in China in 2002 was genetically modified to produce a substance that is

poisonous to the cotton bollworm, a pest that devastates many cotton crops. Farmers had

previously applied the toxin directly by spraying the crops. The benefits of the ‘Bt cotton’ are a reduction in pesticide use, an increase in yields and profits, and health benefits for farm workers who often apply pesticides without protective clothing.

**2.Disease resistance:**

Plants can be genetically modified to be resistant to bacterial, fungal or viral infestation. Examples include research on sweet potatoes to improve viral resistance and bananas modified to resist the Black Sigatoka fungus. Untreated, this fungus can reduce banana yields by as much as 70% but fungicides are expensive.

**3.Crops that can withstand environmental stresses:**

A gene from a plant which can survive prolonged water stress in desert conditions has been introduced into rice. This allows rice to produce a sugar that protects the plant during dehydration, allowing it to survive periods of drought.

**4.Biopharmaceuticals:**

Plants could be genetically modified to produce vaccines or other medicines. Potatoes have been modified to produce edible vaccines against E. Coli bacteria which cause diarrhea. This would allow cheap and easy distribution of the vaccine, but research is still at a very early stage.

**B3.2 Effect of Genetically Modified Crops on human health**

Here are effects of Genetically Modified foods on human health-

**1.Food allergy:**

The list of Genetically Modified food products intersect with the eight most common food allergens are eggs, milk, fish, peanuts, shell fish, soy, tree nuts, and wheat. OCA states that protein in foods is what activates allergic reactions and most of the foreign proteins being gene-spliced into foods have never been eaten by humans before or tested for their safety.

**2.Toxicity:**

**A** review on mammals fed with commercialized Genetically Modified soy and maize that are already in our food and feed chain found consistent toxic effects on the liver and kidneys.

3. **Infertility:**

There is more than a casual association between Genetically Modified foods and adverse health effects." In a study on Genetically Modified corn and fertility there was a "significant decrease in offspring over time and significantly lower litter weight in mice fed Genetically Modified corn**."**  
4. **Gluten Disorders**:

When genetically modified foods as part of the treatment for gluten sensitivity, recovery is faster and more complete. It is believed that Genetically Modified foods in our diet contribute to the rise in gluten sensitivity.  
5. **DNA Transfer:**

Genetically Modified foods are created using horizontal gene transfers as opposed to natural reproduction, which is accomplished via vertical gene transfer. Horizontal gene transfer "involves injecting a gene from one species into a completely different species, which yields unexpected and often unpredictable results." There are concerns that GM DNA can transfer to humans and the environment.

6. **Birth defects:**

Glyphosate is the active ingredient in the herbicide Round up. glyphosate is responsible for causing birth defects, infertility, sperm destruction, and cancer.

**Solution to Question No B4:**

Global warming" means the same thing as "climate change" or "global climate change." Simply it describes the increase in the average ground and atmospheric temperatures across the planet. Temperatures have risen between 1.08 and 1.62 degrees Fahrenheit over the past century.

**B4.1 Causes for change in climate**

The agreement among scientists is that humans are to be blamed, largely due to vehicles, power plants, factories and other energy users burning fossil fuels such as coal and oil, and to land being cleared for development. Such actions send tons of greenhouse gases into the atmosphere, which causes the warming.

Certain gases in the atmosphere block heat from escaping. Long-lived gases that remain semi-permanently in the atmosphere and do not respond physically or chemically to changes in temperature are described as "forcing" climate change. Gases, such as water vapor, which respond physically or chemically to changes in temperature are seen.

1. **Water vapor:**

The most abundant greenhouse gas, but importantly, it acts as a reaction to the climate. Water vapor increases as the Earth's atmosphere warms, but so does the possibility of clouds and rain, making these some of the most important reaction mechanisms to the greenhouse effect.

1. **Carbon dioxide (CO2):**

A minor but very important component of the atmosphere, carbon dioxide is released through natural processes such as respiration and volcano eruptions and through human activities such as deforestation, land use changes, and burning fossil fuels. Humans have increased atmospheric CO2 concentration by more than a third since the Industrial Revolution began. This is the most important gas forcing the climate change.

1. **Methane**:

A hydrocarbon gas produced both through natural sources and human activities, including the decomposition of wastes in landfills, agriculture, and especially rice cultivation, and manure management associated with domestic cattle. On a molecule-for-molecule basis, methane is a far more active greenhouse gas than carbon dioxide, but also one which is much less abundant in the atmosphere.

1. **Nitrous oxide**:

A powerful greenhouse gas produced by soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.

1. **Chlorofluorocarbons (CFCs):**

Synthetic compounds entirely of industrial origin used in a number of applications, but now largely regulated in production and release to the atmosphere by international agreement for their ability to contribute to destruction of the ozone layer. They are also greenhouse gases.

1. On Earth, human activities are changing the natural greenhouse. Over the last century the burning of fossil fuels like coal and oil has increased the concentration of atmospheric carbon dioxide (CO2). This happens because the coal or oil burning process combines carbon with oxygen in the air to make CO2. sheets of Greenland and Antarctica are raising sea levels. Those ice sheets are melting from both above and below.

**B4.2 Methods to create awareness among people about climatic change**

Global warming is extincting many animal species. It is bringing irregular change in climate. The period that we are experiencing now is the biggest carbon dioxide spake in recorded history of humans. Therefore, awareness must be created among the human beings regarding the climate change. Hence the following methods are to be implemented. Most easy way to spread awareness is to bring change in you.

* 1. Plant as many trees and plants as much as your space permits because trees absorbs the carbon di oxide and produces oxygen and hence will help to reduce pollution and control global warming.
  2. Terrace garden are big advantage for people living in cities with limited space because this will lead to the production of clean and fresh air in the dirty and polluted city.
  3. Contact your nearby clubs and conduct awareness classes in nearby schools and your locality.
  4. We can make a big move by joining hands with NGO’s and local authorities to plant more trees.
  5. Promote the uses of public transport to private vehicles because less number of vehicles used less pollution will be caused and release of harmful gases will be less and in a way will reduce global warming.
  6. Encourage people to use cycles since it does not cause pollution.
  7. We can take a major step by conducting exhibitions in public halls that focuses on the increased natural calamities due to climate change imbalance.
  8. Over the current era we can take the help of social media to throw light over the current situation of global warming and climatic change which is affecting our earth the most such as newspaper, social sites where we can show the affects making people known about the happenings around the world due to increase in temperature. youth can help taking major steps to help spreading awareness.
  9. Certain programs must run in universities and colleges regarding the issues of global warming to make students avoid things that affect our climatic change and warming of our planet, regarding the facts faculty should lighten up things to focus over the inventions related to recycling and reusing particles that affects our nature or helps increasing carbon dioxide level.

**Bibliography**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Kinicki and Williams Irwin. (2008) *Management*, McGraw Hill.
2. Decenzo David and Robbin Stephen A. (1996) *Personnel and Human Reasons Management*, Prentice Hall of India.
3. J.A.F. Stoner, Freeman R. E and Daniel R Gilbert. (2004) *Management*, 6th Edition, Pearson Education.
4. Fraidoon Mazda. (2000) *Engineering Management*, Addison Wesley.

All referencing, bibliography needs to be done as described in the following article:

<http://www.msruas.ac.in/pdf_files/VCBlogs/Academic%20Good%20Practices.pdf>