Daily Current Affairs Prelims Quiz 19-08-2021 (IPCC Special)

1) With respect to the Intergovernmental Panel on Climate Change (IPCC), consider the following statements:

1. It is an intergovernmental body of the United Nation (UN) that publishes Assessment Reports once in every five years.
2. It was established by the United Nations General Assembly (UNGA) and the World Meteorological Organization (WMO) in 1988.
3. Participation in the IPCC is open to all member countries of the WMO and UN.

Which of the statement(s) given above is/are correct?

a. 3 only
b. 1 and 2 only
c. 2 and 3 only
d. 1, 2 and 3

Answer : a

Intergovernmental Panel on Climate Change (IPCC)

- It is an intergovernmental body of the United Nations (UN) for assessing the science related to climate change.
- It was created in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP).
- The objective of the IPCC is to provide governments at all levels with scientific information that they can use to develop climate policies.
- IPCC reports are also a key input into international climate change negotiations.
- The IPCC is an organization of governments that are members of the United Nations or WMO.
- The IPCC currently has 195 members.
- The IPCC published its First AR in 1990, second in 1995, third in 2001, fourth in 2007 and the Fifth Assessment Report in 2014.

2) With reference to the findings of 6th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), consider the following statements:

1. The ocean surface will continue to warm more than the land surface.
2. The Arctic will continue to warm more than the global surface temperature.
3. Human-induced global warming has been more rapid in Africa than the rest of the world.

Which of the statement(s) given above is/are correct?

a. 2 only
b. 1 and 3 only
c. 2 and 3 only
d. 1, 2 and 3

Answer : c

Highlights of the IPCC 6th Assessment Report

- **Human's role in climate crisis** - Human activity is the cause of climate change and this is an unequivocal fact.
- Global temperatures have already risen by 1.1 degrees Celsius since the 19th century.
- Average global temperatures will continue to rise and could increase by 5.7°C by the end of this century as compared to 1850-1900.
- No region on Earth has escaped the impacts of the climate crisis.
- **Extreme Weather Events** - Every additional 0.5°C rise in temperature amplifies the intensity and frequency of heatwaves, heavy precipitation and droughts.
- The land surface will continue to warm more than the ocean surface.
- **Ice free Arctic** - The Arctic will continue to warm more than global surface temperature.
- The temperature on the coldest days will increase by three times in the Arctic.
- As a result, the frequency of marine heatwaves will continue to increase in the tropical ocean and the Arctic.
- This will amplify permafrost thawing and loss of seasonal snow cover of land and sea ice.
- The Arctic is likely to be practically sea ice-free at least once before 2050.
- **Highest CO2 Levels** - The levels of CO2, the primary driver of global heating, were higher in 2019 than at any time in "at least 2 million years".
- **Methane Cuts** - In addition to slashing CO2 emissions, the world must also deliver "strong, rapid and sustained reductions" in methane in order to get to grips with the climate crisis.
- **Sea Level Rise** - A warmer climate will intensify very wet and very dry weather and climate events and seasons leading to flooding or drought.
- Land and ocean's capacity to absorb carbon dioxide (CO2) will decrease resulted in the emitted CO2 remain in the atmosphere.
- Greenland ice sheet and Antarctic ice sheet will continuously lose ice over the 21st century.
- This ice loss from the Greenland ice sheet will increase with cumulative emissions.
- Deep ocean warming and ice sheet melt will drive sea level rise for centuries and millennia.
- **Africa** - Human-induced global warming has been more rapid in Africa than the rest of the world.
- At 1.5°C global warming, heavy precipitation and associated flooding are projected to intensify and be more frequent in most regions in Africa.

3) With respect to Methane Hydrates, consider the following statements:

1. It is a solid compound in which a large amount of methane gas molecules (CH4) are caged within a crystalline structure of water.
2. The total amount of carbon in permafrost associated methane hydrates is much less than the carbon in permafrost soils.

Which of the statement(s) given above is/are correct?

a. 1 only

b. 2 only

c. Both 1 and 2

d. Neither 1 nor 2

Answer : c

Methane Hydrates

- Methane Hydrate (MH) is a solid compound in which a large amount of methane gas molecules (CH4) are caged within a crystalline structure of water under low temperature and high

pressure, forming a solid similar to ice.
- It looks like ice, but starts burning when an open flame is brought close to it; methane hydrate is often called “fiery ice.”
- They formed as frozen soils that were flooded when sea levels rose after the last ice age.
- If these hydrates thaw, they may release methane that can bubble up to the surface.
- The total amount of carbon in permafrost associated methane hydrates is much less than the carbon in permafrost soils.
- Global warming takes millennia to penetrate into the sediments beneath the ocean.
- As a result, only a small fraction of the existing hydrates could be destabilised during the coming century.
- Even when methane is released from hydrates, most of it is expected to be consumed and oxidised into carbon dioxide in the ocean before reaching the atmosphere.

4) With reference to Radiative Forcing, consider the following statements:

1. It is the difference between incoming and outgoing energy in the Earth’s climate.
2. Positive Forcing refers to cooling where the outgoing energy is greater than the incoming energy.
3. Negative forcing refers to warming where the incoming energy being greater than the outgoing energy.
4. Forcings from volcanoes and human-emitted aerosols are negative forcings.

Which of the statement(s) given above is/are correct?

a. 1 only

b. 1 and 4 only

c. 2, 3 and 4 only

d. 1, 2, 3 and 4 only

Answer : b

- The IPCC report noted that the human-caused radiative forcing of 2.72 Wm–2 in 2019 relative to 1750 has warmed the climate system.
- This warming is mainly due to increased GHG concentrations, partly reduced by cooling due to increased aerosol concentrations.

Radiative Forcing

- Earth is continually bathed in energy from the sun.
- Sunlight energy heats land and water at the surface, and in turn, they emit heat.
- This heat provides further warming of the atmosphere.
- The mix of gases in our atmosphere keeps some of the heat energy from escaping directly to space, similar to the way a blanket keeps warmth near your body.
- This process is the naturally occurring greenhouse effect, and it keeps Earth warm enough to support life.
- In accordance with the basic laws of thermodynamics, as Earth absorbs energy from the sun, it must eventually emit an equal amount of energy to space.
- **Radiative Forcing** - The difference between incoming and outgoing radiation is known as a planet’s Radiative Forcing (RF).
- **Positive Forcing** - When forcings result in incoming energy being greater than outgoing energy, the planet will warm (positive RF).
- **Negative Forcing** - Conversely, if outgoing energy is greater than incoming energy, the planet will cool.
- Some forcings are positive while others, such as those from volcanoes or human-emitted aerosols, are negative.

5) With reference to Net Zero Emissions, consider the following statements:

1. It is a condition in which a country would bring down its emissions to zero, taking pre-industrial levels as base range.
2. India has not yet committed to a net zero timeline.

Which of the statement(s) given above is/are correct?

a. 1 only
b. 2 only
c. Both 1 and 2
d. Neither 1 nor 2

Answer : b

Net Zero Emissions

- It is also referred to as carbon-neutrality.
- It does not mean that a country would bring down its emissions to zero.
- Rather, net-zero is a state in which a country's emissions are compensated by absorption and removal of greenhouse gases from the atmosphere.
- Absorption of the emissions can be increased by creating more carbon sinks such as forests, while removal of gases from the atmosphere requires futuristic technologies such as carbon capture and storage.
- This way, it is even possible for a country to have negative emissions, if the absorption and removal exceed the actual emissions.
- A good example is Bhutan which is often described as carbon-negative because it absorbs more than it emits.
- India is currently the World's third biggest emitter of greenhouse gases, after the US and China.
- India has not yet committed to a net zero timeline.
- Several other countries, including the UK and France, have already enacted laws promising to achieve a net-zero emission scenario by the middle of the century.
- The European Union is working a similar Europe-wide law, while many other countries including Canada, South Korea, Japan and Germany have expressed their intention to commit themselves to a net-zero future.
- Even China has promised to go net-zero by 2060.

6) Consider the following statements with respect to Natural variability

1. It refers to variations in climate that are caused by processes other than human influence.
2. External natural variability corresponds to the redistribution of energy within the climate system whereas the Internal Variability corresponds to changes in Earth's orbit or from volcanic eruptions.

Which of the statement(s) given above is/are correct?

a. 1 only
b. 2 only
c. Both 1 and 2
d. Neither 1 nor 2

Answer : a

Natural variability

- It refers to variations in climate that are caused by processes other than human influence.
- It includes variability that is internally generated within the climate system and variability that is driven by natural external factors.

- Natural variability is a major cause of year-to-year changes in global surface climate and can play a prominent role in trends over multiple years or even decades.
- But the influence of natural variability is typically small when considering trends over periods of multiple decades or longer.
- **Internal Natural Variability** - It corresponds to a redistribution of energy within the climate system and is most clearly observed as regional, rather than global.
- For example, via atmospheric circulation changes similar to those that drive the daily weather, fluctuations in surface temperature.
- **External Natural Variability** - It can result from changes in the Earth's orbit, small variations in energy received from the sun, or from major volcanic eruptions.

7) With respect to Short Lived Climate Forcers (SLCFs), consider the following statements:

1. These are compounds that warm or cool the Earth's climate over shorter time scales.
2. It includes gases as well as tiny particles called aerosols.
3. They are emitted both naturally and as a result of human activities.

Which of the statements given above are correct?

a. 1 and 2 only

b. 1 and 3 only

c. 2 and 3 only

d. 1, 2 and 3

Answer : d

Short Lived Climate Forcers (SLCFs)

- These are compounds that warm or cool the Earth's climate over shorter time scales – from days to years. They do not remain in the atmosphere for very long.
- Climatic effects of Carbon dioxide, a greenhouse gas, lasts for decades, centuries or even more.
- The SLCFs include gases as well as tiny particles called aerosols, and they can have a warming or cooling effect on the climate.
- **Warming SLCFs** are either greenhouse gases (e.g., ozone or methane) or particles like black carbon (also known as soot), which warm the climate by absorbing energy and are sometimes referred to as short-lived climate pollutants.
- **Cooling SLCFs**, on the other hand, are mostly made of aerosol particles (e.g., sulphates, nitrates and organic aerosols) that cool down the climate by reflecting away more incoming sunlight.
- Some SLCFs do not directly affect the climate but produce climate-active compounds and are referred to as **Precursors**.
- Some of the SLCF Precursors includes sulphur dioxide (which produces sulphates) and nitrogen oxides (which produce nitrates and ozone).
- SLCFs are emitted both naturally and as a result of human activities, such as agriculture or extraction of fossil fuels.
- Emissions have increased since the start of industrialization, and humans are now the dominant source for several SLCFs and SLCF precursors.

8) Consider the following statements:

1. Climate warming induced permafrost thawing could release greenhouse gases in to the atmosphere and further amplifies climate change.

2. The Antarctic is the biggest carbon pool on Earth, storing twice as much carbon in its permafrost, than is currently stored in the atmosphere.

Which of the statement(s) given above is/are correct?

a. 1 only
b. 2 only
c. Both 1 and 2
d. Neither 1 nor 2

Answer : a

Arctic Warming

- In the Arctic, large amounts of organic carbon are stored in permafrost.
- Permafrost is the ground that remains frozen throughout the year.
- If significant areas of permafrost thaw as the climate warm, some of that carbon may be released into the atmosphere in the form of carbon dioxide or methane, resulting in additional warming.
- The **Arctic** is the biggest climate-sensitive carbon pool on Earth, storing twice as much carbon in its frozen soils, or permafrost, than is currently stored in the atmosphere.
- As the Arctic region warms faster than anywhere else on earth, there are concerns that this warming could release greenhouse gases to the atmosphere and therefore significantly amplify climate change.

Permafrost

- The carbon in the permafrost has built up over thousands of years, as dead plants have been buried and accumulated within layers of frozen soil, where the cold prevents the organic material from decomposing.
- As the Arctic warms and soils thaw, the organic matter in these soils begins to decompose rapidly and return to the atmosphere as either carbon dioxide or methane, which are both important greenhouse gases.
- Permafrost can also thaw abruptly in a given place, due to melting ice in the ground reshaping Arctic landscapes, lakes growing and draining, and fires burning away insulating surface soil layers.

9) Consider the following statements:

1. Warming will be stronger in the Arctic, on land and in the Northern Hemisphere.
2. Precipitation will increase in high latitudes, the tropics and monsoon regions.

Which of the statement(s) given above is/are correct?

a. 1 only
b. 2 only
c. Both 1 and 2
d. Neither 1 nor 2

Answer : c

10) With reference to Permafrost, consider the following statements:

1. It is any ground that remains completely frozen or colder for at least two years straight.
2. It can be found in cold places like Tibetan Plateau, high-altitude regions like Rocky Mountains, and on the floor of the Arctic Ocean.
3. Although the ground is frozen in permafrost regions, they are not always covered in snow.

Which of the statements given above are correct?

a. 1 and 2 only

b. 1 and 3 only

c. 2 and 3 only

d. 1, 2 and 3

Answer : d

Permafrost

- It is any ground that remains completely frozen—32°F (0°C) or colder—for at least two years straight.
- These permanently frozen grounds are most common in regions with high mountains and in Earth's higher latitudes—near the North and South Poles.
- Permafrost covers large regions of the Earth.
- Almost a quarter of the land area in the Northern Hemisphere has permafrost underneath.
- Although the ground is frozen, permafrost regions are not always covered in snow.
- Permafrost can be found in colder places like the Tibetan plateau, high-altitude regions like the Rocky Mountains, and on the floor of the Arctic Ocean as undersea permafrost.
- In the southern hemisphere, where there's far less ground to freeze, permafrost is found in mountainous regions such as the South American Andes and New Zealand's Southern Alps, as well as below Antarctica.