Question 1: What are the benefits of electrifying every sector? What are the sectors which are harder to electrify in the present times?
Student Answer: Electrifying every sector ensures that low carbon emissions are maintained as almost all sectors use electricity out of which 70% comes from burning of fossil fuel based resources like coal & petrols. In present times Industry is harder to electrify as it requires high amount of energy to power boilers used in manifacturing & heating. Transportation like heavy weigh transportation of goods using ships or Airplanes can be also a difficult sector as there are technological limitations for engines or fuels used.

Question 2: How will climate change impact crop yields and nutritional quality?
Student Answer: Climate change events like droughts, high percipitation or heat can impact crop yeild.
- Water rich crops like rice will be heavily impacted by droughts as there will be water scarcity.
- Minerals retained by soil will be highly impacted by heat waves as they will result in soil erosion. This will in turn affect nutritional quality as minerals present in soil would be less & also moisture retained in soil would be less.

Question 3: Describe the carbon offset project and program.
Student Answer: The carbon offset project aims to offset any carbon emissions produced by a company or organization.
-These offsets can either be investing in renewable technologies, afforestation or controlling emissions by increasing efficiency or using carbon capture technolgies.
-This can be done by purchasing Carbon credits that can be traded or brought depending on the emissions produced.

Question 4: What is greenwashing and greenhushing?
Student Answer: Greenwashing is a term used when companies or organizations falsely claim or use unethical means to promote themselves as green or carbon-0. This is done to avoid critisim for emissions produced.
- Greenhushing is when companies or organizations undermine their efforts to reduce carbon footprint or not promoting their achurments to avoid scrutinity & judgement.

Question 6: Describe doughnut economy and its purpose.
Student Answer: Doughnout economy is a term that describes socio-economic initiatives side by side ecological initiatives. It promotes a circular economy & takes in considerations that initiatives based on soci-economics (food, water, shelter) do not impact ecological factors (forest cover, climate).

Question 7: What is the greenhouse effect? How does it impact the earth system? Write any three examples of greenhouse gases and its present day concentration.

Student Answer: The green house effect basically produces gases that Maintain heat in the atmosphere. Without these gases heat would not have been trapped & earth would have been too cold to sustain life.
- CO_2 → Carbon-dioxide (Emissions by thermal plants)
- N_2O→ Nitrous oxide (fertilizer (chemical) emissions)
- HFCs → Hydro furo carbons (emitted by appliances)

Question 9: What are carbon sources, stocks and sinks? Explain with examples
Student Answer: Carbon sources are where carbon is emitted like burning of fossil fuels in thermal plants or burning of organic matter.
- Stocks → Reservoirs where carbon is found in heavy concentrations like atmosphere, soil, sea.
- Sinks → Where carbon is processed, like forests & captured

Question 11: What is the difference between carbon removal and carbon offset? What are two categories of carbon dioxide removal?
Student Answer: Carbon removal is a process where carbon is "converted or stored. Carbon Offsets are technologies or methods used for carbon removal. Examples include renewable energy plants, afforestation or refforestation.
→ There are 2 categories of carbon dioxide removal.
- CCUS [carbon capture utilization & storage]
- Excess carbon is captured underground or used in other industrial processes directly from plants. Ex: Biochar
- DAC [Direct Air Capture] - Carbon di-oxide is directly captured from air using DAC technologies.

Question 14: What is clean energy and what are the different types of clean electricity technologies? Explain any 3 with its pros and challenges.
Student Answer: Clean energy has minimal or no emissions. There are many clean energy technologies
Solar
→ Uses energy from sun in the form of sunlight.
→ Cheapest form of clean energy.
→ Requires large amount of lands.
Wind -
Uses wind to generate electricity.
- Pricier than solar but hight output.
- Very specific to location & also prone to damage.
Nuclear
- Uses nuclear fission or fusion to generate electricity.
- The highest output but very expensive.
- Produces toxic waste products which are hard to manage.

Clean energy technologies have very minimal or no emissions over the life of the plant. They also use renewable energy is free & abundant. Technologies like EVs or Hydrogen cells can also be used considered.

Question 16: What are feedback loops in the climate system? Explain positive and negative feedback loops with 1 example each. Explain tipping points using two examples of tipping elements.
Student Answer: Tipping points are thresholds beyond which any change in the climate would result in irreversible changes.
Ex: Greenland / Arctic Glaciers: Melting of these glaciers would result in sea levels rising which would flood or submerge places of inhabitant near the coasts.
: Amazonian Rain Forrest: One of the largest sinks in the world. Defforestation would lead to uncontrolled carbon di-oxide emissions.

Question 5: What are the four different types of solar PV solutions based on their application?
Student Answer: Solar PV solutions:
- Can be used to power grids or EV charging stations. Require ON-grid system installations.
- Off-grid solar installations can be used to power heavy machineraries like electric agricultural equipment.
- For efficient power production, dual axis solar systems can be used which track the movement of the Sun.