The candidate should be able to:

**• Define climate change and differentiate between weather and climate.**

**• Know the general trends of modern climate change, such as observed surface temperature, sea ice coverage, etc.**

**• Describe how the earth’s climate has changed over long periods of time and different methods for measuring non-anthropogenic climatic changes at different time frames.**

**• Understand how the earth’s energy balance, greenhouse effect, and radiative forcing affect the climate.**

**• Know the primary greenhouse gases and aerosols, their sources, and relative contribution to climate change.**

**• Understand the implications of different greenhouse gas global warming potentials as well as atmospheric lifetimes.**

**• Summarize how humans have contributed to atmospheric CO2 increases and modern warming.**

**• Understand the distribution, frequency, and intensity of climate-driven economic and ecological impacts across geography and time.**

**• Understand contributors to, and risks from, sea level rise and ocean acidification.**

**• Describe extreme-event attribution science and the data and techniques scientists use to connect climate change to extreme events.**

**• Understand and describe how positive feedbacks influence climate change.**

**• Describe how climate tipping points could disrupt natural systems and harm human well-being.**

**• Explain the different approaches and key considerations of climate change adaptation, including maladaptation.**

**• Discuss trends in the energy system and how energy sources can contribute to or mitigate climate change. Understand relative carbon intensities of energy sources.**

**• Identify opportunities and strategies for renewable and low-emissions energy technology to act as climate mitigants. Discuss specific challenges (e.g., intermittency) deploying each technology.**

**• Understand the opportunities and drawbacks of implementing geoengineering techniques to combat climate change.**

**• Explain carbon budgets and emissions trajectories to stay within mitigation targets. Know key numeric global emissions limits, commitments, and scenario paths.**