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# RV COLLEGE OF ENGINEERING®

(An Autonomous Institution Affiliated to VTU)

II Semester B. E. Regular / Supplementary Examinations Aug-2024

## GLOBAL CLIMATE CHANGE

*Time: 03 Hours* *Maximum Marks: 100*

*Instructions to candidates:*

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. In Part B question number 2 is compulsory. Answer any one full question from 3 and 4, 5 and 6, 7 and 8, 9 and 10.

**PART-A**

| | | | M | BT | CO |
|---|---|---|---|---|---|
| 1 | 1.1 | Define energy intensity. | 02 | 1 | 1 |
| | 1.2 | How is temperature anomaly different from normal temperature? | 02 | 1 | 1 |
| | 1.3 | What is Chemical Weathering? | 02 | 1 | 1 |
| | 1.4 | List out the various renewable sources of energy. | 02 | 1 | 1 |
| | 1.5 | Name a few human activities that cause climate change on Earth. | 02 | 1 | 1 |
| | 1.6 | What is the turnover time of carbon? | 02 | 1 | 1 |
| | 1.7 | Define offset with respect to carbon emissions. | 02 | 2 | 2 |
| | 1.8 | What do you mean by mitigation of climate change? | 02 | 1 | 2 |
| | 1.9 | Define greenhouse gas effect. | 02 | 1 | 2 |
| | 1.10 | What causes abrupt climate change? | 02 | 2 | 1 |

**PART-B**

| | | | | | |
|---|---|---|---|---|---|
| 2 | a | What is the difference between weather and climate, and why is it important to distinguish between the two when discussing climate change? | 04 | 1 | 1 |
| | b | What is Climate Change? Discuss about the Atmospheric climate variables that affect climate system. | 08 | 1 | 1 |
| | c | Why climate change a serious problem? | 04 | 2 | 2 |
| 3 | a | i) The sun is a 6000-$K$ blackbody. At what characteristic wavelength does it radiate?<br>ii) At what characteristic wavelength does a blackbody radiate at room temperature? | 04 | 3 | 2 |
| | b | Why are incandescent light bulbs being phased out in many countries? | 04 | 2 | 2 |
| | c | Explain how "chemical weathering" removes $CO_2$ from the atmosphere. What is the weathering chemical reaction? Can this process play an important role in counteracting the increase in atmospheric carbon dioxide caused by humans? | 08 | 2 | 3 |
| | | **OR** | | | |
| 4 | a | Explain the combined atmosphere-land biosphere-ocean carbon exchange system. | 10 | 2 | 3 |
| | b | Describe the composition of our atmosphere, with a particular focus on greenhouse gases. | 06 | 2 | 2 |
| 5 | a | What are the names of the four main emissions scenarios created by *IPCC*? Explain them. In just a few sentences, explain the main differences between them. | 10 | 1 | 3 |
| | b | What are the predictions of future climate based on emissions scenarios from *IPCC*. | 06 | 2 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| | | **OR** | | | |
| 6 | a | Explain *IPAT* relationship to analyze the driving forces of individual factors on $CO_2$ emissions. | 08 | 2 | 2 |
| | b | What are the potential impacts of abrupt climate change on ecosystems and societies? | 08 | 2 | 2 |
| 7 | | a) Explain how a carbon tax works.<br>b) Explain how a cap-and-trade system works.<br>c) Illustrate the fundamental difference between these two policies with an example. | 16 | 2 | 3 |
| | | **OR** | | | |
| 8 | a | What are carbon-free energy sources? List the carbon free energy sources and explain any two in detail. | 10 | 1 | 2 |
| | b | What are the advantages and disadvantages of geoengineering. | 06 | 2 | 2 |
| | | | | | |
| 9 | a | What are the new insights on climate impacts, vulnerability, and adaptation from *IPCC*? | 08 | 3 | 4 |
| | b | Discuss key aspects of the Paris Agreement to address climate change. | 08 | 2 | 4 |
| | | **OR** | | | |
| 10 | a | What does *COP* stand for in the context of climate change, and what is its main role? | 08 | 2 | 3 |
| | b | What does *IPCC* stand for, and what is its primary purpose? | 08 | 1 | 4 |