RV Educational Institutions
RV College of Engineering
Autonomous Institution Affiliated to Visvesvaraya Technological University, Belagavi
Approved by AICTE, New Delhi

Go, change the world

Academic year 2023-2024 (Even Sem)

DEPARTMENT OF
CHEMICAL ENGINEERING

Date	15th May 2024	Maximum Marks	50
Course Code	CH124ATD	Duration	90 Min
Sem	II Semester	CIE-1	
Global Climate Change			

Sl. No.		Questions	Marks	CO
1		How climate is different from weather? Which are the components that influence the climate system?	07	1
2		Assume a planet with a one-layer atmosphere has a solar constant of $S = 2{,}000$ W/m^2 and an albedo of $\alpha = 0.4$. a) Derive the expression for planet's surface temperature and calculate the same. Make the standard assumption that the atmosphere is transparent to visible photons but opaque to infrared photons.	10	1
3		What is Climate Change? What is the evidence that shows the climate is changing?	10	2
4	a	Why do you think climate change a serious problem?	05	2
	b	The Sun as a blackbody: a. The Sun is a 6000-K blackbody. At what characteristic wavelength does it radiate? b. At what characteristic wavelength does a blackbody at room temperature radiate?	04	1
5	a	Explain transfer of carbon between rock and atmosphere.	06	2
	b	Discuss about emission of methane into the atmosphere from various sources and atmospheric abundances of methane.	08	2

RV College of Engineering®
Mysore Road, RV Vidyaniketan Post,
Bengaluru - 560059, Karnataka, India

NBA Accredited (UG - 6Years)

hod.ch@rvce.edu.in
www.rvce.edu.in
Tel: 080-68188223

Department of Chemical Engineering

DEPARTMENT OF

CHEMICAL ENGINEERINGs

Date	3rd July 2024	Maximum Marks	10+50
Course Code	CH124ATD	Duration	120 Min
Sem	II Semester	Improvement Test	
Global Climate Change			

Sl. No.		Questions	Marks	CO
		PART-A		
1		Write the approximate composition of atmosphere?	02	1
2		What is chemical weathering?	02	2
3		What is turnover time of carbon?	02	2
4		Define carbon intensity.	02	2
5		Name few human activities that causes climate change on earth.	02	1
		PART-B		
1	a	Explain how humans are modifying the carbon cycle?	06	2
	b	Discuss about emission of methane into the atmosphere from various sources and atmospheric abundances of methane.	10	2
2		On the Earth, the difference between daytime and night time temperatures can be 30 K. On Venus, there is basically no difference between daytime and night time temperatures. Why is this?	06	3
3		What are the predictions of future climate based on emissions scenarios from IPCC.	10	4
4	a	Draw a diagram that shows the energy flows for a planet with a two-layer atmosphere. The solar constant for the planet is S = 3,000 W/m^2 and the albedo of the planet is $\alpha = 0.1$. Make sure each arrow is labeled with the energy flow. What is the surface temperature of this planet?	06	3
4	b	Two people argue about why Venus is so much warmer than the Earth. The first argues that it's because Venus is closer to the Sun, so it absorbs more solar energy. The second argues that it's because Venus has a thick, greenhouse-gas rich atmosphere. Which person is right, and why is the other one wrong?	04	3
5		What are the predictions of future climate based on emissions scenarios from IPCC.	08	2

Explain the IPAT relations for carb. to analyze the factors effecting carbon cycle.

CH114ATD / CH124ATD / 22EM204

USN | 1 | R | V | 2 | 3 | C | D | 0 | 4 | 3 |

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? 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. b) Explain how a cap-and-trade system works. 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