Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–I & II(NEW) EXAMINATION – SUMMER 2023

Subject Code:3110007 Date:09-08-2023

Subject Name:Environmental Sciences

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

Q.1 **(a)** Biomedical waste refers to any waste generated during the diagnosis, treatment, or immunization of human beings or animals, or in research activities that involve biological materials. In India, biomedical waste is regulated by the Biomedical Waste Management Rules, 2016, which specify guidelines for its handling, segregation, transportation, and disposal. Biomedical waste can be classified into four categories: infectious waste, sharps waste, chemical waste, and general waste. Healthcare facilities are required to segregate biomedical waste at the point of generation and dispose of it in a safe and environmentally friendly manner. The proper management of biomedical waste is crucial to prevent the spread of infections and to protect the environment and public health. Based on this context, write the best answers to the question(s). **03**

1. What are the different categories of biomedical waste as per the Biomedical Waste Management Rules, 2016?
2. Why is proper management of biomedical waste crucial in healthcare facilities?
3. How does the Indian government regulate the handling, segregation, transportation, and disposal of biomedical waste?

(b) Water pollution refers to the contamination of water bodies like rivers, lakes, oceans, and groundwater. The quality of water is important for the health of the environment, human beings, and animals. Water quality standards have been established to ensure the quality of water is maintained to protect public health and the environment. There are various sources of water pollution like industrial waste, domestic sewage, agricultural runoff, and oil spills. The classification of water pollutants includes physical, chemical, and biological contaminants. The effects of water pollutants are numerous and can be harmful to human health and the environment. They can cause waterborne diseases, disrupt aquatic ecosystems, harm wildlife, and damage infrastructure. Therefore, it is essential to prevent water pollution through proper waste management and responsible environmental practices. Based on this context, write the best answers to the question(s). **04**

1. What are water quality standards, and why are they important?
2. Name three sources of water pollution.
3. What are the three classifications of water pollutants?
4. What are some of the effects of water pollutants on the environment and human health?

(c) Environmental science is a multidisciplinary field that integrates the principles of physical, chemical, and biological sciences to study the environment and the impact of human activities on it. The scope of environmental science encompasses a wide range of topics, including ecology, geology, atmospheric science, hydrology, and waste management. The principles of environmental science **07**

revolve around the concept of sustainability, which involves meeting the needs of the present generation without compromising the ability of future generations to meet their needs. The rapid development of technology has had a significant impact on the environment, leading to environmental degradation, such as air and water pollution, deforestation, and climate change. Therefore, it is essential to understand the importance of environmental science and its principles for different engineering disciplines to develop sustainable technologies that minimize environmental impacts. Based on this context, write the best answers to the question(s).

1. What is environmental science?
2. What are the principles of environmental science?
3. What is the scope of environmental science?
4. What is sustainability, and why is it important in environmental science?
5. How has technology impacted the environment?
6. What is environmental degradation, and what are its causes?
7. Why is it important for different engineering disciplines to understand environmental science principles?

Q.2 **(a)** What are the factors that contribute to the generation of biomedical waste in Indian healthcare facilities, and what steps should be taken for its safe and efficient management? **03**

(b) What are the main challenges faced in effectively managing solid waste in India, and what measures can be taken to address them? **04**

(c) In India, e-waste generation has been on the rise due to factors such as increasing technology adoption, rapid urbanization, and changes in consumer behavior. Based on this context, write the best answers to the question(s). **07**

1. What are the primary sources of e-waste generation in India? Explain with examples. (3 marks)
2. How has e-waste generation in India changed over the past decade? What factors have contributed to this change? (2 marks)
3. What are the environmental and health hazards associated with e-waste in India? How are these hazards being addressed? (2 marks)

OR

(c) In India, the management of e-waste is a growing concern due to the rapid increase in electronic waste generated from various sources. Based on this context, write the best answers to the question(s). **07**

1. What are the legal frameworks and regulations currently in place in India for the management of e-waste? (1 mark)
2. What steps are being taken by the government and industry stakeholders to improve e-waste management practices? (2 marks)
3. What are some of the challenges faced in effectively managing e-waste in India? How can these be addressed to promote a more sustainable and environmentally responsible approach to e-waste management? (2 marks)
4. Suggest strategies that can be implemented to effectively manage the growing e-waste problem. (2 marks)

Q.3 **(a)** What are the major sources of noise pollution in India, and how does it affect people's health and well-being? Provide examples of any initiatives taken by the government to control noise pollution in the country. **03**

(b) You are a city planner tasked with addressing noise pollution in a residential area. What steps would you take to mitigate the noise pollution and what factors would you consider in your decision-making process? Explain your answer with specific examples. **04**

(c) Air pollution is a major environmental issue in India, with severe impacts on public health and the economy. In this context, discuss the sources, effects, and control measures for particulate matter (PM) pollution in India. **07**

OR

Q.3	**(a)**	What are the legal provisions in India to control noise pollution, and what steps can individuals take to reduce noise pollution in their local communities?	**03**
	(b)	How does exposure to chronic noise pollution affect the physiological and psychological health of individuals, and what are some effective strategies for mitigating its negative effects?	**04**
	(c)	India has experienced alarming levels of air pollution, particularly in urban areas, due to high levels of sulfur dioxide (SO_2) and nitrogen oxides (NO_X) emissions. In this context, discuss the sources, effects, and control measures for SO_2 and NO_X pollution in India, and the role of policy and regulations in addressing this issue.	**07**
Q.4	**(a)**	With the rapid industrialization and urbanization, the quality of water in many Indian rivers has significantly deteriorated over the years. In this context, discuss the causes and effects of water pollution in the Ganga river basin and suggest measures to control and prevent further degradation of water quality.	**03**
	(b)	India's rapidly growing population, coupled with its rapid industrialization and urbanization, has resulted in increased pollution levels and environmental degradation. What measures can be taken to address this problem, particularly in urban areas, and promote cleaner development mechanisms that can help mitigate the impact of global climate change?	**04**
	(c)	As a policy maker, what steps would you take to effectively address the issue of climate change and promote sustainable development in a developing country like India, while balancing economic growth with environmental concerns?	**07**

OR

Q.4	**(a)**	The groundwater in many regions of India is heavily polluted due to indiscriminate disposal of industrial waste, excessive use of chemical fertilizers, and improper disposal of human waste. In this context, discuss the health impacts of groundwater pollution on local communities.	**03**
	(b)	With the increasing frequency and intensity of natural disasters due to climate change, what steps can be taken by governments and communities to ensure resilient and sustainable development in vulnerable areas? How can international cooperation and funding be leveraged to address this issue?	**04**
	(c)	If a country is one of the largest emitters of greenhouse gases in the world, with its carbon footprint steadily increasing. What steps can the respective government take to reduce carbon emissions and promote sustainable development while simultaneously balancing economic growth and poverty reduction?	**07**
Q.5	**(a)**	Give an example of how the 4R principles can be applied in a household to reduce waste generation?	**03**
	(b)	How has the depletion of the ozone layer affected India's agricultural productivity and what measures have been taken to mitigate this impact?	**04**
	(c)	In what ways can the concept of smart cities enhance the sustainability of urban environments in India? Discuss the role of technology and innovation in achieving the objectives of smart cities, and provide examples of successful implementation of smart city initiatives in India.	**07**

OR

Q.5	**(a)**	How can individuals apply the 4R's principles in their daily lives to reduce waste and minimize their impact on the environment?	**03**
	(b)	How does the use of alternative energy sources, such as solar or wind power, relate to the issue of acid rain? Can the use of these sources help to mitigate the effects of acid rain, and if so, how?	**04**
	(c)	How can the concept of green building contribute to the overall sustainability of a city or region? Provide specific examples of how the principles of green building have been applied in cities or regions in India to address environmental challenges.	**07**