

SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF MECHANICAL ENGINEERING

QUESTION BANK



I SEMESTER

1914102 - ENVIRONMENTAL SAFETY

(M.E. INDUSTRIAL SAFETY ENGINEERING)

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SUBJECT CODE/NAME: 1914102- ENVIRONMENTAL SAFETY

SEM/YEAR : I / M.E (I YEAR)

UNIT I -AIR POLLUTION

Classification and properties of air pollutants – Pollution sources – Effects of air pollutants on human beings, Animals, Plants and Materials - automobile pollution-hazards of air pollution-concept of clean coal combustion technology - ultra violet radiation, infrared radiation, radiation from sun-hazards due to depletion of ozone - deforestation-ozone holes-automobile exhausts-chemical factory stack emissions-CFC.

PART A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	List out the composition of atmosphere.	BT-2	Understanding
2.	Define Air pollution	BT-1	Remembering
3.	Define primary and secondary air pollutants.	BT-1	Remembering
4.	List out the types of air pollutants.	BT-1	Remembering
5.	What is ozone layer depletion?	BT-2	Understanding
6.	How do you classify air pollutants?	BT-2	Understanding
7.	Name any two effects on plants due to air pollutants and mention	BT-4	Analyzing
8.	List out air pollutants responsible for ozone layer depletion.	BT-6	Creating
9.	What are the pollutants released from automobiles?	BT-4	Analyzing
10.	How is ozone hole formed?	BT-3	Applying
11.	What is an aerosol?	BT-4	Analyzing
12.	Define global warming.	BT-1	Remembering
13.	What is the concept of clean combustion technology?	BT-4	Analyzing
14.	What are the effects of air pollutants on human health and property?	BT-4	Analyzing
15.	Describe the environmental hazards due to ozone layer depletion	BT-2	Understanding
16.	Mention the harmful effects due to UV and Infra-red rays.	BT-4	Analyzing
17.	Judge whether urbanization is the cause of air pollution.	BT-5	Evaluating
18.	Give examples for the pollutants due to natural cause.	BT-2	Understanding
19.	What is smog? Give its types.	BT-1	Remembering
20.	Air pollution may lead to climate change. Justify	BT-6	Creating
PART B			
1.	(i)Discuss about the air pollutants that contribute climate change. (7) (ii)What are ambient air quality standards? Enumerate its importance (6)	BT-1	Remembering

2.	(i) Explain about the steps that are taken to control air pollution in India. (7) (ii) Mention and explain the categories of air quality index. (6)	BT-1	Remembering
3.	(i) What are the effects of air pollution on animals, plants, materials and human beings? (6) (ii) Write short notes on automobile pollution and mention the various gases emitted. (7)	BT-1	Remembering
4.	(i) Write the sources and classification of air pollutants. (7) (ii) Discuss the effects of air pollutants on humans & plants. (6)	BT-2	Understanding
5.	Explain in detail about the characteristics of air pollution.	BT-2	Understanding
6.	Briefly explain about the concept of clean coal combustion technology.	BT-2	Understanding
7.	Relate how the ozone layer depletion has serious effects on environment.	BT-3	Applying
8.	How is air pollutants categorised? What are the different sources of air pollutants? Give examples	BT-1	Remembering
9.	Make a detailed discussion on global warming and ozone layer depletion.	BT-4	Analyzing
10.	(i) Point out the causes and effects of deforestation. (7) (ii) What is a stack? What are the major stack gas emissions? (6)	BT-4	Analyzing
11.	How air pollutants produce economical effects? Also explain the effects on human beings.	BT-5	Evaluating
12.	(i) Explain the source and harmful effects of CFC gas. (7) (ii) Write a note on "Ozone layer depletion". (6)	BT-2	Understanding
13.	What happens to the pollutants in the Atmosphere?	BT-6	Creating
14.	(i) Describe the state of urban pollution in India. (7) (ii) What are the measures taken by the government to reduce vehicular emissions? How did the quality of air is improved in Delhi. (6)	BT-4	Analyzing

PART C

1.	(i) What are primary and secondary pollutants? Give examples (5) (ii) Briefly discuss about the major causes and effects of indoor and outdoor air pollution? How they can be controlled? (10)	BT-1	Remembering
2.	“The automobile is one of the worst inventions made by mankind”. Justify this statement by focusing on the environmental impact on environment. Review the approach to reduce the usage of automobiles.	BT-6	Creating
3.	List the major air pollutants and explain their effects on human beings, animals, plants and material properties.	BT-2	Understanding
4.	(i) Discuss the global warming -pollutants responsible, their sources and impacts (10) (ii) Write about some of the control measures for air pollution. (5)	BT-2	Understanding

UNIT II WATER POLLUTION

Classification of water pollutants-health hazards-sampling and analysis of water-water treatment - different industrial effluents and their treatment and disposal -advanced wastewater treatment - effluent quality standards and laws- chemical industries, tannery, textile effluents-common treatment.

PART A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Define water pollution.	BT-1	Remembering
2.	What are the various methods for sampling of water?	BT-1	Remembering
3.	List out the various contaminants in water causing pollution.	BT-1	Remembering
4.	What are the permissible limits for the following for drinking water? A)pH B) TDS C)Hardness	BT-1	Remembering
5.	Distinguish between point and non-point sources of water pollution.	BT-4	Analyzing
6.	How to predict the water effluent quality? Give the parameters to be studied.	BT-3	Applying
7.	What happens when the water pollutants are discharged into ground surface?	BT-6	Creating
8.	Choose any 3 appropriate methods for treating the industrial effluents.	BT-5	Evaluating
9.	Name some methods which are listed under advanced waste water treatment system.	BT-1	Remembering
10.	Classify the sources of water pollutants.	BT-2	Understanding
11.	Relate how the industrial effluent discharge causes serious harmful effects on the environment.	BT-3	Applying
12.	Point out the appropriate disposal methods for the industrial effluents.	BT-4	Analyzing
13.	What are the major water quality parameters mandatory in the analysis of water samples?	BT-2	Understanding
14.	What are the chemicals dissolved in water due to effluent discharge from tanneries?	BT-2	Understanding
15.	How do we measure the water quality?	BT-6	Creating
16.	Mention the major health hazards due to water contamination.	BT-1	Remembering
17.	Recall the major causes of water pollution.	BT-1	Remembering
18.	Write down the advanced waste water treatment techniques.	BT-1	Remembering
19.	What is eutrophication?	BT-1	Remembering
20.	What is meant by biomagnification?	BT-4	Analyzing

PART B

1.	List down the sources of water pollution and classification of water pollutants	BT-1	Remembering
2.	(i) How are the water samples collected for analysis? (7) (ii)What are the various techniques adopted for analysis the water	BT-1	Remembering

	quality? (6)		
3.	Describe with a neat sketch about the primary treatment of waste water.	BT-2	Understanding
4.	With a neat sketch, explain in detail about the septic tank.	BT-2	Understanding
5.	(i) How the human health is affected due to contaminated water? (7) (ii) What are the major negative impacts of water pollution on aquatic species? (6)	BT-3	Applying
6.	Write short notes on the following: (i) The Water Act, 1974. (ii) The Water Cess Act, 1977. (iii) Environment Act, 1986.	BT-4	Analyzing
7.	Choose the appropriate methods for purifying water.	BT-5	Evaluating
8.	Write down the preventive measures and cleanup solutions for eliminating the ground water pollution.	BT-1	Remembering
9.	Tabulate the maximum permissible limits for industrial effluent discharge.	BT-1	Remembering
10.	Discuss in detail about the various treatment stages for sewage water with diagram.	BT-2	Understanding
11.	How cultural eutrophication does kill the aquatic species? Predict the causes of eutrophication.	BT-3	Applying
12.	(i) How the BOD content in the water sample is determined? (7) (ii) Point out the major causes for water pollution and explain about them. (6)	BT-4	Analyzing
13.	Write short notes on: (i) Activated Sludge Process (ii) Trickling Filter	BT-4	Analyzing
14.	Write a detailed report regarding any one case study for the following cases: a) surface water pollution b) ground water pollution	BT-6	Creating

PART C

1.	(i) Demonstrate the various stages of sewage or waste water treatment with a neat sketch. (10) (ii) Describe the control measures for oil pollution in sea water. (5)	BT-3	Applying
2.	What is meant by water pollution and mention about the common types of pollutants? Also list the different types of sources of water pollution.	BT-1	Remembering
3.	Explain with neat sketches about the various advanced technologies for water and waste water treatment.	BT-2	Understanding
4.	(i) Summarize the standard limits for drinking water as per BIS. (8) (ii) What are the laws related to water pollution? (7)	BT-2	Understanding

UNIT III HAZARDOUS WASTE MANAGEMENT

Hazardous waste management in India-waste identification, characterization and classification-technological options for collection, treatment and disposal of hazardous waste-selection charts for the treatment of different hazardous wastes-methods of collection and disposal of solid wastes-health hazards-toxic and radioactive wastes-incineration and vitrification- hazards due to bio-process-dilution-standards and restrictions – recycling and reuse.

PART A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	What is a waste and why does it require management?	BT 1	Remembering
2.	What are the different categories of waste?	BT 1	Remembering
3.	Write the full form of MSW and explain it.	BT 1	Remembering
4.	Recall the 3Rs principle.	BT 1	Remembering
5.	What is meant by incineration?	BT 1	Remembering
6.	What is an e-waste? Mention its problems.	BT 1	Remembering
7.	What are the harmful chemicals at our homes?	BT 2	Understanding
8.	List down some of the prohibited wastes in the conventional management of MSW.	BT 2	Understanding
9.	What are the major conditions to be satisfied to have a proper sanitary landfill?	BT 3	Applying
10.	How are the solid hazardous wastes disposed into the land?	BT 3	Applying
11.	Compare incineration and vitrification.	BT 3	Applying
12.	Are hazardous wastes dumped in India? Justify your answer	BT 4	Analyzing
13.	Differentiate between hazardous and non-hazardous wastes.	BT 5	Evaluating
14.	Compare high-level and low-level radioactive waste management.	BT 5	Evaluating
15.	What are the major guidelines for handling the household hazardous chemicals?	BT 6	Creating
16.	Is there any alternative to throwing plastic waste into garbage bin? Justify with any practical solution.	BT 6	Creating
17.	What is the per capita waste generation rate of MSW in India?	BT 1	Remembering
18.	List any two ways to recycle the solid wastes.	BT 2	Understanding
19.	List the advantages of recycling of MSW with examples	BT 2	Understanding
20.	How are the biomedical wastes disposed?	BT 4	Analyzing

PART B

1.	List the various categories of waste and mention their sources.	BT 1	Remembering
2.	Write a short note on sanitary landfill.	BT 2	Understanding
3.	Explain with a flow diagram for the following: (i) Power generation from MSW combustible components. (ii) Biogasification of organic components of MSW.	BT 2	Understanding

4.	How are Indian cities handling the increasing amount of municipal solid wastes?	BT 4	Analyzing
5.	Mention any four hazardous wastes generated from household activities and explain their management strategies.	BT 1	Remembering
6.	What are the advantages of solid waste incineration?	BT 2	Understanding
7.	Explain the ideal options for the management of MSW in India from your view point.	BT 4	Analyzing
8.	How can the solid waste be recycled?	BT 3	Applying
9.	What are the major obstacles in implementation of incineration technology in developing countries?	BT 6	Creating
10.	Write short notes on the health problems faced by MSW handling personnel.	BT 4	Analyzing
11.	Write in detail on the export of hazardous and toxic wastes from one country to another. Why are the wastes exported? What are the environmental and social issues involved? What are the recent developments in this regard?	BT 5	Evaluating
12.	Identify the hazardous waste generated within 5 kms from your residence and propose the methods for the management for the same.	BT 6	Creating
13.	Explain about the two different types of recycling and also mention the problems with recycling plastic.	BT 1	Remembering
14.	Write in detail about the standards and guidelines for the operating parameters of incinerators, autoclaves and deep burial for infection waste.	BT 3	Applying
PART C			
1.	(i) Explain about the radioactive nuclear wastes in a nuclear reactor and mention its advantages and disadvantages. What are the proposed methods for a safer disposal? (10) (ii) Briefly write a case study on Chernobyl nuclear Power Plant accident. (5)	BT 5	Evaluating
2.	With a neat sketch, explain about MSW management practices and also about MSW processing plant.	BT 1	Remembering
3.	Discuss in detail about the characteristics of hazardous waste and their environmental problems. What are the general hazardous waste management strategies?	BT 4	Analyzing
4.	(i) Explain in detail about 3Rs Principle. How can we follow the 3R principle as an individual? (10) (ii) Write short note on phytoremediation process. (5)	BT 2	Understanding

UNIT IV ENVIRONMENTAL MEASUREMENT AND CONTROL

Sampling and analysis – dust monitor – gas analyzer, particle size analyzer – lux meter-pH meter – gas chromatograph – atomic absorption spectrometer. Gravitational settling chambers-cyclone separators-scrubbers-electrostatic precipitator - bag filter – maintenance - control of gaseous emission by adsorption, absorption and combustion methods- Pollution Control Board-laws.

PART – A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Differentiate adsorption and absorption.	BT 4	Analyzing
2.	What do you understand by biofilter?	BT 1	Remembering
3.	State the purpose of air quality monitoring	BT 2	Understanding
4.	List out the methods for controlling gaseous pollutants	BT 2	Understanding
5.	Define absorption as it relates to air pollution control devices.	BT 2	Understanding
6.	What is gravitational settling chamber?	BT 2	Understanding
7.	State the purpose of pH meter.	BT 4	Analyzing
8.	What are the types of condensation system?	BT 3	Applying
9.	Define absorbers.	BT 1	Remembering
10.	What is the importance of activated carbon in adsorption?	BT 3	Applying
11.	What are the devices used for air sampling?	BT-4	Analyzing
12.	Define condensers.	BT 4	Analyzing
13.	Distinguish between Contact condenser and Surface condenser.	BT 4	Analyzing
14.	What is thermal Incinerator?	BT 5	Evaluating
15.	What is catalytic Incinerator?	BT 5	Evaluating
16.	What is the use of gas chromatography?	BT 3	Applying
17.	Draw the line sketch of atomic absorption spectrometer.	BT 1	Remembering
18.	What are the compounds that could be determined by using Gas Chromatography?	BT 4	Analyzing
19.	What is the limit prescribed for particulate matter in residential area by Pollution Control board?	BT 1	Remembering
20.	Mention the environmental legislation for air pollution control.	BT 1	Remembering

PART B

1.	How is high volume air sampler used for ambient air quality? Explain.	BT-4	Analyzing
2.	(i) Write the general principle involved in absorption. (7) (ii) Explain the criteria to achieve high performance in gas absorption equipments. (6)	BT 1	Remembering
3.	Write short notes on: a)lux meter b)pH meter	BT 2	Understanding
4.	(i) Explain briefly about the methods of biological air treatment system. (6) (ii) Briefly discuss on types of carbon adsorption system with suitable neat sketch. (7)	BT 1	Remembering

5.	Discuss in brief about the working of atomic absorption spectrometer with a neat sketch.	BT 2	Understanding
6.	Enumerate and briefly explain various sources of radioactivity in environment and write about its control measures.	BT 2	Understanding
7.	Write a brief note about control and monitoring of gaseous pollutants on environment.	BT 5	Evaluating
8.	Define adsorption and differentiate between physical and chemical adsorption	BT 3	Applying
9.	(i) What are the Advantages and Disadvantages of electro static precipitators? (7) (ii) Design a tubular ESP to treat 10,000 m ³ /hr of a gaseous stream from a paper mill industry for an efficiency of 90%. Assume an effective migration velocity of 0.075m/sec. (6)	BT 6	Creating
10.	(i) Discuss on absorption method of control of gaseous contaminants. (7) (ii) Write a brief notes on engineering design of condensation mode of air pollution control. (6)	BT 2	Understanding
11.	Write a short note about condensation process with examples.	BT 6	Creating
12.	Write a short note about Incineration process with sketches.	BT 3	Applying
13.	Explain briefly about the bag filters.	BT 4	Analyzing
14.	Tabulate the National air quality standards for residential, Industrial and sensitive areas.	BT 2	Understanding
PART C			
1.	Explain about air sampling and the systems adopted for that.	BT 2	Understanding
2.	(i) Illustrate with neat diagram about the working of the following equipment: a) Gravity Settling Chambers b) Cyclone separators (8) (ii) Write short notes on gas and particle size analyzer. (7)	BT 4	Analyzing
3.	Explain with neat sketch the working principle of electro static precipitator with its advantage and disadvantages	BT 2	Understanding
4.	List down the functions of Central and State Pollution Control Board in the area of air pollution control.	BT 1	Remembering

UNIT V - POLLUTION CONTROL IN PROCESS INDUSTRIES

Pollution control in process industries like cement, paper, petroleum-petroleum products-textile-tanneries-thermal power plants – dying and pigment industries - eco-friendly energy.

PART A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Write the criteria to be adopted for selection of suitable sites for an industry.	BT6	Creating
2.	What are the pros and cons of thermal power?	BT 1	Remembering
3.	What do you mean by eco-friendly energy?	BT 2	Understanding
4.	What are the stationary sources of air pollution? Give examples	BT 2	Understanding
5.	What are the two major pollutants that are released from coal burning in power plants?	BT 4	Analyzing
6.	Name some industries that are the sources of water pollution.	BT 3	Applying
7.	What are called as POPs? Give examples.	BT 1	Remembering
8.	What are the various products obtained on heating crude oil at various boiling points?	BT-4	Analyzing
9.	What is a natural gas? How LPG is obtained?	BT 3	Applying
10.	What is the major pollutant that is being discharged into rivers and land by chemical and plastic industries?	BT 2	Understanding
11.	Compare the risk of using nuclear power plant and coal burning power plant in producing electricity.	BT 5	Evaluating
12.	What is meant by active and passive solar energy heating?	BT 1	Remembering
13.	What is mean by bio-fuels?	BT 3	Applying
14.	List down the sustainable energy strategies	BT 4	Analyzing
15.	What is meant by Thermal Pollution?	BT 2	Understanding
16.	What are the steps to be taken to save electricity at home and in the office?	BT 1	Remembering
17.	How to save energy in transportation?	BT 2	Understanding
18.	Is hydropower a good alternative? Justify your answer.	BT-6	Creating
19.	What kind of energy do we get from the sun?	BT 4	Analyzing
20.	Mention the major pollutants which are released from cement industries.	BT 1	Remembering

PART – B

1.	(i) A thermal power plant burns 100 tonnes of coal with 5.5% sulphur content. Calculate minimum stack height required. The particulate concentration in flue gases is 8000 mg/m ³ and the gas flow rate is 20m ³ /sec. (7) (ii) Explain stack gas emission standards for different industries.(6)	BT-6	Creating
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2.	(i) A boiler with stack height of 190m and 0.4m diameter is releasing flue gas a velocity of 16m/s at a temperature of 160°C. The wind speed at the stack height is 6m/s and ambient temperature is 35°C. Estimate the plume rise. (7) (ii) Write short notes on eco-friendly energy (6)	BT-6	Creating
3.	Explain the environmental guidelines for setting of industries.	BT 4	Analyzing
4.	Make a note on air pollution control by process change and raw material change.	BT 1	Remembering
5.	Enumerate and briefly explain various sources of radioactivity in Environment and write about its control measures.	BT 2	Understanding
6.	Discuss in detail about the factors affecting selection of control equipment	BT 5	Evaluating
7.	Discuss the sources of pollutants and its control in a Cement Industry.	BT 1	Remembering
8.	Briefly explain about the emissions and effluent discharge from dyeing and pigment industries and suggest some control measures.	BT 2	Understanding
9.	Explain the air pollution control efforts made in our country.	BT-6	Creating
10.	Explain how almost every source of energy has its limits.	BT 4	Analyzing
11.	Give a brief description about the pollutants and its effects emitted from the following industries: (i) Textile industries, (ii) Petroleum and Petroleum product industries, (iii) Tanneries	BT 5	Evaluating
12.	Compare the advantages and disadvantages of oil, coal and natural gas energy sources.	BT 3	Applying
13.	What is the main source of energy for this planet and how does it give us the energy?	BT 2	Understanding
14.	Explain in detail about the utilization of the following safer renewable sources of energy (i) Solar Power (ii) Wind Power (iii) Hydro Power	BT 3	Applying

PART – C

1.	What are the environmental guide lines for siting of industries to ensure optimum use of natural and man-made resources in sustainable manner?	BT 4	Analyzing
2.	Explain about the emissions from a thermal power plant and provide suitable control measures.	BT 3	Applying
3.	Designing new buildings to save energy and also in existing buildings is possible- Elaborate its concept.	BT 6	Creating
4.	What is the principle behind the usage renewable forms of energy sources for domestic and transportation purposes?	BT 1	Remembering