SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF MECHANICAL ENGINEERING

QUESTION BANK

VIII SEMESTER

1909801 GREEN MANUFACTURING

Regulation – 2019

Academic Year 2024-2025 (Even)

Prepared by

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SUBJECT CODE/NAME: 1909801 GREEN MANUFACTURING

SEM/YEAR: VIII/IV

UNIT I - INTRODUCTION			
Environmental effects of design – Environmental damage – In efficient energy use – Design for recycling.			
PART A			
Q.NO	**QUESTIONS**	**BT LEVEL**	**COMPETENCE**
1.	List down the environmental impacts of design.	BT-1	Remember
2.	Describe carbon footprint.	BT-1	Remember
3.	Define Water pollution.	BT-1	Remember
4.	Write the functional elements of sustainable manufacturing.	BT-1	Remember
5.	Classify the approach of cryogenic machining.	BT-1	Remember
6.	State the principles of green manufacturing.	BT-1	Remember
7.	What are the carbon emissions of manufacturing?	BT-2	Understand
8.	Review the major energy uses of manufacturing.	BT-2	Understand
9.	Write about green product.	BT-2	Understand
10.	Clarify the term green manufacturing.	BT-2	Understand
11.	How are the solid waste generated during operational phase categorized?	BT-2	Understand
12.	Classify the types of processing techniques.	BT-2	Understand
13.	Explain the steps involved in manufacturing a nut.	BT-1	Remember

14.	List down the environmental impacts of steel rolling.	BT-1	Remember
15.	Write any three features of green industry.	BT-1	Remember
16.	List some benefits of green industry.	BT-1	Remember
17.	What is life cycle assessments?	BT-1	Remember
18.	What are the major energy consuming activities in the manufacturing?	BT-2	Understand
19.	Explain the four main phases of LCA.	BT-2	Understand
20.	List down the factors considered in transportation energy.	BT-1	Remember
21.	Clarify the term green house effect.	BT-2	Understand
22.	Explain global warming.	BT-2	Understand
23.	Classify types of green casting.	BT-2	Understand
24.	Define Air pollution.	BT-1	Remember
25.	Recognize De-carbonization.	BT-1	Remember
	PART B		
1.	What is green manufacturing? Write down its benefits.	BT-3	Analyze
2.	What is meant by Dry Machining? Explain them in detail.	BT-3	Analyze
3.	Explain the Sustainable Manufacturing Through Environmentally Friendly Machining.	BT-4	Application
4.	Draw the components of Cryogenic Machining of manufacturing and explain.	BT-4	Application
5.	Explain the environmental life cycle of manufacturing.	BT-4	Application
6.	Explain the role of $C0_2$ is green house effect and global warming.	BT-4	Application
7.	What are the steps involved in High Pressure Jet Assisted Machining process?	BT-3	Analyze
8.	Discuss the environmental impact of current manufacturing systems in detail.	BT-3	Analyze
9.	i. What is composite and how it is manufactured? (6) ii. Compare wet and dry manufacturing process. (7)	BT-3	Analyze
10.	Explain the three safeguard subject categorized under environmental impacts in detail.	BT-4	Application
11.	List down the features of green manufacturing. Explain in detail.	BT-4	Application
12.	i. Explain the Factors affecting the machining process sustainability and their desired levels. (7) ii. Explain the stages in General machining scenario. (6)	BT-4	Application
13.	What is air pollution? How air is polluted due to industries? Suggest practical measures to minimize the same.	BT-3	Analyze

14.	Define sustainability and explain its three pillar model.	BT-4	Application
15.	Elaborate effect of machining parameters in performance.	BT-3	Analyze
16.	State the various steps involved in product selection, development and design. Explain in detail.	BT-4	Application
17.	List out different types of waste and also the sources of waste. Explain in detail.	BT-4	Application
18.	List out different types of recycling. Explain in detail.	BT-4	Application
PART C			
1.	Explain green manufacturing of in detail with a case study.	BT-4	Application
2.	What are the methods of storing solar energy? Explain any two methods in detail.	BT-4	Application
3.	Write the organization setup of maintenance department in a large plant. How does it differ from that in a small plant manufacturing same product?	BT-5	Evaluate
4.	State the role of government, employer and workers for productivity improvement.	BT-4	Application
5.	What are the different types of solid waste disposal you know? What are the positive and negative impact to the society?	BT-4	Application

UNIT II - ENVIRONMENTAL LIFE CYCLE ASSESSMENT			
Material flow and cycles – Material recycling – Emission less manufacturing.			
PART A			
Q.NO	**QUESTIONS**	**BT LEVEL**	**COMPETENCE**
1.	What is meant by material flow?	BT-1	Remember
2.	Define manufacturing waste.	BT-1	Remember
3.	What is the need for recycling manufacturing waste?	BT-2	Understand
4.	Define sustainable manufacturing material.	BT-1	Remember
5.	What is meant by the term cycle?	BT-2	Understand
6.	Define Biomass.	BT-1	Remember
7.	Mention some of the recyclable materials.	BT-2	Understand
8.	Write the importance of energy conservation.	BT-2	Understand
9.	Name some recycled fibers.	BT-1	Remember
10.	Write any three principles to be adhered to develop sustainable alternative manufacturing material.	BT-1	Remember
11.	Categorize C and D waste.	BT-1	Remember
12.	Distinguish between energy efficiency and energy conservation.	BT-2	Understand
13.	Differentiate conventional and modern manufacturing.	BT-2	Understand
14.	Compare the term reuse and recycle.	BT-2	Understand
15.	Draw the embodied energy breakup pie chart.	BT-2	Understand
16.	What are the categories of material recycling?	BT-2	Understand
17.	How to calculate the embodied the energy of manufacturing?	BT-2	Understand
18.	Write any two advantages of recycled and biomass fibers in reinforced composites.	BT-2	Understand
19.	Define the term SMB fillers.	BT-1	Remember
20.	List out the majorly used manufacturing materials.	BT-1	Remember
21.	What are the factors influencing quality of recycled materials?	BT-2	Understand
22.	Write down the objectives of recycled waste.	BT-1	Remember
23.	State the applications of FRG materials.	BT-1	Remember
24.	What are the uses of recycled polymers?	BT-2	Understand
25.	What are the advantages of using recycled steel?	BT-2	Understand

PART B			
1.	What are the factors affecting energy use in manufacturing?	BT-3	Analyze
2.	Explain the process of Vegetable Based Cutting Fluids.	BT-4	Application
3.	Discuss the closed loop material flow manufacturing process.	BT-4	Application
4.	Explain the process of sustainable material flow management.	BT-4	Application
5.	Explain the embodied energy of alternative materials.	BT-4	Application
6.	Write about some sustainable manufacturing materials. Explain in detail.	BT-3	Analyze
7.	Name some recycled biomass fibers and write their advantages. Explain in detail.	BT-3	Analyze
8.	State the properties of eco-friendly manufacturing materials. Explain in detail.	BT-3	Analyze
9.	Write down the benefits and barriers of using recycled materials. Explain in detail.	BT-3	Analyze
10.	Explain the process of reusing metal scraps.	BT-4	Application
11.	Enumerate the factors affecting the selection of material handling equipment in a production shop. Explain in detail.	BT-4	Application
12.	Explain in brief the basic procedure of work measurement.	BT-4	Application
13.	Write down some practical methods of energy conservation. Explain in detail.	BT-4	Application
14.	State and give a brief explanation of the desirable qualities of a lubricant.	BT-4	Application
15.	Explain the purpose of product design. State the requirements of good design.	BT-4	Application
16.	Define product developement. state the need of product development in an industry. Explain in detail.	BT-4	Application
17.	What are the various types of Emission less manufacturing? Discuss in detail.	BT-3	Analyze
18.	Describe the relationship between plant layout and material handling equipments. Explain in detail.	BT-3	Analyze
PART C			
1.	Explain the top ten sustainable manufacturing materials.	BT-4	Application
2.	Write an overview of various recycled fibers.	BT-4	Application
3.	Compare embodied energy of conventional and alternative materials.	BT-4	Application
4.	Explain the procedural approach to be adopted for analysis of handling problems and development of low cost material handling systems.	BT-5	Evaluate
5.	What are the barriers in usage of recycled materials? How will you Overcome this?	BT-3	Analyze

UNIT III - GREEN DESIGN METHODS			
Mass balance analysis – Green indicate – Design for disassembly design for recycle – Risk analysis – Material selection.			
PART A			
Q.NO	**QUESTIONS**	**BT LEVEL**	**COMPETENCE**
1.	Define Green Design.	BT-1	Remember
2.	What are Solar Panels?	BT-1	Remember
3.	List out the use of Triple-Glazed Windows.	BT-1	Remember
4.	Describe Conduction, Convention & Radiation.	BT-2	Application
5.	Define U-value or What is Heat Transfer co-efficient?	BT-1	Remember
6.	Characterize green indicator.	BT-2	Understand
7.	What is disassembly?	BT-1	Remember
8.	Discuss solar map.	BT-1	Application
9.	Write short note on Heat transfer in materials through Conduction.	BT-2	Application
10.	What is meant by Occupant-controlled naturally conditioned spaces?	BT-1	Remember
11.	Expand MPV.	BT-1	Remember
12.	Define Adaptive Model.	BT-1	Remember
13.	What is meant by Comfort zone?	BT-1	Remember
14.	Explain Clothing insulation.	BT-2	Application
15.	Illustrate Metabolic rate.	BT-2	Understand
16.	What is meant by risk analysis?	BT-1	Remember
17.	Expand HVAC system.	BT-1	Remember
18.	What is Dry-bulb temperature?	BT-1	Remember
19.	Define Micro-climate.	BT-1	Remember
20.	State mass balance.	BT-1	Remember
21.	Write down the equation to calculate the Indoor Operative Temperature (IOT)	BT-1	Remember
22.	Write down the equation to calculate the Indoor Operative Temperature using the Air Temperature Based Approach.	BT-1	Remember
23.	What is Cooling Load Estimate Form?	BT-2	Application
24.	Mention the relationship between Mass balance analysis and Risk analysis	BT-2	Understand

25.	Discuss Comfort Chart.	BT-2	Understand
	PART B		
1.	Elaborate the methods to evaluate thermal comfort.	BT-4	Application
2.	Explain the six variables that predict a person's thermal comfort in a factory?	BT-4	Application
3.	Elaborate the Measurement Methods of human comfort in existing manufacturing	BT-4	Application
4.	Explain the Evaluation Methods of comfort in manufacturing methodology	BT-4	Application
5.	Which are the systems account for the manufacturing energy consumption?	BT-3	Analyze
6.	What are the acceptable thermal conditions in occupant-controlled naturally conditioned spaces?	BT-3	Analyze
7.	Explain the significance of thermal comfort in a factory.	BT-4	Application
8.	What are the measures to be ensured to improve the thermal comfort in Automobile Industries?	BT-3	Analyze
9.	How the orientation of a machinery play the role in the thermal comfort of a factory?	BT-3	Analyze
10.	What are the material handling devices used in a factory for the recycling?	BT-3	Analyze
11.	Explain the manufacturing techniques to regulate the heat transfer in a material.	BT-4	Application
12.	Which are Sources of Solar Radiation that Require Shading? Explain in detail.	BT-4	Application
13.	Explain the shading methods used to control Solar Heat on factories.	BT-4	Application
14.	Write short note on i) Elevated air speed ii) Mixed Mode Ventilation iii) Paper Insulation.	BT-4	Application
15.	Elaborate the mechanisms of heat transfer.	BT-3	Analyze
16.	How Indoor air velocity affects the thermal comfort of a factory? Explain in detail.	BT-3	Analyze
17.	How high density factories affect risk analysis? Explain in detail.	BT-3	Analyze
18.	How low density factories benefit risk analysis? Explain in detail.	BT-3	Analyze
	PART C		
1.	Illustrate the ways of Mass balance analysis.	BT-4	Application
2.	Discuss the types of Green indicators.	BT-4	Application
3.	Examine how Design for disassembly done.	BT-5	Evaluate
4.	Explain about the design for recycle characteristics.	BT-4	Application
5.	Risk analysis impact on manufacturing- Explain.	BT-3	Analyze

UNIT IV - DESIGN FOR ENVIRONMENT			
Eco design – Industrial Ecology – Pollution prevention – Reduction of toxic emission.			
PART A			
Q.NO	**QUESTIONS**	**BT LEVEL**	**COMPETENCE**
1.	Define Ecology.	BT-1	Remember
2.	What is meant by – Industrial Ecology?	BT-2	Understand
3.	Expand PSD.	BT-1	Remember
4.	Categorize two main categories of solar power.	BT-2	Understand
5.	Explain Concentrating solar power.	BT-2	Understand
6.	Discuss the term Solar heating and cooling.	BT-2	Understand
7.	What is eco design?	BT-2	Understand
8.	List a few pollution prevention techniques.	BT-1	Remember
9.	List a few organizations in India which promote the Reduction of toxic emission.	BT-1	Remember
10.	Define Reduction of toxic emission	BT-1	Remember
11.	Describe Thermal mass.	BT-2	Understand
12.	Discuss Eco design.	BT-2	Understand
13.	Differentiate between Industrial Ecology and Eco design.	BT-2	Understand
14.	Review the term Industrial Ecology.	BT-1	Remember
15.	What is Pollution prevention?	BT-2	Understand
16.	Describe Pollution.	BT-2	Understand
17.	Write short notes on Natural Ventilation.	BT-1	Remember
18.	Define Stack Ventilation.	BT-1	Remember
19.	Write short notes on Cross Ventilation.	BT-1	Remember
20.	Discuss Night Ventilation.	BT-2	Understand
21.	What is Wind Effect Ventilation?	BT-2	Understand
22.	Illustrate ‘Reduction of toxic emission in green manufacturing.	BT-2	Understand
23.	Discuss the term ‘Pollution prevention’ in green manufacturing.	BT-2	Understand
24.	What is meant by Reduction in ‘Reduction of toxic emission’?	BT-2	Understand
25.	Explain Reduction of toxic emission.	BT-2	Understand

PART B			
1.	Summarize the key aspects of Eco design. Explain in detail.	BT-3	Analyze
2.	Explain the types of Eco design Technologies.	BT-3	Analyze
3.	Discuss Eco design systems. Explain in detail.	BT-4	Application
4.	Explain the Advantages and Disadvantages of Eco design.	BT-4	Application
5.	Characterize the Eco design types. Explain in detail.	BT-3	Analyze
6.	What is the advantage of solar energy comparing other forms of energy?	BT-4	Application
7.	Explain the Eco design for various climatic conditions.	BT-4	Application
8.	What are the Purpose of Eco design? Explain in detail.	BT-4	Application
9.	Express the Industrial Ecology techniques. Explain in detail.	BT-4	Application
10.	Discuss the types of Industrial Ecology. Explain in detail.	BT-3	Analyze
11.	Why we use Industrial Ecology Technologies for green industries? Explain in detail.	BT-3	Analyze
12.	Elaborate the role of Industrial Ecology. Explain in detail.	BT-4	Application
13.	Illustrate different forms of Industrial Ecology. Explain in detail.	BT-4	Application
14.	What are the Advantages of Pollution prevention? Explain in detail.	BT-4	Application
15.	Clarify the term Pollution prevention and Explain it.	BT-4	Application
16.	How Reduction of toxic emission is efficient in Green Industries? Explain in detail.	BT-3	Analyze
17.	Compare Reduction of toxic emission with Elimination of toxic emission.	BT-3	Analyze
18.	Compare Reduction of toxic emission with neutralization of toxic Emissions.	BT-3	Analyze
PART C			
1.	Why Eco design is important for future industries? Explain in detail.	BT-3	Analyze
2.	Discuss why Eco designed industries are energy efficient. Explain in detail.	BT-4	Application
3.	Explain the sustainable forms of Industrial Ecology.	BT-4	Application
4.	Discuss with a case study the Pollution prevention.	BT-5	Evaluate
5.	Summarize with case study the Reduction of toxic emission.	BT-5	Evaluate

UNIT V - SUSTAINABLE ECONOMIC ENVIRONMENT			
Solar energy devices – wind energy resources – Full cost accounting methodology – Selection of natural friendly materials.			
PART A			
Q.NO	**QUESTIONS**	**BT LEVEL**	**COMPETENCE**
1.	Explain the term Solar energy	BT-2	Understand
2.	Define energy.	BT-1	Remember
3.	State the objectives of fibers used in green composites.	BT-1	Remember
4.	Where are industrial green space important?	BT-2	Understand
5.	Review the green road concept.	BT-1	Remember
6.	Define wind energy.	BT-1	Remember
7.	Distinguish between recycle and reuse.	BT-2	Understand
8.	What are the benefits of wind energy?	BT-2	Understand
9.	Categorize types of wind energy.	BT-1	Remember
10.	What are the challenges faced by industries in sustainable energy management?	BT-2	Understand
11.	Define green composites.	BT-1	Remember
12.	Write about Full cost accounting.	BT-1	Remember
13.	Distinguish between solar energy and wind energy.	BT-2	Understand
14.	List out the steps involved in solid waste management.	BT-1	Remember
15.	Why do we need green composites?	BT-2	Understand
16.	Define green cover.	BT-1	Remember
17.	State the objectives of solid waste management.	BT-1	Remember
18.	What are major sources of solid waste?	BT-2	Understand
19.	Give the solution for challenges faced in sustainable energy management.	BT-1	Remember
20.	Write the impacts of unplanned accounting methodology.	BT-1	Remember
21.	Define incineration.	BT-1	Remember
22.	What is composting?	BT-2	Understand
23.	Define solid waste management.	BT-1	Remember
24.	State the objectives of sustainable natural friendly materials in green industries.	BT-1	Remember
25.	Suggest some ways for generating natural friendly materials.	BT-1	Remember

PART B			
1.	What is Solar energy devices and write the factors influencing it. Explain in detail.	BT-4	Application
2.	Explain any two methods of Solar energy devices management.	BT-4	Application
3.	What are the challenges in creating green industries? Explain in detail.	BT-4	Application
4.	Explain in detail the lifecycle of green composites.	BT-4	Application
5.	Write the overview of Solar energy concept. Explain in detail.	BT-4	Application
6.	List down the applications of Solar energy devices. Explain in detail.	BT-4	Application
7.	Explain in detail the concept of waste management.	BT-4	Application
8.	i. What are the five principles to achieve sustainable planning of industries? (7) ii. Write notes on green technology for waste treatment. (6)	BT-3	Analyze
9.	Quote the practices, challenges and solutions of Full cost accounting methodology in developing countries.	BT-3	Analyze
10.	Identify the practices, challenges and solutions of Full cost accounting methodology in developed countries.	BT-3	Analyze
11.	Describe the benefits of wind energy. Explain in detail.	BT-3	Analyze
12.	State the solution strategies for Full cost accounting methodology. Explain in detail.	BT-4	Application
13.	State some waste management policies. Explain in detail.	BT-4	Application
14.	Describe zero waste management with a case study.	BT-5	Evaluate
15.	Discuss the elements of solid waste management. Explain in detail.	BT-4	Application
16.	Construct the types of solid waste management. Explain in detail.	BT-4	Application
17.	Elaborate the Selection of natural friendly materials.	BT-4	Application
18.	Elaborate the reduction of Non-natural friendly materials.	BT-4	Application
PART C			
1.	Explain in detail the availability of Solar energy devices.	BT-4	Application
2.	Show the various wind energy devices with example.	BT-4	Application
3.	Analyze the Full cost accounting methodology in India.	BT-3	Analyze
4.	Explain some simple natural friendly materials.	BT-4	Application
5.	State the recycling techniques for different natural friendly materials	BT-4	Application