

SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK



VII SEMESTER
PCE205- Green Energy Building

Regulations – 2023

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DEPARTMENT OF CIVIL ENGINEERING



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SUBJECT CODE/NAME: PCE205- Green Energy Building
SEM/YEAR: VII/IV

UNIT I - <u>INTRODUCTION</u>			
<i>Definitions, Goals, Principles, Features, Requirements and Benefits - Evaluation of Green Buildings - Energy Rating System - Green Rating Systems - Codes and Certification Programs - Green Building Movements in India - Barriers to the Propagation of Green Buildings.</i>			
PART A			
Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Define a Green Building.	BT-1	Remember
2.	State the primary goal of a Green Building.	BT-1	Remember
3.	List any four principles of Green Building.	BT-1	Remember
4.	Mention any four features of a Green Building.	BT-1	Remember
5.	What are the basic requirements of a Green Building?	BT-1	Remember
6.	List any four benefits of Green Buildings.	BT-1	Remember
7.	Define Green Building Evaluation.	BT-1	Remember
8.	What is meant by Energy Rating System?	BT-1	Remember
9.	Name any four Green Building Rating Systems.	BT-1	Remember
10.	What is the purpose of Green Building certification?	BT-1	Remember
11.	Expand GRIHA and IGBC.	BT-1	Remember
12.	What is LEED certification?	BT-1	Remember
13.	What is the significance of Energy Conservation Building Code (ECBC)?	BT-2	Understand
14.	Explain the need for Green Building evaluation.	BT-2	Understand

15.	Differentiate between conventional buildings and Green Buildings.	BT-2	Understand
16.	Explain the importance of Energy Rating Systems	BT-2	Understand
17.	Summarize the objectives of Green Building certification programs.	BT-2	Understand
18.	Explain the role of IGBC in promoting Green Buildings in India.	BT-2	Understand
19.	Describe the Green Building movement in India.	BT-2	Understand
20.	Explain how Green Buildings contribute to sustainable development.	BT-2	Understand
21.	Discuss the importance of water conservation in Green Buildings.	BT-2	Understand
22.	Explain any two barriers to the propagation of Green Buildings.	BT-2	Understand
23.	Why is indoor environmental quality important in Green Buildings?	BT-2	Understand
24.	Explain the role of renewable energy in Green Buildings.	BT-2	Understand
PART B			
1.	Explain the goals, principles, features, requirements and benefits of Green Buildings with suitable illustrations.	BT-3	Application
2.	Apply the principles of Green Building to design an eco-friendly residential building and justify the selected features.	BT-3	Application
3.	Analyze the environmental, economic and social benefits of Green Buildings over conventional buildings.	BT-4	Analyze
4.	Evaluate the importance of Green Building evaluation in achieving sustainable development goals.	BT-5	Evaluation
5.	Explain the Energy Rating System used in Green Buildings and discuss its significance in improving building performance.	BT-3	Application
6.	Compare and analyze different Green Building Rating Systems such as GRIHA, IGBC and LEED with suitable examples.	BT-4	Analyze
7.	Evaluate the effectiveness of Green Building certification programs in promoting sustainable construction practices.	BT-5	Evaluation
8.	Discuss the various Green Building codes and certification programs adopted in India and evaluate their effectiveness.	BT-5	Evaluation
9.	Analyze the Green Building movement in India, highlighting its growth, achievements and future prospects.	BT-4	Analyze
10.	Evaluate the role of government policies and professional organizations in promoting Green Buildings in India.	BT-5	Evaluation
11.	Analyze the major barriers affecting the propagation of Green Buildings and suggest suitable measures to overcome them.	BT-4	Analyze
12.	Evaluate the economic feasibility of Green Buildings considering initial investment, operational savings and life-cycle cost.	BT-5	Evaluate
13.	Apply Green Building concepts to improve energy efficiency and resource conservation in an institutional building.	BT-3	Application
14.	Analyze the relationship between Energy Rating Systems and Green Building certification in enhancing building sustainability.	BT-4	Analyze
15.	Evaluate the contribution of Green Buildings toward climate	BT-5	Evaluation

	change mitigation and environmental protection.		
16.	Explain how Green Building principles can be implemented in educational institutions and evaluate their long-term benefits.	BT-3	Application
17.	A commercial building is planned in an urban area. Analyze the Green Building features, suitable rating system, certification process and barriers involved in its implementation, and recommend appropriate solutions.	BT-5	Evaluation
UNIT II - <u>SUSTAINABILITY AND ENERGY USE</u>			
<i>Sustainability - Objectives of sustainable development - Sustainable principles - Energy use - carbon emissions - Sustainable building materials - LCA - Embodied Energy in Building Materials - Smart Materials - Transportation Energy for Building Materials - Maintenance Energy for Buildings.</i>			
PART A			
Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Define sustainability.	BT-1	Remember
2.	What is sustainable development?	BT-1	Remember
3.	State any four objectives of sustainable development.	BT-1	Remember
4.	List any four principles of sustainability.	BT-1	Remember
5.	Define carbon emissions.	BT-1	Remember
6.	What is meant by energy use in buildings?	BT-1	Remember
7.	Define Life Cycle Assessment (LCA).	BT-1	Remember
8.	What is embodied energy?	BT-1	Remember
9.	Define sustainable building materials.	BT-1	Remember
10.	What are smart materials?	BT-1	Remember
11.	Define transportation energy for building materials.	BT-1	Remember
12.	What is maintenance energy in buildings?	BT-1	Remember
13.	Explain the importance of sustainability in the construction industry.	BT-2	Understand
14.	Describe the relationship between energy use and carbon emissions.	BT-2	Understand
15.	Explain the need for sustainable building materials.	BT-2	Understand
16.	Summarize the stages involved in Life Cycle Assessment (LCA).	BT-2	Understand

17.	Explain the significance of embodied energy in building materials.	BT-2	Understand
18.	Describe the characteristics of smart materials.	BT-2	Understand
19.	Explain why transportation energy should be minimized in construction.	BT-2	Understand
20.	Discuss the importance of reducing maintenance energy in buildings.	BT-2	Understand
21.	Explain how sustainable materials reduce environmental impacts.	BT-2	Understand
22.	Describe the role of LCA in selecting building materials.	BT-2	Understand
23.	Explain the importance of minimizing carbon emissions in buildings.	BT-2	Understand
24.	Differentiate between embodied energy and operational energy.	BT-2	Understand
PART B			
1.	Explain the concept of sustainability and discuss the objectives and principles of sustainable development with suitable examples.	BT-3	Application
2.	Apply the principles of sustainable development in planning an energy-efficient residential building.	BT-3	Application
3.	Analyze the relationship between energy use and carbon emissions in buildings and suggest measures to reduce environmental impacts.	BT-4	Analyze
4.	Explain the importance of sustainable building materials and discuss the criteria for selecting environmentally friendly materials.	BT-3	Application
5.	Analyze the environmental and economic benefits of using sustainable building materials over conventional materials.	BT-4	Analyze
6.	Explain the concept of Life Cycle Assessment (LCA) and apply its stages to evaluate a building material.	BT-3	Application
7.	Analyze the significance of Life Cycle Assessment (LCA) in achieving sustainable construction.	BT-4	Analyze
8.	Explain the concept of embodied energy and discuss the factors influencing embodied energy in building materials.	BT-3	Application
9.	Analyze the impact of embodied energy on the sustainability of buildings with suitable examples.	BT-4	Analyze
10.	Explain the properties, types and applications of smart materials in sustainable buildings.	BT-3	Application
11.	Analyze the advantages and limitations of smart materials used in modern construction.	BT-4	Analyze
12.	Explain the concept of transportation energy for building materials and discuss methods to reduce transportation energy in construction projects.	BT-3	Application
13.	Analyze the influence of transportation energy on the environmental performance of buildings.	BT-4	Analyze
14.	Explain maintenance energy in buildings and discuss strategies for reducing maintenance energy throughout the building life cycle.	BT-3	Application
15.	Analyze the role of maintenance energy in improving the long-term sustainability of buildings.	BT-4	Analyze
16.	A commercial building project aims to achieve sustainability. Apply suitable sustainable principles, LCA techniques, smart	BT-3	Application

	materials and energy-saving measures to improve its performance.		
17.	Compare different sustainable building materials based on embodied energy, transportation energy, maintenance energy and environmental impact, and analyze their suitability for green building construction.	BT-4	Analyze
<u>UNIT III - COMFORTS IN BUILDING</u>			
<i>Thermal Comfort in Buildings- Issues; Heat Transfer Characteristic of Building Materials and Building Techniques.</i>			
<i>Incidence of Solar Heat on Buildings-Implications of Geographical Locations.</i>			
PART A			
Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Define Thermal comfort.	BT-1	Remember
2.	What are Solar Tiles?	BT-1	Remember
3.	List out the use of Triple-Glazed Windows.	BT-1	Remember
4.	Describe Conduction, Convection & Radiation.	BT-2	Understand
5.	Define U-value or What is Heat Transfer co-efficient?	BT-1	Remember
6.	Characterize natural ventilation.	BT-2	Understand
7.	What is skylight?	BT-1	Remember
8.	Discuss solar map.	BT-2	Understand
9.	Write short note on Heat transfer in buildings through Conduction.	BT-2	Understand
10.	What is meant by Occupant-controlled naturally conditioned spaces?	BT-1	Remember
11.	Expand PMV.	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	Understand
15.	Illustrate Metabolic rate.	BT-2	Understand
16.	What is meant by Exceedance hours?	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 Caulk.	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	Understand
24.	Discuss Comfort Chart.	BT-2	Understand
PART B			
1.	Elaborate the methods to evaluate thermal comfort.	BT-3	Application
2.	Explain the six variables that predict a person's thermal comfort in a building?	BT-3	Application
3.	Elaborate the Measurement Methods of comfort in existing buildings	BT-3	Application
4.	Explain the Evaluation Methods of comfort in existing buildings	BT-3	Application
5.	Which are the systems account for the building's energy consumption?	BT-3	Application
6.	What are the acceptable thermal conditions in occupant-controlled naturally conditioned spaces?	BT-3	Application
7.	Explain the significance of thermal comfort in a building?	BT-3	Application
8.	What are the measures to be ensured to improve the thermal comfort in residential buildings?	BT-3	Application
9.	How the orientation of a building play the role in the thermal comfort of a building?	BT-5	Evaluation
10.	What are the shading devices used in a building for the thermal comfort of a building?	BT-3	Application
11.	Explain the building techniques to regulate the heat transfer in a building	BT-3	Application
12.	Which are Sources of Solar Radiation that Require Shading?	BT-3	Application
13.	Explain the shading methods used to control Solar Heat on Buildings.	BT-3	Application
14.	Write short note on a) Elevated air speed b) Mixed Mode Ventilated Buildings c) Paper Insulation.	BT-3	Application
15.	Elaborate the mechanisms of heat transfer.	BT-3	Application
16.	How Indoor air velocity affects the thermal comfort of a building?	BT-3	Application
17.	How high density cities affect thermal comfort of the people?	BT-3	Application
<u>UNIT IV - ENERGY SYSTEMS AND PASSIVE SOLAR DESIGN</u>			
<i>Utility of Solar energy in buildings concepts of Solar Passive Cooling and Heating of Buildings. Low Energy Cooling. Case studies of Solar Passive Cooled and Heated Buildings.</i>			

PART A			
Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Define Solar Energy.	BT-1	Remember
2.	What is meant by Passive solar?	BT-1	Remember
3.	Expand PSD.	BT-2	Understand
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 PV Energy?	BT-1	Remember
8.	List a few solar PV materials	BT-1	Remember
9.	List a few organizations in India which promote the use of solar energy.	BT-1	Remember
10.	Define a trombe wall	BT-1	Remember
11.	Describe Thermal mass.	BT-2	Understand
12.	Discuss SHGC.	BT-2	Understand
13.	Differentiate between glass SHGC and window unit SHGC.	BT-2	Understand
14.	Review the term Chimney Effect.	BT-1	Remember
15.	What is Shading?	BT-1	Remember
16.	Describe Ventilation.	BT-1	Remember
17.	Write short notes on Natural Ventilation.	BT-2	Understand
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-1	Remember
22.	Recall 'Aperture' in passive heating system	BT-1	Remember
23.	Discuss the term 'Distribution' in passive heating system?	BT-2	Understand
24.	What is meant by in 'Control' in passive heating system?	BT-1	Remember
PART B			

1.	Summarize the key aspects of passive solar design.	BT-3	Application
2.	Explain the types of Solar Energy Technologies.	BT-3	Application
3.	Discuss SHC systems.	BT-3	Application
4.	Explain the Advantages and Disadvantages of Solar Power.	BT-3	Application
5.	Characterize the Solar Power types.	BT-4	Analyze
6.	What is the advantage of solar energy comparing other forms of energy?	BT-3	Application
7.	Explain the building window orientation design for various climatic conditions.	BT-3	Application
8.	What are the Purposes of Passive Cooling?	BT-3	Application
9.	Express the passive cooling techniques.	BT-3	Application
10.	Discuss the types of ventilation.	BT-3	Application
11.	Why Buildings are Going Solar? Discuss in worldwide context.	BT-3	Application
12.	Discuss why Solar Powered Buildings are energy efficient.	BT-3	Application
13.	Explain the three Forms of Solar Energy used for Buildings.	BT-3	Application
14.	Discuss with case study the Solar Passive Heating of Buildings.	BT-3	Application
15.	Summarize with case study the Solar Passive Cooling of Buildings.	BT-3	Application
16.	How solar energy is efficient in Commercial buildings?	BT-3	Application
17.	Compare solar energy with Conventional energy.	BT-3	Application

UNIT V - GREEN COMPOSITES FOR BUILDINGS

Concepts of Green Composites. Water Utilization in Buildings, Low Energy Approaches to Water Management. Management of Solid and Hazardous Wastes. Management of Sullage Water and Sewage. Urban Environment and Green Buildings. Green Cover and Built Environment.

PART A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Explain the term sullage.	BT-2	Understand
2.	Define sewage.	BT-1	Remember
3.	State the objectives of fibers used in green composites.	BT-1	Remember
4.	Where are urban green space important?	BT-2	Understand
5.	Review the green road concept.	BT-1	Remember

6.	Define Eco town.	BT-1	Remember
7.	Distinguish between recycle and reuse.	BT-2	Understand
8.	What are the benefits of grey water reuse?	BT-1	Remember
9.	Categorize types of urban green cover.	BT-2	Understand
10.	What are the challenges faced by urban areas in sustainable water management?	BT-2	Understand
11.	Define green composites.	BT-1	Remember
12.	Write about grey water treatment.	BT-1	Remember
13.	Distinguish between grey water and black water.	BT-2	Understand
14.	List out the steps involved in solid waste management.	BT-1	Remember
15.	Why do we need green composites?	BT-3	Application
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-1	Remember
19.	Give the solution for challenges faced in sustainable water management.	BT-2	Understand
20.	Write the impacts of unplanned construction activity.	BT-2	Understand
21.	Define incineration.	BT-1	Remember
22.	What is composting?	BT-1	Remember
23.	State the objectives of sustainable water management in urban areas.	BT-1	Remember
24.	Suggest some ways for grey water harvesting.	BT-2	Understand
PART B			
1.	What is grey water reuse and write the factors influencing it.	BT-3	Application
2.	Explain any two methods of sewage management.	BT-3	Application
3.	What are the challenges in creating green spaces?	BT-3	Application
4.	Explain the lifecycle of green composites.	BT-3	Application
5.	Write the overview of green building concept.	BT-3	Application
6.	List down the applications of green composites.	BT-3	Application
7.	Explain the concept of waste management.	BT-3	Application

8.	i. What are the five principles to achieve sustainable planning of housing? ii. Write notes on green technology for water treatment.	BT-3	Application
9.	Quote the practices, challenges and solutions of urban water development in developing countries.	BT-3	Application
10.	Identify the practices, challenges and solutions of urban water development in developed countries.	BT-3	Application
11.	Describe the benefits of grey water reuse.	BT-4	Analyze
12.	State the solution strategies for urban green spaces.	BT-3	Application
13.	State some waste management policies.	BT-3	Application
14.	Describe zero waste management with a case study.	BT-4	Analyze
15.	Discuss the elements of solid waste management.	BT-3	Application
16.	Construct the types of solid waste management.	BT-3	Application
17.	Elaborate the disposal methods of sewage.	BT-3	Application

