Q.5	i.	What is daylighting? What are its key benefits in construction?	**3**	1	1	1	2
	ii.	Discuss the concept of energy demand and its implications for building design. How can onsite sources and sinks be integrated into construction practices to enhance energy efficiency and sustainability?	**7**	2	7	4	2
OR	iii.	Discuss low energy approaches to water management in the context of sustainable building design. What principles guide these approaches? What techniques and technologies can be implemented to minimize energy use while ensuring efficient water supply and wastewater management?	**7**	2	7	4	2
Q.6		Attempt any two:					
	i.	Define embodied energy in the context of building materials. Discuss its significance in sustainable architecture and construction.	**5**	2	1	1	2
	ii.	What are alternative building materials? How do they differ from conventional materials in terms of sustainability, performance, and environmental impact?	**5**	2	7	4	2
	iii.	Discuss the role of waste management plans, material reuse and recycling, and innovative construction practices in minimizing construction waste.	**5**	2	7	4	2

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering
End Sem Examination Dec 2024
OE00037 Green Building Technologies

Programme: B.Tech. Branch/Specialisation: All

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	**BL**	**PO**	**CO**	**PSO**
Q.1	i.	Which of the following is a well-known VOC that is often monitored for air quality? (a) Carbon monoxide (b) Methane (c) Formaldehyde (d) Nitrogen dioxide	**1**	1	1	1	1
	ii.	What is the primary purpose of using a programmable thermostat? (a) To increase indoor humidity (b) To automatically adjust the temperature and save energy (c) To improve indoor air quality (d) To increase the life of heating and cooling systems	**1**	1	1	1	1
	iii.	The National Building Code recommends which of the following for earthquake-prone areas? (a) Use of concrete only (b) Increased building height (c) Flexible structural designs to absorb seismic forces (d) No specific recommendation for earthquake-prone areas	**1**	1	6	2	2
	iv.	In urban areas, microclimates are often warmer than rural surroundings. This phenomenon is called: (a) Temperature inversion (b) Urban heat island effect (c) Desertification (d) Cold spot	**1**	1	1	2	2

v.	Which of the following principles does wind towers work based on? (a) Forced convection (b) Natural convection and air pressure difference (c) Electrical fans inside the tower (d) Water cooling system	**1**	1	1	2	2
vi.	Which of the following surfaces would likely cool the fastest due to radiative cooling? (a) A metal roof (b) A concrete wall (c) A white-painted surface (d) An exposed soil surface	**1**	1	1	1	2
vii.	Which of these materials is often used to diffuse daylight and reduce glare? (a) Clear glass (b) Tinted glass (c) Frosted or translucent glass (d) Metal panels	**1**	1	1	1	2
viii.	Light shelves are commonly used in daylighting design to: (a) Block all sunlight (b) Redirect sunlight deeper into a room (c) Reflect sunlight outdoors (d) Absorb heat from sunlight	**1**	1	1	1	2
ix.	Which of the following is a key benefit of using rammed earth as a building material? (a) High cost-effectiveness in humid climates (b) Increased energy consumption in production (c) High thermal mass, which aids in temperature regulation (d) Limited availability of materials	**1**	1	1	1	2
x.	Cork is a renewable building material primarily harvested from: (a) The roots of the cork tree (b) The bark of the cork oak tree, which regenerates (c) The leaves of cork plants (d) Recycled wood products	**1**	1	1	2	2

Q.2	i.	Define sustainability and its importance for future generation.	**2**	1	1	1	2
	ii.	What is GRIHA? What are its main objectives in promoting sustainable building practices in India?	**3**	2	6	3	2
	iii.	Explain what "zero VOC" means in the context of building materials and indoor air quality. Discuss its benefits, limitations, and common applications in construction.	**5**	3	2	3	2
OR	iv.	Discuss the key design and construction phases of energy-efficient green buildings. How do these phases contribute to the overall sustainability and energy performance of the building?	**5**	3	2	2	2
Q.3	i.	What do you mean by microclimate.	**2**	1	1	1	2
	ii.	Define the major climatic zones and discuss their characteristics. How do these zones influence architectural design and construction practices in different regions?	**8**	3	1	4	2
OR	iii.	Discuss the National Building Code (NBC) and its significance in the construction industry. Include its primary objectives, key components, and how it influences building safety, accessibility, and sustainability.	**8**	3	6	4	2
Q.4	i.	What is passive cooling? What are its benefits in building design?	**3**	1	7	1	1
	ii.	Explain the concept of thermal storage walls in building design. Discuss their function, materials commonly used, benefits, and how they contribute to energy efficiency in buildings.	**7**	2	7	5	2
OR	iii.	Explain the concept of passive downdraft evaporative cooling. Discuss its principles, components, advantages, and how it can be effectively integrated into building design for energy efficiency.	**7**	2	6	5	2

Marking Scheme

OE00037 Green Building Technology

Q.1	i)	c	**1**
	ii)	b	**1**
	iii)	c	**1**
	iv)	b	**1**
	v)	b	**1**
	vi)	d	**1**
	vii)	c	**1**
	viii)	b	**1**
	ix)	c	**1**
	x)	b	**1**

Q.2	i.	Sustainability – 1marks Importance of sustainability – 1 marks	**2**
	ii.	Definition of GRIHA – 1 marks Objectives of GRIHA – 2 marks	**3**
	iii.	Zero VOC – 2 marks benefits, limitations, and common applications – 3 marks	**5**
OR	iv.	key design and construction phases of energy-efficient green buildings – 3 marks How it effects the overall sustainability and energy performance – 2 marks	**5**

Q.3	i.	Microclimate (definition) – 2 marks	**2**
	ii.	Major climate zones – 5 marks Its influence on architectural design and construction practices – 3 marks	**8**
OR	iii.	Definition of NBC – 2 marks Significance – 2 marks Objectives & key components - 2 marks Its influences building safety, accessibility, and sustainability – 2 marks	**8**

Q.4	i.	Definition of passive cooling – 1 marks Benefits – 2 marks	**3**
	ii.	concept of thermal storage walls – 2 marks Its function and materials commonly used – 3 marks Its benefits and its contribution to energy efficiency in buildings – 2 marks	**7**
OR	iii.	concept of passive downdraft evaporative cooling – 2 marks principles, components and advantages – 3 marks how it can be effectively integrated into building design - 2 marks	**7**

Q.5	i.	Daylighting – 1 marks Benefits of daylighting – 2 marks	**3**
	ii.	concept of energy demand and its implications – 3 marks onsite sources and sinks – 4 marks	**7**
OR	iii.	low energy approaches to water management – 2 marks principles guide these approaches – 3 marks techniques and techniques that can be implemented to minimize energy use – 2 marks	**7**

Q.6

	i.	Define embodied energy – 2 marks Its significance in sustainable architecture and construction – 3 marks	**5**
	ii.	Alternative building materials – 2 marks How do they differ from conventional materials – 3 marks	**5**

P.T.O.

[2] [3]

iii. role of waste management plans, material reuse and recycling – 2 marks **5**

Innovative construction practices in minimizing construction waste – 3 marks

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