BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: B. ARCH. **SEMESTER: 7th**
BRANCH: ARCHITECTURE **SESSION: MO/2022**

SUBJECT: AR403 ENERGY EFFICIENT ARCHITECTURE

TIME: 2 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

				CO	BL
Q1	(a)	Define Sustainability. What are the life cycle stages of a Building? List down the 'R' principles adopted globally for bringing energy efficiency in building and construction industry.	[2]	CO4	Knowledge
Q1	(b)	Why there is a need to bring energy efficiency in construction industry? Explain in the context of SDGs.	[3]	CO1 & CO4	Knowledge & Analysis
Q2	(a)	List down the Renewable Energy Sources. Explain the concept of passive solar heating in buildings.	[2]	CO3	Knowledge
Q2	(b)	Discuss the features of Sustainable Building Materials.	[3]	CO3 & CO4	Comprehension
Q3	(a)	Define: Embodied Energy, Embodied Carbon, CCS and CCU.	[2]	CO1	Knowledge
Q3	(b)	Explain the causes, effects and solutions towards Global energy Crisis in building industry.	[3]	CO1	Comprehension
Q4	(a)	What are the different modes of heat transfer in buildings? Explain Thermal transmittance, its unit and the formula for calculation.	[2]	CO1	Knowledge
Q4	(b)	Explain SHGC & Visual Transmittance. If a roof is treated with a layer of thermal insulation material, the internal heat gain is reduced by 60%. The U-value of the roof slab without thermal insulation is 3 Watt/deg.C. Assuming a constant temperature difference between indoor and outdoor, calculate the U-value of the thermal insulation layer in Watt/deg.C.	[3]	CO1 & CO3	Knowledge & Application
Q5	(a)	What are the different ways of integrating daylighting into buildings? The indoor illumination requirement for a building is 350 lux. If the daylight factor is 2.7 and the design sky illuminance is 9000 Lux, then what will be the required supplementary artificial lighting?	[2]	CO1 & CO3	Knowledge & Application
Q5	(b)	Explain the following with sketches: Trombe wall & Solar Chimney.	[3]	CO2	Knowledge & Comprehension

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