Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - AUGUST 2024

Semester : II	**Date : 13-08-2024**
Course Code : CIV5003	**Time : 9.30am to 12.30pm**
Course Name : Self Sustainable Building	**Max Marks :100**
Program : M. Tech	**Weightage :50%**

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ANY 10 QUESTIONS **10Q X 2M=20M**

1	What is the need for sustainability?	(CO 1)	[Knowledge]
2	What is Ecological Footprint?	(CO 1)	[Knowledge]
3	Explain the Earth overshoot day.	(CO 1)	[Knowledge]
4	What are ISO 9001 and ISO 14001?	(CO 1)	[Knowledge]
5	Name 4 red-listed chemicals and materials that are harmful to humans.	(CO 2)	[Knowledge]
6	What is Trombe wall?	(CO 2)	[Knowledge]
7	What is Bioswales?	(CO 2)	[Knowledge]
8	Define Pozzolans	(CO 2)	[Knowledge]
9	Explain living concrete	(CO 2)	[Knowledge]
10	What is the window wall ratio?	(CO 3)	[Knowledge]
11	What are the various elements of durability in green building	(CO 3)	[Knowledge]
12	Expand the following terminology: LEED, GRIHA, IGBC, BREEAM	(CO 3)	[Knowledge]
13	Define Floor Space Index.	(CO 3)	[Knowledge]

14 What is the use of the Edge tool? (CO 3) [Knowledge]

PART B

ANSWER ANY 7 QUESTIONS **7Q X 5M = 35M**

15 Calculate the ecological footprint for a farm with 3 crops maize, rice, and wheat. (CO 1) [Application]

a) The harvest of maize is 4 tonnes, rice is 3 tonnes and wheat is 5 tonnes in the year 2023.
b) The average yield of the farm for maize is 6 tons/ha, rice is 2 tons/ha and wheat is 4 tons/ha.
c) The yield factor for maize is 1.25 gha/ha, rice is 1.28 gha/ha and wheat is 1.29 gha/ha.
d) The equivalence factor for all the crops is 2.8 gha/ha.

16 The Biological Productivity and Area of three areas are given below: (CO 1) [Application]

a) Desert: Biological Productivity of 4 ha and Area of 8 ha
b) Agricultural area: Biological Productivity of 9 ha and Area of 3.2 ha
c) Ocean: Biological Productivity of 6.8 ha and Area of 9.2 ha

Calculate Equivalency Factors for the above three areas.

17 LCA is known for life-cycle analysis, eco-balance, and cradle-to-grave analysis. List the four stages of conducting a LCA as per ISO standards. Explain the first two stages of a LCA. (CO 1) [Comprehension]

18 Sustainable flooring is produced from sustainable materials that reduce demands on ecosystems during its life cycle. Explain any five sustainable flooring materials as a part of green building. (CO 2) [Comprehension]

19 Green buildings reduce or eliminate negative impacts in their design, construction, or operation. Many techniques are employed to construct green buildings to create positive impacts on our climate and natural environment. Concerning the same, write a case study of a Green Building situated in India and their use of techniques in the construction. (CO 2) [Comprehension]

20 Sustainability focuses on waste reduction measures and the enabling of reuse and recycling of materials. In this regard, what is recycled aggregate, and explain how is it manufactured? Write the advantages and sustainable aspects of recycled aggregate. (CO 2) [Comprehension]

21 In green construction practices, the use of River sand is replaced with Manufactured sand. Is M sand compared to be more sustainable than River sand, If so why? Compare M-sand and River Sand. (CO 2) [Comprehension]

22 LEED is the world's leading green building project and performance management system, delivering a comprehensive framework for green building design, construction, operations, and performance. LEED Project earns points across 9 key aspect areas. What are those key aspects? (CO 3) [Comprehension]

23 Energy Efficiency is the reduction in the use of non-renewable sources of energy. Is it possible to completely shift to renewable sources of energy? Then what is net-zero-energy building and explain the four concepts of net-zero-energy building. (CO 3) [Comprehension]

24 Since 90% of our lifetime is spent in our homes, indoor air quality is an essential parameter that needs focused attention. The vulnerability of different sections of the population to indoor air pollutants varies. Explain who is more prone to be affected by indoor air pollution. How do these pollutants affect their health? (CO 3) [Comprehension]

PART C

ANSWER ANY 3 QUESTIONS **3Q X 15M = 45M**

25	a) Estimate the total embodied energy of a RCC slab with a total volume of 8 m^3. The percentage of steel can be taken as 1.5%. The embodied energy of concrete and steel is 0.0075 MJ/kg and 6 MJ/kg. Assume density of steel as 7850 kg/m^3 and concrete as 2400 kg/m^3. b) Sustainability is critical to halting climate change in the face of increasing global warming and ozone layer depletion. What measures are taken to promote sustainable development? What are the challenges we encounter while practicing sustainability?	(CO 1)	[Application]
26	An Ideal green building material is a material that has no negative environmental impacts. Possibly it should have positive environmental impacts. In this idea explain the following a) Explain how GGBFS Concrete is prepared. What are their uses and sustainability aspects? b) What is High-volume fly ash concrete? Explain the various applications of fly ash	(CO 2)	[Comprehension]
27	Green building design involves finding the balance between homebuilding and the sustainable environment. As a civil engineer, you are planning to build a Green building. What are the ideas you will implement concerning a) Material Selection – write a short note on five different green materials you will use on-site. b) Construction Techniques - write a short note on five different construction practices you will adopt to ensure green practice in construction.	(CO 2)	[Comprehension]
28	Ventilation is an important aspect of green buildings as outdoor air helps remove indoor air pollutants. In addition, the regulation of building temperature and humidity is done well by ventilation. You have been given the task of designing a ventilation system for an upcoming project. (a) Give five indoor air pollutants along with their sources. (b) Explain any two ventilation systems that you would prefer to use in that project. (c) Benefits of a ventilation system in indoor air quality.	(CO 3)	[Application]
29	The IGBC is a part of the Confederation of Indian Industry (CII) and was formed in the year 2001. It is aimed at improving the environmental performance of the building. Explain in detail about IGBC green certification. Explain the process of rating, types of rating, and criteria considered for rating green buildings. Give an example of an IGBC green-certified building.	(CO 3)	[Comprehension]