

**Roll No.**

**Total No. of Pages : 02**

**Total No. of Questions : 08**

**M.Tech. (Mechanical Engineering) (Sem.-3)**

## SUSTAINABLE DESIGN AND MANUFACTURING

**Subject Code : MTME-219**

**M.Code : 74995**

**Date of Examination : 23-12-22**

**Time : 3 Hrs.**

**Max. Marks : 100**

**INSTRUCTIONS TO CANDIDATES :**

1. Attempt any FIVE questions out of EIGHT question.
2. Each question carry TWENTY marks.

1.
  - a) What are the main components of Sustainable Development? Discuss the linkages between technology and sustainability.
  - b) What do you understand by Sustainable Development? What does it mean and how is it to be achieved?
2.
  - a) Why do we need Sustainable Business models? How can you start and maintain a Sustainable Business model?
  - b) Discuss the elements of the Sustainability Matrix and explain various issues addressed in the Sustainability Matrix.
3.
  - a) What is the circular economy? Explain the technological elements of the circular economy and the principles of 6R based closed-loop material flow in sustainable manufacturing.
  - b) Describe environmental Quality Function Deployment for Sustainable Products giving an appropriate example.
4. Explain the importance of Environmental Impact Assessment (ETA). Explain the applications of important EIA methodologies for assessing the impacts of any developmental activity on the environment.
5. What is Design for disassembly? Discuss the guidelines for ensuring a successful implementation of DFD techniques. Discuss the opportunities and challenges in adopting Design for disassembly.

6. Explain the principle concept of a Life Cycle Sustainability Assessment (LCSA). Identify and describe three specific assessment methods that should be included as part of an LCSA study.
7. What is an eco-friendly design? Explain the Eco-design approach for developing Eco-friendly products. What are examples of Sustainable Design?
8.
  - a) Write a short note on Product Sustainability and Risk/Benefit assessment.
  - b) How can we measure Sustainable Development? Describe the key indicators of Sustainable Development and their applications.

**NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.**