

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTER B.TECH DEGREE EXAMINATION (Regular), DECEMBER 2022

COMMON TO ALL BRANCHES

(2020 SCHEME)

Course Code : 20MCN201

Course Name: Sustainable Engineering

Max. Marks : 50

Duration: 2 Hours

PART A

(Read the Stories/Cases/Data set as the case may be, and answer ALL questions. Each FULL question carries 10 Marks)

1. In 2013, severe floods affected the North Indian state of Uttarakhand, due to unusually high rainfall during the monsoon season caused devastating floods and landslides. Over 3 lakhs of pilgrims and tourists trapped in the valleys and had to be evacuated. Almost all districts of the state were placed on affected. Severe landslides have left the hilly districts isolated.
 - a) Relate the scenario given, with sustainability? (3 Marks)
 - b) Give any two instances of over-exploitation of natural resources that worsened the impact of monsoon. (3 Marks)
 - c) List out the impacts caused by flood. (4 Marks)
2. In metro cities in India, an individual produces an average of 0.8 kg waste/person daily. The total municipal solid waste (MSW) generated in urban India has been estimated at 68.8 million tons per year (0.573 million metric tons per day in the year 2008). The average collection efficiency of MSW ranges from 22% to 60%. MSW typically contains 51% organic waste, 17% recyclables, 11% hazardous and 21% inert waste. However, about 40% of all MSW is not collected at all and hence lies littered in the city/town and finds its way to nearby drains and water bodies, causing choking as well as pollution of surface water. Unsegregated waste collection and transportation leads to dumping in the open, which generates leachate and gaseous emissions besides causing nuisance in the surrounding environment. Leachate contaminates the groundwater as well as surface water in the vicinity and gaseous emissions contribute to global warming.
 - a) Do you think local environmental issues contribute to global warming? (2 Marks)

- b) Suggest any three solutions to the issues mentioned. (4 Marks)
- c) List any three global impacts of issues mentioned above (2 Marks)
- d) Do you prefer 3R concept or zero waste concept to address above issue? (2 Marks)
3. a) What is Life Cycle Analysis (LCA)? (5 Marks)
- b) Prepare the LCA for LED lamps. (5 Marks)
4. a) What is the scope of using geothermal energy as a non-renewable energy source also mention its advantages and disadvantages. (4 Marks)
- b) Being an agriculture country, what is the scope of using bio-fuels for meeting the energy needs of India? (6 Marks)
5. Housing, being the very basic requirement that holds the key to accelerate social development in many ways, the Government of Kerala launched a Mission named LIFE (Livelihood Inclusion and Financial Empowerment) which envisages a comprehensive housing scheme for all the landless and homeless in Kerala State. The target of the mission is to provide safe housing to nearly 4.30 lakhs of homeless in the State within a period of 5 years. Also, the homeless will be provided with provision for pursuing their livelihoods, converging social services including Primary Health Care, Geriatric Supports, Skill Development and provision for financial services inclusion. Priority will be given to coastal population, plantation workers and those who stay in temporary shelters in government lands.
- a) Propose sustainable habitat principles for the mission. (3 Marks)
- b) List the possible barriers to the mission. (3 Marks)
- c) Analyze the mission from social, economic, and environmental sustainability perspective. (4 Marks)
