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B.Tech DEGREE EXAMINATION, DECEMBER 2023

Fifth Semester

18BTO106T - WASTE TO WEALTH TO WHEELS

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks)
Answer **all** Questions

		Marks	BL	CO
1.	Which one of the following is not a part of waste lifecycle? (A) Manufacturing (B) Reduction (C) Recycling (D) Consumption and use	1	1	1
2.	Pick out the most suitable waste suitable for composting (A) Kitchen waste (B) Nuclear waste (C) Leather waste (D) Biomedical waste	1	1	1
3.	Waste management pyramid include the following components except (A) Recycling (B) Disposal (C) Renovation (D) Reuse	1	2	1
4.	In which stage of the waste to wealth platform, the 'smart bins' play a crucial role? (A) Waste providers (B) Waste transporters (C) Waste transformers (D) Waste utilizers	1	2	1
5.	Which of the following is not a fossil fuel (A) Coal (B) Natural Gas (C) Lignite (D) Biomethane	1	1	1
6.	Geosequestration is mostly used for the purpose of (A) Capturing SO_2 (B) Capturing Carbon di oxide (C) Capturing Carbon monoxide (D) Capturing Nitrogen oxide	1	3	2
7.	Which pair of air pollutant is responsible for acid rain? (A) CH_4/CO_2 (B) CH_4/H_2 (C) NO_x/CO_2 (D) NO_x/SO_2	1	2	2
8.	According to wastes life cycle at what stage the waste to be neglected from the cycle? (A) Manufacturing (B) Consumption (C) usage (D) Recycling	1	4	2
9.	Biochar is a product of (A) Combustion (B) Co-firing (C) Co-generation (D) Pyrolysis	1	1	3
10.	Fischer Tropsch synthesis is used for production of (A) Biomethane (B) Ethanol (C) FAME (D) Hydrocarbons	1	3	3
11.	Non-legume crops are unable to fix the -------, so it depends on a huge amount of chemical fertilizers, (A) Phosphorous (B) Potassium (C) Atmospheric nitrogen (D) Sodium	1	2	3

12.	The most efficient composting occurs with an optimal carbon:nitrogen ratio of about (A) 18:3 (B) 10:4 (C) 25:1 (D) 23:5	1	1	3
13.	Oleaginous microbes can convert substrates such as carbon dioxide, sugars and organic acids to ------ (A) Butanol (B) Single cell oil (C) Ethanol (D) Methanol	1	1	3
14.	Cultivated microalgae can fix, (A) CO_2 (B) CH_4 (C) CO (D) SO_2	1	2	4
15.	The better substituent of LPG (A) Bioethanol (B) FAME (C) Biomethane (D) Syngas	1	1	6
16.	.....enzyme is used in starch hydrolysis (A) Cellulase (B) Laccase (C) Amylase (D) Peroxidase	1	3	4
17.	Among the following which one of following is NOT a main theme of genetic modification of crops is (A) Conserving biodiversity (B) Alleviation of poverty and hunger (C) Increasing agriculture's environmental footprint (D) Mitigating climate change	1	2	5
18.	When mixed with landfill methane gas, the conventional combustion can result in reduced_____ (A) CO (B) CO_2 (C) NOx (D) O_2	1	2	6
19.	Landfill gas can be used for generation of (A) Bioethanol (B) Biodiesel (C) Electricity (D) Hydrogen	1	1	4
20.	Natural gas is most ------- rich carbon source available on earth, (A) Oxygen (B) Hydrogen (C) Nitrogen (D) Methane	1	2	4

PART - B (5 × 4 = 20 Marks)

Answer **any 5** Questions

		Marks	BL	CO
21.	What is waste to wealth platform?	4	2	1
22.	You have been assigned as process engineer for biomass conversion unit in a Tier I metrocity. There were lot of biomass in terms of MSW and garden wastes are found in the dump yard. You are requested to provide a suggestion list of bioconversion technologies possible to convert into fuels and value-added chemicals. What would you submit as the suggestive treatment options?	4	4	2
23.	Though combustion, co-firing and co-generation seems to be same, there is a distinct difference amongst them. What are all those? Draw a table to enlist them.	4	2	3
24.	Define the concept of 'C' neutral fuels in a schematic way.	4	1	3
25.	Justify the need for the clean coal technologies.	4	3	4
26.	Enlist the factors that effects the composting and vermicomposting process.	4	3	5
27.	How landfill gas can be effectively managed for energy consumption?	4	3	6

PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

		Marks	BL	CO

28.	(a) What are fossil fuels? Describe the different sources and its implication on health and the environment.	12	2	1
	(OR)			
	(b) Schematically explain the waste management pyramid and its component. Provide your views on Waste to Energy conversion technology for sustainable development.			
29.	(a) How kinetic energy of flowing water from a water reservoir could be tapped for electricity production? Explain the process with a sketch.	12	2	2
	(OR)			
	(b) There are different types of solid form of fossil fuel are being utilized for power production. Enlist them according to their nature. In India, how majority of the power production is carried out? Schematically explain.			
30.	(a) Describe different platforms for production of bioethanol using biological resources.	12	3	3
	(OR)			
	(b) How biodiesel is produced from plants and microbes? Explain the process with a flow chart.			
31.	(a) For synthesis of next generation materials like CNTs and graphene, some waste resources are an efficient raw material. How? Explain the process of synthesis for any 1 given waste material.	12	3	4
	(OR)			
	(b) How ABE fermentation is different from conventional ethanol fermentation? Describe the process of production from a lignocellulosic feedstock.			
32.	(a) Detail the process of effective management of landfill gas and leachate without hampering the environment.	12	4	6
	(OR)			
	(b) Describe the ways of Gas to Liquid Conversion technology and how transport mechanism is being done?			

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