Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14BT2054** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BIOENERGY AND BIOMATERIALS** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Name a few secondary feed-stock for liquid biofuel. | CO1 | 1 |
| b. | What are the array of products in biomass pyrolysis? | CO1 | 1 |
| c. | What are the point of merits for biomass energy in comparison to other energies? | CO2 | 2 |
| d. | Illustrate potential benefits from biogas technology. | CO2 | 2 |
| e. | Analyze the oil based energy trend in India. What are challenges and opportunities? | CO1 | 14 |
| (OR) | | | | |
| 2. | a. | State the major environmental impacts of lignocellulosic biomass production. | CO2 | 1 |
| b. | Exemplify use of two energy crops and their products. | CO2 | 1 |
| c. | What are the factors that influences Biomass energy potential? | CO2 | 2 |
| d. | Illustrate advantages of lignocellulosic crops over food-crops in bioenergy sector. | CO2 | 2 |
| e. | What is bioenergy chain? Describe the conversion process and energy products. | CO2 | 14 |
| 3. | a. | What is composition of biooil? | CO1 | 1 |
| b. | What are the various thermochemical conversion route? | CO1 | 1 |
| c. | Illustrate the biochemical conversion steps in bioenergy production. | CO2 | 2 |
| d. | What do you understand by cogeneration plant? | CO2 | 2 |
| e. | Describe specific advantages of 3rd generation biofuel when using microalgae. | CO2 | 14 |
| (OR) | | | | |
| 4. | a. | What are the products in torrefaction process? | CO2 | 1 |
| b. | How does the energy content changes with torrefaction? | CO2 | 2 |
| c. | What happens in “Ageing” of biooil? | CO2 | 2 |
| d. | How can you manipulate pyrolysis process to have increased yield of bio-oil? | CO2 | 2 |
| e. | How the biooil quality can be improved in upgradation process? | CO2 | 14 |
| 5. | a. | Is there any environmental benefit of AD process? | CO2 | 1 |
| b. | What is the role of methanogenic microbes? | CO2 | 1 |
| c. | How would AD process be affected if acetogenic methanogens are washed away? | CO2 | 2 |
| d. | How the temperature is likely affect anaerobic digestion process? | CO2 | 2 |
| e. | Describe the inhibited steady-state condition in AD? How can it be managed. | CO2 | 14 |
| (OR) | | | | |
| 6. | a. | Write the overall reaction in AD process. | CO2 | 1 |
| b. | Which microbial group converts VFA to acetate? | CO2 | 1 |
| c. | Offer some strategies to increase rate of hydrolysis in AD process. | CO2 | 2 |
| d. | Explain the possible mechanism in ammonia toxicity. | CO2 | 2 |
| e. | Diagrammatically explain the AD pathways and its intermediates. | CO2 | 14 |
| 7. | a. | What are the major three reservoirs in carbon cycle? | CO2 | 1 |
| b. | What major form of C exists in Oceanic reserve? | CO2 | 1 |
| c. | How the increasing atmospheric carbon dioxide is likely to affect C-cycle? | CO2 | 2 |
| d. | Describe short-term and long-term C cycle. | CO2 | 2 |
| e. | Illustrate various C exchange process between atmosphere and terrestrial biosphere. | CO2 | 14 |
| (OR) | | | | |
| 8. | a. | Name the enzyme involved in nitrogen fixation process. | CO3 | 1 |
|  | b. | What is the consequence Annamox process? | CO3 | 1 |
|  | c. | What is the obligate intermediate in denitrification? | CO3 | 2 |
|  | d. | Over use of fertilizer is going to destabilize the N-cycle, explain how? | CO2 | 2 |
|  | e. | Illustrate the different stages of Nitrogen cycle, how are they connected? | CO3 | 14 |
|  | | **Compulsory:** |  |  |
| 9. | a. | What do you understand by the term “bioavailability”? | CO2 | 1 |
|  | b. | What type of organic contaminants requires anaerobic degradation process? | CO3 | 1 |
|  | c. | What are the possible fate of any organic pollutant in soil-water system? | CO2 | 2 |
|  | d. | Differentiate between phytodegradation to phytoextraction. | CO3 | 2 |
|  | e. | When will you adopt “biostimulation”, “bioaugmentation” strategy in contaminant removal? Discuss the major factors that determines bioremediation efficiency. | CO3 | 14 |