



End Semester Examination – Nov/Dec – 2016

Code : 14BT2054
Sub. Name : Bioenergy and Biomaterials

Semester : 2016-17 ODD
Duration : 3hrs
Max. marks : 100

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

| 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 3 rd 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 |
| | | <u>Compulsory:</u> | | |
| 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 |