

Damietta University
Faculty of Sciences
Environ. Sc. Dept.
4th year Env. Sc. Students



Course: Environ. Biotechnology
Code: (409 E)
Date: 25/6/2024
Time: 2 hours
Full Mark: 70 Marks

Answer All the following Questions

الاختبار في ثلاث ورقات

Question 1: (18 Marks)

Explain the following:

- Microbiological processes are used to degrade or transform contaminants to less toxic or nontoxic forms
- Harmful effects of chemicals & biological agents
- Degree of toxicity can vary depending on place of organism & its food web.

Question 2: (17 Marks)

Write a brief note on the following:

- Advantages & Disadvantages of Bioremediation
- Main factors which influence the growth of bacteria and fungi in the environment
- Current environmental have to need for changing the crisis

Question 3: (25 Marks)

a) Choose the correct answer: (12 Marks)

1. All the following feedstocks used to commercially produce second-generation biofuels except

- Lignocellulosic materials
- Switch grass and poplar
- Corn and sugarcane
- Agri-residues byproducts

2. What is the temperature range of the moisture removal step in the thermal gasification process?

- a) 200-300°C
- b) 100-200°C
- c) 600-1300°C
- d) There is no moisture removal step in the thermal gasification process

3. What are the limitations of open ponds for algae cultivation?

- a) Inability to produce microalgae and cyanobacteria
- b) Require high operation and investment costs
- c) Risk of contamination from other organisms
- d) None of the above

4. What is the effect of higher temperatures on the solubility of gaseous substrates in liquid medium through syngas fermentation process?

- a) Gas solubility decreases with decreasing temperature
- b) Gas solubility increases with decreasing temperature
- c) Gas solubility increases with increasing temperature
- d) It has no effect on the solubility of gaseous substrates in liquid medium

5. What is the main disadvantage of the Fischer-Tropsch process?

- a) Low microbial catalyst selectivity
- b) No specific ratio of gas components is required to yield a desired product
- c) Catalyst poisoning by the trace amount of sulfur gases presented in the syngas
- d) All of the above

6. What is the type of algae grow without light, using carbon sugars as a source of energy?

- a) Mixotrophic
- b) Heterotrophic
- c) Photoautotrophic
- d) None of the above

b) Give interpretations for the following: (13 Mark)

1. Limited commercial applications of biochemical pathways.
2. It is not recommended to increase the pressure through FT process.
3. Appearance of the second generation of biofuels.
4. Using syngas fermentation process instead of biochemical and FTP approaches.

Question 4: (10 Marks)

- a) Why are algae of interest for biofuel production? **(4 Marks)**
- b) Illustrate the name of the microbial catalyst used in syngas fermentation process, and mention the composition of the media used through this process? **(6 Marks)**
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Good Luck

Examiners: Prof. Maie ElGammal

Dr. Basma Omar