

قلم

<p>Damietta University Faculty of Science Environmental Science Dept. 4th year Env. Sc. / Env. Sc. & Chemistry Students</p>	 <p>جامعة دمياط Damietta University Second term Exam 2024</p>	<p>Course Title: Energy Resources Course Code: (414 E) Date: 23/6/ 2024 Time: 1 Hour</p>
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Answer All the following Questions **Total Mark: 35**

Question (1) (18 Marks)

Complete the following sentences:

1. is the rate-limiting step of the AD process strongly depending on macromolecules composition and structure.
2. The adsorbents used in PSA technology are.....,and
3.is the reaction of H₂ with CO₂ at elevated temperatures and pressures in the presence of nickel catalyst to produce methane and water.
4. The purpose of filters used in the gas-gas membrane separation unit is
5. are preferred to be used in the chemical upgrading systems instead of amines solutions.
6.,and.....are among the main factors influencing biogas digester's efficiency and performance.
7.is the technique used for separating and converting CO₂ and other gases included in biogas to a liquid or a solid material.
8.and.....are the major advantages of using microalgae in bioenergy field.

Question (2): (17Marks)

A) Give interpretations for the following: (13 Marks)

1. CO₂ removal from the biogas.
2. Using biological biogas upgrading instead of traditional upgrading methods.
3. Appearance of sticky residues deposited in biogas combustion engines and valves.
4. Increasing the temperature to 160 °C in the stripping column of the amine upgrading systems.
5. Using acetogenic bacteria in the upgrading systems.

B) What are the differences between In-situ and Ex-situ biogas upgrading systems and which one is considered the best? (4 Marks)

-----With my best wishes-----
Dr. Basma Omar