this statement. *[4 Marks]*

b) What is meant by *"the end of pipe measures"* under the context of the wastewater management? *[3 Marks]*

c) What is the organic loading rate and the sludge loading rate of an activated sludge plant treating sewage water and working with a hydraulic retention time of 6.1 hours and has an influent biochemical oxygen demand of 482 ppm and a MLSS of 4111 mg/l? *then* deduce the treatment rate of this treatment plant. *[8 Marks]*

Question [3]: (14 Marks)

a) *"Increasing the natural self-purification capacity of a river is one of the strategic options for wastewater management"*. Briefly demonstrate this concept, and mention some ways that could be used to achieve this concept. *[3 Marks]*

b) Give one example of an integrated solid waste management, which represents waste to energy technology, and refer to the form of the produced energy in the mentioned technology. *[3 Marks]*

c) Discuss the microbial growth pattern in batch culture of a biological wastewater treatment system, then answer the following: - *[8 Marks]*

i. What is optimum stage for the biological treatment of wastewater and why?

ii. What will happen if wastewater is supplied again to the media before the completion of the last phase?

جامعة دمياط
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etta University
ty of Science
onmental Sciences Department

Semester: Jan. 2025
Date: Sunday 29/12/2025
Allowed Time: 2 hours

Final Exam of Wastes Management *(Course Code: 412 E)*

for 4th. Level Environmental Sciences Program

ver All the Following Questions:

Total Mark: 70 Marks

stion [1]: (23 Marks)

mpare between *submerged MBR* and *activated sludge* processes for wastewater atment, and use the drawing for clarification. *[10 Marks]*

scuss in brief the concept of *"the international waste transport"*, and mention to main recommendations of the Basel's meeting that held regarding to this issue. *[5 Marks]*

lculate the TOC and COD of 5.9 millimoles of pentanoic acid solution in ppm, nowing that the oxidation of pentanoic acid occurs as follows:

$$CH_3CH_2CH_2CH_2COOH + 6\frac{1}{2}O_2 \longrightarrow 5CO_2 + 5H_2O$$ *[8 Marks]*

stion [2]: (15 Marks)

idation ponds have diverse characteristics in waste water treatment. Comment on

Question [4]: (18 Marks)

a) At which phase of anaerobic wastewater degradation, the organic load of a dairy wastewater starts to be actually treated? What is the reason for your answer? *[5 Marks]*

b) A sample of an industrial liquid waste was analyzed, and the results showed that 8.6% of its content is dissolved solids, 13.5% is coarse suspended solids, and 77.9% is colloidal solids. According to your knowledge, what will be the first choice for treating this investigated wastewater? Is it *chemical, biological* or *physical* treatment? and why? *[3 Marks]*

c) Choose the most appropriate answer for each of the following: *[10 Marks]*

1- Sand filtration is considered as a ***(secondary – advanced – primary – tertiary – conventional)*** treatment of the municipal wastewater.

2- In the anaerobic treatment of wastewater, ***(sludge adaption is fast and sludge production is high - sludge adaption is fast and sludge production is low - sludge adaption is slow and sludge production is low)***.

3- Cross flow filtration prevents thicker particles from building up a ***(tangential flow – dead end – filter cake – enzymatic cleaning)*** on the membrane surface.

4- Azote and phosphorus fertilizers are among the main sources of ***(sewage – municipal liquid waste – agricultural liquid waste – domestic liquid waste -***