Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**M.E. – SEMESTER – IV EXAMINATION – OCTOBER 2012**

**Subject code: 741801 Date: 25-10-2012**

**Subject Name: Anaerobic Biotechnologies**

**Time: 2:30 pm – 5:00 pm Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

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|---|---|---|---|
| Q-1 | (a) | Write a brief note on applicability of anaerobic treatment for industrial waste water. Cite appropriate example. | **(7)** |
| | (b) | Would you recommend anaerobic treatment for high flow low strength wastewater? Justify your answer. | **(7)** |
| Q-2 | (a) | Describe the effect of following condition on the performance of anaerobic reactor.<br>(i) Temperature (iii) Ammonical nitrogen (ii) pH | **(7)** |
| | (b) | Explain the relationship between methane generation and waste stabilization. | **(7)** |
| | | **OR** | |
| | (b) | Enlist and explain the sources of methane in anaerobic process. | **(7)** |
| Q-3 | (a) | With the help of neat diagram explain the different stages in anaerobic process. | **(7)** |
| | (b) | Define sludge and enlist the sludge treatment methods. Explain any one in detail. | **(7)** |
| | | **OR** | |
| Q-3 | (a) | Give the difference between suspended growth anaerobic treatment & Attached growth anaerobic treatment process. | **(7)** |
| | (b) | Explain Expanded Granular Sludge Blanket with neat sketch. | **(7)** |
| Q- 4 | (a) | Give the difference between Low Rate Anaerobic Reactor & High Rate Anaerobic Reactor | **(7)** |
| | (b) | Explain internal circulation anaerobic reactor with neat sketch. | **(7)** |
| | | **OR** | |
| Q-4 | (a) | Assuming 3.0 kg of volatile solids/day/m3 as loading rate and the data given below, determine the capacity of anaerobic sludge digester to treat the sludge generated from a 10 MLD domestic waste water treatment plant.<br>(i) Suspended solids in waste water: 250mg/L<br>(ii) SS removal efficiency of primary clarifier: 60%<br>(iii)Volatile content of solids: 70% | **(7)** |
| Q-5 | (a) | Determine the amount of $CH_4$ produced from 1 kg of $BOD_L$ stabilized. Assume that the BOD contribution is due to glucose ($C_6H_{12}O_6$) | **(8)** |
| | (b) | Write a short note on "Up flow Anaerobic Sludge Blanket" with neat sketch. OR | **(6)** |

Q-5 (a) Explain the COD mass balance for complex organic waste with line diagram. **(7)**

(b) Give the difference between Anaerobic Migrating Blanket reactor (AMBR) & Anaerobic Blanket Reactor. **(7)**

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