



Uva Wellassa University, Sri Lanka  
End Semester Examination – March 2011



MRT 302-1 Microbiology for Water Science

Time: One (01) hour

Total six (06) questions  
Answer four (04) questions only

1. I. According to the carbon and energy supply microorganisms can be classified in to four (04) major groups. What are they? (04 marks)
- II. You found a particular microorganism and after some experiment you found out that in the presence of light it use  $H_2S$  as electron donor to reduce  $CO_2$  to cellular carbohydrates. Under which category you can classify it? Justify your answer. Give another microorganism that is classified under same category. (10 marks)
- III. In a Bacterial culture the number of bacteria present at an early stage in exponential growth ( $N_0$ ) was  $4 \times 10^3$ . The number of bacteria present after 5 hours of exponential growth ( $N_t$ ) was  $3.6 \times 10^7$ . Using following equation,  
$$N_t = N_0 \times 2^n$$
- a. Calculate number of generations ( $n$ ). (06 marks)
- b. What is the generation time of that bacterium? (05 marks)
2. I List five (05) fecal indicators. (5 marks)
- II Give two (02) purposes of using microbial indicators in water treatment plants. (4 marks)
- III In water samples of a water treatment plant, you found higher levels of fecal streptococci. The ratio between Coliform and Streptococci was 5.
- a. What can you predict about contamination without further analysis? Briefly explain. (8 marks)

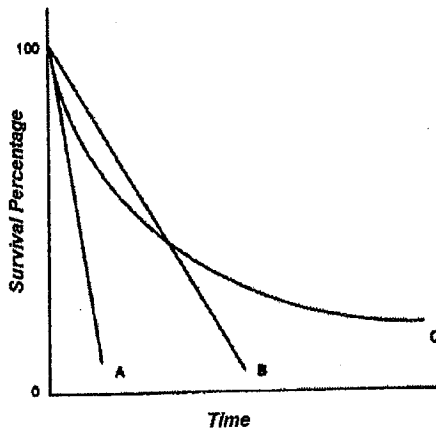
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- b. Describe how you are going to detect the presence of fecal streptococci?  
(8 marks)
3. I. In water distribution plant you notice a green colour bloom is forming.
- a. What can you do to prevent this?
- b. Even though you have removed green colour bloom physically, still water may not be safer to drink. Why? Explain with details.  
(15 marks)
- II Briefly describe activated sludge process.  
(10 marks)
4. I. What are the major factors that you have to consider in controlling bacterial growth in bottle water?  
(10 marks)
- II. In a housing scheme suddenly inhabitants started getting Pneumonia. After some studies the authorities found out that the causative agent came through water distribution system. Even the water had been heated (to about 50°C) still people got infected.
- a. Which microbial species do you suspect as the causative agent?
- b. What factors might have stimulated their growth?
- c. Describe how you are going to control this disaster?  
(15 marks)
5. I. Closer to Trincomalee port, an oil transporting ship had an accident. Most of the oils had been spilled.
- a. What is the most environmentally friendly, low cost method you can use to remove the oil spill?
- b. Describe the major factors you have to consider before applying this method.  
(15 marks)
- II Briefly describe slow sand filtration and its ability to remove microorganisms.  
(10 marks)

6. I. Draw a normal growth curve of a microorganism.

(05 marks)

II. You added a particular disinfectant to a tank in a water treatment plant, containing A,B,C species of microorganisms. After checking the effectiveness you got the following graph. What can you state about the disinfectant and the microorganisms?



(05 marks)

III. Some people argue that instead of using chlorine use of chloramines is better. Comment on this describing both disinfectants.

(15 marks)

