

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
FIRST SEMESTER 2017-2018
BIO G525, ENVIRONMENTAL BIOTECHNOLOGY AND WASTE MANAGEMENT
Mid-Semester test (Closed Book)

Duration: 90 Min.

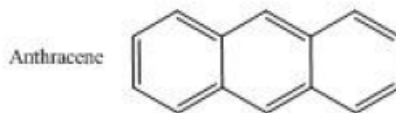
Date: 11/10/2017

Total marks: 35

1. A) What is FISH? Is FISH a culture dependent or independent method?
B) How does total bacterial counts done with a microscope differ from enumeration by viable plate counts?
C) You did PCR for the 16S rRNA gene from 10 soil samples and got a 1500 bp band on a gel, describe how you could determine the genetic diversity of the DNA in the PCR tube by clone library and by DGGE. Which method would be faster? Which method would give you more conclusive results about the types of organisms in the soil samples? [2+2+2]

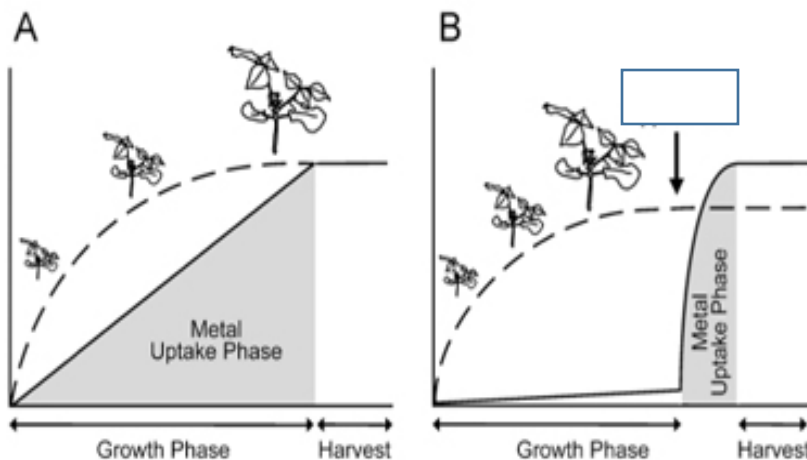
2. A) Municipal wastewater is in part changed in its properties along its flow-path from its place of origin to the wastewater treatment plant. Name the processes which can lead to changes in the properties of the wastewater along the flowpath.
B) In the inflow to a municipal wastewater treatment plant the COD = 1000 mg/l and the BOD₅ = 500 mg/l. From these figures it can be identified that one is concerned with which type of wastewater?
C) The self-cleaning capacity of a body of water depends on the biology of the water and on the nutrients available List the relevant individual factors for the self-cleaning capacity.
D) A sufficient supply of oxygen for the bacteria is the essential task of the aeration in aeration tanks. a) Which factors have an influence on a modification of the oxygen demand in aeration tanks? Justify your answer.[2+2+2+2]

3. A) Using an appropriately annotated diagram briefly explain the key steps that microbes would have to undertake to aerobically degrade the polycyclic aromatic hydrocarbon anthracene (it is not necessary to provide balanced equations). [5]



B) Draw a labeled diagram of suspended growth bioreactor. [2]

C) What phenomena are described in the following figures A and B? What does the arrow in B indicate?



[5]

4. Describe 2 different reaction sequences for the measurement of glucose using glucose oxidase with electrochemical detection (enzyme electrodes). At least one of these should not require the presence of oxygen. Draw a diagram to show how the sensors are constructed. [5]
5. Describe the color coding in the biomedical waste management in India. [4]

-----Good Luck-----



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