Ollscoil na hÉireann, Gaillimh · GX 2273
National University of Ireland, Galway

Semester II Examinations, 2003/2004

Exam Code(s) 3EV1

Exam(s) 3rd Year B.Sc. (Environmental Science)

Module Code(s) MI319

Module(s) Environmental Microbiology II

Paper No. 1
Repeat Paper _____ Special Paper _____

External Examiner(s) Professor C.M. Brown
Internal Examiner(s) Professor E. Colleran

Instructions: **Answer THREE Questions**

Please indicate clearly the numbers of the questions answered on the first page of your Answer Book

Duration 2 Hrs
No. of Answer books _____

Requirements:
Handout ~~1~~ 3
MCQ _____
Statistical Tables _____
Graph Paper _____
Log Graph Paper _____
Other Material _____

No. of Pages 2
Department(s) _____

Q1. Describe the operation of the light phase of oxygenic photosynthesis in blue-green bacteria (*Cyanobacteriaceae*) and clearly distinguish between non-cyclic and cyclic operation with respect to both their mechanism and purpose(s).

Q2. "Chemolithotrophs occupy unique environmental niches in the biosphere because of their ability to obtain energy, reducing power and carbon for growth and reproduction from inorganic compounds". Critically discuss this statement with reference to the H_2 and Iron (Fe^{2+}) – utilising bacteria.

Q3. "Not only does the development of a proton-motive-force, with associated F_0/F_1 ATP-synthetase pumps, provide the bulk of the ATP generated by aerobic heterotrophs, this phosphorylation system is also responsible for ATP generation in photosynthetic and chemolithotrophic species". Critically discuss this statement.

Q4. "Toxic organic and inorganic chemicals in potable water supplies, arising either from source, treatment processes or infiltration, present a public health hazard for consumers". Critically discuss this statement.

OR

"Pathogenic bacterial, viral and protozoan contamination of source and potable waters represent the dominant risk to public health of consumers". Critically discuss this statement.

Q5. Critically discuss the advantages and disadvantages of using *E.coli* as an indicator of faecal contamination of water and potential public health risk of contaminated supplies.

Q6. (a) Distinguish between nitrogen fixation, nitrification and denitrification in the global nitrogen cycle.

(b) Describe any one of these processes in detail and discuss its significance in the operation of the nitrogen cycle.

Q7. Write an essay on the role and significance of soil microbes.

OR

Outline the various associations that exist between individual bacteria and between bacteria, plants and animals in natural ecosystems.