

BOWEN UNIVERSITY, IWO
DEPARTMENT OF BIOLOGICAL SCIENCES
2010/2011 SECOND SEMESTER EXAMINATION

MCB 307: BIODETERIORATION

Answer questions one (Compulsory) and one question each from sections B and C.

Time: 2 hrs 20 mins

SECTION A

1. (a) Sample **D** and **M** were taken from batches of products imported into Nigeria. There were no expiry dates on the packs. Describe systematically, how you can prove biodeterioration in the samples. (*Sample D is milk product, Sample M is meat*).
- (b) An underground concrete sewer (pipe carrying sewage) was observed to have developed several leaks as well as disintegration of the concrete material. As a microbiologist, you were invited to help unravel the implicating microorganisms.
- (i) Specify the condition under which you would grow the culture plates containing the concrete samples.
 - (ii) Suggest the group of micro-organisms likely to be responsible for the deterioration problem.
 - (iii) Explain how corrosive metabolites may have been precipitated by the group of organisms in question b(ii).
 - (iv) If the concrete sewer had been above ground, what group of micro-organisms would have produced deterioration and under what condition would you have grown the culture plates containing the concrete samples.
 - (v) In terms of pH, differentiate between freshly prepared concrete and corroded concrete. (30 Marks)

SECTION B

2. Write notes on each of the following **AND** give an example of each:
- | | |
|---------------------------|-----------------------------|
| (i) Thermophilic bacteria | (ii) Psychrotropic bacteria |
| (iii) Mesophilic bacteria | (iv) Aciduric bacteria |
| (v) Butyric acid bacteria | |
- (20 Marks)
3. Explain how the following groups of organisms cause biodeterioration of materials: fungi, insects, bacteria, rodents, snail. (20 Marks)

SECTION C

4. (a) Describe the formation of biofilms
(b) With the aid of **four** specific examples, explain the detrimental effects of biofilms. (20 Marks)
5. Explain the following:
- | | |
|-----------------------------|-----------------------------------|
| (a) Biocorrosion of metals. | (b) Biodeterioration of textiles. |
|-----------------------------|-----------------------------------|
- (20 Marks)