BINDURA UNIVERSITY OF SCIENCE EDUCATION
BIOLOGICAL SCIENCES DEPARTMENT
BScBZH/BScBioTec/HBScEd

MICROBIOLOGY (BZH112/BTEC131/BZH 105)

EXAMINATION
2 HOURS (100 MARKS)

~~JUN 2023~~

INSTRUCTIONS TO CANDIDATES
Answer FOUR questions. You MUST answer QUESTION 1 (Section A) and any THREE questions from section B. Each question carries 25 MARKS. Where a question contains sub-divisions, the mark value of each sub-division is given in brackets. Illustrate your answer where appropriate with large clearly labelled diagrams. You should not spend more than thirty minutes on each question.

SECTION A (COMPULSORY)

1. A presumptive test using Lauryl tryptose broth was set up for a coliform bacterial analysis of a surface water sample. The results are shown in Table 1 below.

Table 1

Size of portion/mL	Number positive	Number negative
10.0	3	2
1.0	2	3
0.1	1	4

(a) Define the terms (i) presumptive (2 marks)
    (ii) coliform (3 marks)
(b) Determine the Most Probable Number(MPN) for the sample using the table provided. (2 marks)
(c) Would the sample be safe for drinking? Explain your answer. (2 marks)
(d) Suggest any **THREE** advanatges and **THREE** disadvantages of using MPN procedure. (6 marks)
(e) Describe any further confirmatory tests that you would carry out to identify the types of microorganisms present in the water. (marks)

SECTION B

2. Provide a comparative description of the characteristics and identification features of phyla in the Kingdom Fungi.

3. Using suitable examples, describe the role of microorganisms in the nitrogen cycle.

4. Outline the grouping of microorganisms according to their oxygen, temperature, and pH requirements.

5. (a) Describe any **THREE** common mechanisms of gene exchange in microorganisms.

(9 marks)

(b) Using suitable examples, discuss the economic importance of bacteria.   (16 marks)

6. (a) Discuss theories on the origin of viruses.   (12 marks)

(b) Describe methods of virus cultivation in the laboratory.   (13 marks)

END OF EXAMINATION QUESTION PAPER

Table 1. MPN values per 100 ml of sample and 95% confidence limits for various combinations of positive and negative results (when three 10-ml, three 1-ml, and three 0.1-ml test portions are used)

No. of tubes giving a positive reaction			MPN (per 100 ml)	95% confidence limits	
3 of 10 ml	3 of 1 ml	3 of 0.1 ml		Lower	Upper
0	0	1	3	,1	9
0	1	0	3	,1	13
0	0	0	4	,1	20
1	0	1	7	1	21
1	1	0	7	1	23
1	1	1	11	3	36
1	2	0	11	3	36
2	0	0	9	1	36
2	0	1	14	3	37
2	1	0	15	3	44
2	1	1	20	7	49
2	2	0	21	4	47
2	2	1	28	10	149
3	0	0	23	4	120
3	0	1	39	7	130
3	0	2	64	15	379
3	1	0	48	7	210
3	1	1	75	14	230
3	1	2	120	30	380
3	2	0	93	15	380
3	2	1	150	30	440
3	2	2	210	35	470
3	3	0	240	36	1300
3	3	1	460	71	2400
3	3	2	1100	150	4800