

2022

**MICROBIOLOGY — HONOURS**

**Paper : SEC-B-2**

**(Microbiological Analysis of Air and Water)**

**Full Marks : 80**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

Answer **question no. 1** and **any six** from the rest.

1. Answer **any ten** questions : 2×10
- (a) How air infectious droplet differs from air infectious dusts?
  - (b) What are typical and atypical colonies?
  - (c) Name one bacterial and one viral air borne disease and mention their causative agents.
  - (d) What do you mean by HEPA and where generally do you find its application?
  - (e) What are the advantages of membrane filtration technique?
  - (f) Why is EMB agar called as a differential plating medium?
  - (g) What is the most preferred method of air sanitization in operation theatres and why is it so?
  - (h) How alum is used for water purification?
  - (i) Name one water borne viral disease and mention the name of the viral group causing it.
  - (j) What is the most common methodology applied to detect viral contaminants in water?
  - (k) What do you mean by potable water and what are the Indian standards for water potability?
  - (l) Name the media used for MPN analysis of water quality and also mention the name of the indicator dye used in this test.
  - (m) What is the full form of MTF? Write its significance.
  - (n) What do you mean by false presumptive test?
  - (o) Mention one drawback of using UV radiation for disinfection of water.
2. (a) Air is an inhospitable microbial habitat. — Elucidate.  
(b) What are the possible sources of microbes in air?  
(c) What do you mean by bioaerosols and how they can be classified?  
(d) Give a very brief account of each class of bioaerosols. 3+2+3+2

**Please Turn Over**

3. (a) What are the features of indicator microbes?  
(b) Why these microbes are named so?  
(c) What does presence of coliphages in water indicates?  
(d) How can you specifically detect fecal coliforms?  
(e) Why does fecal coliforms give green metallic sheen on EMB Agar plates? 3+1+2+2+2
4. (a) With suitable diagram elucidate the working principle of Anderson air sampler.  
(b) What is its advantage of traditionally used Lemon's Impinger based sampler?  
(c) State the factors that contributes survival of microbes in air.  
(d) Give example of hospital air borne secondary infection. 4+2+3+1
5. (a) Why double strength lactose broth is used in one set of the MPN analysis in presumptive test?  
(b) Why a small tube is inserted in inverted position in lactose broth tubes during MPN analysis?  
(c) What is the name of the tube and its significance in MPN analysis?  
(d) State briefly the working principle of completed test in water potability testing.  
(e) Give example of one fecal and one non-fecal coliform bacteria. 2+1+2+3+2
6. (a) How relative humidity of air affects survival of microbes in air?  
(b) Which control mechanism is chosen that would modulate the level of relative humidity in air thus effectively controlling microbial content in air?  
(c) State the significance of air microflora in food processing industry. 3+3+4
7. Write short notes on : 2½×4  
(a) Water purification by chlorination  
(b) Air flora control by fumigation  
(c) PA Test  
(d) Citrate Test for differentiating fecal/non-fecal coliforms.
8. (a) State the biochemical reactions behind differentiation of a fecal and non-fecal coliform using Indole and Voges – Proskauer Test. Also mention the desired results.  
(b) You have been provided with a bottle of packaged drinking water and has been asked to perform microbiological potability analysis. What will be your approach and state the reason behind selection of your approach? 3+(3+4)
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