

[Time : 3 Hours]

[Max. Marks : 70]

Instructions: (1) Figures on right side indicate marks.

(2) Draw neat figures wherever necessary.

1. Answer the following : (any two)

(14)

- (a) What do we mean by microbial interactions ? Discuss positive interactions in soil.
- (b) Discuss advantages and disadvantages of methods to study soil micro flora.
- (c) Write a note on mycorrhizia.
- (d) Describe role of Winogradsky Column in studying microbial diversity of soil.

Describe the following : (any two)

(14)

- (a) Nitrogen cycle
- (b) Biofertilizers
- (c) Carbon cycle
- (d) Role of micro-organisms in enhancing soil fertility

Answer the following : (any two)

(14)

- (a) What is potable water ? Describe sources of contamination in natural water bodies.
- (b) Discuss differentiation test for coliforms.
- (c) What is disease ? Discuss water borne diseases.
- (d) What is quantitative analysis of water ? Discuss total viable count as enumeration method.

Answer the following : (any two)

(14)

- (a) Enlist types of waste water and describe physical and chemical characteristics of domestic waste.
- (b) Discuss trickling filter as a method for waste water treatment.
- (c) Write a detailed note on anaerobic sludge digestion.

(a) Write notes on :

(i) Primary treatment of sewage

(ii) Disinfection step in waste water treatment

Answer the following in one to two lines :

(1) What is antagonism ?

(2) Name both the partners in the phenomenon of root nodulation.

(3) Give two negative impacts of micro-organisms on plants in Rhizosphere.

(4) Name the soil horizon with least microbial activity and give reason for the same.

(5) Name two phosphate - solubilizing bacteria.

(6) Give examples of aerobic Iron bacteria.

(7) What is immobilization and mineralization of elements ?

(8) What is the role of *Trichoderma viridae* in carbon cycle ?

(9) Give two disadvantages of MPN method.

(10) Name the media which can be used for detection of coliforms.

(11) Give the role of slime forming bacteria as nuisance flora of water.

(12) Outline the difference between septic tank and Imhoff tank.

(13) what is the difference between BOD, COD and TOD ?

(14) What type of micro-organisms can create bulking sludge during activated sludge treatment ?