

2021
MICROBIOLOGY
[HONOURS]
Paper : IX

Full Marks : 80

Time : 4 Hours

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.**Write the answers to questions of each Group in separate books.***Answer all the questions.****GROUP-A****(Environmental and Agricultural Microbiology)****(Marks : 60)**

1. Answer any **four** of the following: 1×4=4
- i) What is cardinal temperature?
 - ii) What are coliforms?
 - iii) What is UASB technology?
 - iv) What is rhizocompetance?
 - v) Define biopesticide with an example.
 - vi) What is microsite?

2. Answer any **three** of the following questions : 2×3=6
- i) What is presumptive and completed test in water quality analysis?
 - ii) What is acid mine drainage? Write the name of different microbes found therein.
 - iii) Write the bottleneck of bio-formulation.
 - iv) What are the sources of microbes in air?
 - v) Write difference between steno- and eury- psychrophiles.
3. Answer any **five** of the following : 6×5=30
- i) Write the different factors that are affecting distribution, activity and population of microorganism in soil. What are entomopathogenic fungi? 4+2
 - ii) Write briefly the role of microbes in iron based structure corrosion. What is crown corrosion? 4+2
 - iii) Write the types of biofertilizers. Write the quality of model carrier used in biofertilizer formulation. 3+3
 - iv) What are the basic approaches of biocontrol? Write the different mode of action of biocontrol agent in soil. 2+4

[Turn over]

- v) Write the two components of microbial diversity? How do microorganisms survive in cold and high temperature? What is hydrothermal vent? 2+3+1
- vi) Write the environmental factors that determine survivability of microbes in air. Give example of two air-borne diseases. How are these diseases spreaded and controlled? 1+1+4
- vii) Write the major microbial indicator used in drinking water quality analysis. Write the different methods of drinking water treatment for the maintenance of pH, test/odor, iron and manganese and nitrate. 2+4
4. Answer any **two** of the following : 10×2=20
- i) Write the difference between biodegradation and biodeterioration. Write the role of microbes in phosphorous biogeochemical cycle. How microorganisms drive the S-cycle? 2+3+5
- ii) Write short note on the following : $2\frac{1}{2}\times 4$
- Mechanism of PGPR activity
 - VAM in soil fertility
 - Dissimilatory sulfate reduction

d) Role of iron oxidizing bacteria in Fe-cycling

- iii) Write the waste treatment options. Write briefly about different aerobic waste water treatment processes. Write the operating parameter of activated sludge process. What is disinfection efficiency? 2+4+3+1

GROUP-B

(Microbial Biotechnology, IPR & Bioethics)

(Marks : 20)

5. Answer any **two** of the following: 1×2=2
- Name one chlorinated hydrocarbon used as herbicide.
 - What is genetically engineered vaccine?
 - What are the PAHs?
 - Define ecorestoration.
6. Answer any **three** of the following: 2×3=6
- Discuss in brief the prospect of bioaugmentation.

- ii) What is biofuel? Name one algae producing it. 1+1
- iii) Discuss the process of microbial biotransformation.
- iv) What is intellectual property right? What is the major difference between copyright and patent? 1+1
- v) Schematically describe commercial biogas production.
7. Answer any **two** of the following: 6×2=12
- i) Describe diagrammatically the components of a biosensor. What are the characteristics of an ideal biosensor? 3+3
- ii) a) What are interferons? Name two recombinant interferons.
- b) Discuss the issues of biohazards related to GMM release.
- c) Discuss the role of bacteria in cleaning petroleum spillage. (1+1)+2+2
- iii) What is bioremediation? Discuss the prospect of bacteria in bioremediation of halogenated hydrocarbons. 1+5
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