Seat No. : _____

NH-139

November-2025

M.Sc., Sem.-III

MIC-503 : Microbiology

(Green and Blue Biotechnology)

Time : 2:30 Hours] **[Max. Marks : 70**

1. Answer the following :

   Discuss the use of biomass as a source of biofuel citing examples. **14**

OR

1. (a) Discuss production of biohydrogen and give advantages of the method discussed by you. **7**

   (b) Discuss biorefinery concept. **7**

2. Answer the following :

   Discuss the mechanism and pathways involved in the bioleaching of metals from sulphidic minerals with suitable illustrations **14**

OR

2. (a) Discuss abiotic factors that affect the metal bioextraction process. **7**

   (b) Explain methods used to control acid mine drainage with its pros and cons. **7**

3. Answer the following :

   Describe in detail *in situ* bioremediation technique for oil contaminated site. **14**

OR

3. (a) Write the mechanism of mercury resistance in bacteria. **7**

   (b) Write a short note on 'Phytoremediation'. **7**

4. Answer the following :

Evaluate the potential use of marine EPS in food and nutraceuticals. What are the functional properties and safety issues to consider ? **14**

OR

4. (a) Give a brief account of marine-derived antimicrobial peptides (AMPs). **7**

(b) Discuss the role of marine enzymes in structural and molecular biology. **7**

5. Answer the following (any **seven**) : **14**

(a) Give composition of Biogas.

(b) What is MEOR ?

(c) What is the significance of Jatropha ?

(d) Define - Chemolithoautotropy

(e) Explain - Refractory ore

(f) Define - Biobeneficiation

(g) What is Bioaugmentation ?

(h) Define Reductive dehalogenation

(i) Metallothioonein like proteins

(j) Which marine therapeutics are used to treat leukemia ?

(k) What are marine nutraceuticals ?

(1) What is blue biotechnology ?