

M. Tech. Part- I, Sem-I & IDD Part-IV, Sem-VII
Mining Engineering Odd Semester Examination, 2015
Subject: MN-5104: Eco-Friendly Mining

Time: 3 Hrs.

Max. Marks: 50

Note: Attempt Six questions in total, taking Two questions from each section.

Section – A (Answer Any Two Questions- marks: 16)

1. Describe, in detail, the procedure for 'Multiple test fermentation technique' for estimate of bacterial count in wastewater. Give the formula for determination of 'total coliform bacteria' using Thomas method. (8)
2. The BOD test data for a sample of wastewater is reported below as BOD exerted (y) versus time (t): (8)

't' (day)	2	4	6	8	10	12
'y' (mg/L)	12	20	26	30	33	35

Using 'Least Square Method', compute 'Total BOD initially present' in the sample of wastewater and the average value of 'Reaction rate constant'.

3. a) Giving the classification for coarse fraction of soil, explain how its nomenclature is decided upon. (4)
- b) State the 'Power of Central Government to take measures to protect and improve environment' as per 'The Environment (Protection) Act, 1986'. (4)

Section – B (Answer Any Two Questions - marks: 18)

4. What do you mean by the term 'sustainable mining practices'? Explain with the help of suitable example, how pre-rejection of the waste rock from ROM ore before sending it to the downstream processes help in improving overall profit of the mine. Explain with the help of suitable examples. (9)
5. What do you mean by the term 'eco-friendly mining'? Mention the essential points to be considered during preparation of waste management plan in the mine. (9)
6. a) What are the environmental problems associated with the release of mine effluents to surface streams? Explain briefly the methods of its control. (5)
- b) An opencast coal mine discharges its effluent into a river having flowrate of $10 \text{ m}^3/\text{s}$ and concentration of suspended solids of 20 mg/L . The suspended solids of mine effluent of 3000 mg/L concentration is discharged at a flowrate of $0.1 \text{ m}^3/\text{s}$ in the river. Will this mine effluent need to be treated before disposing its effluent to the river water?-explain why. (4)

Section – C (Answer any Two Questions - marks: 16)

7. What are the sources of different types of pollution in copper mines? Explain with suitable examples with neat diagrams. What are the methods and prescribed frequency of sampling for monitoring air quality? (8)
8. Write notes on the following: (8)
 - i) Airborne particulate matter characterization and measuring equipments.
 - ii) Permissible limits of environmental quality (air, water and noise).
9. Differentiate between acid rock drainage and acid mine drainage. Why does acid mine drainage not a problem in Gondwana coal mines? Explain different methods used for prediction of water quality for a proposed coal mine, if the mine is suffering with seepage of acidic water. Suggest various methods of treatment of acid drainage. (8)
10. What are the guidelines for 'mine closure planning'? Explain the integrated approach for closure of a mega opencast coal project in terms of environmental damage cost and cash flow. Consider the life of mine is 40 years with stripping ratio 1:3. (8)