

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI

I SEMESTER 2023-2024

CE F434/
BITS F494

Environmental Impact Assessment

11.10.2023

Mid-Semester Examination
(Open Book)

Max. Marks: 60

Duration: 90 minutes

Note:

- A. Hand written notes, covered in the class, are allowed in the exam.
- B. Photocopy of PPT is allowed in the exam.
- C. No other material is allowed in the exam.

1. Calculate NSF WQI using the weighted product aggregation function of indices of River A. The following are the weight of water parameters – [12]

Parameters	DO % Saturation (mg/L)	Faecal coliform (MPN/100 ml)	pH	BOD (mg/L)	Total nitrogen (mg/L)	Total Phosphorus (mg/L)	Water Temp. (°C)	Turbidity (NTU)	Total Residual Chlorine (mg/L)
Weight	0.18	0.13	0.15	0.1	0.1	0.1	0.1	0.09	0.05
Value	50	50	$H^+ = 10^{-7}$	50	15	10	20	15	5

Use following tables for calculation of i values.

Parameters	DO % Saturation (mg/L)	Faecal coliform (MPN/100 ml)	pH	BOD (mg/L)	Total nitrogen (mg/L)	Total Phosphorus (mg/L)	Water Temp. (°C)	Turbidity (NTU)	Total Residual Chlorine (mg/L)
value	45-55	45-55	6.5-7.5	45-55	10-20	5-15	15-25	10-20	0-10
i Value	20-30	30-40	80-90	50-60	10-20	15-25	25-35	20-30	25-35

2. A city discharges 1500 litre per second of sewage into a stream whose minimum rate of flow is 5000 litre per second, the temperature of both being 20⁰ C. The 5-day BOD at 20⁰C of sewage is 180 mg/l and that of river is 2 mg/l. The DO content of sewage is zero and that of the river water is 90% of the saturation of DO. If the minimum DO to be maintained in the river water is 4.5 mg/l, find out the degree of sewage treatment required. Assume K=0.1 per day, R = 0.3 per day and saturation DO at 20⁰ C as 9.17 mg/l. Take base 10 for all the calculations. [18]
3. Suppose the annualized cost of purchasing, fueling and maintaining a compactor truck is given by the following expression: [10]
Annualized cost (Rs./yr) = 250000 + 4000 V
Where V is the truck volume in m³. Suppose the truck two person crews, with labor charged at Rs. 240 per hour each. Truck volume is 14.4 m³ and truck collects municipal solid waste from 340 households each day. Each household generates 2.7 kg of solid waste per day.

The truck and crew work 5 days per week. Assume 8-hours per day, 5-days per week, 52 –p weeks per year. Find the following:

- a. Annual cost per ton
 - b. Annual cost per household
 - c. If the density of waste is 1 ton/m^3 and depth of landfill is 3 m, calculate the area required for landfill for one year.
4. Suppose we have to establish A Deer Reserve National Park in Shekhawati region of Rajasthan, which is consisting of Churu, Jhunjhunu and Sikar District (total area 40000 km^2). By adopting the appropriate EIA methodology, please discuss the relevant steps for the site selection of Deer Reserve National Park. [10]
5. Describe the environmental impacts of Global Warming by using network methodologies of EIA. [6]
6. Explain the various impacts on social pattern or life style of people due to Mining Project in Tribal Area. [4]

Paper Ends