

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech Degree S6 (Hons.) Examinations April 2026 (2023 Admn)

Course Code: CET398

Course Name: ENVIRONMENTAL POLLUTION MODELLING

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

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| 1 | Discuss the objectives of modelling. | (3) |
| 2 | What do you mean by Box models? | (3) |
| 3 | Elaborate the different air pollutant transport mechanisms. | (3) |
| 4 | Distinguish between line source and point source air pollution models. | (3) |
| 5 | What is eutrophication? How does it affect water quality? | (3) |
| 6 | What do you mean by low flow analysis? | (3) |
| 7 | Describe the use of Ground water model. | (3) |
| 8 | What is porosity? Explain its importance in groundwater flow. | (3) |
| 9 | Differentiate between ambient noise and background noise. | (3) |
| 10 | Describe the various Noise mapping methodologies? | (3) |

PART B

Answer one full question from each module, each carries 14 marks.

Module I

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| 11 | a) Describe the relationship between model complexity and model accuracy. | (7) |
| | b) Explain the concept of model uncertainty and its sources. | (7) |

OR

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| 12 | a) How is the data of environmental pollutant concentrations presented? | (7) |
| | b) What are the different modelling principles? | (7) |

Module II

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| 13 | a) Explain different atmospheric stability conditions and name different plume behaviours? | (9) |
| | b) What do you mean by Dispersion Modelling? | (5) |

OR

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| 14 | a) Elaborate the concept of Gaussian Plume Model? | (9) |
| | b) Discuss the effect of stack height on the dispersion of air pollutants. | (5) |

Module III

- 15 a) The initial BOD of a river just below a sewage outfall is 30 mg/L. The oxygen deficit just upstream from the outfall is 1.48 mg/L. The de-oxygenation rate coefficient k_d is 0.18/day, and the reaeration rate coefficient k_r is 0.8/day. Saturation D.O level of the river was found to be 6 mg/L. The river is flowing at a speed of 16 km /day. (9)
- a) Find the critical distance downstream at which DO is a minimum
- b) Find the minimum DO.
- b) What do you mean by sediment transport modelling? (5)

OR

- 16 a) Explain the Streeter Phelps model in detail? (7)
- b) Describe the concept of mass balance for well mixed lakes? (7)

Module IV

- 17 a) A confined aquifer consists of sandy soil having a hydraulic conductivity of 2.5×10^{-4} m/s. Two observation wells, located 150 m apart, show groundwater heads of 42 m and 36 m respectively. The aquifer has a thickness of 18 m and a width perpendicular to flow of 250 m. Determine: (a) The hydraulic gradient of groundwater flow. (b) The cross-sectional area through which groundwater flows. (7)
- b) What do you mean by sea water intrusion? (7)

OR

- 18 a) Define Darcy's law and also list out ground water flow equations for homogenous, heterogenous, isotropic and anisotropic conditions? (9)
- b) Discuss the practical applications of the Ghyben–Herzberg equation in coastal groundwater management. (5)

Module V

- 19 a) Noise levels were measured at a busy traffic intersection over a period of 3 hours. The recorded sound pressure levels were 72 dB during the first hour, 78 dB during the second hour, and 82 dB during the third hour. Determine the Equivalent Continuous Sound Pressure Level (L_{eq}) for the 3-hour period. (9)
- b) What are the different sound propagation factors? (5)

OR

- 20 a) Differentiate between CoRTN and RLS90 models? (8)
- b) Explain the role of noise barriers in controlling highway traffic noise. (6)
