Printed Pages: 02 **Sub Code: NEV602**

Paper Id: | 1 | 9 | 7 | 6 | 0 | 2 | **Roll No.** | | | | | | | | | | |

B.TECH.
(SEM VI) THEORY EXAMINATION 2017-18
ENVIRONMENTAL SYSTEM AND ANALYSIS

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. Define the term Simulation.
b. Define the terms "Constant", "Parameter" and "Variables" in the context of a model.
c. Differentiate deterministic systems.
d. Define dispersion.
e. Write the three meteorological parameters on which Pasquil Criteria of Atmospheric stability is based upon
f. What do you understand by Surface Water Quality Modeling ?
g. Which water quality model do you have used in your lab ?
h. Define runoff.
i. What problems arise transportation of water supply?
j. How you are remove the complication in simplex method?

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. Define simulation and differentiate between static and dynamic simulation.
b. Calculate the total concentration of air at 1 bar and 25^0 C in molecules cm^{-3}.
c. What do you understand by total solids in water? How they are calculated?
d. What input data are required for setting the simulation run in storm water management model for urban water shed?
e. Explain the Hardy Cross method of solving the network by balancing heads by correcting flow.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) What do you understand by calibration and validation of a model ? Describe in brief any case study on the calibration and validation of a typical soil and water management model.
(b) Differentiate between Deterministic and Stochastic models with suitable examples.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) What do you understand by Maximum Mixing Height in the context of air pollution dispersion modeling? Illustrate with suitable diagram.
(b) Write an overview on the air pollution modeling procedure. A stack in an urban area is emitting 80 g/s of NO. It has an effective stack height of 100 m. The wind speed is 4 m/s at 10 m. It is a clear summer day with the sun nearly

overhead. With the help of Gaussian Steady State Model, estimate the ground level concentration at (i) 2 km downwind on the centerline and (ii) 2 km downwind, 0·1 km off the centerline (Given σy = 290 and σz = 220).

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) If 2.5 ml of raw sewage has been diluted to 250 ml & D.O. concentration of diluted sample at beginning test was 8 mg/l & 5 mg/l after 5 –day incubation at 20^0C. Find BOD of raw sewage.

(b) Illustrate computational methods of runoff by infiltration method. And The Avg sewage flow from a city is 80X106 L/d. If the avg. 5day BOD in 285 mg/L. Compute the total daily 5 day oxygen demand in kg & the population equivalent of sewage.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Describe the SCS curve number method for calculation of runoff in the Storm Water Management Model

(b) What do you understand by the term Hydrological cycle? Explain with neat sketch.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Two crops are grown on a land of 200 ha. The cost of raising crop 1 is 3 unit/ha, while for crop 2 it is 1 unit/ha. The benefit from crop 1 is 5 unit/ha and from crop 2, it is 2 unit/ha. A total of 300 units of money is available for raising both crops. Formulate a Linear Programming Model for the problem in order to maximize the total net benefits.

(b) Use the simplex method to find the maximum value of $Z=2X_1-X_2+2X_3$ (Objective Function), Subject to constraints
$2X_1+X_2 \leq 10$, $X_1+2X_2-2X3 \leq 20$, $2X_2+2X_3 \leq 5$ Where $X_1 \leq 0$, $X_2 \leq 0$ and $X_3 \leq 0$