

Name:
Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Program: M. TECH (HSE+DM)
Subject (Course): Environmental Engineering & Management
Course Code: HSFS7001
No. of page/s:3

Semester –I
Max. Marks : 100
Duration : 3 Hrs

SECTION A (Attempt all the question, 5*4=20 Marks)

1. Water quality testing is an important part of environmental monitoring. When water quality is poor, it affects not only aquatic life but the surrounding ecosystem as well. Illustrate coagulation and flocculation with example.
[CO3]
2. Compare Hazen's Law and Newton's law for settling velocity in sedimentation tank.
[CO3]
3. Describe the following plume behavior in the following regime with a neat diagram [CO5]
 - a. Fanning
 - b. Fumigation
 - c. Looping
 - d. Lofting & Trapping
4. Explain following:
[CO1,5]
 - a) Great Smog of London.
 - b) Eutrophication
5. Discuss briefly about designing aspect of landfill with standard dimension for solid waste management.
[CO6,7]

SECTION B (Attempt only four question, 4*10=40 Marks)

6. The Dilution Factor P for an unseeded mixture of waste and water is 0.030. The DO of the mixture is initially 9.0mg/L, and after five days, it has dropped to 4.0mg/L. The reaction rate constant K has been found to be 0.20 days⁻¹.
[CO3]
 - i. What is the five-day BOD of the waste?
 - ii. What would be the ultimate carbonaceous BOD?
 - iii. What would be the remaining Oxygen demand after five days?

OR

7. Describe following , [CO6]
 a. Hypo chlorination
 b. Drawbacks of UV light Filtration
8. Find the BOD of a seeded water sample at 25^{oC} and 30^{oC} if it has 300mg/l ultimate BOD at 20^{oC}. Consider dilution factor K=0.33. [CO3]
9. A test bottle containing just seeded dilution water where its DO level drop by 1 mg/l in a 5-day test. A 300ml BOD bottle filled with 15 ml of wastewater and the rest seeded dilution water experiences a drop of 7.2mg/l in the same time. What would be the 5-day BOD of the wastewater? [CO3,4]
10. Explain following with their application. [CO5,7]
 i. Wind rose
 ii. Scoping (EIA)

SECTION-C

(Attempt only two question, 2*20=40 Marks)

11.

- I. Enumerate the following:
[CO7,4]
 a) Rapid & Comprehensive EIA
 b) Vermicomposting & Termigradation
 c) Gross primary productivity & Net primary productivity of ecosystem
 d) Atmospheric Stability
- II. Treatment of our nation's wastewater is a priority. Currently, India dumps over 150 billion liters of untreated and undertreated wastewater (sewage) into our waterways every year. The Government of India worked with the provinces and engaged municipalities and others to strengthen the country's wastewater treatment and management system. Explain sewage/wastewater treatment plant with the help of flow diagram. [CO 7,3,1]

12.

- I. A large power plant has a 200 m stack with inside diameter of 2m. The exit velocity of the stack gas is estimated at 8m/s at the temperature of 130^{oC}. Ambient temperature is 25^{oC} and the wind at stack height is estimated to be 3m/s. Estimate the total effective height of the stack. If
 a) The atmosphere is stable with temperature increasing at the rate of 3^{oC}/km.
 b) The temperature is slightly unstable.
[CO5,CO1]

- II. Discuss the following:
[C1,CO7]

- I. National Green tribunal act

II. Adiabatic lapse rate and its derivation

OR

13. During the designing of an equalization basin, an environmental engineer observed the fluctuation between time and flow rate for supply water. The fluctuation was increasing 2% gradually from zeroth hour to 12th hour and from 13th hour to 24th hour it was gradually decreasing by 2%. Determine the inline storage volume of the equalization basin if the initial flow rate at zeroth hour was $0.0492 \text{ m}^3/\text{s}$.

Note: The proposed supply system is variable in nature and given flow rate is maximum
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