

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, May 2018**

**Course: Environmental Engineering & Management**  
**Program: B.TECH (FSE)**  
**Time: 03 hrs.**

**Semester: VI**  
**Course Code: ENVO303**  
**Max. Marks: 100**

**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 chemical water quality parameters. [CO1]
2. Compare vermicomposting and composting. [CO5]
3. Differentiate between permanent hardness and temporary hardness. [CO2]
4. Researchers say the water crisis in Flint, Michigan, is nearing an end as tests show significantly fewer homes have water contaminated with heavy metals and other pollutant. The situation there has heightened awareness about drinking water contamination nationwide, which could be more widespread than the public realizes and people has started drinking bottled water. Is Bottled Water Safer and Cleaner than Tap Water? Justify. [CO3]
5. Discuss briefly about designing aspect of sedimentation tank with standard dimension for wastewater treatment system. [CO3]

**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<sup>-1</sup>. [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. Find the BOD of a seeded water sample at 25<sup>oC</sup> and 30<sup>oC</sup> if it has 300mg/l ultimate BOD at 20<sup>oC</sup>. Consider dilution factor K=0.33. [CO3]

8. 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]
9. Describe following , [CO5]
- Hypo chlorination
  - Gas chlorination
  - Disinfection
  - Drawbacks of UV light Filtration
10. Explain following with their application. [CO4]
- Coagulation
  - Flocculation

**SECTION-C**

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

11. Enumerate the following:  
[CO4]
- Cyclone Separator
  - Dry & Wet Scrubber
  - Subsidence & Radiant Inversion
  - Atmospheric Stability
12. Cleaning up 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. [CO3]
- 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 9% gradually from zeroth hour to 12th hour and from 13th hour to 24th hour it was gradually decreasing by 9%. Determine the inline storage volume of the equalization basin if the initial flow rate at zeroth hour was 0.0492 m<sup>3</sup>/s.  
Note: The proposed supply system is variable in nature and given flow rate is maximum  
[CO2]

**SECTION-C**

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

**11.** 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 9% gradually from zeroth hour to 12th hour and from 13th hour to 24th hour it was gradually decreasing by 9%. Determine the inline storage volume of the equalization basin if the initial flow rate at zeroth hour was 0.0492 m<sup>3</sup>/s.

Note: The proposed supply system is variable in nature and given flow rate is maximum  
[CO2]

**OR**

**12.** Cleaning up 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. [CO3]

**13.** Enumerate the following:  
[CO4]

- a) Cyclone Separator
- b) Dry & Wet Scrubber
- c) Subsidence & Radiant Inversion
- d) Atmospheric Stability