

Name:  
Enrolment No:



**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, December 2021**

**Program: M.Tech (HSE)**  
**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, 4\*5=20 Marks)**

1. Enlist different method used for primary treatment of sewage & hence explain any one method with flow chart. [CO1]
2. Explain sludge thickening & write short notes on gravity thickener. [CO2]
3. Explain following: [CO1]  
Wind rose .  
Acid Rain
4. Discuss briefly about designing aspect of landfill with standard dimension for solid waste management. [CO2]
5. Explain the working principle of a dry scrubber with example. [CO3]

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

6. You are appointed as environmental engineer and have been tasked to carry out site investigations for a cement industry. Describe the investigation procedure and discuss the information required to determine the air pollution control equipment to control air pollution and suggest a low budget equipment, which is best for this situation? Justify your choice of pollution control equipment. [CO5]
7. The Dilution Factor P for an unseeded mixture of waste and water is 0.030. The DO of the mixture is initially 9.4.0mg/L, and after five days, it has dropped to 3.6.0mg/L. The reaction rate constant K has been found to be 0.20 days<sup>-1</sup>. [CO4]
  - 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?

8. Describe the following plume behavior in the following regime. [CO2]

- a. Fanning
- b. Fumigation
- c. Looping
- d. Lofting & Trapping

9. Discuss briefly about designing aspect of sedimentation tank with standard dimension for wastewater treatment system. [CO3]

OR

10. Explain following with their application. [CO3]

- i. Primary & Secondary air pollution
- ii. Line & Areal Air pollution

**SECTION-C**

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

11. Enumerate the following: [CO3]

- a) Rapid & Comprehensive EIA
- b) Vermicomposting & Termigradation
- c) Gross primary productivity & Net primary productivity of ecosystem
- d) Atmospheric Stability

**OR**

A large power plant has a 200 m stack with inside diameter of 1.5m. The exit velocity of the stack gas is estimated at 8m/s at the temperature of 130<sup>0</sup>C. Ambient temperature is 23<sup>0</sup>C 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<sup>0</sup>C/km.
- b) The temperature is slightly unstable. [CO3]

12. You are appointed as HSE engineer and have been tasked to carry out site investigations for a construction site. Describe the investigation procedure and discuss what information is required for the preparation of sedimentation tank for wastewater treatment plant. [CO5]

OR

An Investor wants to put up an Industrial Plant for the manufacture of paper and its derivatives for both local and external market. The Investor intends to establish the paper manufacturing mill in relatively wet and forested upper parts of Dehradun District. A part from the paper mill, the Investor will also provide infrastructure and social amenities in the region. In view of the socio-economic and bio-physical environmental implications that may result due to the proposal, there has been public debate particularly on the loss of habitat/biodiversity and competition for scarce water resources in the region. Assuming your consultancy firm has won a contract to undertake Environmental Impact Assessment (EIA) study on this proposed project: Discuss the logical steps in the EIA process that your study team is likely to follow in order to achieve the task assigned to you. Justify the formation of the Interdisciplinary Team for this EIA study. [CO5]