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Total Number of Pages : 02

B.Tech
PCI7J004

7th Semester Regular Examination 2018-19
INDUSTRIAL WASTE MANAGEMENT & DISPOSAL

BRANCH : CIVIL

Time : 3 Hours

Max Marks : 100

Q.CODE : E151

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Short Answer Type Questions (Answer All-10) (2 x 10)

- What are the factors affecting self-purification capacity of stream?
- Differentiate effects hazardous and non-hazardous waste to direct human life.
- List out the categories of industries according to pollution control board.
- What are adsorption isotherms?
- List the methods for Residue management.
- What are the challenges involved in waste audit?
- Give the names of any four primary neutralizing agents.
- Name the contaminants that could be removed from industrial waste water by the advanced treatment method 'Adsorption'.
- Differentiate suspended growth and attached growth treatment.
- Write the typical characteristics of dairy industry raw effluent.

Part- II

Q2 Focused-Short Answer Type Questions- (Answer Any EIGHT out of TWELVE) (6 x 8)

- Discuss in detail what should be the characteristics of Industrial waste water from each type of Industries as per CPCB guide line before disposal.
- What are the advantages and disadvantages of disposal of Industrial effluent into streams?
- "Environmental legislations for regulating the industry pollutions are not compatible with the volume and nature of pollutions". Discuss
- Explain the procedure involved in Industrial Waste Audit.
- Discuss the scope and functions of recycle and reuse management in pollution management.
- Draw the neat sketch of oxygen sag curve. Explain the re-oxygenation, De-oxygenation and Oxygen deficit.
- Estimate the theoretical volume of methane gas that would be expected from anaerobic digestion of a tonne of waste water having the composition of $C_{50}H_{100}O_{40}N$. Density value of Methane is 0.7167kg/m^3 .
- Explain the different settling zones of sedimentation with neat sketches.
- The BOD of a sewage incubated for 5 days at 30°C is 125mg/l . Calculate the BOD at 20°C . Assume $k_{20}=0.10$
- The sewage of a town is to be discharged into a river stream. The quantity of sewage produced per day is 8MLD and its BOD is 250mg/L . If the discharge in river is 200L/sec and its BOD are 6mg/L . Find out the BOD of Diluted water.
- Write Short note on Chemical Oxidation Process.
- List Design Principle followed for membrane Filtration

Part-III

Long Answer Type Questions (Answer Any TWO out of FOUR)

Q3 Briefly, explain various acts pertaining to prevention and control of Industrial effluent and Hazardous waste. **(16)**

Q4 Explain various methods for achieving waste volume reduction and strength reduction by which industries can minimise their waste disposal. **(16)**

Q5 Derive the expression for Mean cell residence time in a Completely mixed reactor. **(16)**
An activated sludge system is to be used for secondary treatment of 10,000m³/d of municipal waste water. After primary clarification, the BOD is 150mg/L, and it is desired to have not more than 5mg/L of soluble BOD in the effluent. A completely mixed reactor is to be used, and pilot plant analysis has established the following kinematic values: $Y = 0.5\text{kg/kg}$, $k_d = 0.05\text{d}^{-1}$. Assuming MLSS concentration of 3000mg/L and an underflow concentration of 10,000mg/L from the secondary clarifier, determine :
a) The volume of reactor
b) The mass and volume of the solid that must be wasted each day, and
c) The recycle ratio.

Q6 Give a case study for Fertilizer Plant and prepare a report highlighting the Production Process (including Sources and Characteristics of Waste generated) and steps taken by industries to minimise its environmental impact. **(16)**