

**MID-TERM EXAMINATION**  
 (Course Name: B. Tech.) (Semester: I)  
 (October 2024) OFF LINE mode

Subject Code: BAS 104	Subject: ENVIRONMENTAL SCIENCES
Time : 1 ½ Hours	Maximum Marks :30

Note: Q1 is compulsory. Attempt any two parts of Q2 and Q3

Q1		(2.5*4=10)
a)	Explain the remedial steps taken (with chemical reactions) for removal of nutrients from industrial sewage.	
b)	How to calculate the type and amount of alkalinity with the case $P > \frac{1}{2} M$ , where P = Phenolphthalein alkalinity and M = Methyl orange alkalinity.	
c)	Describe any two chemical processes of solid waste disposal and treatment.	
d)	Calculate the atom economy of the desired product in the given chemical reaction  $\begin{array}{ccc} \text{SO}_3\text{Na} & + & 2\text{NaOH} \\ \text{C}_6\text{H}_5\text{SO}_3\text{Na} & + & 2\text{NaOH} \\ \text{---} & + & \text{---} \\ & \longrightarrow & \\ & \text{C}_6\text{H}_5\text{ONa} & + \text{Na}_2\text{SO}_3 + \text{H}_2\text{O} \\ & \text{Desired} & \\ & \text{Product} & \end{array}$	

**UNIT I**

Q2	Attempt any two parts	(5*2=10)
a)	20 mL of standard hard water (containing 15 g of $\text{CaCO}_3$ per L) required 25 mL EDTA solution for end-point. 100 mL of water sample required 18 mL EDTA solution; while same water after boiling required 12 mL EDTA solution. Calculate carbonate and non-carbonate hardness of water. Which buffer is used in this titration and what is its pH? $\text{NH}_4^+ + \text{NH}_3$ buffer, pH: 8-9	
b)	(i) What are the major approaches to conserve water resources? How is water harvesting practiced in India? (ii) Discuss the principle of Winkler's method for determination of Dissolved Oxygen (DO).	
c)	Explain the various steps involved in treatment of organic matter in waste water.	

**UNIT II**

Q3	Attempt any two parts	(5*2=10)
a)	Explain the chemistry involved in the formation of Photochemical Smog. What is the main chemical constituent of Photochemical Smog?	
b)	Explain the treatment of hazardous waste using chemical methods.	
c)	Discuss the following tools of Green Chemistry with example: i. Green starting material ii. Green reaction	