

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University I SEMESTER M.TECH. (ENVIRONMENTAL ENGINEERING) **END SEMESTER EXAMINATIONS, NOV/DEC 2016**

SUBJECT: APPLIED ENVIRONMENTAL CHEMISTRY AND MICROBIOLOGY [CIE 5122]

REVISED CREDIT SYSTEM

Time: 3 Hours

Г

MAX. MARKS: 50

٦

Instructions to Candidates:				
 Answer ALL the questions. 				
 Missing data may be 	suitably assumed			
What are catalysts? Explain how a catalyst changes the rate of reaction. With examples mention the use of catalysts in control of air pollution.				04
Explain the solubility product and its significance in Environmental Engineering.				
Calculate the volume of tank required to hold 5000 kg of carbon dioxide gas at 40°C and 1.5 atm pressure.				
 State and mention the application in Environmental Engineering field of (i). Henry's law (ii).Dalton's law of partial pressure. 				
Discuss briefly the effects of liquid ionic strength and separating distance between colloids on the force of interaction between them.				03
• Explain the reaction of metals with water and oxygen.				03
Explain the principle of solvent extraction.				04
. Write a note on (i) Pseudo first order reaction (ii) Consecutive reactions.				04
The half-life of atrazine (an herbicide) is estimated to be approximately 14 days. What fraction of the initial atrazine will remain after 100 days?				02
With a neat sketch explain the working of Gas chromatography.				03
Granular Activated Ca organic matter from tre of the wastewater and concentration of solub Langmuir adsorption is	rbon (GAC) was ated wastewater. D l it is contacted f ble organic conten otherm using the da Mass of GAC added (mg) 0.2 0.5 2.0 5.0 10 20 50	tested for its abil ifferent masses of 0 for 20h at 20° C t is 1.0 mg/1. Do ata given below. C, mg/L of organic matter 0.8 0.75 0.35 0.19 0.14 0.09 0.06	ity to remove soluble GAC were added to 1L and $pH = 7.5$. Initial erive the equation for	05
	 Answer ALL the que Missing data may be What are catalysts? E examples mention the u Explain the solubility p Calculate the volume of and 1.5 atm pressure. State and mention the a (i). Henry's law (ii).Dalton's law of p Discuss briefly the effect colloids on the force of Explain the reaction of Explain the principle of Write a note on (i) Pseu The half-life of atrazing What fraction of the ini With a neat sketch expl Granular Activated Ca organic matter from tre of the wastewater and concentration of solub Langmuir adsorption is 	Instructions to C Answer ALL the questions. Missing data may be suitably assumed What are catalysts? Explain how a cata examples mention the use of catalysts in cole Explain the solubility product and its signil Calculate the volume of tank required to h and 1.5 atm pressure. State and mention the application in Enviro (i). Henry's law (ii).Dalton's law of partial pressure. Discuss briefly the effects of liquid ionic colloids on the force of interaction between Explain the principle of solvent extraction. Write a note on (i) Pseudo first order react The half-life of atrazine (an herbicide) is What fraction of the initial atrazine will re With a neat sketch explain the working of Granular Activated Carbon (GAC) was organic matter from treated wastewater. D of the wastewater and it is contacted for concentration of soluble organic content Langmuir adsorption isotherm using the data data data data data data data dat	Instructions to Candidates:	Instructions to Candidates: ◆ Answer ALL the questions. ◆ Missing data may be suitably assumed What are catalysts? Explain how a catalyst changes the rate of reaction. With examples mention the use of catalysts in control of air pollution. Explain the solubility product and its significance in Environmental Engineering. Calculate the volume of tank required to hold 5000 kg of carbon dioxide gas at 40°C and 1.5 atm pressure. State and mention the application in Environmental Engineering field of (i). Henry's law (ii).Dalton's law of partial pressure. Discuss briefly the effects of liquid ionic strength and separating distance between colloids on the force of interaction between them. Explain the reaction of metals with water and oxygen. Explain the principle of solvent extraction. Write a note on (i) Pseudo first order reaction (ii) Consecutive reactions. The half-life of atrazine (an herbicide) is estimated to be approximately 14 days. What fraction of the initial atrazine will remain after 100 days? With a neat sketch explain the working of Gas chromatography. Granular Activated Carbon (GAC) was tested for its ability to remove soluble organic matter from treated wastewater. Different masses of GAC were added to IL of the wastewater and it is contacted for 20h at 20° C and pH = 7.5. Initial concentration of soluble organic content is 1.0 mg/l. Derive the equation for Langmuir adsorption isotherm using the data given below. Mass of GAC C, mg/L of added (mg) organic



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

-spi	RED BY A Constituent Institution of Manipal University	
4C.	The soil sample contains Benzene of 5 mg/1. What is the concentration in ppm if the density of soil is 1.8 g/ cm^3 ?	02
5A.	With a neat sketch of bacterial growth curve explain the different phases of bacterial growth.	03
5B.	Discuss the different types of bacteria based on their shape.	03
5C.	List the various glycolytic pathway of microbial metabolism. Explain with sketch anyone	04