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GIET UNIVERSITY, GUNUPUR – 765022
 B. Tech (Fifth Semester-Regular) Examinations, December – 2022
BPECH5050 – Process Utility and Industrial Safety
 (Chemical Engineering)

Time: 3 hrs

Maximum: 70 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)

(1 x 10 = 10 Marks)

Q.1. Answer ALL questions

	CO#	PO #
a. Which characteristic of water does Calcium contribute to?	CO1	PO1
i. Hardness		
ii. Suspended solids		
iii. pH		
iv. Colour		
b. What is the most common used coagulant	CO1	PO2
i. Alum		
ii. Ferric sulphate		
iii. Limestone		
iv. Coal		
c. What is the role of chlorine in water treatment?	CO1	PO1
i. To remove hardness		
ii. To remove ions		
iii. Coagulant agent		
iv. To remove bacteria		
d. Which of the following is not a physical characteristic?	CO1	PO2
i. Colour		
ii. pH		
iii. Odour		
iv. Temperature		
e. The economiser is used in boilers to.....	CO2	PO1
i. Increase thermal efficiency of boiler		
ii. Economise on fuel		
iii. Extract heat from the exhaust the gases		
iv. Increase flue gas temperature		
f. Water tube boilers are those in which.....	CO2	PO1
i. Flue gases pass through tubes and water around it		
ii. Water passes through the tubes and flue gases around it		
iii. Work is done during adiabatic expansion		
iv. Change is enthalpy		
g. Reciprocating compressors are used for delivering	CO3	PO2
i. small quantities of air at high pressures		
ii. large quantities of air at high pressures		
iii. small quantities of air at low pressures		
iv. large quantities of air at low pressures		
h. The _____ process determines whether exposure to a chemical can increase the incidence of adverse health effect.	CO4	PO1
i. Hazard identification		
ii. Exposure assessment		
iii. Toxicity assessment		
iv. Risk characterization		
i. What is the main objective of risk assessment?	CO4	PO2
i. To evaluate hazard and minimize the risks		
ii. Remediation of contaminated sites		
iii. Hazard management		
iv. To know source of pollutants		
j. What is the first stage of risk assessment?	CO4	PO1
i. Exposure assessment		
ii. Hazard identification		
iii. Toxicity study		
iv. Risk characterization		

PART – B: (Short Answer Questions)**(2 x 10 = 20 Marks)**

Q2. Answer ALL questions	CO #	PO #
a. Discuss the consequent effect of physical and chemical impurities on quality of water.	CO1	PO1
b. How Fire-tube boiler and Water-tube boiler are differentiated.	CO1	PO2
c. What is Scale? Discuss any two reasons with chemical reaction for formation of scale.	CO2	PO2
d. What are the unit of Hardness to express?	CO1	PO3
e. Mentions the Biological Hazard and its preventive steps.	CO3	PO2
f. Differentiate between Swept Volume and Clearance volume in case of a compressor.	CO2	PO1
g. Why in the ion exchange process water is usually first passed through the cation exchanger and then through the anion exchanger?	CO3	PO1
h. What are the safety tools and equipments normally used for Industrial safety?	CO3	PO2
i. Enumerate the five Steps of risk assessment and Hazards control measures.	CO4	PO1
j. What are the principles of health and safety?	CO4	PO3

PART – C: (Long Answer Questions)**(10 x 4 = 40 Marks)**

Answer <i>ALL</i> questions	Marks	CO #	PO #
3.a. Describe the Demineralisation process of softening of hard water. What are its advantages over Zeolite Process?	8	CO1	PO1
b. What is ion selective Membrane. Give example of it.	2	CO1	PO2
(OR)			
c. What do mean by softening of water. Discuss the Boiler trouble removal by internal treatment and external methods.	10	CO1	PO3
4.a. Classify the Boilers according to the contents in the tube, position of the furnace, axis of the shell, number of tubes, method of circulation of water and steam and according to the use	8	CO2	PO1
b. What are the characteristics /Essentials of Good boilers?	2	CO2	PO2
(OR)			
c. Mentioning with a neat flow diagram discuss each in particular about construction, working, special features, advantages and disadvantages from High pressure Boiler and Low pressure Boiler.	10	CO2	PO1
5.a. What is an air compressor? What are the applications of air compressors?	5	CO3	PO2
b. What are the different types of air compressors according to different design and principle of operation?	5	CO3	PO3
(OR)			
c. Discuss in length about Construction and Working Principle of Single stage Reciprocating Air Compressor.	10	CO3	PO1
6.a. How will you do the risk assessment in process plant? Also write its advantages and disadvantages.	4	CO4	PO1
b. What is Hazard? Classify the Hazard according to its risk involvement. Enumerate about each categories of Hazards according to its potential to cause injury and damage.	6	CO4	PO3
(OR)			
c. Does the company have an assessment process for identifying risks? Describe the process	6	CO4	PO1
d. Write about the procedure carried out for HAZOP.	4	CO4	PO2

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