

Reg. No.

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B. E / B. TECH.DEGREE EXAMINATIONS, MAY 2023

First Semester

CY18151 - ENGINEERING CHEMISTRY*(Common to all branches except Marine Engineering)**(Regulation 2018/2018A)*

TIME:3 HOURS		MAX.MARKS: 100
COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Estimate the hardness of water, assess the boiler feed water requirement and related problems also identification of suitable water treatment methods.	3
CO 2	Differentiate the mechanisms of different types of corrosion and suggest suitable corrosion control techniques to mitigate the problem of corrosion including protective coatings.	3
CO 3	Compare the nano and bulk materials, their synthesis and its applications in various fields.	2
CO 4	Interpret the photochemical reactions and spectroscopic techniques.	2
CO 5	Assess the types and quality of fuels, its calorific values and significance of flue gas analysis.	4

PART- A (10 x 2=20 Marks)

(Answer all Questions)

	CO	RBT LEVEL
1 What happens when temporary hard water is boiled? Give an equation.	1	2
2 Calgon treatment prevents scaling in boilers. Justify this claim.	1	3
3 Fe corrodes faster than Al. Provide a reason.	2	3
4 Comment on galvanic corrosion.	2	2
5 Differentiate nano particles, molecules and bulk materials.	3	4
6 Explain the term bottom up approach in nanochemistry.	3	2
7 State Stark Einstein's law of photochemical equivalence.	4	2
8 What you mean by auxochrome?	4	1
9 How will you improve the anti-knocking characteristics of diesel?	5	2
10 Water gas is superior to producer gas. Justify the statement.	5	2

PART- B (5 x 14=70 Marks)

(Restrict to a maximum of TWO subdivisions)

	Marks	CO	RBT LEVEL
11(a) With a neat sketch explain the zeolite process for the removal of hard water with necessary equations. Write its merits and demerits.	(14)	1	2
(OR)			
11(b) (i) Describe the various internal conditioning methods of boiler feed water.	(7)	1	2

(ii)	Write a short note on reverse osmosis process for the removal of salt in brackish water.	(7)	1	2
12(a)	Explain the chemical corrosion and apply the Pilling bed-worth rule for the intensity of corrosion varying with the nature of oxide layer formation.	(14)	2	3
(OR)				
12(b)	Explain the cathodic protection of metals with suitable methods.	(14)	2	3
13(a)	Why properties of nanomaterials differ from bulk materials? Discuss the application of nano materials in various fields.	(14)	3	2
(OR)				
13(b)	Write short notes on the synthesis of nanomaterials	(14)	3	2
	a. Precipitation			
	b. Chemical vapour deposition			
14(a)	(i) Deduce the Beer-Lambert's law. Mention its limitations.	(7)	4	3
	(ii) Elucidate the mechanism of photosensitization with suitable examples.	(7)	4	3
(OR)				
14(b)	Explain the principle, instrumentation and working of IR spectroscopy with a few applications.	(14)	4	3
15(a)	Elucidate the suitable analysis method to determine the chemical composition of coal. Explain its significance.	(14)	5	4
(OR)				
15(b)	With a neat diagram, explain the analysis of flue gas by Orsat apparatus. Provide the precautions to be followed during the analysis.	(14)	5	4

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16	Construct the Otto-Hoffman's byproduct oven for manufacturing metallurgical coke. Based on this process, how will you separate different by products?	(10)	5	4
