Q. Code:132916

Reg. No. | | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2024

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, asses 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	Asses 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.	Why is $CaSO_4$ in water harmful to boilers?	**1**	**3**
2.	At what circumstances boiler explosions are expected?	**1**	**3**
3.	A pure metal rod half immersed vertically in water starts corroding at the bottom. Give reasons.	**2**	**3**
4.	Welded joint is preferred to riveted one. Why ?	**2**	**3**
5.	Explain the term bottom up approach in nanochemistry.	**3**	**2**
6.	What makes the nano materials more superior than bulk materials?	**3**	**2**
7.	How is a photochemical reaction differing from thermal reactions?	**4**	**2**
8.	State Stark Einstein's law of photochemical equivalence.	**4**	**2**
9.	Compare how water gas is superior to producer gas.	**5**	**4**
10.	Calculate the Gross calorific value of a coal sample having the following composition. C = 84 %; H = 5.5 %; O = 8.4 %; S = 1.5 %; N = 0.6%.	**5**	**4**

PART- B (5 x 14 = 70 Marks)

		Marks	CO	RBT LEVEL
11. (a)	How would you apply reverse osmosis for desalination of water and brief	**(14)**	**1**	**3**

out electrodialysis process with its significance?

(OR)

(b)	With a neat sketch explain the zeolite process for softening of hard water. Write its merits and demerits.	**(14)**	**1**	**3**
12. (a)	Explain the mechanism of chemical corrosion and summarize the intensity of corrosion varying with the nature of oxide layer formation over metal.	**(14)**	**2**	**2**
	(OR)			
(b)	Discuss the cathodic protection of metals with suitable examples.	**(14)**	**2**	**2**
13. (a)	Write the applications of nano materials in any six fields.	**(14)**	**3**	**2**
	(OR)			
(b)	Explain laser ablation and CVD methods of synthesizing nano materials with a neat diagram.	**(14)**	**3**	**2**
14. (a)	Write a note on the radiative and non-radiative transitions of photo physical process with a neat diagram.	**(14)**	**4**	**2**
	(OR)			
(b)	Explain the instrumentation and operating principle of IR spectroscopy. Write its applications.	**(14)**	**4**	**2**
15. (a)	Describe the analysis of flue gas by Orsat Apparatus. What conclusion can be drawn from the experiment?	**(14)**	**5**	**3**
	(OR)			
(b)	Explain the ultimate analysis of coal with its significance.	**(14)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Give an account on principle, instrumentation and application of UV-Visible spectroscopy.	**(10)**	**4**	**2**

****