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GIET UNIVERSITY, GUNUPUR – 765022
M. Sc (Third Semester) Examinations, December' 2020
CHPE 302 – Analytical Chemistry – I
(Chemistry)

Time: 2 hrs

Maximum: 50 Marks

(The figures in the right hand margin indicate marks.)

- Q.2. Answer **ALL** the questions (2 x 10 = 20)
- What is DTA curve? What information will you gathered from this curve?
 - What is the difference between TGA & DTGA?
 - Why do we use three electrodes in a electrochemical cell?
 - In a system that uses a three electrode potentiostat, between which two electrode is the potential measured?
 - Mention about the differences between SEM and TEM.
 - How do X-rays generated?
 - How fuels are classified. Give one example for each?
 - What are opioids and why are they dangerous?
 - In cyclic voltammetry why do we use reference, counter and working electrodes?
 - State Bragg's law.

PART – B (6 x 5 = 30 Marks)

- Answer ANY FIVE questions Marks
- In the thermogravimetric analysis of 0.025gm of calcium hydroxide, the loss in weight at different temp was (6)
 - 0.018 g at 100-150°C (Loss of hydroscopic water)
 - 0.038 g at 500-560°C (Dehydration)
 - 0.0229 g at 900-950°C (Dissociation)

Determine the composition of Ca(OH)₂.
 - What is DTA? How DTA is used in following measurements? (6)
 - heat capacity
 - glass transition temperature
 - Discuss the difference between normal pulse voltammetry and differential pulse voltammetry. (6)
 - Which of the following among Linear sweep voltammetry and cyclic voltammetry is better and why? Why cyclic voltammetry has been recognized as the most versatile electrochemical technique? (6)
 - State and explain the principle of SEM and TEM. Mention about it's advantages and disadvantages. (6)
 - Find the shortest wavelength of X-rays produced by an X-ray tube operated at 10 kV, and hence, calculate the frequency of the X-ray beam emitted? Given $h = 6.626 \times 10^{-34} \text{ J s}$, $e = 1.6 \times 10^{-19} \text{ C}$, $c = 3 \times 10^8 \text{ m s}^{-1}$. (6)
 - Describe some of the important significance of gas chromatography. (6)
 - Explain proximate and ultimate analysis of coal and mention about their useful importance. (6)

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