

Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

Online End Semester Examination, Dec 2021

Course: Analytical Methods in Chemistry

Semester: Vth

Program: B.Sc. Chemistry

Time 03 hrs.

Course Code: CHEM 3008D

Max. Marks: 100

SECTION A

1. Section A: Each Question will carry 4 Marks

2. Instruction: Complete the statement / Select the correct answer(s)

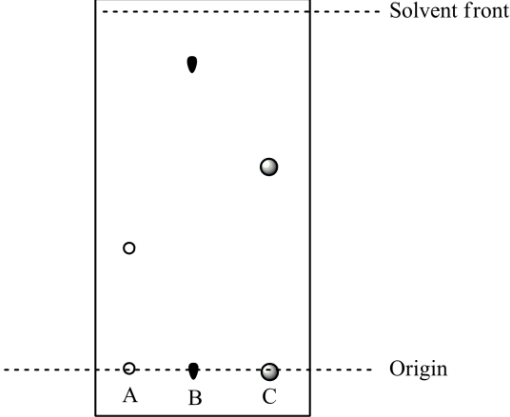
S. No.	Questions	CO
Q1	How will you differentiate between the terms <i>precision</i> and <i>accuracy</i> in analytical processes? Define both the terms with appropriate examples.	CO2
Q2	Four measurements of the weight of an object whose correct weight is 0.1026 g are 0.1021, 0.1025, 0.1019 and 0.1023 g. Calculate the mean, the median, the average (mean) and the standard deviation.	CO2
Q3	What is the basic principal of thin-layer chromatography (TLC)? Explain the significance of Retention Factor (R_F) value in chromatography.	CO3
Q4	Suggest the best chromatographic technique for the separation of natural dyes. Explain with your reason. Give example of two natural dyes commonly used in chemical laboratory.	CO3
Q5	What are the common solvents used in solvent extraction methods. Write a short note on solvent extraction method.	CO3

SECTION B

1. Each question will carry 10 marks

2. Instruction: Write short / brief notes

Q6	How will you identify and analyze the thermal stability of polyvinyl chloride (PVC), polyethylene (PE) and polytetrafluoro ethylene (PTFE) using thermogravimetric analysis (TGA). Draw the TGA-thermogram for above-mentioned polymers.	CO1
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<p>Q7</p>	<p>(i) How do you use the Beer-Lambert Law to perform quantitative analysis? Establish the relation between <i>Absorbance</i> and <i>Transmittance</i>.</p> <p>(ii) Consider the following silica gel TLC plate of compounds A, B, C developed in hexane:</p> <div style="text-align: center;">  </div> <p>Which compound A, B or C is most polar?</p>	<p>CO1 and CO3</p>
<p>Q8</p>	<p>List three reasons for weight loss in TGA analysis. Draw a TGA-thermogram of calcium oxalate monohydrate $\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$. Write down the all equations.</p>	<p>CO1</p>
<p>Q9</p>	<p>(i) Write the name of light sources used in a typical UV-Visible spectrophotometer.</p> <p>(ii) The intensity of a light beam decreases by 50% when it passes through a sample of 1.0 cm path length. What is the transmission percentage of the light if it passes through the same sample, but of 3.0 cm path length?</p> <p style="text-align: center;">OR</p> <p>Define at least two solvent extraction methods for metal ions. State at least three important characteristics of solvents utilized in solvent extraction processes.</p>	<p>CO1 and CO3</p>
<p>SECTION-C</p> <p>1. Each Question carries 20 Marks.</p> <p>2. Instruction: Write long answer.</p>		
<p>Q10</p>	<p>Write down the principal and applications of thermogravimetric analysis (TGA). Define all the the important components used in TGA instrument. What are the limitations of TGA?</p> <p style="text-align: center;">OR</p> <p>Define each of the following analytical terms with a suitable examples:</p> <p>(i) Mean</p>	<p>CO1 and CO2</p>

	<ul style="list-style-type: none"> (ii) Median (iii) Average (mean) deviation (iv) Standard deviation (v) Relative standard deviation (%) (vi) Error of the mean 	
Q11	<p>What is the significance of the basic components used in Flame Atomization Technique? Differentiate between single-beam and double-beam instrument. What is the sequence of events occurring during flame atomization of NaCl?</p>	CO1