
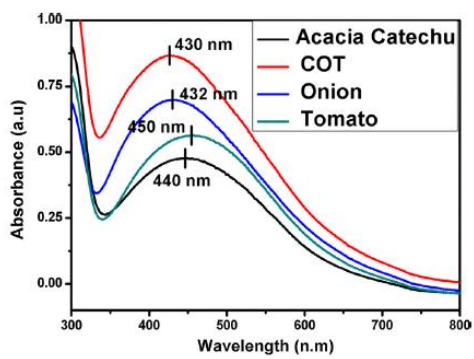
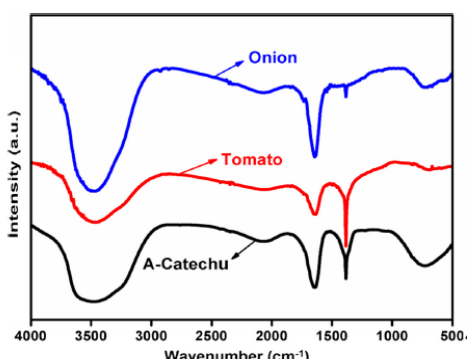


<b>Name:</b> <b>Enrolment No:</b>		
<b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b> <b>End Semester Examination (Online Mode), Dec 2020</b> <b>Course:</b> Green Chemistry <span style="float: right;"><b>Semester:</b> III</span> <b>Program:</b> M. Sc. Chemistry <span style="float: right;"><b>Time:</b> 3 hr</span> <b>Course Code:</b> CHEM 8002 <span style="float: right;"><b>Max. Marks:</b> 100</span>		
<b>SECTION - A</b> <span style="float: right;"><b>6 x 5 = 30 Marks</b></span> <b>1. Each Question (A+B parts) will carry 5 Marks</b> <b>2. Instruction: Complete the statement / Select the correct answer(s)</b>		
Q 1	Fill in the blanks with first (1-6) FIVE principles among twelve principles of Green Chemistry. These are-----,-----, ----- -----, -----, -----	CO1
Q 2	Fill in the blanks with last (7-12) FIVE principles among twelve principles of Green Chemistry. These are-----,-----, ----- -----, -----, -----	CO1
Q 3	<b>A:</b> Write any two best definitions of Green Chemistry. <b>B:</b> The need for Green Chemistry _____.	CO1
Q 4	Choose correct biocatalysts from the following list. <b>A:</b> RX/AlCl <sub>3</sub> <span style="margin-left: 150px;"><b>D:</b> HNO<sub>3</sub>+H<sub>2</sub>SO<sub>4</sub></span> <b>B:</b> nano silver with polymer base <span style="margin-left: 150px;"><b>E:</b> Zeolites</span> <b>C:</b> aq. HCl/ $\Delta$ T <span style="margin-left: 150px;"><b>F:</b> NaOH/<math>\Delta</math>T</span>	CO1
Q 5	<b>A.</b> Green chemistry improves _____ of chemical manufacturers. a) Competitiveness      b) Easiness of production c) Services                      d) Chemicals <b>B.</b> The green synthesis methods should have _____. a) Low efficiency                      b) High harmful products c) Low energy requirements      d) Low atom efficiency	CO2  CO2
Q 6	Select the correct Green solvents from the below list. <b>A:</b> Toluene <b>D:</b> Ether <b>G:</b> ethyl lactate <b>J:</b> Acetone <b>B:</b> Hexane <b>E:</b> Water <b>H:</b> cyclo pentyl methylether <b>C:</b> Glycerol <b>F:</b> Lactone <b>I:</b> 2-methyltetrahydrofuran	CO2

<b>SECTION – B</b>		<b>10 x 5 = 50 Marks</b>
<b>1. Each question (A+B parts) will carry 10 marks</b> <b>2. Instruction: Write short / brief notes</b>		
Q 7	<b>A:</b> What are the main goals of Green Chemistry. <b>B:</b> How Green Chemistry advances towards a sustainable future.	CO1
Q 8	Illustrate with examples (differences and similarities) Green Chemistry with Environmental Chemistry.	CO1
Q 9	<b>A:</b> How Green Chemistry is interdisciplinary in nature ? <b>B:</b> Describe few Environmental Laws.	CO1
Q10	Describe with minimum two national and one international industrial case study on wealth from waste (with highlights of Green Chemistry).	CO2
Q 11	<b>A:</b> Explain about emerging Green Technologies. <b>B:</b> Illustrate few next generation Catalyst Design methods.	CO2
<b>Section – C</b>		<b>1 x 20 = 20 Marks</b>
<b>1. Answer any One Question. Each Question (A+B parts) carries 20 Marks.</b> <b>2. Instruction: Write long answer.</b>		
Q 12	<b>A:</b> Discuss about the characterization techniques with results presented from the following FIGURES presented.	CO2
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>(a)</p> </div> <div style="text-align: center;">  <p>(b)</p> </div> </div> <p><b>Figure (a):</b> UV-Visible spectra of silver nano particles (AgNPs) synthesized with onion (O), tomato(T), Acacia catechu (C).</p> <p><b>Figure (b):</b> FTIR spectra of AgNPs synthesized with anion, tomato, Acacia catechu.</p> <p><b>B:</b> Discuss the solvent free synthesis methods with examples.</p> <p style="text-align: center;"><b>OR</b></p>	CO2

	<b>A:</b> Explain any THREE methods of greener approaches for nanoparticle synthesis.	CO2
	<b>B:</b> Depict selective method for the oxidation of 5-hydroxymethylfurfural (HMF) by using hydrogen peroxide (H <sub>2</sub> O <sub>2</sub> ) and activated-carbon-supported ruthenium (Ru/AC) as the catalyst.	CO1