UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2022

Course: Industrial Chemicals and Environment **Semester: V**
Program: BSc Hons Chemistry **Time   : 03 hrs.**
Course Code: CHEM3007D **Max. Marks: 100**

Instructions: Attempt all questions.

<table>
<tr><td colspan="4" align="center">SECTION A
(5Qx4M=20Marks)</td></tr>
<tr><td>S. No.</td><td></td><td>Marks</td><td>CO</td></tr>
<tr><td>Q 1</td><td>At which temperatures (in degree Kelvin) will Nitrogen, Oxygen, Argon, and Helium separate in an ASU?</td><td>4</td><td>CO3</td></tr>
<tr><td>Q 2</td><td>Write short notes on:
  A) Primary pollutants
  B) Secondary pollutants</td><td>4</td><td>CO2</td></tr>
<tr><td>Q 3</td><td>Mention ways in which Bleaching powder and Hydrogen peroxide are used in the industry?</td><td>4</td><td>CO3</td></tr>
<tr><td>Q 4</td><td>Discuss the importance of ultrapure metals in semiconducting industry, give examples.</td><td>4</td><td>CO3</td></tr>
<tr><td>Q 5</td><td>How does a biocatalyst impact the activation energy of a reaction in comparison to a non-catalytic and a chemo-catalyst-based reactions?</td><td>4</td><td>CO1</td></tr>
<tr><td colspan="4" align="center">SECTION B
(4Qx10M= 40 Marks)</td></tr>
<tr><td>Q 1</td><td>Recall the different types of information given in the MSDS.</td><td>10</td><td>CO3</td></tr>
<tr><td>Q 2</td><td>Enlist the different ways solid waste can be managed as part of their disposal process.</td><td>10</td><td>CO2</td></tr>
<tr><td>Q 3</td><td>Differentiate, with diagram, between Induced Fit and Lock & Key mechanisms for Biocatalysis.</td><td>10</td><td>CO1</td></tr>
<tr><td>Q 4</td><td>Elaborate on the different water pollutants, specially covering their sources and environmental impact.

Or

Discuss the following:
  A) Techniques to measure air pollutants
  B) Techniques to measure water pollutants</td><td>10

5 + 5</td><td>CO2</td></tr>
<tr><td colspan="4" align="center">SECTION-C
(2Qx20M=40 Marks)</td></tr>
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Q 1	A) Elaborate the process of acid rain formation? Give chemical equations. Write a brief note on their environmental impact. B) Arrange biomedical wastes in various categories and assign the categories to appropriate color coding of waste bag. Or A) Elaborate on the photochemistry of smog. Give equations. B) Elaborate on Effluent treatment plants and briefly touch upon its limitations.	**10 + 10** **10 + 10**	**CO2**
Q 2	A) Distinguish between Gross Calorific Value and Net Calorific Value. In addition, mention how are they related to each other? B) Discuss the role of latent heat of condensation of steam in calculating Net Calorific Value of a fuel. C) Identify the different corrections applied to calculate Gross Calorific Value. D) Use the example of synthesis of Ibuprofen to demonstrate the difference between simple chemical reaction route and green synthesis inspired chemical reaction route.	**4 + 4 + 4 + 8**	**CO1**