Name: **Enrolment No:**	

UPES

End Semester Examination, December 2023

Course: Industrial Chemistry **Semester: VII**

Program: BSc by Research (Mathematics) **Time : 03 hrs.**

Course Code: CHEM 4014 **Max. Marks: 100**

Instructions:

i) Read questions carefully.

ii) All questions are mandatory.

SECTION A

(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Discuss the process of fractional distillation of crude oil.	**4**	**CO1**
Q 2	Show the reforming process of n-hexane to benzene.	**4**	**CO1**
Q 3	How does graphite act like a lubricant?	**4**	**CO2**
Q 4	What are the different steps undertaken during proximate analysis of coal?	**4**	**CO1**
Q 5	List the different types of spice flavors and include their examples.	**4**	**CO3**

SECTION B

(4Qx10M= 40 Marks)

Q 6	Define and recall the different types of flavonoids. Mention their sources.	**10**	**CO3**
Q 7	Perform ultimate analysis for percentages of C, H, N, and S for the following case: 2.1 g of coal was burnt and increase in weights of anhydrous $CaCl_2$ and KOH was seen to be 0.53 g and 5.73 g, respectively. 0.75 g of the coal in Kjeldahl's experiment released NH_3, which was passed in 50 mL 0.12 N HCl. The HCl required 39 mL of 0.12 N NaOH to neutralize. When 1.9 g of coal is treated with $BaCl_2$, it gave 0.41 g of $BaSO_4$.	**10**	**CO1**
Q 8	What do you understand by LAS, ABS, and LABS? Or Discuss rancidity and autoxidation of oil with examples.	**10** **Or** **5 + 5**	**CO2**

Q 9	i) ii)	Why and how do we consider the percentage of hydrogen present in the fuel while calculating the LCV for a fuel? Solve for HCV and LCV when 3 g of fuel was burnt in a calorimeter having 2100 g of water and water equivalent of bomb calorimeter is 300 g. The fuel had 7% hydrogen, and the temperature of water rose by 4°C. The cooling correction was 0.5°C, acid correction was 8 cal, and fuse correction was 44 cal.	**4 + 6**	**CO1**
SECTION-C (2Qx20M=40 Marks)				
Q 10	i) ii) iii)	How does soap clean? Use appropriate drawings to illustrate the process. Explain saponification value, and iodine number. What are hard and soft soap. Give examples.	**10 + 4 + 6**	**CO2**
Q 11	Discuss in detail the roles of the following as food additives: Antioxidant i) ii) iii) iv) Or i) ii)	Acidity regulator Emulsifying salt Flavor enhancer Antifoaming agent What are food preservatives? Mention the different groups in which India classifies preservatives. Give examples. Define sweetening agents. Recall their types with examples.	**5 × 4** **Or** **10 + 10**	**CO3**