SET A	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, July 2020
Open Book – Through Blackboard Learning Management System

Course: Chemistry **Semester: II**
Programme: BT-CSE-LLB-Spz-CL/ IPR **Course Code: CHEM1002**

Time: 03 hrs. **Max. Marks: 100**

Instructions:
As this examination is non-proctored, the students are expected to demonstrate a very high degree of Academic Integrity and not copy contents from resources referred. Instructors would look for understanding of the concept by the students and any similarity found from resources online/ offline shall be penalized in terms of deduction of marks and even cancellation of paper in requisite cases. The online examination committee of the School would also look for similarity of two answer scripts and if answer scripts of two or more students are found similar, both the answer scripts shall be treated as copied and lead to cancellation of the paper. In view of the aforesaid points, the students are warned that they should desist from any unfair means and provide answers in their own words.

All Questions are Compulsory
Answer each question in not more than 500 words

S. No.		Marks	CO
1	a. Discuss the various properties of a good fuel based. b. Compare the solid, liquid and gaseous fuel on the basis of their properties. c. Discuss the advantages and disadvantages of solution polymerization technique. d. Write a short note on waterline corrosion.	**[5+5+ 5+5]**	**CO3+CO3 +CO4+ CO4**
Ans.			
2	a. Calculate the weight and volume of oxygen required for the complete combustion of 5 kg of fuel containing 65% C, 15% H, 10% O, 5% S, 5% N and remaining ash b. Explain the emulsion polymerization technique. Compare it with solution polymerization. c. Differentiate between Net Calorific value and Gross Calorific value. What type of errors are countered while determining calorific value using a bomb calorimeter? d. Differentiate between addition and condensation polymers. Give examples of each type of polymer	**[5+5+ 5+5]**	**CO1+CO4 +CO1+ CO4**
Ans.			

3	a. A first order reaction is 99% completed in 100 minutes. Calculate (i) rate constant (ii) Half-life (iii) time required for 30 % conversion to be completed. b. Discuss the graphical method, and Isolation method used to determine the order of a reaction	**[10+ 10]**	**CO3+CO2**
Ans.			
4	a. Examine the feasibility of nucleophilic substitution in vinyl chloride, allyl chloride, benzyl chloride and chlorobenzene with suitable reasoning. b. Discuss in details the method of preparation of nanoparticles using **sol gel method** by drawing a **suitable sketch**.	**[10+ 10]**	**CO2+CO3**
Ans.			
5	a. A sample of coal powder was analysed by proximate analysis. The observed results were as follows. Moisture content: 43%; volatile content: 28%. If the initial weight of the samples was 0.80 gm, find out the amount of moisture content (**in gm**), volatile content (**in gm**), carbon content (**in gm**) and ash content (**in %**) content, provided that at the end of the experiment the residual ash was found to be 100.0 mg. b. One gram of polymer sample contains a mixture of three polymers having molecular weights of 5500; 2000; and 18,000 g/mol in a ratio of 0.55:0.35:0.85. Find out the Mn and Mw of the sample.	**[10+ 10]**	**CO1+CO4**
Ans.			