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

Course: Chemistry   **Semester: II**
Programme: BSc LLB

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 <u>even cancellation of paper in requisite cases</u>. 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	Justify the following statements: a. Corrosion is necessary evil. b. The bomb calorimeter gives only the net calorific value c. The lid of the crucible must be covered while determining the volatile matter in a coal sample d. A small amount of moisture must be ideally present in a coal sample.	[5+5+5+5]	CO3+CO3+CO4+CO4
Ans.			
2	a. Which type of corrosion is more prevalent in seawater? Explain giving reasons. b. Write the units of the following: a. specific conductance; b. molar conductance; and c. equivalent conductance; d. Rate constant for a first order reaction. c. Write the components of an electrochemical cell. Taking copper and zinc as an example, draw an electrochemical cell stating the redox reaction involved. d. Explain pitting corrosion giving suitable examples.	[5+5+5+5]	CO1+CO4+CO1+CO4
Ans.			
3	a. Write a note on electrically conducting polymers with examples.	[8+8+4]	CO3+CO2

	b. What is octane number of a fuel sample? How does it vary with the substitution of hydrocarbon? c. Explain the importance of the following in improving the octane number of a fuel: i) Cracking ii) Aromatisation		
Ans.			
4	a. Differentiate the various types of polymers on the basis of their stereochemistry. b. Bulk polymerisation is a primitive technique for the synthesis of polymers. Explain. c. The first order diffraction of X-rays from a certain set of crystal planes occurs at an angle of 20° from the planes. If the interplanar distance is 0.867 nm, calculate the wavelength of the X-rays used.	**[8+6+6]**	**CO2+CO3**
Ans.			
5	a. How does the molar conductance of an electrolyte vary with dilution? Explain giving suitable reasons. b. Differentiate between Net Calorific value and Gross Calorific value. What type of errors are countered while determining calorific value using a bomb calorimeter? c. A first order reaction is 99% completed in 120 minutes. Calculate (i) rate constant (ii) Half-life (iii) time required for 50 % conversion to be completed.	**[6+6+8]**	**CO1+CO4**
Ans.			