Name:

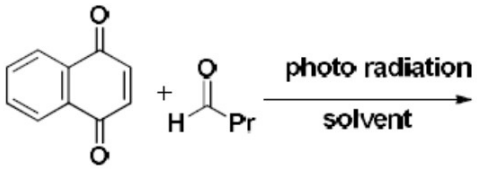
Enrolment No:

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

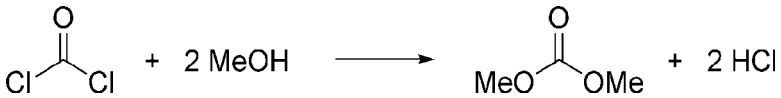
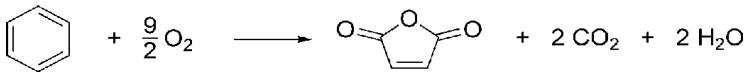
Course: Green and Sustainable Chemistry — **Semester: II**
Program: M.Sc. (Chemistry) — **Time : 03 hrs.**
Course Code: CHEM 7030 — **Max. Marks: 100**

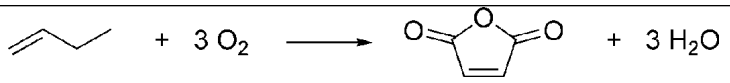
Instructions:

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Explain the role of Green Chemistry in sustainable development.	**4**	**CO1**
Q 2	What is the economic impact of innovation and research?	**4**	**CO2**
Q 3	Discuss briefly some of the prominent organic water pollutants.	**4**	**CO2**
Q 4	Write the product of acylation of 1,4-naphthoquinone by photocatalysis. 	**4**	**CO1**
Q 5	Describe a green method of synthesis of Ag nanoparticles.	**4**	**CO3**

SECTION B
(4Qx10M= 40 Marks)

Q 6	(a) Write a short note on the inter-disciplinary nature of Green Chemistry. (b) Dimethyl carbonate can be traditionally synthesized from phosgene by the following method  Suggest an alternate green method for the synthesis of dimethyl carbonate.	**5+5**	**CO1**
Q 7	Explain the cavitation mechanism in detail in sonochemical synthesis.	**10**	**CO3**
Q 8	Maleic anhydride may be prepared using two routes: 	**10**	**CO2**

	 The benzene oxidation route typically occurs in 65 % yield, while the but-1-ene route only gives yields of 55 %. Assuming that each reaction is performed in the gas phase only, and that no additional chemicals are required, calculate (i) the atom economy and (ii) the effective mass yield of both reactions. You should assume that O_2, CO_2 and H_2O are not toxic.		
Q 9	Which solvents are considered as green solvents? What are their advantages and disadvantages? **OR** How caprolactum is synthesized using green process? Explain the mechanism of caprolactum synthesis.	**10**	
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	(a) What is Bio-catalysis? Discuss the advantages of Bio-catalysis. Explain the Bio-catalytic production of acrylamide by Mitsubishi process. (b) What are the critical needs for designing a new catalyst?	**10+10**	**CO1**
Q 11	(a) Describe the basic principle how solar cell functions. What are different applications of solar energy? (b) Using examples explain the benefits of microwave in chemical synthesis. **OR** Define Green Nanotechnology. What are the major areas of research in green nanotechnology? Briefly discuss their impacts on environment.	**10+10**	**CO3**