

Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, May 2021

Course: Industrial Chemicals and Environment

Semester: VI

Program: B. Sc. (Hons.) Chemistry

Time 03 hrs.

Course Code: CHEM 3007D

Max. Marks: 100

SECTION A

1. Each question will carry 5 marks

2. Instruction: Complete the statement/ Select the correct answer

S. No.	Question	Marks	CO
Q 1	(i) Acetylene is mainly used in oxy-acetylene flames for and for (ii) Two main uses of nitrogen are: and (iii) Bomb calorimeter is used for determining calorific value for which type of samples: a. Solid samples only b. Liquid samples only c. Gaseous samples only d. Both solid and liquid samples	5	CO3
Q 2	There are mainly five types of biocatalysts namely,,,, and	5	CO1
Q 3	The name of two methods for the removal of suspended particulates from air are and	5	CO2
Q 4	(i) Which of the following is not a primary air pollutant? (a) Methane (b) Sulphur dioxide (c) Ozone (d) Asbestos (ii) Photochemical smog does not possess..... (a) CO ₂ (b) O ₃ (c) Nitrogen Oxides (d) PAN	5	CO2
Q 5	One hundred millilitre of water sample contain 0.1 mg of CaCl ₂ , 0.2 mg MgSO ₄ , 0.4 mg Ca(HCO ₃) ₂ and 0.3 g of NaNO ₃ . What is the temporary hardness of the water sample in ppm?	5	CO2

Q 6	Examples of three primary treatment processes of waste water are.....	5	CO2
SECTION B			
1. Each question will carry 10 marks 2. Instruction: Write short / brief notes			
Q 1	(a) Discuss the reactions occurring in nuclear fission and nuclear fusion with appropriate examples. (b) What is the environmental impact of hydropower and solar power?	10	CO1
Q 2	(a) Briefly discuss the manufacture, application and hazards of any two of the following inorganic chemicals. Sodium thiosulphate, hydrogen peroxide, potash alum, chrome alum. (b) Describe the refining process of ultrapure metals taking example of Van-Arkel-de Boer process and Zone refining process. For which metal these two processes are used?	10	CO3
Q 3	(a) Describe a method to control the pollution due to oxides of sulfur (SO _x). (b) What are primary and secondary air pollutants? Give examples	10	CO2
Q 4	10 mL of waste water is added to a 500 mL of BOD flask. The initial and after 5 days incubation, dissolved oxygens measured using Winkler's method are 25 mg/L and 7 mg/L respectively. Calculate the biochemical oxygen demand (BOD) of the waste water.	10	CO2
Q 5	(a) A water sample contains 10 mg/L calcium bicarbonate, 20 mg/L magnesium chloride. Calculate the total and temporary hardness of the water sample. <p style="text-align: center;">OR</p> Describe the spectrophotometric method of determination of nitrate in waste water (b) Describe the IR photometry method for the measurement of CO. <p style="text-align: center;">OR</p> Give a brief discussion on the process of coagulation	10	CO3
SECTION-C			
1. Each question carries 20 marks 2. Instruction: Write long answers			
Q 1	(a) A sample of coal contains: C = 91%, H = 8% and ash = 1%. The following data were obtained when the above coal was tested in a bomb calorimeter: Weight of coal burnt = 0.83 g Weight of water taken = 550 g Water equivalent of bomb and calorimeter = 2,200 g Rise in temperature = 2.32°C Fuse wire correction = 10.0 cal Acid correction = 50.0 cal Calculate the gross and net calorific value of coal, assuming that the latent heat	10	CO1

	<p>of condensation of steam is 580 cal/g.</p> <p style="text-align: center;">OR</p> <p>Illustrate with suitable diagram the fractional distillation of petroleum giving the boiling point ranges of various fractions.</p> <p>(b) Describe the process of ion exchange method of removal metal ions in waste water. How the cation and ion exchange resins are regenerated?</p> <p style="text-align: center;">OR</p> <p>Give a brief description about one method of removal of suspended and dissolved solids in waste water.</p>	10	
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