Seat No:_____ Enrollment No:_____

PARUL UNIVERSITY

FACULTY OF APPLIED SCIENCE

M.Sc. Winter 2018-19 Examination

Semester: 2 **Date: 18 /12/2018**

Subject Code: 11205153 **Time: 10.30 am to 1.00 pm**

Subject Name: Physical Chemistry-II **Total Marks: 60**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1. A) Essay type/ Brief note (4x2) (Each of 04 marks) **(08)**

(a) Differentiate between Physisorption and chemisorption. (four points)

(b) Write a note on homogenous and heterogenous catalysts with example.

Q.1. B) Answer the following questions (Any two)

(a) Short note/ Brief note (2x2)/ Schematically label the figures (2x2)(Each of 02 marks) **(04)**

1. How temperature and pressure affects the physical adsorption?
2. Write the various applications of adsorption.

(b) Write a note on phase transfer catalysts. **(04)**

(c) Write a note on catalytic converters. **(04)**

Q.2. A) Answer the following questions.

(a) Short note/ Brief note (2x2)/ Fill in the blanks. (Each of 02 marks) **(04)**

1. Discuss Roult's law.
2. Draw vapour pressure curves for positive and negative deviations for real solutions.

(b) Discuss the factors affecting solubility of gas in a solution. **(04)**

Q.2. B) Answer the following questions (Any two)

(a) Short note/ Multiple choice questions. (Each of 01 marks) **(03)**

1. Write an important industrial catalyst and the reaction catalyzed by it.
2. What are promoters in a catalytic reaction?
3. Write one example of poison in a catalytic reaction.

(b) What is Duhem-Margules equation? Explain the various terms in the equation. **(03)**

(c) What is the relationship between Henry's law and Raoult's law? **(03)**

Q.3. A) Essay type/ Brief note (4x2) (Each of 04 marks) **(08)**

(a) Explain the working of scintillation counters with a well labeled diagram.

(b) Write a short essay on artificial transmutation of elements.

Q.3. B) Answer the following questions (Any two)

(a) Short note/ Brief note (2x2)/ Schematically label the figures (2x2) (Each of 02 marks) **(04)**

1. What is Townsend avalanche?
2. What is an Isotopic Effect? Explain with an example.

(b) Calculate binding energy/ nucleon in carbon atom C^{12} which has a mass of 12.011 a.m.u. mass of 1 neutron = 1.008665 a.m.u. and mass of 1 H atom =1.007825 a.m.u.1 a.m.u. is equivalent to 931.5 MeV. **(04)**

(c) Calculate the fractional abundances for two naturally occurring isotopes of copper. The mass of isotopes are 62.9298 and 64.9278 a.m.u. The atomic mass of copper is 63.546 a.m.u. **(04)**

Q.4. A) Answer the following questions.

(a) Short note/ Brief note (2x2)/ Fill in the blanks. (Each of 02 marks) **(04)**

1. Draw a well labeled Jablonski Diagram.
2. What are the laws of photochemistry?

(b) Explain photochemical decomposition of HI. Why observed quantum yield is <2? **(04)**

Q.4. B) Answer the following questions (Any two)

(a) Short note/ Multiple choice questions. (Each of 01 marks) **(03)**

1. What is quantum yield?
2. Which isotope is used to detect leakage in underground pipes?
3. In a positive "beta decay", what happens to the atomic number?

(b) Explain the mechanism of fluorescence and phosphorescence. **(03)**

(c) What is Photosensitization? Explain the mechanism. **(03)**