CLASS: IMSC   **SEMESTER: III**
BRANCH: PHYSICS   **SESSION : MO/2019**

SUBJECT : CH213 CHEMISTRY-II

TIME: 2 HOURS   **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates may attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.

Q1 (a) Show diagrammatically variation of fraction of molecules as a function of velocity at two different temperatures. Explain the dependence. [2]

Q1 (b) Critical density of a substance having molar mass 111 is 0.55 gm cm^{-3} & P_c = 48 atm. Calculate van der Waals constants 'a' and 'b'. [3]

Q2 (a) What is meant by Reynolds number? What is its significance? [2]

Q2 (b) A liquid rises to 1 cm in a glass capillary of radius r. How will it rise if the cross-sectional area of the tube is (a) halved (b) doubled? [3]

Q3 (a) Calculate the Miller indices of crystal plane which cut through the axes at (i) 2a, 3b, c and (ii) 2a, -3b, -3c. [2]

Q3 (b) Derive Bragg equation. [3]

Q4 (a) Draw heat of hydrogenation diagram to explain the unusual stability of benzene in comparison to cyclohexene, cyclohexadiene and cyclohexatriene. [2]

Q4 (b) What is isotopic effect. Draw and explain with mechanistic energy diagram for nitration of benzene. [3]

Q5 (a) Draw a reaction mechanism of Friedel-Craft's Alkylation. [2]

Q5 (b) Identify the aromatic, nonaromatic and anti-aromatic character in the following compounds [3]

i) $\triangledown$ ii) $\underset{\oplus}{\triangledown}$ iii) $\underset{\ominus}{\triangledown}$

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