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Registered Number:

DATE: **23** **-04-2018 (9 AM)**

**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU-27**

B.Sc. CHEMISTRY – IV SEMESTER

SEMESTER EXAMINATION – April 2018

**CH 415: CHEMISTRY**

**Time: 1 ½ hrs. Maximum marks: 35**

*This paper has TWO printed pages and THREE parts.*

**PART A**

Answer any **THREE** of the following: (3 x 2 = 6)

1. Explain what happens when toluene is exposed to chlorine gas in presence of light. Write chemical equation.
2. Complete the following reaction:



1. Give the mathematical equation for Gibb’s phase rule and explain the terms involved.
2. List out any two industrial applications of catalysis.
3. Give the structures of sulphurous acid and thiosulphuric acid.

**PART B**

Answer any **FOUR** of the following: (4 x 6 = 24)

1. Using the resonance stabilisation of arenium ions explain the orienting effect of –CH3 group in toluene towards further electrophilic substitution reaction.
2. Draw and explain the phase diagram of Pb-Ag system. Discuss the application of the phase diagram for desilverisation of argentiferous lead.
3. How would you prepare benzene-sulphonic acid starting from benzene? Give the mechanism of the reaction.
4. Derive an expression for the rate constant of an acid catalysed reaction. Under what conditions does it represent (i) specific H+ion catalysis, (ii) general acid catalysis?
5. Draw the structures of XeO3F2 and IF7. Discuss the structure of XeO3F2 based on hybridisation.
6. Classify the oxyacids of phosphorus based on oxidation state giving an example for each class. Give the structure of pyrophosphoric acid and hypophosphorous acid.

**Part C**

Answer any **ONE** of the following:

1. a. Classify cyclobutadiene and cycloheptatrienyl cation as aromatic, non-aromatic or   
    anti-aromatic.

b. Complete the following synthesis by filling in the missing reagents/products.



c. SF6 is a known compound while SCl6 is not. Why? (1+2+2)

1. a. Calculate the number of phases, components and degrees of freedom for an aqueous solution of NaCl.

b. Why are oxide ores fewer than sulphide ores? (3+2)