Roll No. | | | | | | | | | | | | |

Total No. of Pages : 03

Total No. of Questions : 19

M.Sc. (Chemistry) (Campus) (2015 to 2017) (Sem.-1)

REACTIVE INTERMEDIATES - I

Subject Code : CHL-402

M.Code : 51141

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying FIVE marks each and students have to attempt ALL questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. What is the criteria that defines a compound to be aromatic ?
2. The nucleophilic displacement reaction (S_N1) in allylic halides and tosylates occurs easily. Explain.
3. Define carbene. What is the hybridisation present in singlet carbene ?
4. Define Neighbouring Group Participation (NGP).
5. What is Friedel-Craft acylation ?
6. Why direct nitration of aniline is not a satisfactory reaction? How it can be carried out?
7. Arrange the following carbocation in the decreasing order of stability.

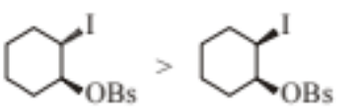
A B C

8. What is Chichibabin reaction ?
9. What is Diazo coupling?
10. Explain peroxide effect (Kharasch effect).

SECTION-B

11. Write a short note on formation of carbocation and give the stability order of 1°, 2° and 3° carbocations. Why tropylium cation is highly stable?

12. i) The rate of acetolysis of *trans*-2-iodo-cyclohexyl brosylate is many times faster than *cis*-isomer. Explain.



ii) The rate of solvolysis of 2-chloroethyl-ethylsulfide with water is 700 times faster than hexyl chloride. Explain.

Relative Rate of Solvolysis = 1 700

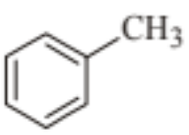
13. Discuss the mechanism of aliphatic electrophilic substitution unimolecular (SE1) reaction.

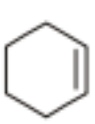
14. Explain Smmelet Hauser rearrangement with mechanism.

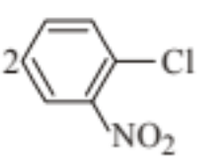
15. Describe Vilsmeir reaction with mechanism and examples.

16. Write the structure of product(s) formed during these reactions :

i) $H_3C-\underset{H}{\overset{|}{C}}=CH_2 \xrightarrow[hv,CCl_4]{NBS} A$

ii)  $\xrightarrow[hv,CCl_4]{NBS} B$

iii)  $\xrightarrow[hv,CCl_4]{NBS} C$

iv)  $\xrightarrow{Cu,\ 225^{\circ}C} D$

iv) $C_2H_5COOAg \xrightarrow{Br_2} E$

SECTION-C

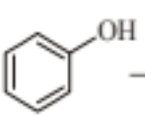
17. i) Explain thermodynamic and kinetically controlled reactions with examples.

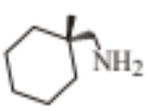
ii) Why the rate of reaction of 2-bromo propionate with hydroxide ion is thousands of times faster and proceed with complete retention of configuration?

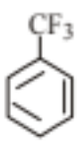
18. i) Discuss S_Ni mechanism with example.

ii) Explain Smiles rearrangement with examples.

19. Write the structure of product(s) (A-F) formed during following :

i) $CHCl_3$ —NaOH, heat→ A +  —NaCH, heat→ B

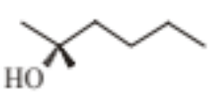
ii)  —$NaNO_2$,HCl, 0°C→ C

iii)  —$NaNH_2$,NH_3→ D

iv) 

—NH_3, heat→ E

—BuLi, 100°C→ F

iv)  —H_2SO_4,80°C→ G

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.