LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **CHEMISTRY**

SECOND SEMESTER – **APRIL 2022**

PCH 2501 – ORGANIC REACTION MECHANISM AND HETEROCYCLIC COMPOUNDS

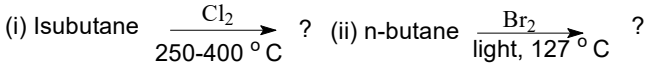
Date: 15-06-2022 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

Part – A

Answer ALL Questions. **(10 × 2= 20)**

1. List the conditions for aromatic, non-aromatic and anti-aromatic compounds.
2. Write the mechanism of S_Ei reaction.
3. What is Smiles rearrangement reaction? Give reason.
4. 'Aryl fluorides are the most reactive among the aryl halides towards a given nucleophile whereas alkyl fluorides are the least reactive'- Justify.
5. What is syn-elimination? Give an example.
6. Predict the product/s of the following reactions.



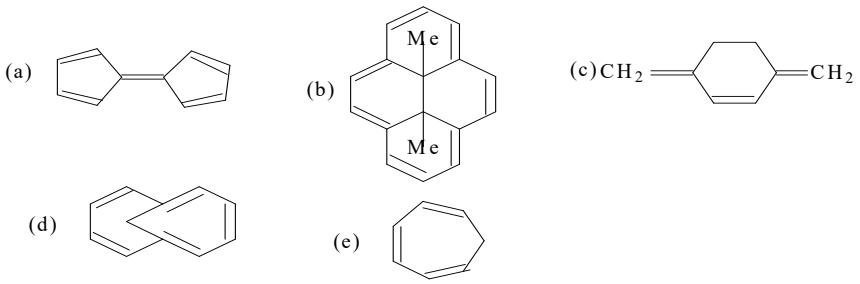
7. Predict the product for the following reaction and mention the type of mechanism involved in it.

8. What is Swain – Scott relationship?
9. Write the mechanism of the reaction between anisole and Na / liq. NH_3.
10. Give the Baeyer's synthesis of uric acid from urea.

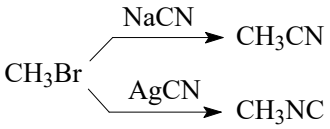
Part – B

Answer any EIGHT Questions. **(8 × 5= 40)**

11. Predict the aromaticity of the following compounds.

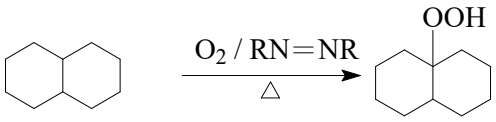


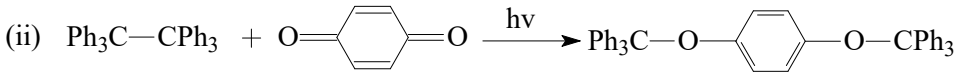
12. Explain the mechanism and limitations of Friedel Crafts alkylation or arylation of arenes.
13. Why does 1-isopropyl-4-methylbenzene give some product of ipso substitution, whereas 1,4-dimethylbenzene produces only substitution product? Explain.
14. Explain benzyne mechanism with suitable example and evidences.
15. Discuss von Richter reaction with suitable example.
16. Justify the following conversions with suitable mechanism.



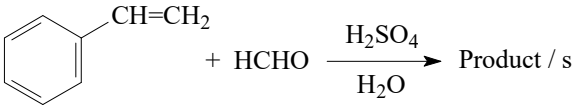
17. Give the mechanism and evidence in favour of the E2 mechanism.

18. Formulate reasonable mechanisms for the following reactions:

(i) 

(ii) 

19. Explain Simon–Smith reaction with suitable example.
20. Predict the product and write mechanism for the following reaction.



21. Draw the resonance structures of indole and pyrrole. Compare their reactivity towards electrophilic substitution reactions.
22. Write any one method of synthesis of (i) pyrazine and (ii) phthalocyanin.

Part – C

Answer any FOUR Questions. **(4 × 10 = 40)**

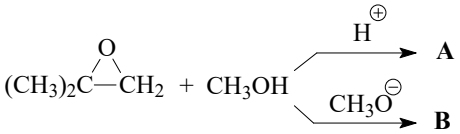
23a. Discuss the orientation and reactivity of phenol and nitrobenzene. (6)

b. Write and explain the importance of Stark-enamine reaction (4)

24a. Discuss PMO approach to aromaticity with any five examples. (5)

b. Explain ion-pair mechanism with suitable example and evidences. (5)

25a. Identify the products A & B and justify your answer. (5)



b. Explain single electron transfer (SET) mechanism with suitable example. (5)

26a. "The erythro-isomer of 1-bromo-1,2-diphenylpropane undergoes base-induced dehydrobromination to give cis-α-methylstilbene". Justify with effect of conformation. (5)

b. Explain the formation of various products via the detection of triphenyl methyl free radical by Gomberg method. (5)

27. Predict the product and name the reaction. **(5 × 2 = 10)**

i) $C_6H_5COCH_3 \xrightarrow{mCPBA} ?$

ii) $C_6H_5CHO \xrightarrow[H_2O,\ EtOH]{KCN} ?$

iii) $NCCH{=}CH_2 \xrightarrow[ArN_2^+Cl]{CuCl_2} ?$

iv) $Ph_2C{=}O + BrCH_2C{\equiv}CH \xrightarrow[2.\ H_3O^{\oplus}]{1.\ Zn} ?$

v) $H_2C{=}CHCHO + H_2C(COOEt)_2 \xrightarrow{NaOEt} ?$

28a. Discuss the electrophilic substitution reactions in oxazole and thiazole with suitable examples. (5)

b. Write the synthetic scheme of Fischer indole synthesis. (5)

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