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CH/AC/OC/CAH 402



First Semester M.Sc. Degree Examination, December 2018
CHEMISTRY/APPLIED CHEMISTRY/ORGANIC CHEMISTRY/ANALYTICAL
CHEMISTRY
(CBCS : 2016-17 Syllabus) Organic Chemistry

Time : 3 Hours

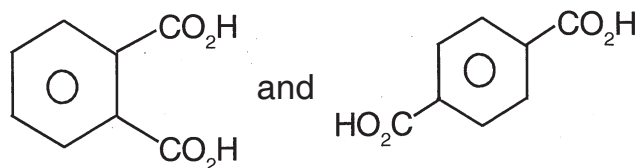
Max. Marks : 70

- Note :** i) Answer **all** sub-questions from Part – **A** and **any four** questions from Part – **B**.
 ii) Figures to the **right** indicate **marks**.

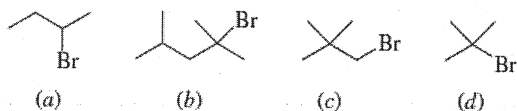
PART – A

1. Answer **all** the following sub-questions : **(2×9=18)**

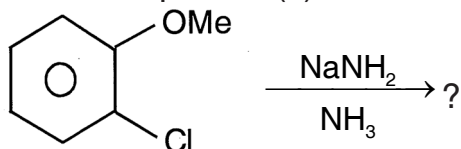
- a) How do you distinguish aromatic and non-aromatic compounds by chemical method ?
- b) Which of the following pair is weak acid ? Give reasons.



- c) What are cryptands ? How are they differentiate from crown ethers ?
- d) Which of the following alkyl halides would be most likely to give a rearranged product under S_N1 conditions ? Give explanation.



e) Predict the product(s) in the following reaction :



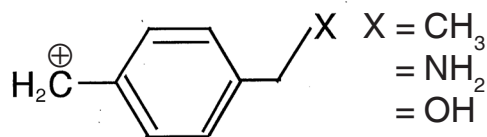
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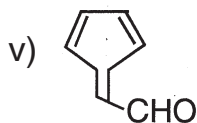
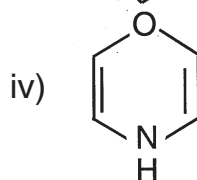
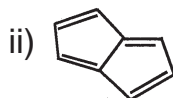
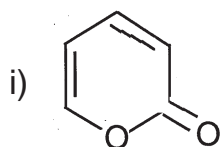
- f) Nitration of benzaldehyde and deuterated benzaldehyde occurs at the same rate. What does it indicate ?
- g) Draw the most stable conformational structures of 2-methylcyclohexanone. Assign R/S configuration to their chiral centres.
- h) How many stereoisomeric products are obtained from the reaction of 1-methylcyclopentene with bromine ? What is their relationship ?
- i) Write the structures of
- Z-3,6-diethyl-2,5-octadien-1-ol
 - Z-3-Phenyl-hex-3-en-(S)2-ol.

PART – B

2. a) Explain the stability order for the following compounds



- b) Classify the following into aromatic, non-aromatic or anti aromatic with justifications.



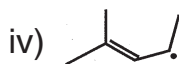
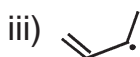
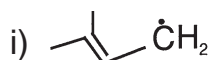
- c) Discuss the inductive and resonance effects on the basic strengths of aryl amines. (4+5+4)
3. a) Calculate the energy associated with butadiene system.
- b) Differentiate aromatic and non-aromatic compounds using spectroscopic methods.
- c) Write a note on fluxional molecules. (5+5+3)
4. a) Write a note on S_Ni reaction.
- b) Explain the generation and reactivities of nitrenes.
- c) Discuss the neighbouring group participation in nucleophilic substitution reactions. (4+5+4)



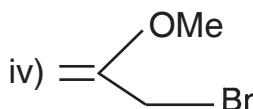
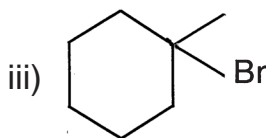
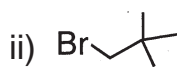
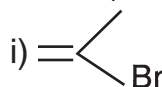
5. a) Explain how the following techniques are useful in identifying reaction mechanism :

- i) Isotopic labelling
- ii) Trapping of intermediates.

b) Arrange the following free radicals in the order of increasing stability with justification.



c) Rank the following in order of decreasing rate of solvolysis with aqueous ethanol (fastest to slowest) :



(5+4+4)

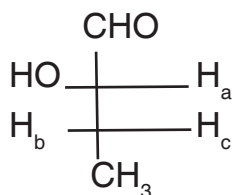
6. a) Reaction of (S)-2-methylcyclohexanone with NaBH₄ in methanol will give how many products ? Draw their conformational structures and indicate which is major.

b) Explain the optical activity in biphenyls and spiro-compounds.

c) Discuss the methods for determining the configuration of geometrical isomers. (3+5+5)

7. a) What is asymmetric synthesis ? Explain with examples.

b) Find and explain the relationship between H_a & H_b; H_b & H_c; and H_c and H_a in the following molecule.



c) Identify and write the structures of A and B in the following reactions. Comment on the stereochemical outcome of the products. (3+6+4)

