

2018

CBCS

3rd Semester

CHEMISTRY

PAPER—C7T

(Honours)

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

**Organic Chemistry—III****Group-A**

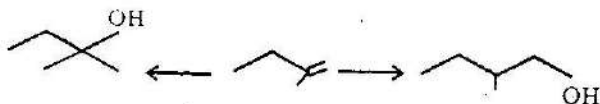
1. Answer any five questions :

2×5

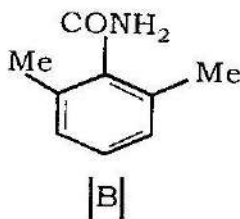
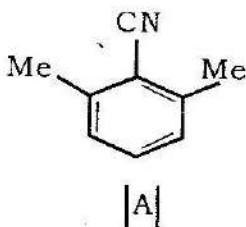
- (a) The addition of bromine to ethylene ( $H_2C = CH_2$ ) in presence of excess chloride anion produces  $Br-CH_2-CH_2-Cl$  as one of the products. Explain mechanistically.

(Turn Over)

- (b) Explain why is phenyl group in biphenyl an activating, and ortho and para orienting ?
- (c) Provide suitable reagent and conditions for the following conversions

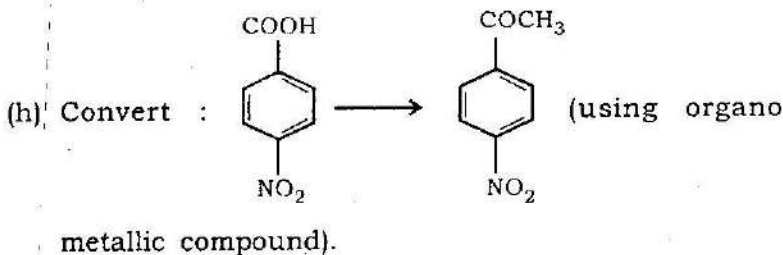


- (d) A careful study of the reaction of 2,4,6-trinitroanisole with sodium methoxide revealed that two different Meisenheimer complexes were present. Suggest reasonable structures for these two complexes.
- (e) The nitrile (A) can be hydrolyzed very readily to the corresponding amide, B, which is extremely difficult to hydrolyze further. Explain



- (f) Aldehydes (MeCHO) are generally more reactive than ketones (MeCOMe) toward nucleophilic attack. Justify the statement mentioning the general effects.

- (g) Explain the role of  $\text{Na}^+$  in  $\text{NaBH}_4$  reduction of a ketone (i) in aqueous medium and (ii) in dry THF medium.

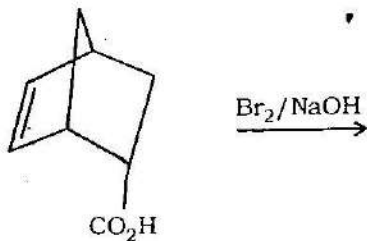


### Group-B

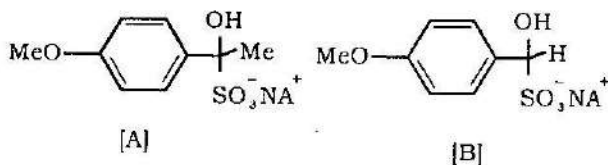
Answer any *four* questions.

4×5

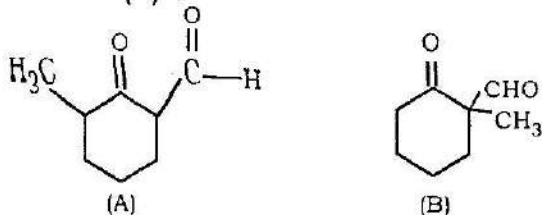
2. (a) Two ozonides are formed when  $\text{Me}_2\text{C} = \text{CMe}_2$  is treated with ozone in presence of  $\text{HCHO}$ . Give mechanism of the formation of two products. 2
- (b) What product can you expect from the following reaction? Depict the stereochemical outcome at every step.



3. What is meant by  $\sigma$ -complex and  $\pi$ -complex? Draw the energy profile diagram of an aromatic electrophilic substitution reaction which passes through  $\sigma$ -complex and  $\pi$ -complex and formation of  $\sigma$ -complex is rate-limiting. Give experimental evidence for the formation of  $\sigma$ -complex and  $\pi$ -complex. 2+2+1
4. (a) Why Friedel-Craft alkylation of benzene with 1-chloropropane gives isopropyl benzene? How would you prepare n-propylbenzene from benzene? 2
- (b) Write the twelve principles of Green chemistry. 3
5. (a) Under comparable conditions, the general base catalyzed elimination of bisulphite ion from A is about 10 times greater than from B. Give reason. 2

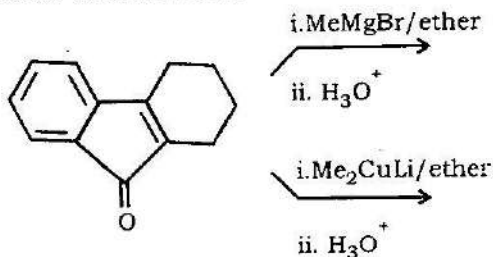


- (b) Explain why ethyl formate condenses with 2-methyl cyclohexanone in the presence of a base to yield (A) and not (B): 3



- 6 (a) How would you introduce aldehyde group in the aromatic nucleus by a reaction involving carbene intermediate. Give mechanism. 2

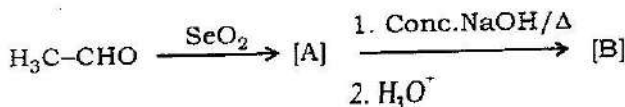
- (b) Predict the product(s) in the following reaction with plausible mechanism. 3



7. (a) Discuss the stereospecificity of reduction of the following alkyne to alkene when reacted with sodium in liquid ammonia. 2



- (b) Complete the following reaction sequence and give mechanism for formation of [B] from [A].



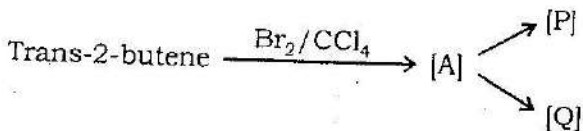
### Group-C

Answer any *one* question.

1×10

8. (a) Write the product of the reaction. What is the relationship between P and Q ?

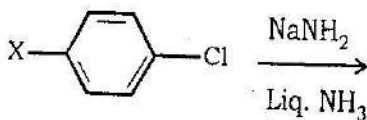
3



- (b) Write mechanisms to show the products in the following reaction when :

4

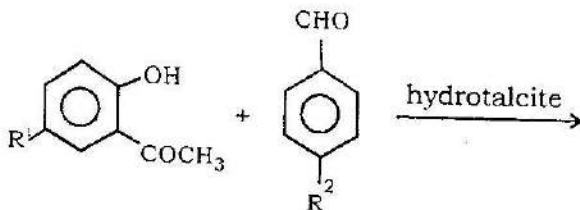
- (i) X = -NO<sub>2</sub>      (ii) X = -OMe



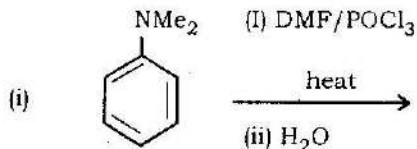
Given Evidences in favour of the mechanisms proposed.

- (c) Given the product of the following reaction and explain the advantages of the given reagent over the conventional basic reagent used to carry out the reaction.

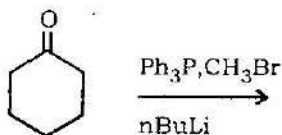
3



9. (a) Indicate the product(s) and explain the mechanism involved. 2



- (b) Predict the product(s) and give plausible mechanism their formation : 2



- (c) Write down the product of the following reactions showing the plausible mechanism in each case. 3×2

