

F - 516

M.Sc. (Second Semester)
EXAMINATION, May - June, 2022
CHEMISTRY
Paper No. CH - 8
(Reaction Mechanism)

Time : Three Hours]

[Maximum Marks:80

Note: Attempt all the sections as directed.**(Section - A)****(Objective/Multiple Choice Questions)****(1 mark each)**

1. Using the following code, arrange the given halides in order to decreasing reactivity towards NaI in acetone:

I. $MeCl$ II. Me_2CHCl III. Me_2CHF

- (A) $I > II > III$
(B) $II > III > I$
(C) $II > I > III$
(D) $III > II > I$

[2]

2. Benzyne is generated from:

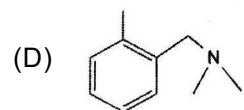
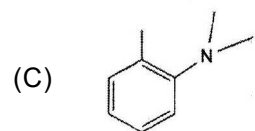
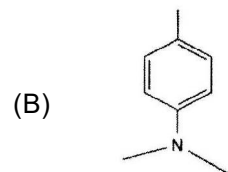
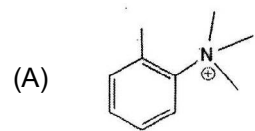
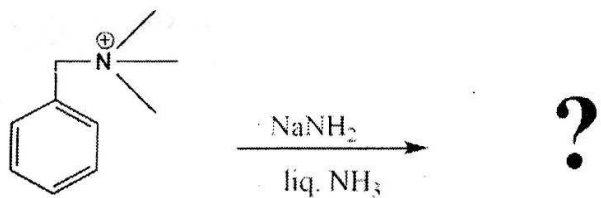
- (A) Chlorobenzene in presence of sodamide in liquid NH_3
(B) Benzene with sodium in liquid NH_3
(C) Benzene in liquid NH_3
(D) Action of heat on benzoic acid

3. Which of the following statements is incorrect for SN_2 reaction?

- (A) In the gas phase, the order of reactivity of halide ions is: $F^- > Cl^- > Br^- > I^-$ while in methanol, the order of reactivity is $I^- > Br^- > Cl^- > F^-$
(B) In an aprotic solvent, e.g. DMF, the order of reactivity of halide ion is: $F^- > Cl^- > Br^- > I^-$
(C) Increase the solvent polarity cause increase in the rate of reaction between OH^- and MeS^+ .
(D) Increase the solvent polarity casue large increase in the rate of reaction between NH_3 and EtBr.

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4. Identify the product of the given reaction?

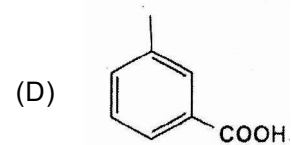
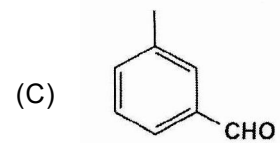
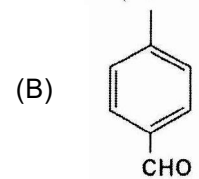
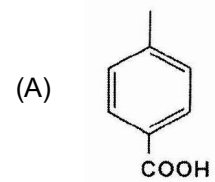
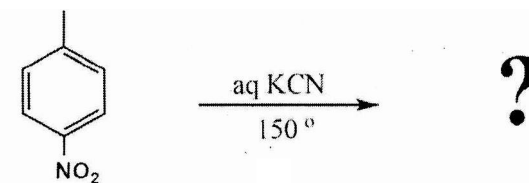


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5. Identify the product of the given reaction?



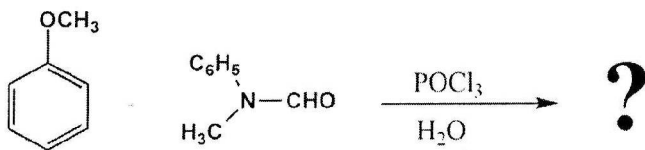
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6. Which among the following undergoes nitration most readily?

- (A) Benzene
 (B) Acetanilide
 (C) Acetophenone
 (D) Chlorobenzene

7. Identify the product of the given reaction?



- (A)
- (B)
- (C)
- (D)

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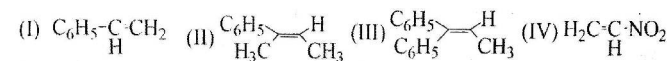
8. Which one among the following will be least reactive in SE2 (back) reaction (L = leaving group)?

- (A) $Me-L$
 (B) Me_2CH-L
 (C) Me_3C-L
 (D) $Et-L$

9. Which $CHCl_3$ is more reactive than CHF_3 in SE1 reaction?

- (A) Cl has larger size than F
 (B) Cl uses its d-orbital for stabilizing the carbanion formed, whereas F cannot
 (C) Cl is less electronegative than F
 (D) None of these

10. Arrange the following compounds in decreasing order of their electrophilic addition reaction with HX .

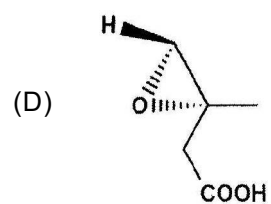
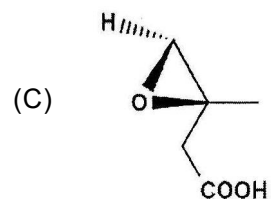
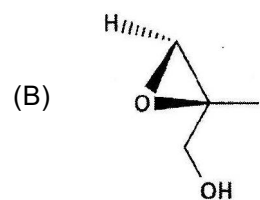
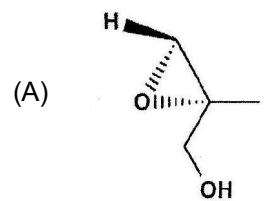
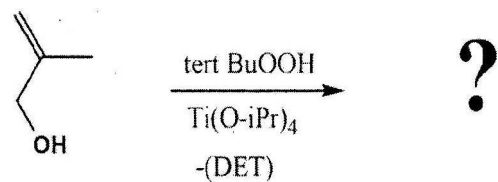


- (A) $IV > I > II > III$
 (B) $III > II > I > IV$
 (C) $II > III > I > IV$
 (D) $I > III > IV > I$
 (E) None of these

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11. Identify the product of the given reaction?

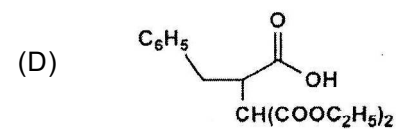
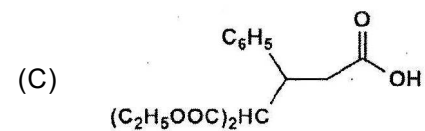
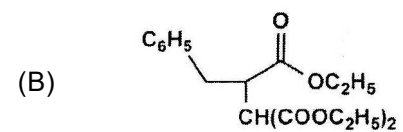
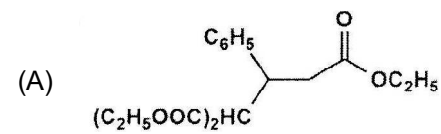
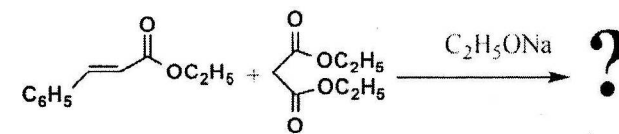


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12. What is the product of the given reaction?



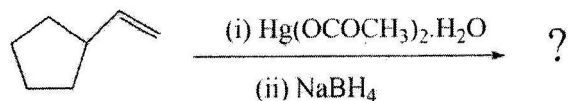
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13. Which of the following reagents will give syn - addition reaction with alkene?

- (i) Br_2
- (ii) $\text{Dil. KMnO}_4/\text{OH}^-$
- (iii) $\text{OsO}_4/\text{NaSO}_3\text{H}/\text{HOH}$
- (iv) $\text{H}_2/\text{Ni}/\Delta$
- (A) only i
- (B) ii and iii
- (C) ii, iii and iv
- (D) only iv
- (E) None of these

14. What is the product of the given reaction:



- (A)
- (B)
- (C)
- (D)

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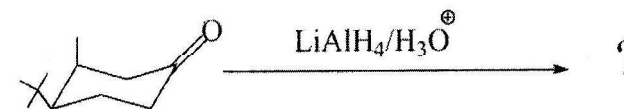
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15. Consider the following statements:

- (1) Alkene is more reactive than alkyne for electrophilic addition
- (2) Alkyne is more reactive than alkene for Nucleophilic addition
- (3) Alkyne is more reactive than alkene for electrophilic addition reaction
- (4) Alkene having CF_3 at vinylic carbon is more reactive than alkene having CH_3 group of these, correct statement are:
- (A) 3 and 4
- (B) 1,2 and 3
- (C) 1,2 and 4
- (D) 1 and 2

16. What is the product of the given reaction:



- (A)
- (B)
- (C)
- (D)

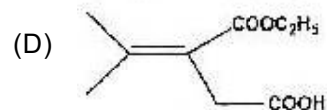
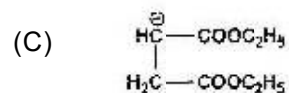
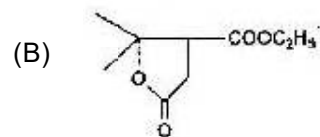
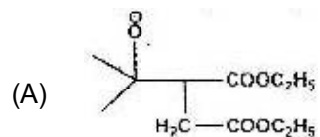
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17. In aldol addition reaction product is always

- (A) β - Hydroxyaldehydes
- (B) β - hydroxyketone
- (C) $\alpha - \beta$ - unsaturated aldehydes
- (D) $\alpha - \beta$ - unsaturated ketones

18. The intermediate will form in stobbe condensation is?

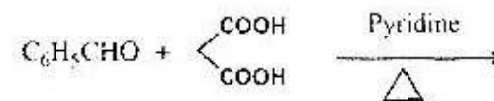


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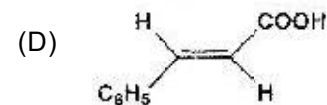
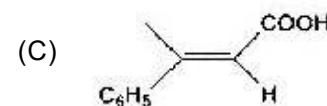
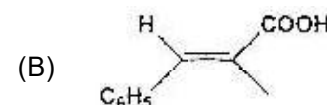
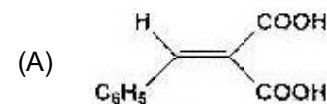
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19. What is the product of the given reaction is?



?



20. Match the following with their respective reagents/catalyst

- | | |
|---------------------|------------------------|
| (a) Knoevenagel | (i) $POCl_3/H_2O$ |
| (b) Vilsmeier | (ii) $NaNH_2/liq.NH_3$ |
| (c) Gatterman Koach | (iii) $aq.KCN$ |
| (d) Sommet Hauser | (iv) Pyridine |
| | (v) $NaOH$ |
| | (vi) $AlCl_3/CuCl$ |

- (A) a-iv, b-i, c-v, d-ii
- (B) a-iii, b-i, c-vi, d-ii
- (C) a-iv, b-i, c-vi, d-ii
- (D) a-i, b-ii, c-iii, d-iv

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Section - B

(Very Short Answer Type Questions)

(2 marks each)

Note: Attempt all questions.

1. Define neighbouring group participation with suitable example.
2. Define the regioselectivity.
3. How do you identify the reaction is SE1 or SE2?
4. Explain the Gottermann Koch reaction.
5. Define the enantioselective reaction.
6. Explain the chemoselectivity.
7. How do you differentiate the properties of LiAlH_4 and NaBH_4 ?
8. What do you mean by cross Aldol condensation reaction?

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Section - C

(Short Answer Type Questions)

(3 marks each)

Note: Attempt all questions.

1. What is benzyne mechanism explain with reaction mechanism.
2. What is Somlet Hauser reaction? Write the Mechanism and suitable example.
3. Explain the effect of substrates in aliphatic electrophilic substitution reaction.
4. How do you understand the reaction is SE2? Explain with suitable example.
5. Explain the addition of water in alkene with suitable example.
6. Discuss the addition reaction of cyclopropane ring.
7. What is Wittig reaction give the mechanism and application?
8. What is Knoevenagel reaction? Write the mechanism and examples.

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Section - D

(Long Answer Type Questions)

(5 marks each)

Note: Attempt all questions.

1. What do you mean by ArSN₂ and ArSN₁ mechanism?
Explain with suitable example.

OR

What is Smile reaction give the mechanism and application.

2. Explain the SE² and SE¹ Mechanism with suitable example and rate profile.

OR

What is Vilsmier reaction give the mechanism and application.

3. Explain the hydroboration-Oxidation reaction with suitable example.

OR

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Explain the Michael addition reaction with examples and mechanism.

4. What is Benzoin condensation reaction? Write the Mechanism and examples.

OR

What is Stobbe condensation reaction give the mechanism and application.