

Roll No.

E-516

M. Sc. (Second Semester) (Main/ATKT)

EXAMINATION, May-June, 2021

CHEMISTRY

Paper No. CH-8

(Reaction Mechanism)

Time : Three Hours]

[Maximum Marks : 80

[Minimum Pass Marks : 16

Note : Attempt all Sections as directed.

Section—A

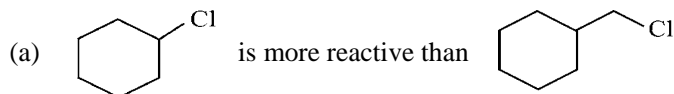
1 each

(Objective/Multiple Choice Questions)

Note : Attempt all questions.

Choose the correct answer :

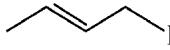
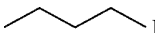
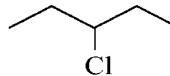
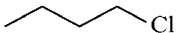
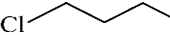
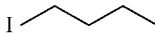
1. Which of the following statements is correct for reactivity in S_N2 reaction ?



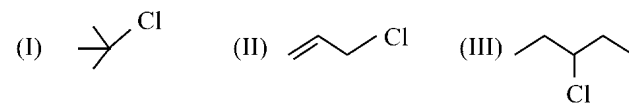
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- (b)  is more reactive than 
- (c)  is more reactive than 
- (d)  is more reactive than 

2. Using the given codes, arrange the following compounds in decreasing order of the rate of solvolysis by S_N1 mechanism :



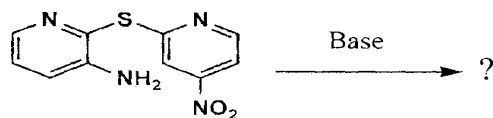
- (a) $I > III > II$
- (b) $III > II > I$
- (c) $I > II > III$
- (d) $II > I > III$
3. Which of the following is not ortho and para directing group in aromatic electrophilic substitution reaction ?

- (a) NH_2
- (b) NO_2
- (c) OH
- (d) NR_2

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4. What is the product of the given reaction ?



- (a)
- (b)
- (c)
- (d)

5. The rate of which of the following S_N2 reactions will increase in solvent polarity ?

- (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br} \xrightarrow{\text{OH}^-} \text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
- (b) $\text{EtI} + \text{Me}_3\text{N} \rightarrow \text{Me}_3\text{NEt}$
- (c) $\text{Me}-\text{OH}_2^+ + \text{Br}^- \rightarrow \text{MeBr} + \text{H}_2\text{O}$
- (d) $\text{Me}_4\text{N}^+ + \text{H}_2\text{S} \rightarrow \text{Me-SH}_2^+ + \text{Me}_3\text{N}$

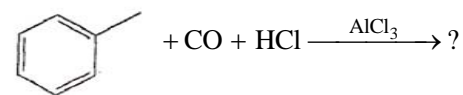
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6. Which among the following will be most reactive in S_E1 reaction (L = leaving group) ?

- (a) CH_3L
- (b) ClCH_2L
- (c) Cl_2CHL
- (d) CCl_3L

7. What is the product of the given reaction ?



- (a)
- (b)
- (c)
- (d)

8. Which one of the following reactions will take place most readily at bridgehead carbon in a [2, 2, 1] bicyclic system ?

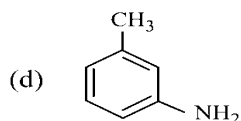
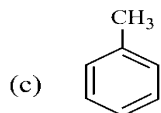
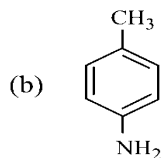
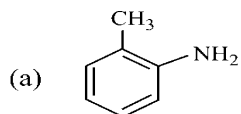
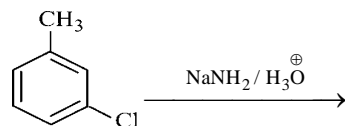
- (a) S_N1
- (b) S_E1
- (c) S_E2 (back)
- (d) S_N2

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9. Which is the product of the given reaction ?

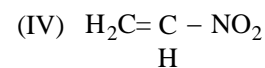
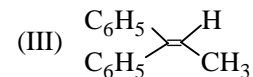
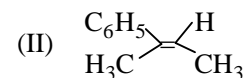
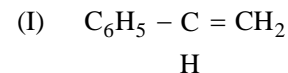


10. The base can be used in Vilsmeier reaction is :

- (a) SOCl_2
 (b) POCl_3
 (c) COCl_2
 (d) Both (b) and (c)
 (e) All (a), (b) and (c)

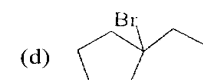
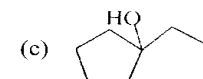
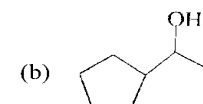
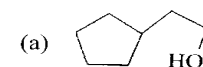
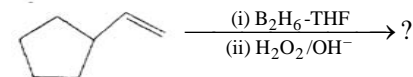
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11. Arrange the following compounds in decreasing order for electrophilic addition reaction with HX :

- (a) $\text{IV} > \text{I} > \text{II} > \text{III}$
 (b) $\text{III} > \text{II} > \text{I} > \text{IV}$
 (c) $\text{II} > \text{III} > \text{I} > \text{IV}$
 (d) $\text{I} > \text{III} > \text{IV} > \text{I}$
 (e) None of the above

12. What is the product of the given reaction ?



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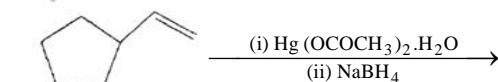
13. Consider the following statements :

- (I) Alkene is more reactive than alkyne for electrophilic addition.
- (II) Alkyne is more reactive than alkene for nucleophilic addition.
- (III) Alkyne is more reactive than alkene for electrophilic addition reaction.
- (IV) Alkene having CF_3 at vinylic carbon is more reactive than alkene having CH_3 group.

The correct statements are :

- (a) III and IV
- (b) I, II and III
- (c) I, II and IV
- (d) I and II

14. What is the product of the following reaction ?



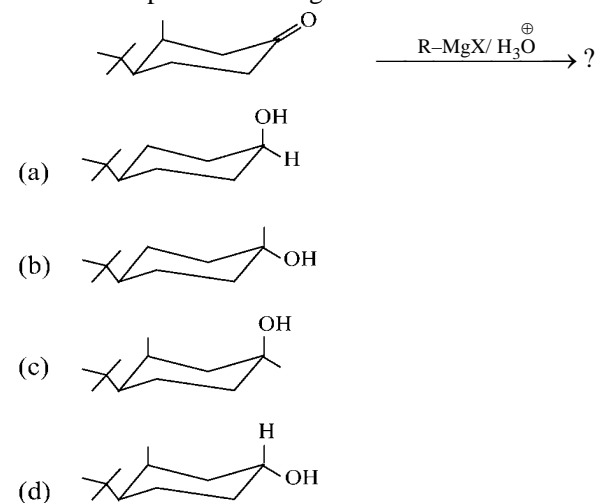
- (a)
- (b)
- (c)
- (d)

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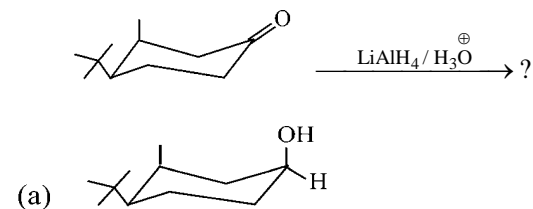
15. Which of the following will give anti addition reaction ?

- (a) Br_2
- (b) $\text{Hg}(\text{OCOCH}_3)_2 \cdot \text{H}_2\text{O}$
- (c) $[\text{RhCl}(\text{PPh}_3)_3]$
- (d) Ni/Pd/Pt-H_2
- (e) None of the above

16. What is the product of the given reaction ?



17. What is the product of the given reaction ?



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- (b)
- (c)
- (d)

18. Anion of which compounds can give Knoevenagel reaction with aromatic aldehydes ?

- (1)
- (2)
- (3)
- (4)

Select the correct answer from the codes given below :

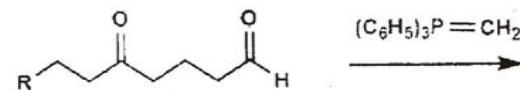
Codes :

- (a) Only (1) and (2)
- (b) (1), (2) and (4)
- (c) (1), (2) and (3)
- (d) (1), (2), (3) and (4)

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19. What is the product of the given reaction ?



- (a)
- (b)
- (c)
- (d)

20. Which of the following reactions can be used for the preparation of C – C bond in organic synthesis ?

- (I) Reformatsky reaction
- (II) Claisen ester condensation
- (III) Wittig reaction
- (IV) Knoevenagel reaction
- (a) Only IV
- (b) II, III and IV
- (c) I, II and III
- (d) I, II, III and IV
- (e) None of the above

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Section—B

2 each

(Very Short Answer Type Questions)

Note : Attempt all questions.

1. Write any *one* reaction of ArS_{N}^2 reaction.
2. What do you mean by achimeric assistance ?
3. Write the reaction of SE^1 reaction.
4. Write reaction on aliphatic diazonium coupling.
5. Write the reaction of Michael reaction.
6. What do you mean by Stereoselective reaction ?
7. Write any *two* reactions of metal hydride with carbon-hetero multiple bond.
8. Write the reaction of hydrolysis of amides.

Section—C

3 each

(Short Answer Type Questions)

Note : Attempt all questions.

1. What do you mean by Smile Rearrangement ? Explain with suitable example.
2. Explain the benzyne mechanism with suitable example.
3. Explain the SE^2 reaction with mechanism.
4. What is Gottermann Koch reaction ?
5. Explain the hydrogenation of double and triple bond.
6. Discuss the addition reaction of cyclopropane ring.
7. What is Aldol condensation reaction give the mechanism and application ?
8. What is Knoevenagel reaction ? Write the mechanism and examples.

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Section—D

5 each

(Long Answer Type Questions)

Note : Attempt all questions.

1. Explain the following :
 - (a) Ambident nucleophilicity
 - (b) Neighbouring group mechanism

Or

What is Von-Richter reaction ? Give the mechanism and application.

2. Explain the following :
 - (a) ipso attack
 - (b) Arenium ion mechanism

Or

What is Vilsmeier reaction ? Give the mechanism and application.

3. Explain the following :
 - (a) Hydroboration reaction
 - (b) Regioselective reaction

Or

What is Sharpless asymmetric epoxidation ? Explain with suitable examples.

4. Explain the following :
 - (a) Wittig reaction
 - (b) Ammonolysis of ester

Or

What is Stobbe reaction ? Give the mechanism and application.

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