KATHMANDU UNIVERSITY
End Semester Examination
March, 2025

Marks Scored:

Level : B.Sc./B.Tech.
Year : II

Course : CHEM 207
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date : 16 March -025

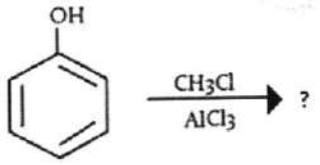
SECTION "A"

[20Q. × 1 = 20 marks]

Choose and Mark [X] in the most appropriate option from each set of choices

1. Which of the following statements is wrong?
   [ ] S_N1 reactions proceed via carbenium ion intermediates.
   [ ] The S_N2 mechanism does not involve an intermediate.
   [ ] The rate constant of an S_N1 reaction depends on the nucleophile
   [ ] The rate constant of an S_N2 reaction does not depend on the nucleophile

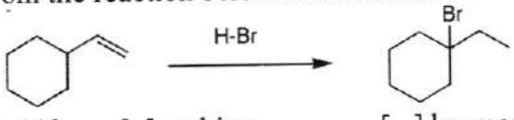
2. What will be the product in the given reaction?
   [ ] m-chlorophenol
   [ ] m-hydroxytoluene
   [ ] o-chlorophenol and p-chlorophenol
   [ ] o-hydroxytoluene and p-hydroxytoluene



3. Which of the following reactions are favoured by polar aprotic solvent?
   [ ] SN_1 reactions
   [ ] SN_2 reactions
   [ ] Both SN_1 and SN_1 reactions
   [ ] None of the mentioned

4. Which of the following statements apply to E1 reactions of alkyl halides?
   [ ] Rate = k[base]
   [ ] Rate = k[base][RX]
   [ ] Rate = k[RX]
   [ ] The reactions occur in singe step.

5. The product from the reaction below is the result of a:



   [ ]1,2-methyl shift [ ] carbine [ ] bromonium ion [ ] 1,2-hydride shift

6. The orientation of free-radical addition doesn't depend on
   [ ] Polar factor
   [ ] Steric factor
   [ ] Stability of carbocation
   [ ] stability of free radical

7. Grignard reagent on reaction with ketones followed by hydration yields
   [ ] Primary alcohol
   [ ] Secondary alcohol
   [ ] Tertiary alcohol
   [ ] Aldehyde

8. What is the order of reactivity of the following alkenes towards electrophile?

I II III

[ ] III > II > I [ ] I > II > III
[ ] II > III > I [ ] II > I > III

9. Which of the following compounds is formed when benzyl alcohol is oxidised with KMnO4?
[ ] CO_2 and H_2O [ ] Benzoic acid [ ] Benzaldehyde [ ] Benzophenone

10. Alcohol on refluxing with Cr_2O_7 gives _____
[ ] Ester [ ] Aldehyde [ ] Sugar [ ] Carboxylic acid

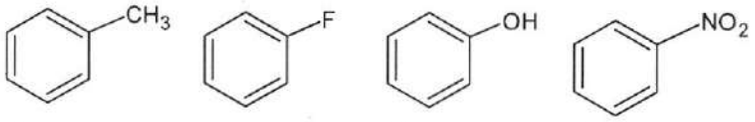
11. Primary alcohols undergo what reaction to form alkenes?
[ ] Elimination [ ] Oxidation [ ] Reduction [ ] Hydrolysis

12. Carbonyl compounds especially ketones undergo reduction to form _____
[ ] Primary alcohols [ ] Secondary alcohols
[ ] Alkanes [ ] Alkenes

13. Which of the following is converted into an alcohol on treatment with HNO_2?
[ ] Methyl amine [ ] Aniline [ ] Dimethyl amine [ ] Triethyl amine

14. Identify the incorrect statement regarding aromaticity.
[ ] It is the low stability possessed by a molecule
[ ] It follows Huckel's rule
[ ] p-orbitals must be planar and overlap
[ ] Cyclic delocalization takes place

15. Which is least reactive in electrophilic substitution?



[ ] [ ] [ ] [ ]

Fill in the blanks

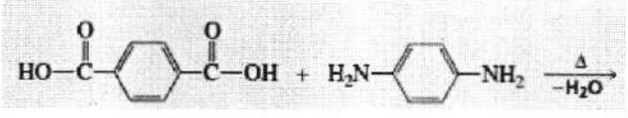
16. In enzyme chymotrypsin histidine is present at position number_____.

17. Dehydrohalogenation of 2-bromo-2 methyl pentane gives major product_____.

18. The acid catalyzed dehydration of alcohol is best described as _____ mechanism.

19. The IUPAC name  of the compound is _____.

20. Write the product/s of the following reaction



_____.

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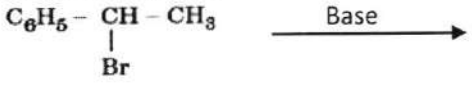
SECTION "B"

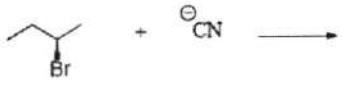
Attempt *ALL* questions.

1.

a. Consider the E2 reaction. [2+2+1=5]



i. Draw the mechanism
ii. Write about the reactivity of haloakanes in this reaction.
iii. Write the IUPAC name of reactants and products.

b. For $S_N1$reactions:  [2+2+1=5]

i. Write down the mechanism
ii. Explain the stereochemistry
iii. Write the IUPAC name of reactants and products.

2. Explain the following statements. [3×4=12]
a. The order of reactivity of haloalkanes for E1 reaction is Teriary>Secondary>Primary
b. Halogens are deactivating but Ortho & para directing in electrophilic substitution reaction.
c. Tertiary amines are more basic than primary basic.
d. Benzene is an aromatic compound.

3. Shorts notes [4×2.5=10]
a. Carbocation Stability
b. Polymerization reactions
c. Aromatic compounds
d. Secondary structure of Protiens

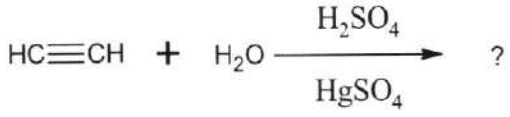
4. Write the mechanism for the following reactions [3×5=15]
a. Oxymercuration-demercuration
b. Addition of an alcohol to aldehyde in presence of acid
c. Dehydration of tertiary alcohol
d. Free radical polymerization of ethane
e. Addition of H_2O to Prop-1-ene in presence of acid

P.T.O.

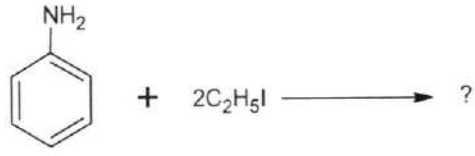
5.

a. Give reactant/s or product/s for the following reactions. [4×1=4]

i.

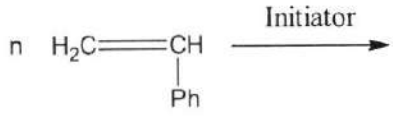


ii.



iii.

iv.



b. Carry out following the conversion (write down the chemical reactions) [2×2=4]

i. Benzene to Methylbenzene

ii. Acetic acid to Acetamide