Marks scored:

KATHMANDU UNIVERSITY
End Semester Examination [C]
July, 2017

Level : B.E./B.Sc./B. Pharm./B. Tech. Course : CHEM 201
Year : II Semester: I
Exam Roll No. : Time: 30 mins. F. M. : 20

Registration No.: Date : JUL 14 2017

SECTION "A"
[20Q. × 1 = 20 marks]

Select the most appropriate answer.

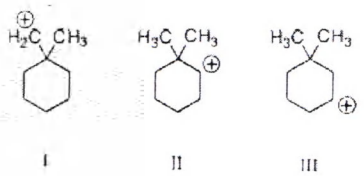
1. In electrophilic aromatic substitution reactions the –NO2 group is:
[ ] an o,p-director since it stabilizes the ortho, para position less than the meta.
[ ] a m-director since it destabilizes the meta position less than the ortho, para.
[ ] an o,p-director since it stabilizes the ortho, para position more than the meta.
[ ] a m-director since it destabilizes the meta position more than the ortho, para.

2. The difference of potential enegy between two confermers of cyclohexane is 7.1kcal. They are
[ ] chair and boat confermers [ ] half-chair and boat confermers
[ ] twisted boat and boat confermers [ ] half-chair and twisted boat confermers

3. The observed rotation of 30 gm/L solution of an optically active compoud is -0.48^0 when kept in a polarimeter of sample tube of 8 cm.What is the specific rotation of that compound?
[ ] -0.02^0 [ ] -2.00^0 [ ] -20.00^0 [ ] -40.00^0

4. which of the following statements is/are true?
A. for SN1 Rate=K [R-X][Nu]
B. for SN2 Rate=K [R-X][Nu]
C. SN1 ,order of reactivity haloalkanes , methyl>primary>secondary>tertiary
D. SN2 ,order of reactivity haloalkanes, methyl>primary>secondary>tertiary
[ ] AC [ ] AD [ ] BC [ ] BD

5. Which of the following carbocations is/are NOT likely to undergo rearrangement through a methyl shift?
[ ] I [ ] II
[ ] III [ ] I &III



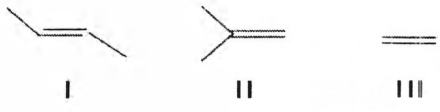
I II III

6. Which of the following compounds would react rapidly in an SN1 reaction?
[ ] $(CH_3)_3$-I [ ] $(CH_3)_2CH$-Br [ ] CH_3CH_2-Br [ ] CH_3CH_2-Cl

7. The acid catalyzed dehydration mechanism for alcohol is best described as a/an
[ ] E1 [ ] E2 [ ] SN1 [ ] SN2

8. Which of the following solvent is the least favorable for the SN1 reaction?
[ ] Water [ ] Ethanol [ ] Dimethylsulfoxide [ ] Trifluroacetic acid

9. What is the order of reactivity of the following alkenes towards free radical addition of HBr?



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

10. Match the substituent to the stated orientation and activation effects on nucleophilic aromatic substitution. Which set is correct?

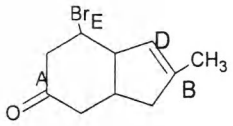
A. Cl; activating C. NO_2; deactivating
B. Me; activating D. OH; deactivating

[ ] A & B [ ] B & C [ ] C & D [ ] A &D

11. Acetone reacts with HCN to form a cyanohydrin,it is an example of :

[ ] Electrophilic addition [ ] Nucleophilic addition
[ ] Nucleophilic substitution [ ] Electrophilic substation

12. Which carbon/s is/are the most susceptible for the electrophilic addition?



[ ] A & F [ ] B &D
[ ] E only [ ] A only

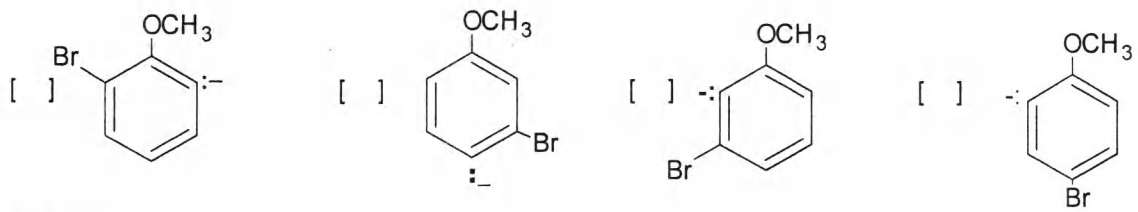
13. In the Benzyne ..... Hybridization.

[ ] 4 carbons are in sp3 and 2 carbons are in sp2
[ ] 4 carbons are in sp2 and 2 carbons are in sp
[ ] 4 carbons are in sp3 and 2 carbons are in sp
[ ] 4 carbons are in sp and 2 carbons are in sp2

14. Nitronium ion is

[ ] a nucleophile [ ] a free radical [ ] an elecrophile [ ] an anion

15. The most stable intermediates among the given is



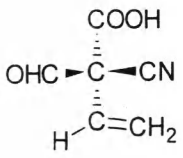
Fill in the blanks.

16. The order of reactivity of alkylhalides (R-F, R-Cl, R-Br and R-I) in E2 reaction is.....

17. The structural formula for chair form of trans -1,3 dichlorocyclohexane is.....

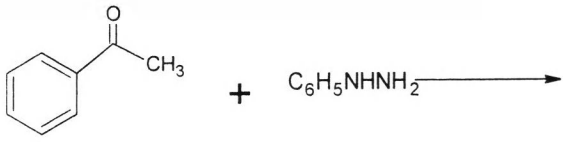
18. During Friedel-Craft alkylation the catalyst used is... .....

19. Acoording to sequence rule the priority order of the substituents in the chiral compound is .....



20. The major product of the reaction

is.....



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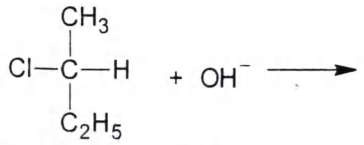
SECTION "B"

Attempt ALL the questions.

1. a. Consider the given reaction [3 × 2=6]



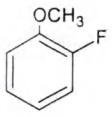
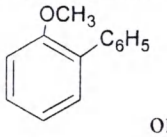
Write the mechanism
i. when OH^- reacts as a nucleophile
ii. when OH^- reacts as a base

b. Discus the role of solvent for the SN1 reaction. [3]

2. Give the appropriate reasons for the following facts. [2× 5=10]

i. Twisted boat conformer of cyclohexane is more stable than the boat form.

ii. The heat of hydrogenation for Benzene is 36 kcal less than the calculated value.

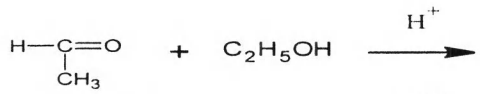
iii.  does not form  on reaction with C_6H_5-Li .

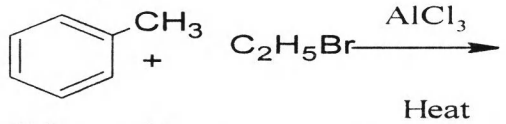
iv. Heat of combustion per CH2 for cyclohexane is less than cyclopentane.

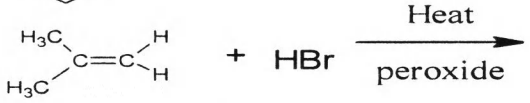
v. E1 mechanism are accompanied by rearrangement

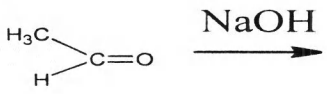
3. Write notes on. [2 × 5= 10]
i. Phase transfer catalyst
ii. Resolution of racemic modification
iii. Generation of chiral centers
iv. Structure of Benzene
v. Conformational isomers of n-butane and relative stabilities

4. Give the mechanism for the following [2.5× 4 = 10]

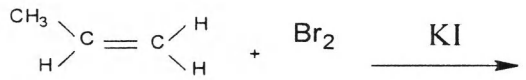
i. 

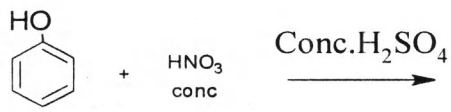
ii. 

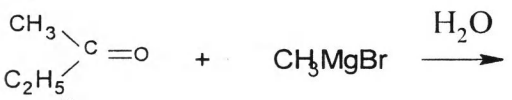
iii. 

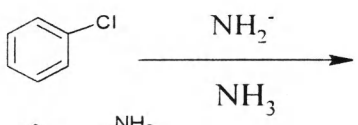
iv. 

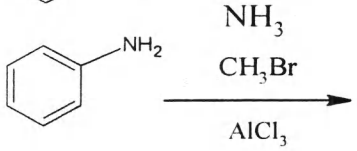
5. Give the product/s for the following reactions. [1 × 6 = 6]

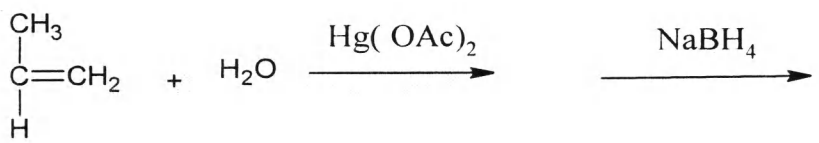
i. 

ii. 

iii. 

iv. 

v. 

vi. 

6. How do you convert the following compounds to the respective products (give the appropriate reactions) [2 × 5=10]

i. Bromobenzene to para-bromonitrobenzene
ii. A Ketone to Semicarbazone.
iii. 2-Methyl-1-butanol to 2-Methyl-2- butene.
iv. An alkene to halohydrine
v.