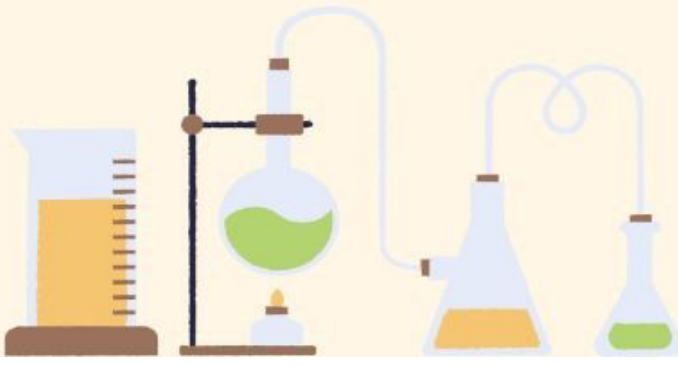
Organic Chimestry

Chapter 6 test bank

written by:
Sama shannak



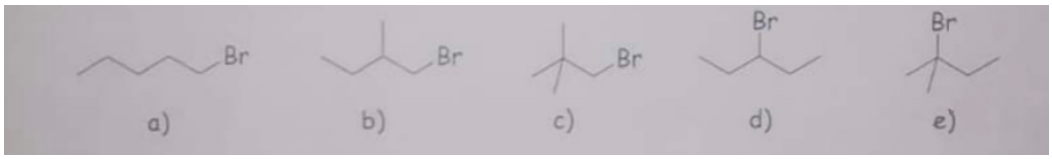
1. Which of the following reactions proceeds with inversion of configuration at the carbon bearing the leaving group?
a) SN2 only
b) Su1 only
c) E2 only
d) E1 only
e) SN1 and E1 only

Ans: a

2. Which of the following is not a correct representation of relative nucleophile strength?
a) HO- › HS-
b) - NH2 > F-
c) I- > Br-
d) CH3- > OH-
e) CH3O- > CH3OH

Ans:a

3.Which alkyl halide would you expect to undergo an SN1 reaction most rapidly?

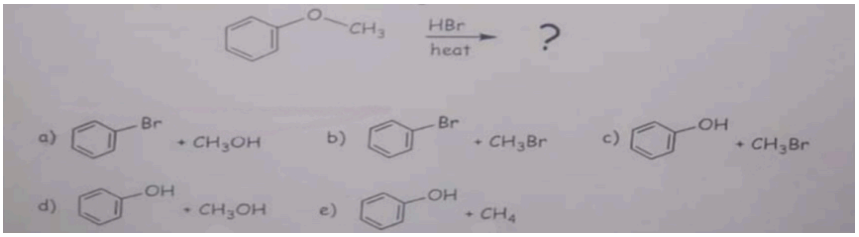


Ans e

4. Which Sn2 reaction will occur most rapidly in aqueous acetone solution?
a) HO- + CH3-Br ——> CH3OH + Br-
b) HO- + CH3-I —> CH3OH + I-
c) HO- + CH3-F —> CH3OH + F-
d) HO- + CH3-Cl —> CH3OH + Cl-
e) They will all occur at the same rate.

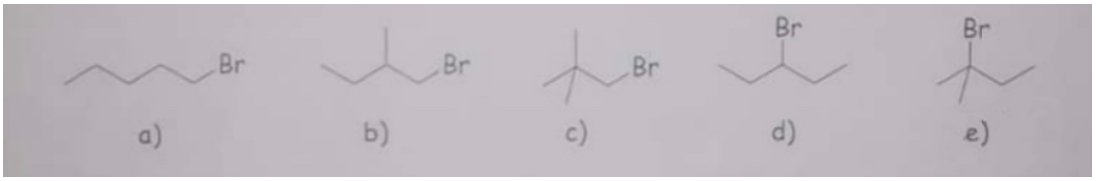
Ans b

5. What is the product of the following reaction?



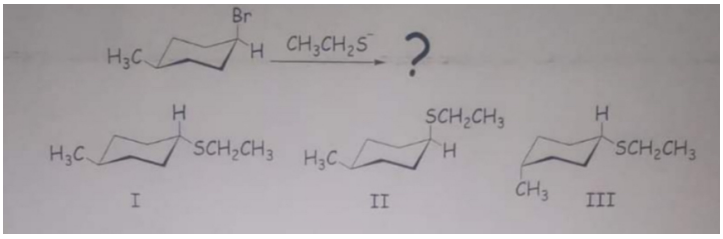
Ans: c

6. Which alkyl halide would you expect to undergo an SN1 reaction most rapidly?



Ans e

7. The product(s) of the following reaction is

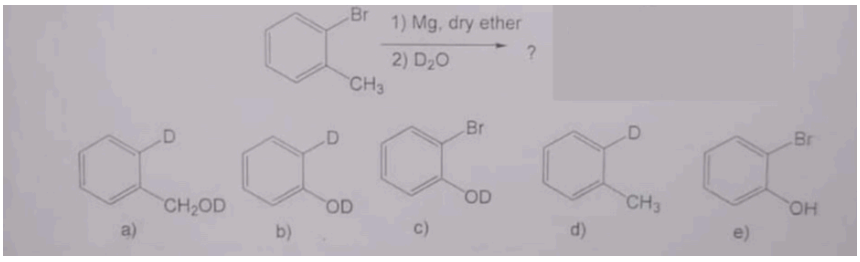


a) III only

b) II only
c) I only
d) equal amounts of I and III
e) equal amounts of II and III

Ans: c

8. What is the product of the following reaction?



Ans:d

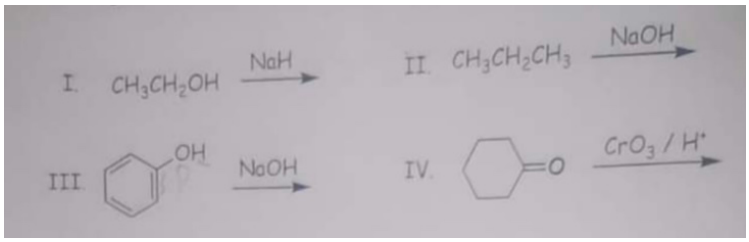
9. Which of the following is not a nucleophile?
a) NH3
b) NH4+
c) CN-
d) H2O

e) CH3O-

Ans b

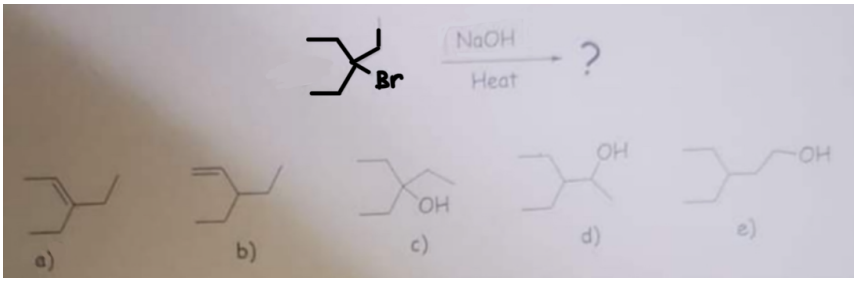
10. Which of the following mixtures would NOT react?

a) I
b) II
c) III
d) IV
e) II and IV



Ans:

11. What would be the major product of the following reaction?



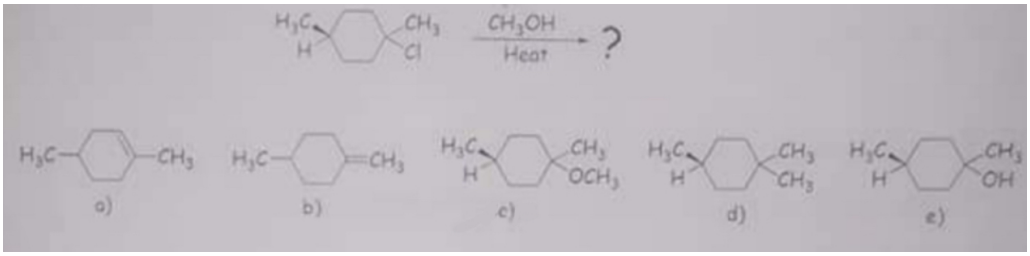
Ans a

12. Which statement is true for SN2 reactions?

a) The rate of the reaction is dependent on the stability of a carbocation
b) The rate of reaction is dependent on just the substrate.
c) The fastest reaction will occur with a tertiary halide.
d) Displacement occurs with inversion of configuration.
e) The mechanism is a two-step process.

Ans d

13. What would be the major product of the following reaction?



Ans c

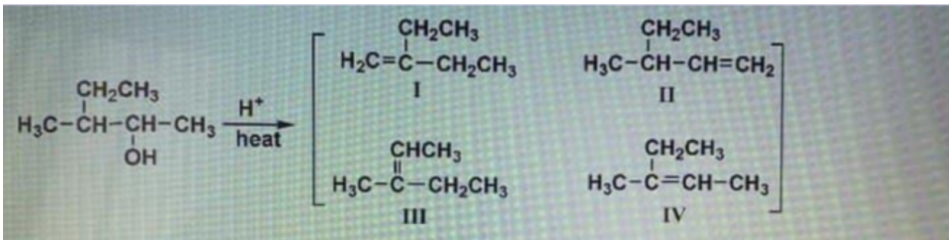
14. Which of the following alcohols would react most rapidly under SN1 conditions?

a) CH3OH
b) CH3CH2OH

c) (CH3)2CHCH2OH
d) (CH3)3COH
e) CH3CH2CH2OH

Ans d

15. Which is the major product of the following reaction?



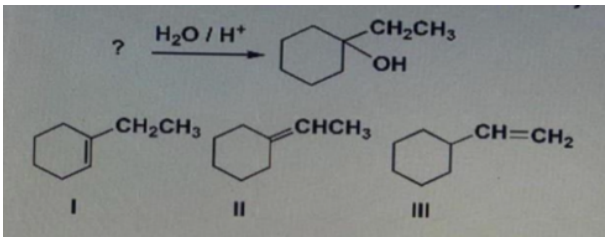
a) III
b) II
c) I
d) IV

Ans d

16. Which halide is least reactive towards Sn2 reactions?
a) Tert - butyl bromide
b) Sec - butyl bromide
c) Isopropyl bromide
d) Methyl bromide
e) Cyclohexyl bromide

Ans A

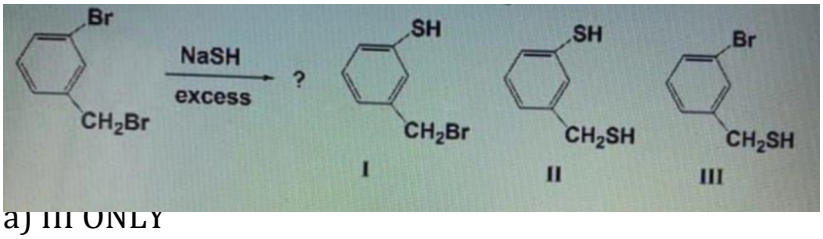
17. Which starting material will yield the given alcohol as major product?



a) II ONLY
b) I AND II
c) II AND III
d) I ONLY
e) III ONLY

Ans b

18. Which product will be formed from the following reaction?



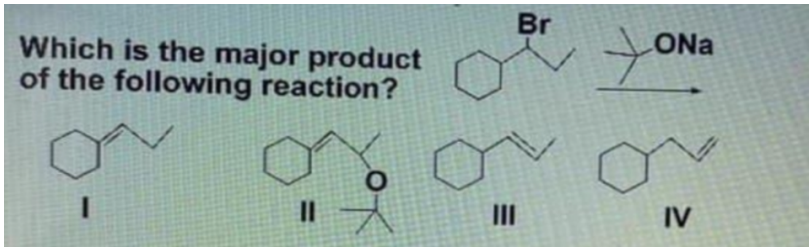
a) III ONLY
b) II ONLY
c) I AND III
d) I ONLY

Ans a

19. Which statement is not true for SN2 reaction?
a) It is preferred for less crowded substrates.
b) It occurs with inversion of configuration.
c) It faster with strongest nucleophiles
d) It occurs in two steps.
e) Rate depends on the concentration of both reactants.

Ans d

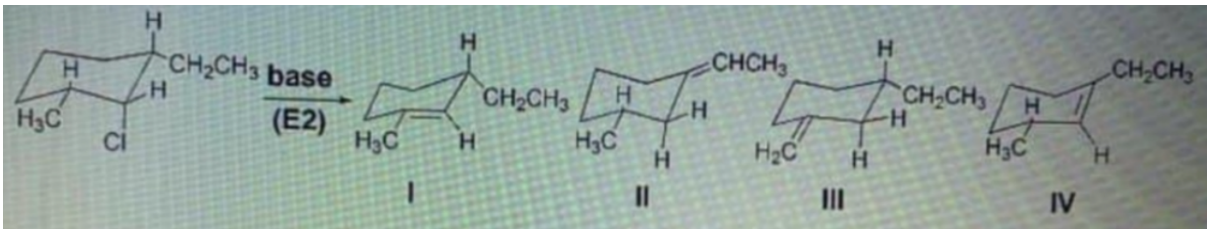
20. Which is the major product of the following reaction?



a) IV
b) III
c) II + III
d) I
e) Il

Ans d

21. Which product will be formed from this E2 reaction?



a. IV only

b. Ill only
c.I and IV
d.I and III
e. Il only

Ans c

22. (s) -2- chlorobutane gave an optically inactive substitution product. what is the reagent and mechanism of this reaction?

a) CHONa; SN2
b) NaOCHs; SN2
c) CH3OH; SN1
d) NaOH ; SNI + SN2
e) Sodium tert-butoxide ; E2

Ans c

23. Which of the following is the strongest nucleophile?
a) CH3CH2O-
b) H2O
c) CH3CH2OH
d) HO-
e) CH3CH2S-

Ans e

24. Which statement is NOT true for Sn1 reactions?
a)Rate depends only on concentration of alkyl halide.
b)It is fastest in polar protic solvents.
c) Reaction occurs in one step.
d) Reaction is slowest with primary halides.
e) Reaction occurs with racemization of configuration.

Ans :c

25. Which nucleophile reacts with the following trans-halide to give a substitution product with cis-geometry ?

a) NaCN

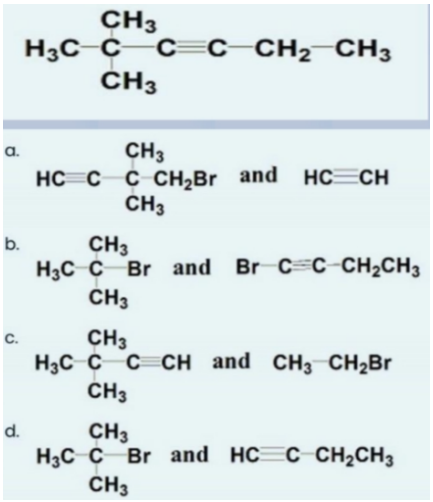
b)ethanol

c) CH3OH

d) H2O

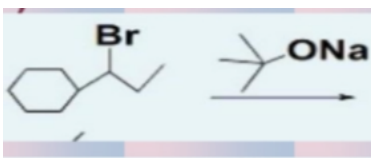
Ans a

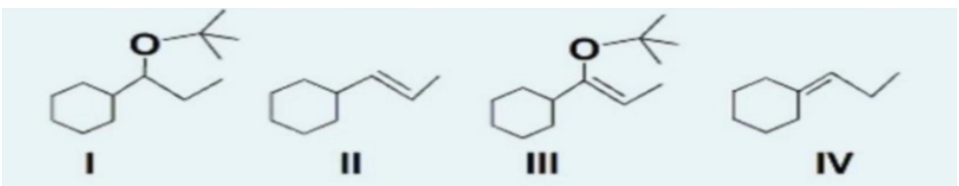
26. Which two starting materials would you need to prepare this compound?



Ans c

27. Which is the major product of the following reaction?



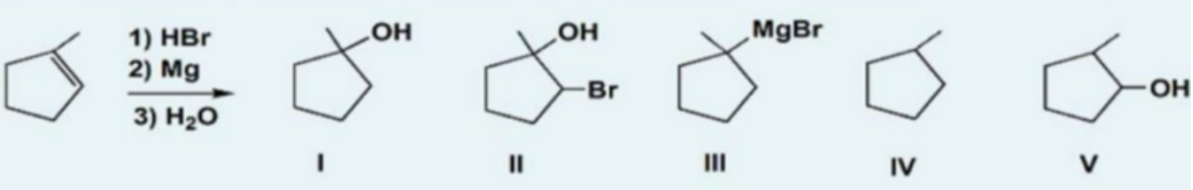


a) IV

b) Il
c) III
d) I + III
e) I

Ans a

28. What is the product of the following reaction?



a) IV
b) I
c) Ill
d) II
e) V

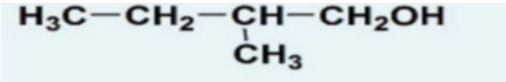
Ans a

29. (S)-2-chlorobutane gave an optically inactive substitution product. What is the reagent and mechanism of this reaction?

a) NaOH; Sn + Sn2
b)CH3OH; SNI
b) Sodium tert-butoxide; E2
c) NaOCH3; Sp2
d) CH3ONA; SN2

Ans b

30. Which starting material will give this alcohol as major product upon reaction with BH3 followed by H2O2/ OH- ?



a) 2-methyl-1,3-butadiene
b) 3-methyl-1-butyne
c) 2-methyl-2-butene
d) 3-methyl-1-butene
e) 2-methyl-1-butene

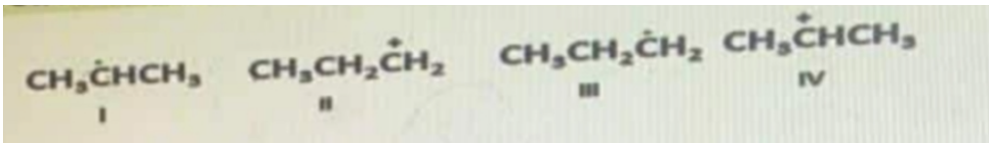
Ans e

31. Which statement is true for S2 reactions?

a) Reaction rate depends on stability of carbocation
b) Reaction rate depends only on the nucleophile
c) Reaction occurs with Inversion of configuration
d) Reaction Is fastest with tertiary halides

Ans c

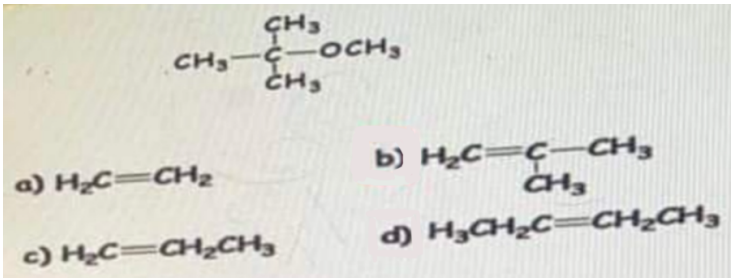
32. Which Intermediate is formed when propane reacts with bromine in presence of heat or light?



a) I + II
c) II + III
b)I+ IV
d) I + III

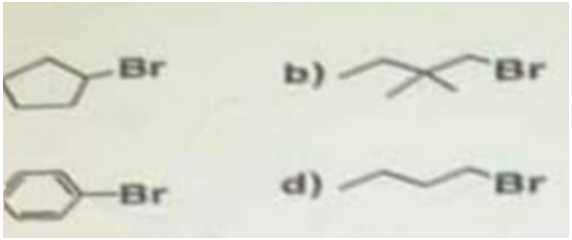
Ans d

33.Which alkene reacts with methanol in presence of acid catalyst to give the following ether?



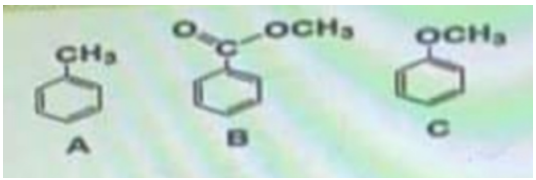
Ans b

34. Which halide does not react with nucleophiles?



Ans c

35. What is the correct order of decreasing reactivity (most reactive first) of these compounds toward electrophilic aromatic substitution?



a) C>B>A

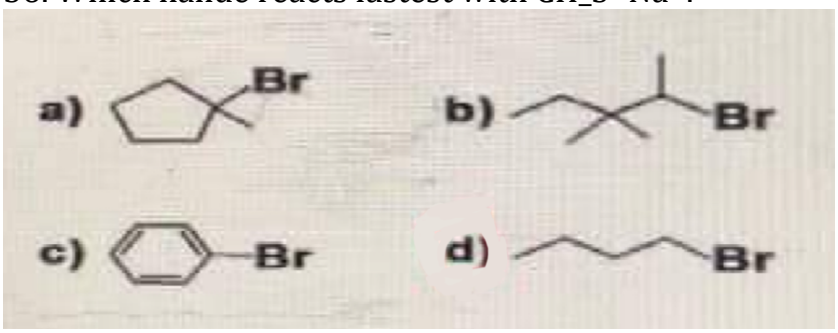
b)A>C>B

c)B>C>A

d) C>A>B

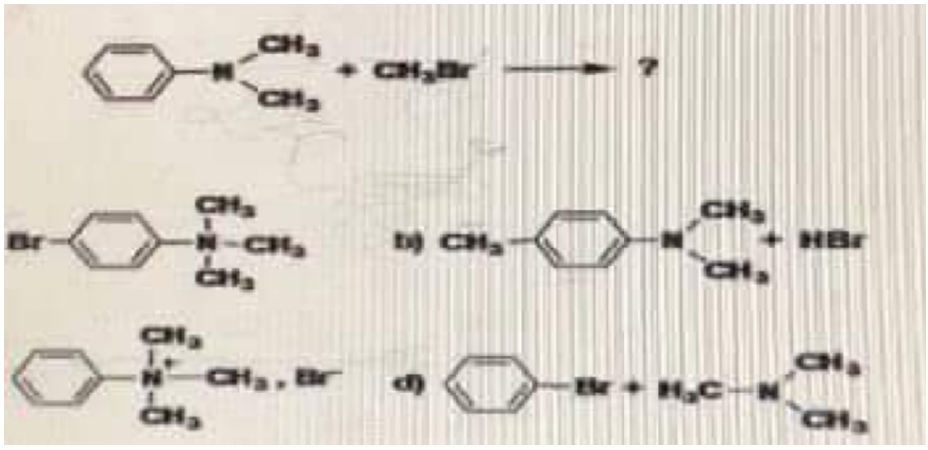
Ans d

36. Which halide reacts fastest with CH_S- Na*?



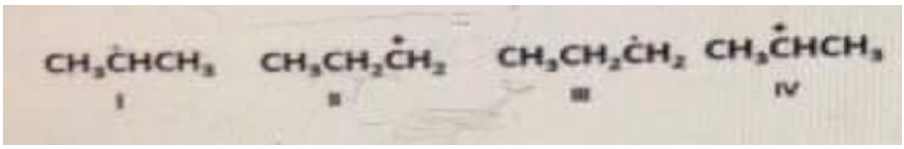
Ans d

37. What is the product of the following reaction?



Ans c

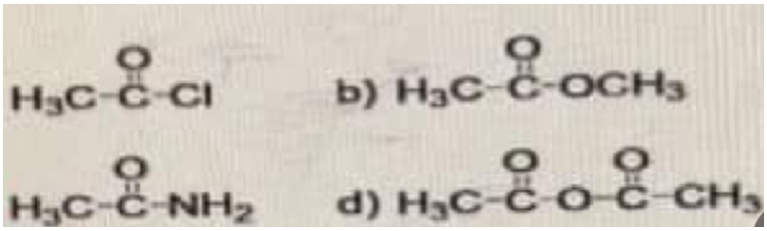
38. Which intermediate is formed when propane reacts with bromine in presence of heat or light?



a) I + II
c) II + III
b)I+ IV
d) I + III

Ans d

39. Which is the least reactive towards nucleophilic acy|substitution?



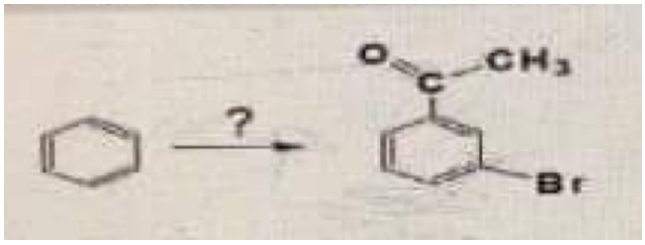
Ans c

40.Which statement is true for S2 reactions?

a) Reaction rate depends on stability of carbocation
b) Reaction rate depends only on the nucleophile
c) Reaction is fastest with tertiary halides
d) Reaction occurs with Inversion of configuration

Ans d

41. Which conditions would achieve the following transformation?



a)CH3CI/AICI2, then Br2/ FeBr3,

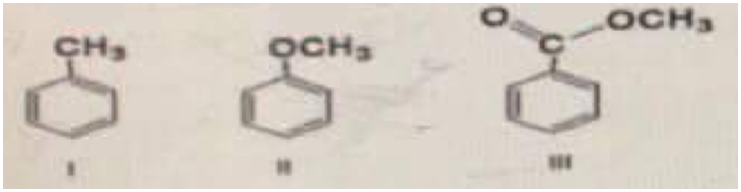
b)CH3COCI/AICI2 then Br2 / FeBr3,

c) Br2/ FeBr3 then CH3COCI/AICI2

d) Br2/ FeBr3 then CH3COCI/AICI2

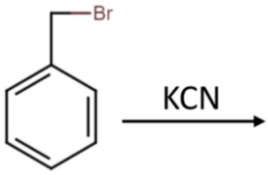
Ans b

42. What is the correct order of decreasing reactivity (most reactive first)of these compounds toward electrophilic aromatic substitution?



Ans: ||>|>|||

43. By what mechanism is the major product of this reaction formed ?



A)SN2.

B)SN1.

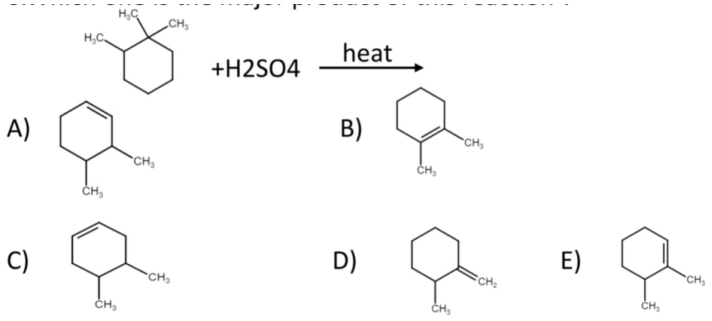
C)E1.

D)E2.

E)SN1+E1.

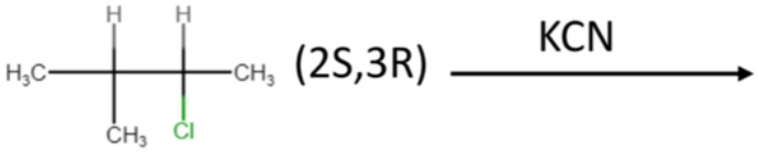
Ans A

44. Which one is the major product of this reaction ?



Ans B

45.What would this SN2 reaction give as a major product?



a) An optically inactive racemic mixture.
b) An optically active single enantiomers.
c) Two optically active diastereomers.
d) And optically inactive meso form.
e) Two optically inactive diastereomers.

Ans B

46. Which of the following is the weakest nucleophile?
(atomic No. C=6; N=7; F=9; s=16)
A) HO-
B) CH3O-
C)CH3S-
D) CN-
E) F-

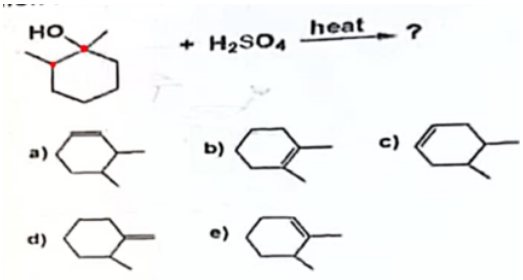
Ans E

47.Which halide is the most reactive in SN2 ?

a) CH3CH2CH2CH2Br
b) CH3CH2CHBrCH3
c) CH3CH2CH(CH3)CH2Br
d) CH3CH2CH=CHBr
e) CH3C(CH3)2(Br)

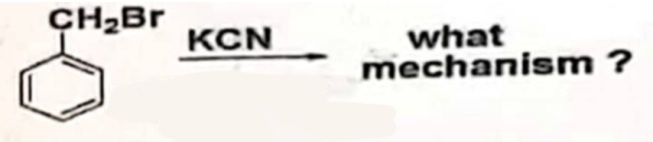
Ans A

48. Which Is the major product of this reaction?



Ans b

49. By what mechanism Is the major product of this reaction formed?



a) Sn2

d) E2

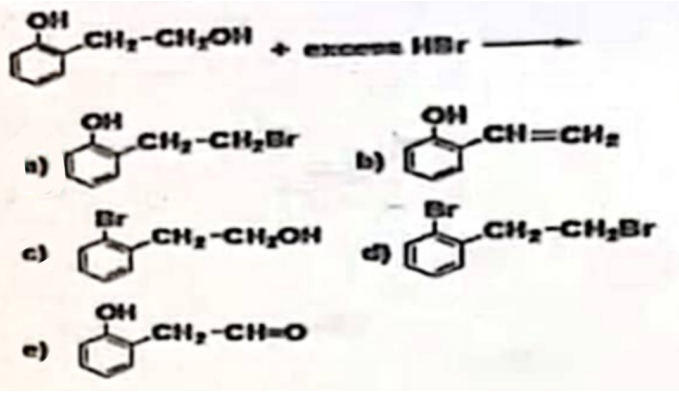
b) Sn1

e) Sn1 + E1

c) E1

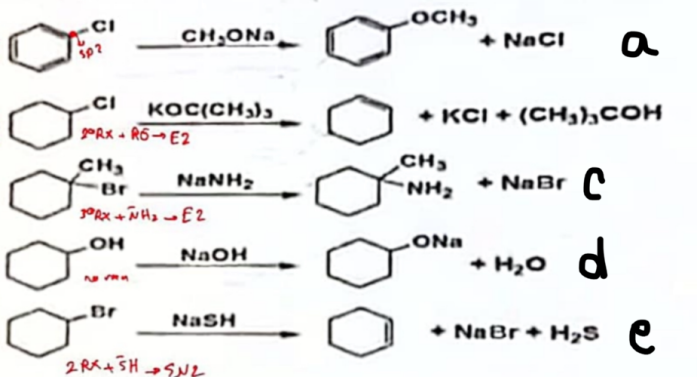
Ans a

50. What is the major product of the following reaction ?



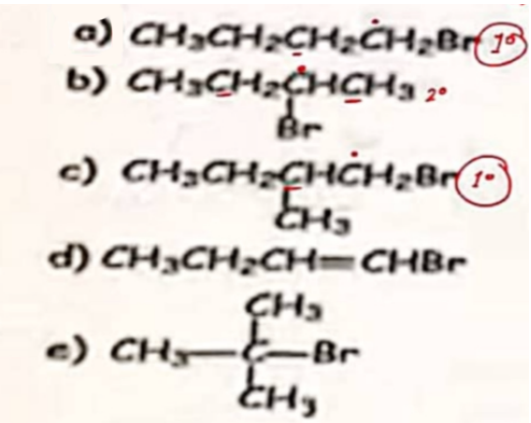
Ans a

51. Which reaction gives the Indicated product as major one?



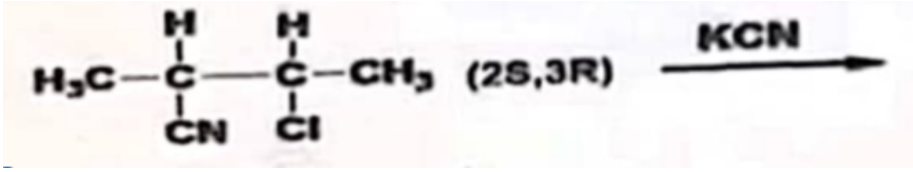
Ans b

52. Which halide is most reactive in SN2 reactions?



Ans a

53. What would this ^{Sn2} reaction give as a major product ?



a) an optically Inactive raceric mixture

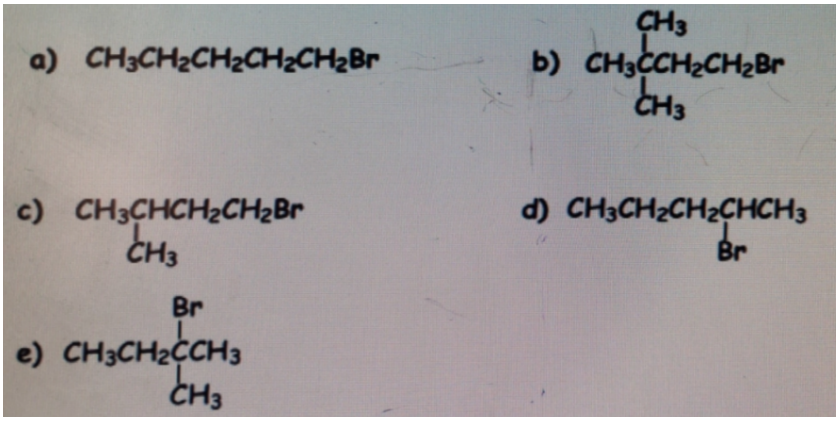
b) an optically ective single enantiomer
c) two optically active diastercomera
d) an optically inactive meso form
e) two optically Inactive diastereomers

Ans b

54. Which of the following Is weakest nucleophlle?
(atomic No. C=6; N=7; 0=8; F=9; 5=16)
a) HO-
b)CH3O-
c) CH3S-
d)CN-
e)F-

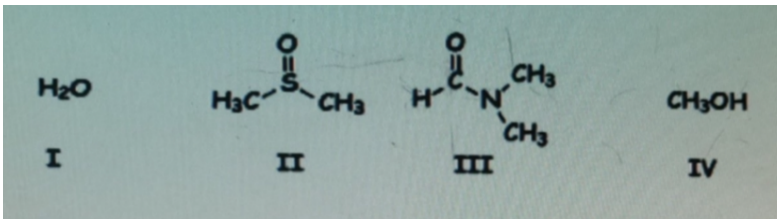
Ans e

55. Which alkyl halide would you expect to undergo an SN1 reaction most rapidly?



Ans E

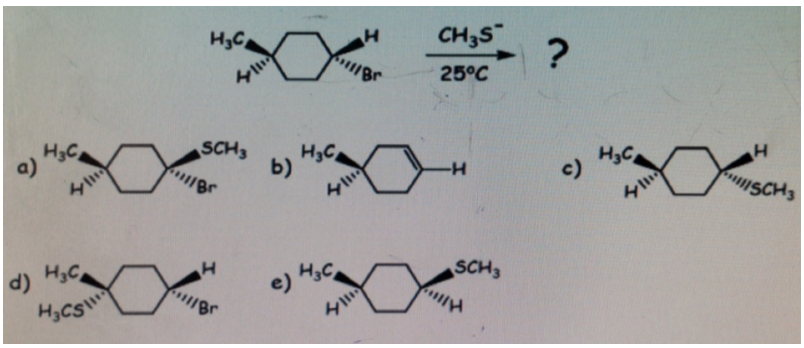
56. Which of the following is aprotic solvent?



a) III and IV
b) II and IV
c) I and II
d) II and III
e) I and III

Ans d

57. What would be the major product for the following reaction?



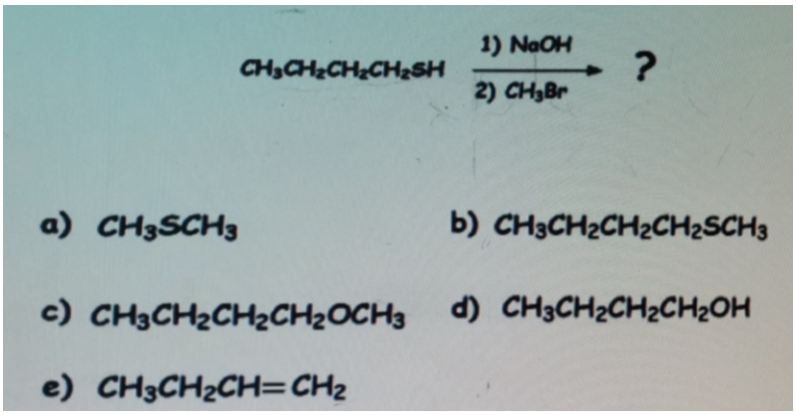
Ans e

58. What is the correct order of reactivity of hydrogen halides when they react with 1-butanol

a) HI > HBr > HCI
b) HCI > HBr > HI
c) HCI = HBr = HI
d) HI > HCI > HBr
e) HBr › HCI › HI

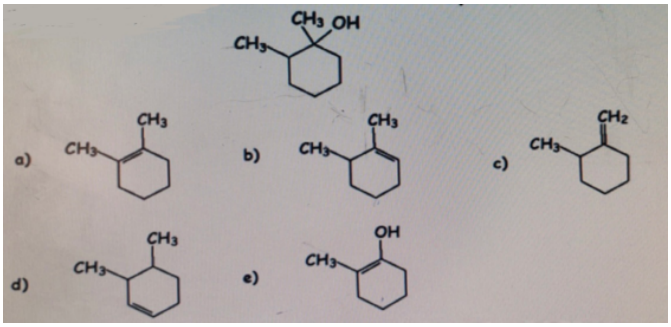
Ans A

59. What would be the major product for the following reaction?



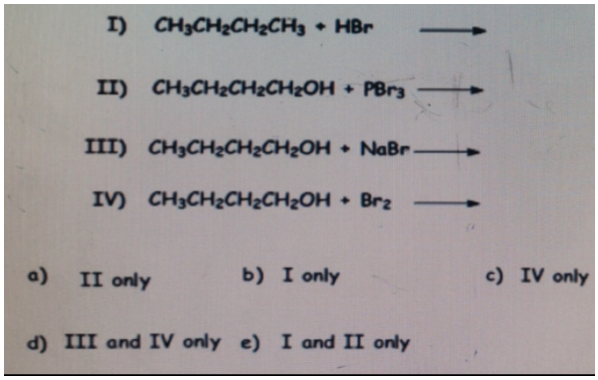
Ans b

60. What is the major product from the E1 dehydration of the following alcohol?



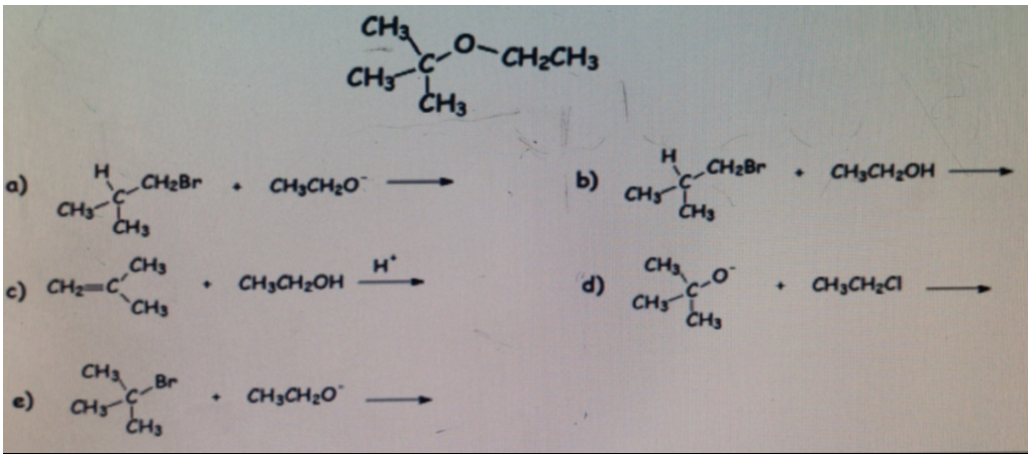
Ans a

61. Which is the best synthetic route to prepare CH3CH2CH2CH2Br?



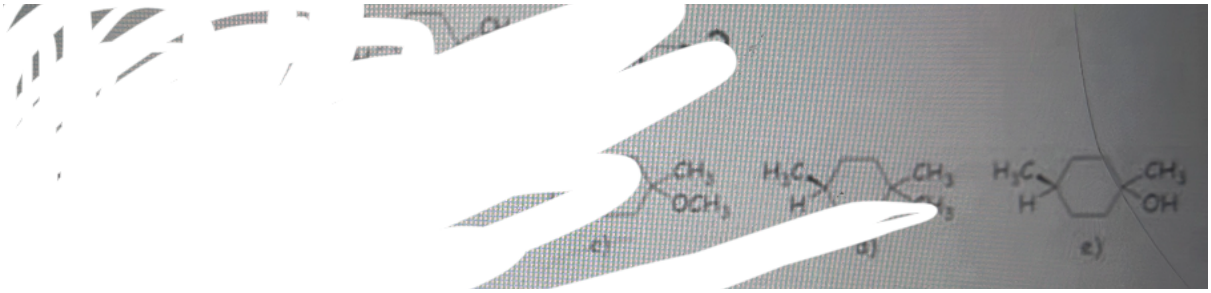
Ans a

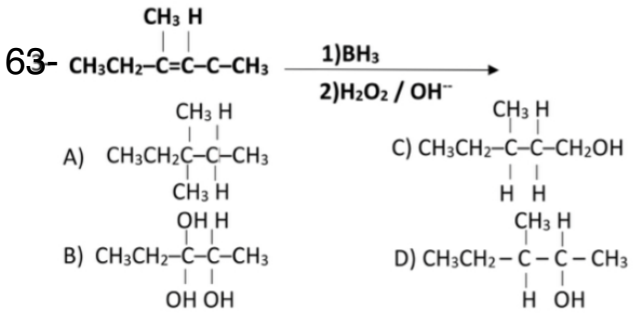
62. Which would be the best way to prepare the following ether?



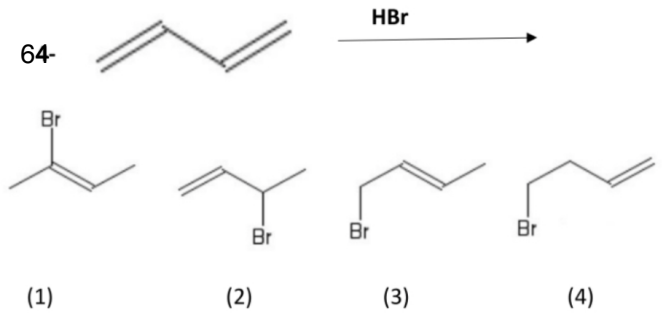
Ans c

63. W[illegible] the major product of the following reaction?



63- 

Ans d

64- 

A) 1
B) 2
C) 3
D) 4
E) 2 AND 3

Ans E

65- Which reagent would you choose for the following reaction:-

$CH_3CH_2CH_2Br \rightarrow CH_3CH{=}CH_2$

A) -OH
B) $-Ch_3(CO)_3$
C) -SH
D) $-CH_3CH_2O$
E) $-CH_3O$

66 Which of the following is an incorrect representation of relative nucleophile strength:
A) $^-H_3C^- > HO$
B) $^-HO^- > HS$
C) $CH_30^- > CH_3OH$
D) $^-I^- > Br$
E) $^-H_2N^- > F$

67- What is the leaving group in the following Reaction:
A)CH_3CH_2Br
B) CH_3-O-CH_2CH_3
C) Br^-
D) Na^+
E) CH_3O-NA^+

$$\rightarrow CH_3O^-Na^+ + CH_3CH_2Br$$
$$^+CH_3\text{-}O\text{-}CH_2CH_3 + Br^- + Na$$

68- .Which of the following is protic solvent
a) acetonitrile, CH3CEN
b) dimethyl sulfoxide.(CH3)2S=O
c) dimethylformamide, (CH3)2NCHO
d) acetone, (CH3)2C=O
e) Methanol, CH3OH

Ans E

69- .which of the following alcohols would react most rapidly under SN1 conditions
a) CH3)2CHCH,OH)
b) CH3CH20H
c) CH3CH2CH20H
d) CH3H2CH(CH3)OH
e) CH3)3COH

Ans E

70- .The rate-determining step in the following reaction is

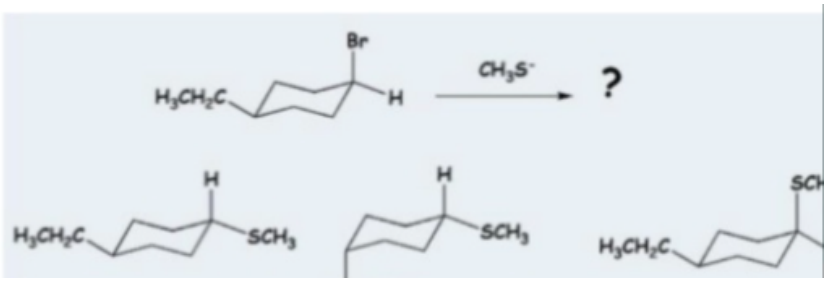
$$(CH_3)_3COH + HBr \rightarrow (CH_3)_3CBr + H_2O)$$

a) lonization of alcohol to give carbocation

b) Displacement of water from the protonated alcohol by bromide ion
c) Protonation of alcohol
d) Capture of a carbocation by bromide ion
e) Loss of water from the protonated alcohol to give a carbocation

Ans C

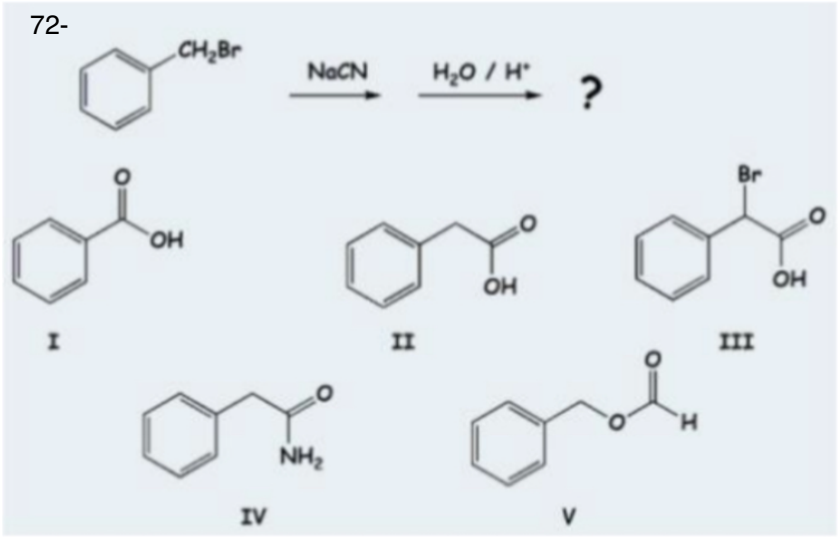
71- -The products) of the following reaction is (are) :



a) II & III
b) I& I
c) II ONLY
d) III ONLY
e) I ONLY

Ans c

72-



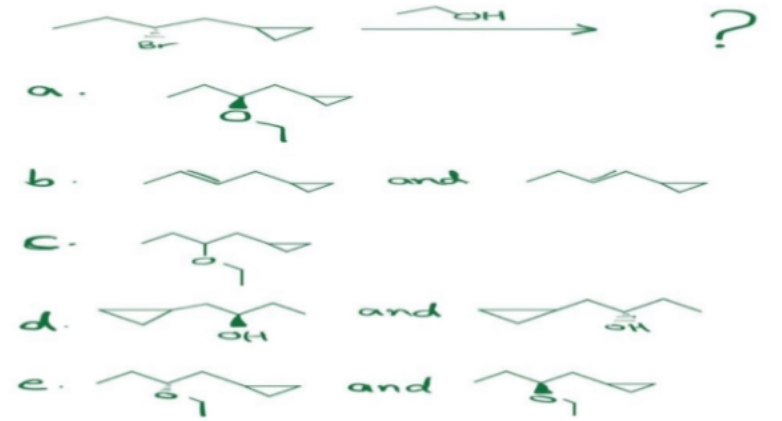
Ans: II

73- Which carbonyl compound reacts fastest with nucieophiles?

a) 2,2-dimethylbutanal
b) Cyclopentanone
c) 2,4,6-trimethylbenzaldehyde
d) Acetone
e) 2,2-dichloropropanal

Ans e

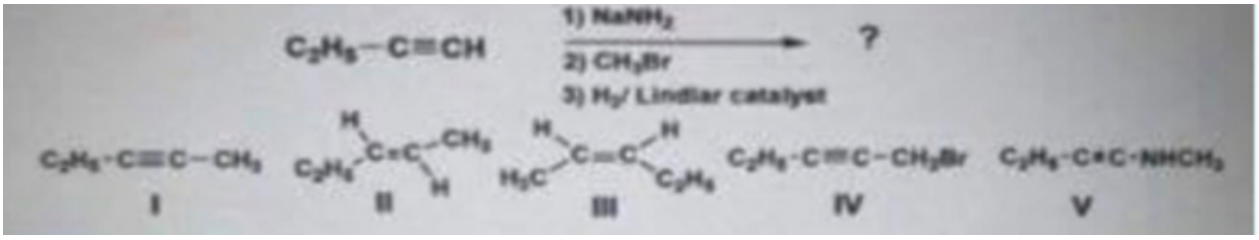
74- . what is the major product of the following reaction?



a) A
b) B
c) C
d) D
e) E

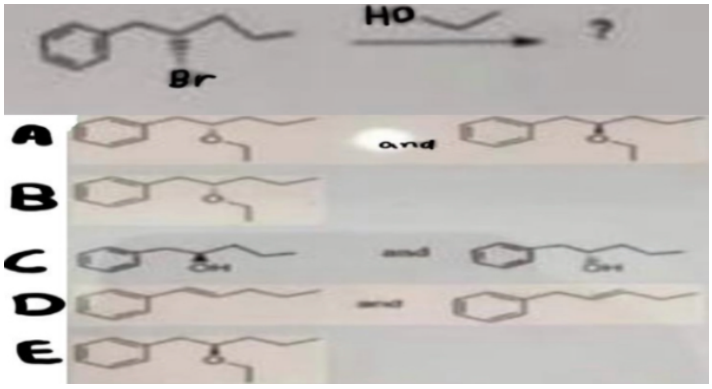
Ans e

75- . What is the major product of the following reaction?



Ans a

76- . What is the major product of the following reaction?



Ans a

77- . What products will be formed when 2-butene is treated with m-choloperbenzoic acid (peroxyacid) followed by methanol/H+?

a) 3-chlorobutan-2-ol
b) 2,3-butanediol
c) 2-butene oxide
d) Butyl methyl ketone
e) 3-methoxybutan-2-ol

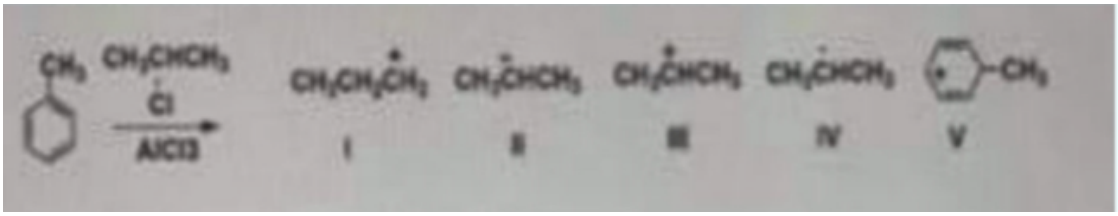
Ans e

78- . Which carbonyl compound reacts fastest with nucleophiles:

a) 2,2-dichloropropanal
b) Cyclopentanone
c) 2,4,6-trimethylbenzaldehyde
d) 2,2-dimethylbutanal
e) Acetone

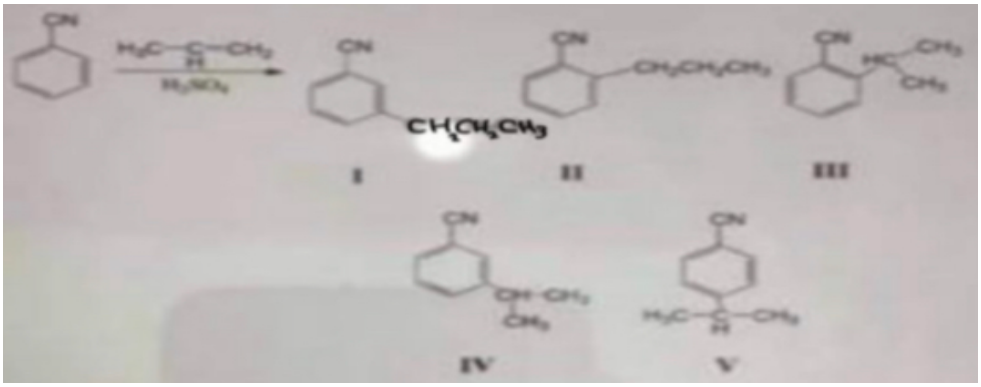
Ans a

79- . Which is the electrophilic reagent generated in this reaction?



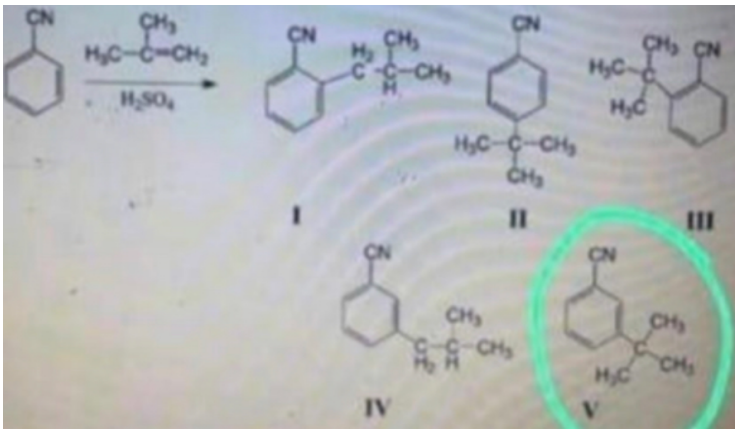
Ans III

80- . The product(s) in the following reaction is(are)



ans IV only

81- . The product(s) in the following reaction is(are);



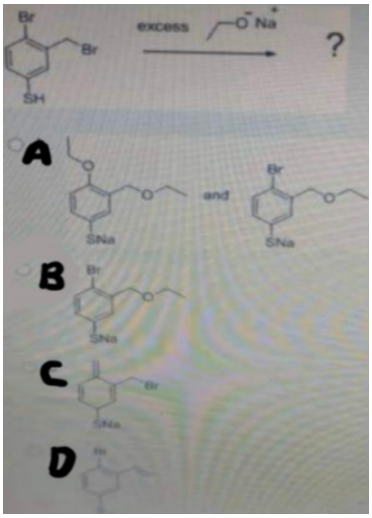
Ans :V

82- . Which carbonyl compound reacts slowest with nucleophiles?

a) Acetaldehyde
b) Cyclohexanone
c) Diethyl ketone
d) Formaldehyde
e) Disopropyl ketone

Ans e

83-



. What is the major product of the previous reaction?

a) A
b) B
c) C

d) D

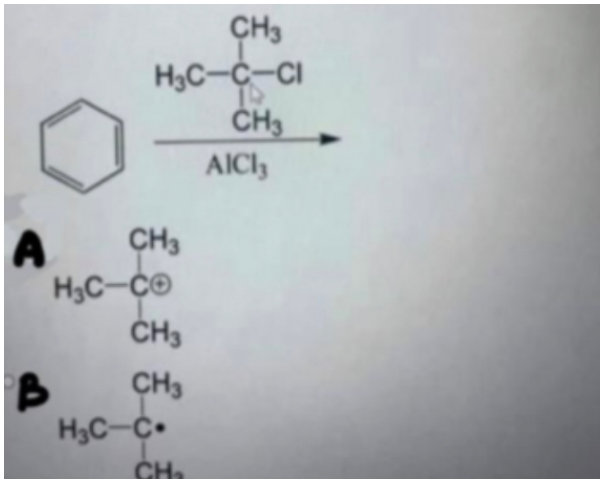
Ans :b

84- . Which of the following is least reactive toward nucleophilic acyl substitution?

a) a. CH3COCI
b) B.CH3CO2CH3
c) CHaCONH2
d) C6H5CO2CH3

Ans:c

85- . The electrophilic reagent in the following reaction is



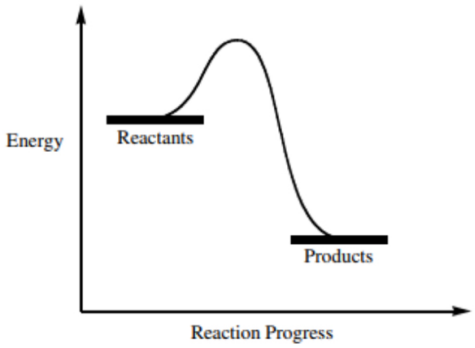
A

B

Ans:a

86-

The following diagram represent



A) Endothermic SN_1 reaction
B) Endothermic SN_2 reaction
C) Exothermic SN_1 reaction
D) Exothermic SN_2 reaction

Sol : D

87-

Which nucleophile gives highest overall reaction rate in SN_1 reactions?

A) I^-
B) Br^-
C) Cl^-
D) All gives the same rate

Sol : D

88-

The SN_1 mechanism for nucleophilic substitution reactions

A) involves one step and occurs fastest with primary halides.
B) involves one step and occurs fastest with tertiary halides.
C) involves two steps and occurs fastest with tertiary halides.
D) involves two steps and occurs fastest with primary halides.

Sol : C

89-

The SN_2 mechanism for nucleophilic substitution reactions

A) involves two steps and occurs with inversion of configuration.

B) involves one step and occurs with inversion of configuration.

C) involves two steps and occurs with racemization.

D) involves one step and occurs with retention of configuration.

Sol : B

90-

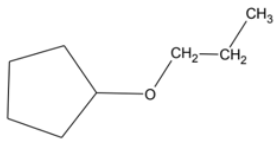
Which of the following is a polar aprotic solvent?

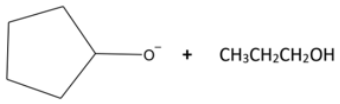
A) H_2O
B) $(CH_3)_2NCHO$
C) $(CH3)_2S=O$
D) B+C

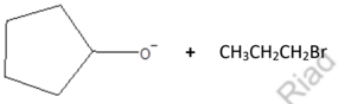
Sol : D

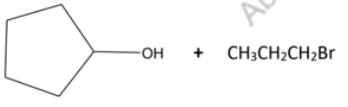
91-

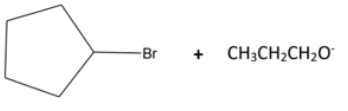
The best reaction for the preparation of the following compound



A) 

B) 

C) 

D) 

Sol : B

92-

Which of the following is the best leaving group?

A) HO^-
B) Cl
C) I^-
D) Br^-

Sol : C

93-

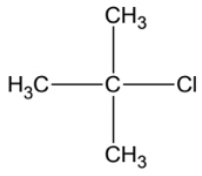
Which of the following is the best leaving group?

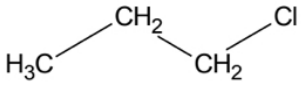
A) $CH_3SO_3^-$
B) CH_3COO^-
C) CN^-
D) OH^-

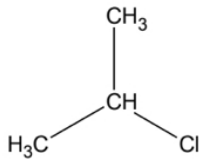
Sol : A

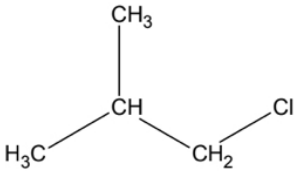
94-

Which halide is most reactive in SN_2 reactions

A) 

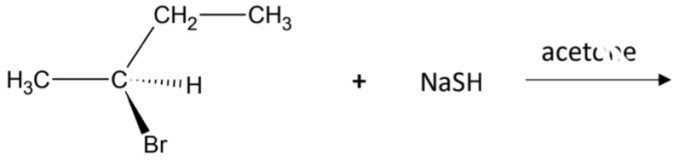
B) 

B) 

D) 

Sol : B

95-
Which statement is not correct for the following substitution reaction



A) It is a one step reaction
B) It is faster in aprotic solvents
C) A carbocation intermediate is formed
D) the product is optically active

Sol : C

96-
What is the mechanism of the following reaction?

A) SN_1
B) SN_2
C) E_1
D) E_2

Sol : B

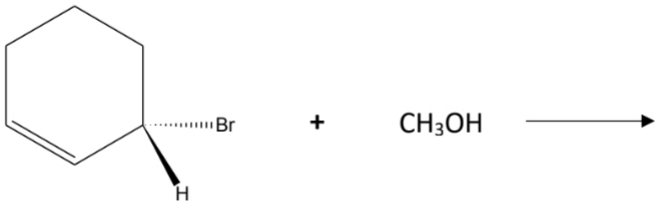
97-
Which of the following is an incorrect representation of relative nucleophile strength?

A) $NH_2^- > F^-$
B) $HO^- > HS^-$
C) $CH3^- > HO^-$
D) $CH3O^- > CH3OH$

Sol : B

98-

Which statement is correct about the following reaction



A) The rate increase by increasing the concentration of CH_3OH
B) It is faster in aprotic solvents
C) A carbocation intermediate is formed
D) It is a one step

Sol : C

99-

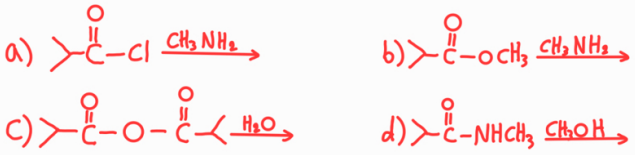
Which of the following is the best nucleophile?

A) CH_3OH
B) CH_3O^-
C) CH_3S^-
D) CH_3SH

Sol : C

100-

Which of the following reactions does not occur?



Ans: d

101-

Which statement is true for SN2 RXN ?

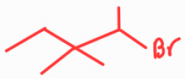
a) Reaction rate depends on stability of carbocation
b)Reaction rate depends only on the nucleophile
c)Reaction occurs with inversion of configuration
d)Reaction is fastest with tertiary halides

Ans : c

102-

which halide reacts fastest which $CH_3S^-Na^+$?

a) 

b) 

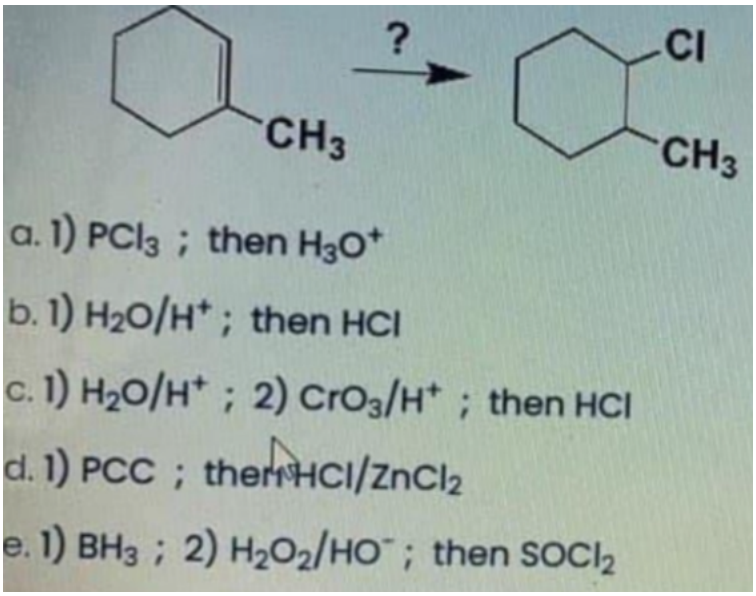
c) 

d) 

Ans: d

103-

Which reaction conditions will achieve the following conversion?



Ans e