



CHEMISTRY

BOOKS - PATHFINDER CHEMISTRY (BENGALI ENGLISH)

HALOALKANES AND HALOARENES

Question Bank

1. What is racemic mixture?

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2. Why are enantiomers also called optical isomers?

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3. Arrange the following in increasing order of property indicated

CH_3F , CH_3Cl , CH_3Br , CH_3I (reactivity towards nucleophilic substitution reaction)

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4. What happens when n-Butyl chloride is treated with alcoholic KOH?

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5. Give Wurtz reaction.

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6. Draw the structure of 1-chloro-4-ethylcyclohexane.

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7. Why the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride.

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8. Grignard reagents should be prepared in anhydrous condition. Why?

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9. Give one use of Freon-12.

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10. Where is iodoform used?

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11. Why is thionyl chloride considered as the best reagent to convert alcohol into alkyl chlorides?

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12. Discuss the ability of alkyl halides to dissolve in water.

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13. Discuss the ability of alkyl halides to dissolve in organic solvent.

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14. Neopentyl bromide undergoes nucleophilic substitution reactions very slowly. Why?

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15. What happens when $CHCl_3$ reacts with oxygen in presence of sunlight?

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16. Tert-butyl chloride reacts with aqueous NaOH by S_N1 while n-butyl chloride reacts by S_N2 mechanism. Why?

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17. Vinyl chloride is unreactive in nucleophilic substitution reaction. Explain

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18. Differentiate between retention and inversion.

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19. Which compound in each of the pairs have higher boiling point. Give reason.

n-butyl chloride and isobutyl chloride



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20. Which compound in each of the pairs have higher boiling point. Give reason.

2-bromo-2-methyl propane and 1-bromo-2-methylpropane



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21. Which compound in each of the pairs have higher boiling point. Give reason.

Chloroethane and bromoethane



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22. Explain the following terms

Plane polarized light

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23. Explain the following terms

optical activity

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24. Explain the following terms

asymmetric molecule

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25. What do you understand by

Chirality





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26. What do you understand by

Racemic modification



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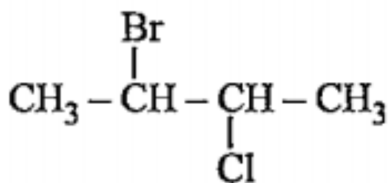
27. What do you understand by

Meso compound



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28. Give IUPAC name of the following:



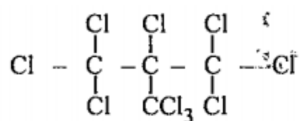
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29. Give IUPAC name of the following:



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30. Give IUPAC name of the following:



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31. Although chlorine is an electron-withdrawing group, yet it is ortho-, para-directing in electrophilic aromatic substitution reactions. Why?

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32. Draw the resonance structures of chlorobenzene and further explain why it does not undergo nucleophilic substitution reaction easily.

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33. Describe the nucleophilic substitution reaction giving two different types of mechanisms.

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34. Sweet smelling organic compound is slowly oxidized by air in presence of light to a highly poisonous gas. On heating with silver powder, it forms a gaseous substance B, which is also produced by the action of calcium carbide on water. Identify A and B and write the chemical equations of the reactions involved.

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35. Write all the structural isomers of C_4H_9Br and IUPAC name of those.

Classify them as primary, secondary and tertiary bromide

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36. Arrange the following haloalkanes according to their decreasing b.p.



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37. Arrange each set of compounds in order of increasing boiling points: bromomethane, bromoform, chloromethane, dibromomethane.

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38. Arrange each set of compounds in order of increasing boiling point: 1-chloromethane, Isopropyl chloride, 1-chlorobutane.



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39. Write the products of



reaction



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40. Write the products of

$CH_3 - CH_2 - CH = CH_2 + HCl \rightarrow$ reaction



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41. Write the products of



reaction



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42. An alkane of molecular formula (C_5H_{12}) yields three monochlorides on photochemical chlorination. Identify the alkane

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43. How will you bring about ethanol \rightarrow ethyl chloride (single step) conversion?

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44. How will you bring about toluene \rightarrow benzyl bromide (single step) conversion?

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45. How will you bring about ethanol \rightarrow ethyl fluoride (2 steps) Conversion ?



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46. Which is better leaving group $MeSO_3^{\ominus}$ or $CF_3SO_3^{\ominus}$?



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47. 

Can you predict a suitable reason for the above observation ?



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48. Identify the product (s) in the  reaction



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49. Identify the product (s) in the  reaction



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50. In the following pairs of halogen compounds, which would undergo SN2 reaction faster ?



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51. Whether the reaction is feasible or not ?



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52. Arrange the following in decreasing order of stability of their transition state during elimination by strong base



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53. The most probable product in the following reaction is :



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54. Identify various products of SN1 and E1 reaction of the following reaction .



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55. 

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56. Identify A,B,P,R,R,E and F in the following





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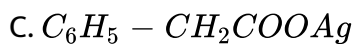
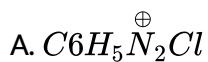
57. 

What is the organic product formed ?



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58. Chlorobenzene can be prepared from:



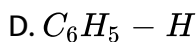
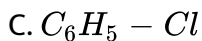
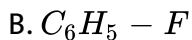
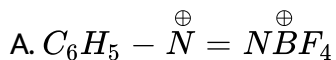
D. all of these

Answer: A



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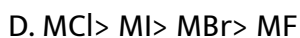
59. In the given reaction, $C_6H_5\overset{\oplus}{N}_2Cl \xrightarrow{HF / BF_3 / \Delta} [X], [X]$ will be :



Answer: B

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60. In alkali metals, the covalent character decreases in the order:



Answer: D

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61. 

Predict the product (s)?

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62. Which of the following salts will give highest pH in water?

A. (a) KCl

B. (b) NaCl

C. (c) Na_2CO_3

D. (d) CuSO_4

Answer: B

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63. Which of the following oxides is not expected to react with sodium hydroxide?

- A. (a) CaO
- B. (b) SiO_2
- C. (c) BeO
- D. (d) B_2O_3

Answer: C



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64. Potassium super oxide is used in space and submarines because it:

- A. (a) Absorbs carbon-dioxide and increases oxygen contents.
- B. (b) Eliminates moisture and increases CO contents.

C. (c) Absorbs carbon-dioxide only

D. (d) Produces Ozone.

Answer: D

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65. A metal (M) burns with dazzling brilliance in air to give a white powder. The white powder reacts with water to form a white precipitate and a colourless gas with a characteristic smell. The metal (M) decomposes hot water but not cold water, liberating the inflammable hydrogen gas. The metal (M) is:

A. (a) K

B. (b) Ca

C. (c) Mg

D. (d) Rb

Answer: A



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66. Solution of sodium metals in liquid ammonia is strongly reducing due to the presence of :

- A. (a) Sodium hydride
- B. (b) Sodium atoms
- C. (c) Sodium amide
- D. (d) Solvated electrons

Answer: B



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67. Each of the following reaction is given by tertiary butyl bromide, except

- A. SN1

B. Sn₂

C. E1

D. E2

Answer: B

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68. Amongst the following the total number of elements , which produce Hydrogen gas with Sodium Hydroxide is: Zn, Al, Sn, Pb, P, Si

A. (a) 3

B. (b) 4

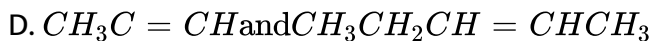
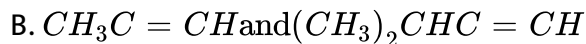
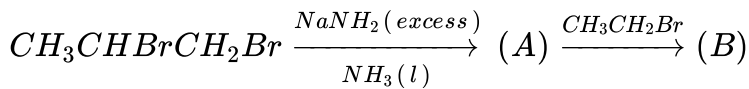
C. (c) 5

D. (d) 6

Answer: C

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69. Consider the following sequence of reactions

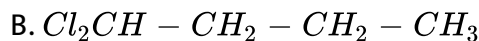


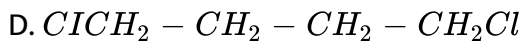
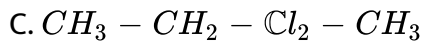
Answer: C



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70. Upon treatment with I_2 and aqueous NaOH, which of the following compounds will form iodoform?

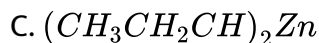
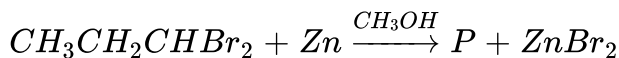




Answer: C

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71. What is the product (P) in the following reaction?



D. None of these

Answer: A

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72. Convert Ethanoic acid into methanamine.

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73. Freon-12 is used as

- A. household refrigerants
- B. deodorant
- C. foaming agent
- D. all of these

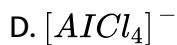
Answer: D

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74. The combustion of sodium in excess air yields a higher oxide. What is the oxidation state of the oxygen in the product?

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75. Chlorobenzene is formed by reaction of chlorine with benzene in the presence of $AlCl_3$. Which of the following species attacks the benzene ring in this reaction?



Answer: B



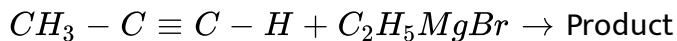
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76. Hydrogen reacts with a metal (A) to give an ionic hydride (B). The metal (A) gives brick red colour with bunsen flame. The hydride formed is commonly known by its trade name. The compound (B) on treating with water gives back hydrogen and (C). Identify group of (A).



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77. What is the product in the following reaction ?



A. 

B. C_2H_6

C. $CH_3 - C \equiv C - C_2H_5$

D. None of these

Answer: B



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78. The synthesis of alkyl fluorides is best accomplished by

A. Sandmeyer's reaction

B. Finkelstein reaction

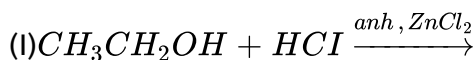
C. Swarts reaction

D. Free radical fluorination

Answer: C

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79. Which of the following reaction(s) can be used for the preparation of alkyl halides ?



A. (I),(III) and (IV) only

B. (I) and (II) only

C. (IV) only

D. (III) and (IV) only

Answer: A



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80. In an S_N1 reaction on centres there is

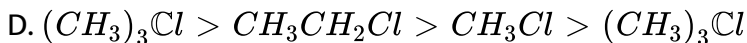
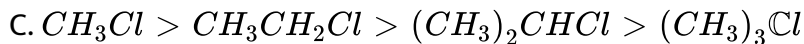
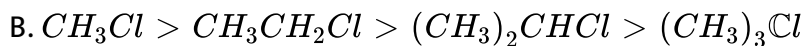
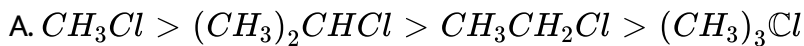
- A. 100 % racemization
- B. inversion more than retention leading to partial racemization
- C. 100 % retention
- D. 100 % inversion

Answer: B



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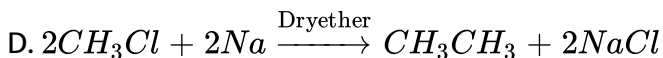
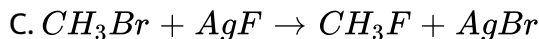
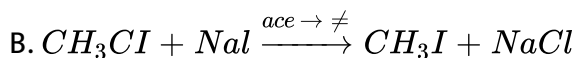
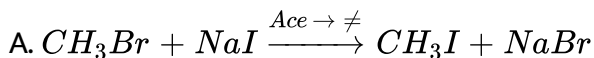
81. In S_N2 reactions, the correct order of reactivity for the following compounds CH_3Cl , CH_3CH_2Cl , $(CH_3)_2CHCl$ and $(CH_3)_3Cl$ is :



Answer: B

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82. Which one is the Swarts reaction from the following?



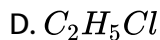
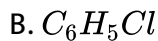
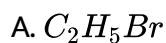
Answer: C

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83. What are carbides? Mention the 3 different types of carbides with example.

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84. Which of the following alkyl halides is used as a methylating agent ?



Answer: C

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85. Assertion alkyl benzene is not prepared by Friedel-Crafts alkylation of benzene.

Reason Alkyl halides are less reactive than acyl halides in S_N reaction.

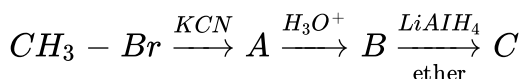
- A. If both Assertion and Reason are true and reason is correct explanation of Assertion
- B. If both Assertion and Reason are true but reason is not the correct explanation of Assertion
- C. Assertion is false but reason is true
- D. If both Assertion and Reason are false

Answer: D



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86. In the following sequence of reactions,



the end product (C) is

- A. acetone
- B. methane
- C. acetaldehyde
- D. ethyl alcohol

Answer: D



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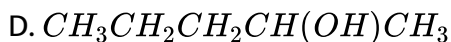
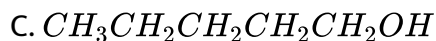
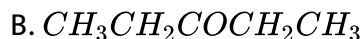
87. Which of the following compounds will give a yellow precipitate with iodine and alkali ?

- A. Acetophenone
- B. Methyl acetate
- C. Acetamide
- D. 2-hydroxypropane

Answer: A::D

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88. Upon treatment with I_2 and aqueous NaOH, which of the following compounds will form iodoform ?



Answer: D

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89. Which one of the following is not formed when a mixture of methyl bromide and bromobenzene is heated with sodium metal in the presence

of dry ether ?

A. Diphenyl

B. Propane

C. Toluene

D. Ethane

Answer: B



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90. Alkyl halide is converted into alcohol. This is an example of reaction

A. Addition

B. displacement

C. substitution

D. complex formation

Answer: C



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91. When alkyl halide is heated with dry Ag_2O it produces

- A. ester
- B. ether
- C. ketone
- D. alcohol

Answer: B



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92. In alkaline hydrolysis of a tertiary halide by aqueous solution of alkali if concentration of alkali is doubled, then the reaction

- A. Will be doubled
- B. will be halved

C. will remain constant

D. None of these

Answer: C

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93. Neopentyl alcohol on treatment with HBr gives

A. neopentyl bromide

B. 2-bromo-2-methylbutane

C. 2-methyl-2-butane

D. 2-methyl-1-butene

Answer: B

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94. Which one of the following compounds will give in the presence of peroxide different from that obtained in the absence of peroxide ?

- A. 1-butene, HI
- B. 1-Butene, HBr
- C. 2-Butene, HCl
- D. 2-Butene, HBr

Answer: B



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95. On monochlorination of 2-methylbutane, the total number of chiral compounds are

- A. 2
- B. 4
- C. 6

D. 8

Answer: A

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96. 1-chloro-4- fluorobutane is allowed to react with one equivalent of NaI in acetone whereby a precipitate is formed. The precipitate formed is

A. NaCl

B. NaF

C. $FCH_2CH_2CH_2CH_2I$

D. $ClCH_2CH_2CH_2I$

Answer: A

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97. SN1 reactions usually proceed with

A. Methyl > isopropyl > allyl > benzyl > neopentyl

B. Benzyl > allyl > neopentyl > isopropyl > methyl

C. Methyl > allyl > Isopropyl > neopentyl > benzyl

D. Allyl > methyl > isopropyl > neopentyl > benzyl

Answer: B



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98. When a lead storage battery is recharged:

A. (a) Lead Sulphate is formed

B. (b) Lead is formed

C. (c) Sulphur-Dioxide is consumed

D. (d) Sulphuric acid is formed

Answer: B

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99. Select the correct statement with respect to sodium peroxide?

- A. (a) It decolourises the acidified potassium permanganate solution
- B. (b) On heating with oxygen at 450 degree celcius and 300atm pressure, it becomes paramagnetic.
- C. (c) It is obtained along with sodium metal, when sodium oxide is heated to a temperature more than 400 degree celcius.
- D. (d) It gives both hydrogen peroxide and oxygen gas with water as well as with sulphuric acid.

Answer: A

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100. Property of the alkali metals that increases with their atomic number is:

A. (a) Ionic mobility of their ions in water.

B. (b) Solubility of their sulphates.

C. (c) Solubility of their carbonates.

D. (d) Solubility of their hydroxides.

Answer: B



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101. Which of the following disproportionates(s) on heating with NaOH ?

A. (A) P_4

B. (B) S_8

C. (C) Cl_2

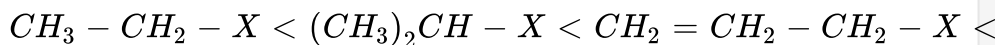
D. (D) B

Answer: B

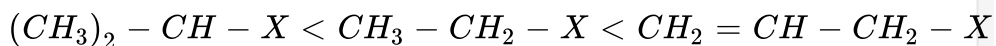
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102. The correct increasing order of the reactivity of halides for SN1 reaction is

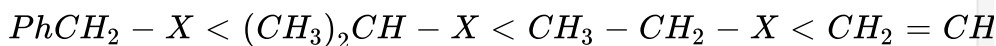
A.



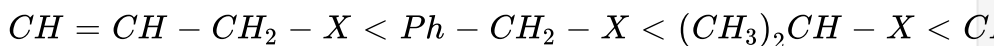
B.



C.



D.



Answer: A





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103. To prepare a buffer solution of $\text{pH}=4.04$, amount of Barium acetate to be added to 100mL of 0.1 M acetic acid solution [$\text{p}K_b(\text{CH}_3\text{COO}^-)=9.26$] is:

- A. (a) 0.05 mole
- B. (b) 0.025 mole
- C. (c) 0.1 mole
- D. (d) 0.005 mole

Answer: B



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104. Hypo is used in photography to:

- A. (a) reduce AgBr grains to metallic silver.
- B. (b) convert metallic silver to silver salt.

C. (c) remove undecomposed silver bromide as a soluble complex.

D. (d) remove reduced silver.

Answer: A

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105. Why does bleeding stops by rubbing moist alum?

A. `

B.

C.

D.

Answer: C

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106. Explain the Lewis acid character of Boric acid.

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107. Although aluminium is above hydrogen in the electro-chemical series, it is stable in air and water.

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108. Why is it necessary to remove CO when ammonia is obtained in Haber's process?

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109. SN1 reactions usually proceed with

- A. Equal amounts of inversion and retention at the centre undergoing substitution
- B. slightly more inversion than retention at the centre undergoing substitution
- C. Retention of configuration
- D. Complete inversion

Answer: B

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110. Name the enzymes and write the reactions involved in the preparation of ethanol from sucrose by fermentation.

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111. Which of the following on treatment with $NaNH_2$ in liquid NH_3 gives m-methoxy aniline ?

- A. o-bromoanisole
- B. m-bromoanisole
- C. None of the above
- D. Both (1) and (2)

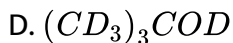
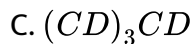
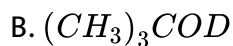
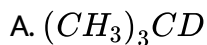
Answer: D

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112. How will you convert an alkyl bromide to a primary alcohol having two more carbons than the bromide?

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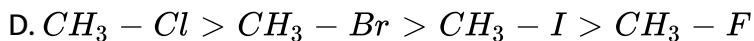
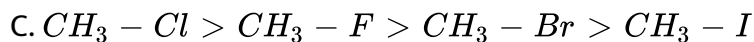
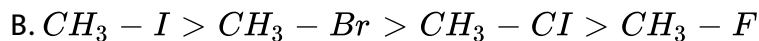
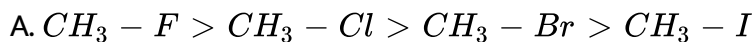
113. $(CH_3)_3CMgCl$ on reaction with D_2O produces



Answer: A

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114. The correct decreasing order of the dipole moment in CH_3Cl , CH_3Br and CH_3F is



Answer: C

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115. Which of the following alkenes would be the best choice as a starting material for preparing 3,4 -dimethyl-3-bromohexane ?

- A. 3,4-dimethyl-3-hexene
- B. 3,4-dimethyl-1-hexene
- C. 3,4-dimethyl-2-hexene
- D. 2-ethyl-3-methyl-1-pentene

Answer: B

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116. Reaction of HBr with propene in presence of peroxides gives

- A. Isopropyl bromide
- B. 3-Bromopropane

C. Alkyl bromide

D. n-propyl bromide

Answer: D

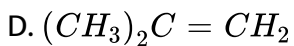
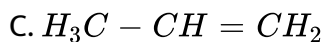
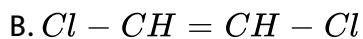
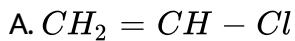
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117. Write down the structure of the product in the following reaction:

3,3-dimethyl-2-butanol (in presence of conc. Sulphuric Acid) \rightarrow

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118. The addition of HBr is easier with



Answer: D

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119. 2-Methylbutane on reacting with Br_2 in presence of sunlight mainly gives

- A. 1-Bromo-2-methylbutane
- B. 2-Bromo-2- methylbutane
- C. 2-Bromo-3-methylbutane
- D. 1-Bromo-3- methylbutane

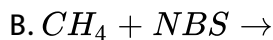
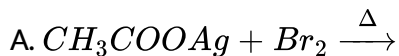
Answer: B

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120. When phenol reacts with phosphorus pentachloride, minor amount of chlorobenzene is formed. What is the major product?

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121. CH_3Br can be prepared by

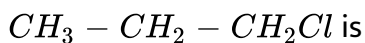
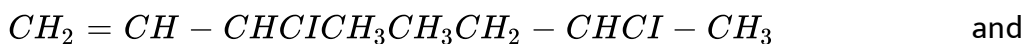


D. Both (1) & (2) are correct

Answer: A

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122. The order of decreasing $\text{S}_{\text{N}}1$ reactivities of the halides



A. $I > II > III$

B. $II > I > III$

C. $II > III > I$

D. $III > II > I$

Answer: A

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123. Anhydrous calcium chloride cannot be used for drying ethanol. Why?

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124. Which of the following is more reactive towards moist Ag_2O ?

A. CH_3Cl

B. CH_3CH_2Cl

C. CH_3OCH_2Cl

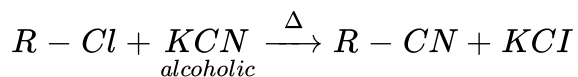
D. $CH_3CH_2CH_2Cl$

Answer: C



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125. Following is the substitution reaction in which -CN replaces -Cl.



To obtain propanenitrile, R -Cl should be

- A. chloroethane
- B. 1-chloropropane
- C. chloromethane
- D. 2-chloropropane

Answer: A



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126. Which one of the following is not true for the hydrolysis of t-butyl bromide with aqueous NaOH?

- A. Reaction occurs through the SN1 mechanism.
- B. The intermediate formed is a carbocation.
- C. Rate of the reaction doubles when the concentration of alkali is doubled.
- D. Rate of the reaction doubles when the concentration of t-butyl bromide is doubled.

Answer: C

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127. A trihydric alcohol is used for domestic purposes. Write its structural formula.

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128. What is denatured alcohol?

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129. Which is true regarding E1 reaction of an alkyl halide?

A. Different halides (Fluoride, chloride, bromide and iodide) with same alkyl group have same reactivity.

B. A stronger base react at faster rate.

C. Rate = [alkyl halide][base]²

D. It always competes with SN1 reaction.

Answer: D

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130. In an SN1 reaction on centres there is

- A. Increasing the conc. Of reactant
- B. Increasing the conc. Of base
- C. Increasing the temperature
- D. Increasing the polarity of solvent

Answer: C

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131. What happens when benzenediazonium chloride is heated with water?

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132. Out of o-nitrophenol and o-cresol, which is more acidic?

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133. Out of o-nitrophenol and p-nitrophenol, which is more volatile?

Explain.

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134. Chloro benzene is sulphonated with fuming sulphuric acid. The major product formed is

- A. 2-chlorobenzene sulfonic acid
- B. 3-chloro benzene sulphonic acid
- C. 4-chloro benzene sulphonic acid
- D. Benzene sulphonyl chloride

Answer: C

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135. Chlorobenzene on treatment with sodium in dry ether gives diphenyl.

The name of the reaction is

- A. Fitting reaction
- B. Wurtz-Fittig reaction
- C. Sandmeyer reaction
- D. Wurtz reaction

Answer: A

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136. Why are ethers used as a solvent?

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137. The IUPAC name of the compound formed in the reaction of chlorobenzene with chloral is

- A. dichlorodiphenyltrichloroethane
- B. p,p'-dichlorodiphenyltrichloroethane
- C. 1,1-bis (4-chlorophenyl)-2,2,2-trichloroethane
- D. 1,1,1-trichloro -2,2-bis (4-chlorophenyl)ethane

Answer: D

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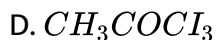
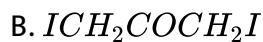
138. Which of the following does not give iodoform test?

- A. Ethanol
- B. Ethanal
- C. Benzophenone
- D. Acetophenone

Answer: C

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139. Which of the following compounds is not formed in iodoform reaction of acetone ?



Answer: B

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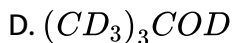
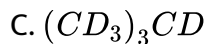
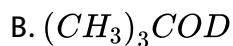
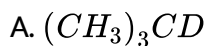
140. Why is chemisorption referred to as activated adsorption?

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141. How will you convert cyclohexanol into adipic acid?

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142. $(CH_3)_3CMgCl$ on reaction with D_2O produces



Answer: A

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143. Arrange the following compounds in order of increasing dipole moment, Toluene (I), m-dichlorobenzene (II), o-dichlorobenzene (III) and p-dichlorobenzene (IV).

A. $I < IV < II < III$

B. $IV < I < II < III$

C. $IV < I < III < II$

D. $IV < II < I < III$

Answer: B



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144. CCl_4 is used as a fire-extinguishing liquid for petroleum fire because:

A. It has low b.p and is easily vaporised

B. It is non- toxic

C. It is non-combustible and heavier than air

D. Insoluble in water

Answer: C

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145. Allyl chloride on dehydrochlorination gives

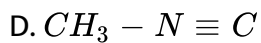
- A. propadiene
- B. propylene
- C. allyl alcohol
- D. acetone

Answer: A

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146. $CH_3 - NH_2 + CHCl_3 + KOH \rightarrow X + KCl + H_2O$ 'X' is

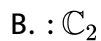
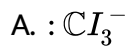
- A. $CH_3 - CN$
- B. $(CH_3)_2NH$
- C. $CH_3 - \overset{\theta}{N} \equiv C$



Answer: C

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147. $CHCl_3 + OH^- \rightarrow HCOO^-$ Intermediate of this reaction can be



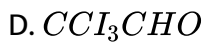
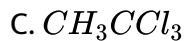
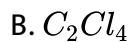
C. Both

D. None

Answer: B

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148. Perchloroethylene is

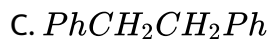
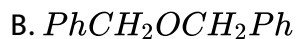


Answer: B

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149. In the reaction sequence $PhCH_3 + Cl_2 \xrightarrow{\text{heat}} A \xrightarrow{\text{aqKOH}} B \xrightarrow{Na} C$

$A + C \rightarrow d$, The product 'D' is



Answer: B



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150. Which among the following methods gives symmetrical and unsymmetrical alkane from alkyl halides ?

- A. Wurtz reaction
- B. Corey-House synthesis
- C. Frankland reaction
- D. All of these

Answer: B



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151. Cyclohexanol is more soluble in water than hexan-1-ol. Explain.



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152. An alkyl halide with molecular formula $C_6H_{13}Br$ on dehydrohalogenation gave two isomeric alkenes X and Y with molecular formula C_6H_{12} . On reductive ozonolysis, X and Y gave four compounds CH_3COCH_3 , CH_3CHO , CH_3CH_2CHO and $(CH_3)_2CHCHO$. The alkyl halide is

- A. 2-bromohexane
- B. 2,2-dimethyl-1-bromobutane
- C. 4-bromo-2-methylpentane
- D. 3-bromo-2-methylpentane

Answer: D

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153. How will you obtain monobromobenzene from aniline?

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154. Why do we add alum to purify water?

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155. Which colloidal sol is administered to a patient suffering from arsenic poisoning?

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156. In moist air, copper corrodes to produce a green layer on the surface. Explain.

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157. n-propyl bromide would give SN2 reactions under which of the following condition(s)?

A. NaN_3

B. NaOH,DMF

C. $CH_3COO^- Na^+$, CH_3COOH

D. LDA,DMF

Answer: A::B::C

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158. Aryl halides that have no activating substituent (electron withdrawing substituent) at ortho or para position do not generally react with nucleophiles under ordinary laboratory conditions. However, they can be made to undergo nucleophilic aromatic substitution of halogen by using very nucleophilic aromatic substitution of halogen by using very strong base (formation of benzyne intermediate) and addition of nucleophile (NH_3 in this case) to the benzyne intermediate.

The main intermediate formed in the reaction of m-bromoanisole with $NaNH_2$ in liquid ammonia is

A. 

B. 

C. 

D. 

Answer: C

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159. 

Find out Value of 'x'.

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160. 

Find out value of 'X'.

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161. Find out numbers of possible E_1 products from following reaction.



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162. Identify number of substrate those can give SN1 and SN2 reaction both.



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163. How many substrates will show rearrangement during SN1 reaction



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164. What are A,B,C,E and F in the following reactions?



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165. What happens when aluminium is heated with hot concentrated sodium hydroxide?

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166. Vinyl chloride does not give nucleophilic substitution reactions but allyl chloride gives. Explain.

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167. When $CH_3CH = CHCH_2Cl$ reacts with alcoholic KCN, a mixture of isomeric products is obtained. Explain

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168. 

Write down the structure of A and B.

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169. Write chemical structures of monomers used in the manufacture of teflon, Orlon, PVC.

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170. Ethyl phenyl ether can be obtained by method I or II given below:



Which path is adopted ?

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171. Ammonia has a higher boiling point than PH₃. Why?

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172. Benzyl chloride ($C_6H_5CH_2Cl$) can be prepared from toluene by chlorination with

A. SO_2Cl_2

B. $SOCl_2$

C. $Cl_2/h\nu$

D. NaOCl

Answer: A::C

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173. Which of the following is/are expected to have dipole moments ?

A. cis-1,2-dichloroethene

B. trans-1,2-dichloroethene

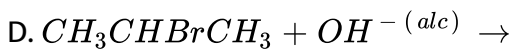
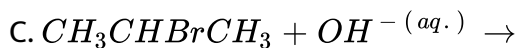
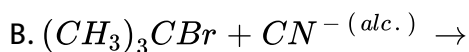
C. cis-1,2-dibromoethene

D. trans-1,2-dibromoethene

Answer: A::C

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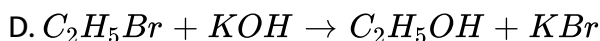
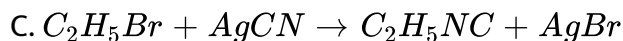
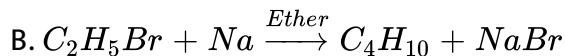
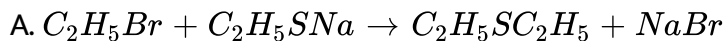
174. Of the following , which is/are SN2 reactions?



Answer: A::C

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175. Which of the following reactions depict the nucleophilic substitution of C_2H_5Br ?



Answer: A::C::D



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176. For an SN_2 reaction, which of the following statements is /are true?

A. The rate of reaction is independent of the concentration of the nucleophile.

B. The nucleophile attacks the C-atom on the side of the molecule opposite to the group being displaced.

C. The reaction proceeds with simultaneous bond formation and rupture.

D. Rearrangement occur

Answer: B::C

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177. Which of these statements is /are true for the isomeric compounds ethylene chloride and ethylidene chloride?

A. Both react with aqueous KOH to give the same product.

B. Both react with alcoholic KOH to give the same product.

C. They are derivatives of ethane.

D. They respond to Beilstein's test.

Answer: B::C::D

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178. Aryl halides are less reactive than alkyl halides towards nucleophilic reagents

- A. the formation of less stable carbonium ion
- B. resonance stabilization
- C. sp^2 -hybridized carbon attached to halogen.
- D. the inductive effect

Answer: A::B::C

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179. Which of the following statements is/are true about chloroform?

- A. It is used as an anaesthetic.
- B. It is used as a solvent.
- C. It has sp^2 -hybridized carbon.

D. It has a distorted tetrahedral shape.

Answer: A::B::D

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180. Which of the following statements is/are correct?

A. An S_N1 reaction proceeds with inversion of configuration.

B. An S_N2 reaction proceeds with stereochemical inversion

C. An S_N reaction of tert, butyl bromide with OH^\ominus follows first -order kinetics.

D. An S_N reaction of ROH and $SOCl_2$ proceeds through retention of configuration.

Answer: B::C::D

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181. Blood darkens if hydrogen sulfide enters it. Why?

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182. Why pure HI solution in a bottle acquires brown colour after sometime?

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183. Match the column I (reaction) with Column II (reaction intermediate)and select the correct answer using the codes given below the Column.

Match list -I with List_II



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184. Match the column I (reaction) with Column II (reaction intermediate) and select the correct answer using the codes given below the Column.



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185. When isopentane is monohalogenated, find total number of isomers formed.

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186. When acetaldehyde reacts with I_2 in KOH, Iodoform is formed. How many molecules of KOH are required for the reaction to give a molecule of CHI_3 .

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187. Neither pure H_2SO_4 nor pure $HClO_4$ conducts electricity but a mixture of two doses does. Explain.

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188. The number of structural isomers obtained on mono chlorination of 1,4 -dimethylcyclohexane

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189. Identify A,B,C,D,E and F in the following series of reaction.



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190. Give the structure of the nucleophile that could be used to convert ethyl bromide into each of the following compounds in an SN_2 reaction.



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191. Why ozone is thermodynamically less stable than oxygen?



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192. Give the structure of the nucleophile that could be used to convert ethyl bromide into each of the following compounds in an S_N2 reaction.



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193. Give the structure of the nucleophile that could be used to convert ethyl bromide into each of the following compounds in an S_N2 reaction.



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194. Treatment of $(\text{CH}_3)_3\text{C}=\text{CH}_2$ and $(\text{CH}_3)_3\text{C}(\text{OH})\text{CH}_3$ with conc. Hydrochloric acid gives the same two isomeric alkyl chlorides. What are these two products?

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195. When the following compound is heated in methanol, several different products are formed. Propose mechanisms to account for the four products shown.



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196. Explain



gives less substituted alkene as the major product when treated with alcoholic KOH.



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197. Name two solid elements which on combination give a liquid compound.



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198. Two isomeric S_N2 products are possible when sodium thiosulphate is allowed to react with one equivalent of methyl iodide in methanol solution. What would be the major product of this reaction.



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199. Compound X forms Y with potassium . X forms Z with $SOCl_2$. Y and Z forms propoxypropane.



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200. Tertiary alkyl undergoes solvolysis in either acetic acid or in ethanol. What is the solvolysis product in each solvent?

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201. Tertiary alkyl undergoes solvolysis in either acetic acid or in ethanol. In which solvent reaction is more rapid and why?

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202. Both the reactants can be used to prepare styrene through dehydrohalogenation reaction. Which alkyl halide is better substrate to prepare styrene.



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203. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: Alkyl iodides can be prepared by treating alkyl chlorides/bromides with NaI in acetone.

Statement-II: NaCl/NaBr are soluble in acetone while NaI is not.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: C

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204. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: Benzene reacts with iodine monochloride in presence of anhyd. $AlCl_3$ to form iodobenzene.

Statement-II: Iodine monochloride reacts with anhyd. $AlCl_3$ to produce I^+ which attacks the benzene ring.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: A

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205. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: Chlorination of ethylbenzene with Cl_2 in presence of heat and light mainly yields 1-chloro-2- phenylethane.

Statement-II: The reaction occurs through intermediate formation of the radical, $C_6H_5\dot{C}HCH_3$.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: D



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206. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: The dipole moment of CH_3F is lower than that of CH_3Cl .

Statement-II: C-F bond is more polar than C-Cl bond.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: B

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207. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I:Optically active-2 iodobutane on treatment with NaI in acetone undergoes racemization.

Statement-II:Repeated Walden inversions on the reactant and its product eventually give a racemic mixture.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: A

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208. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: SN₂ reaction of an optically active alkyl halide with an aqueous solution of KOH always gives an alcohol with opposite sign of rotation.

Statement-II: SN₂ reactions always proceed with inversion of configuration

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: D

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209. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I:n-Propyl bromide on heating with alcoholic $AgNO_2$ gives 1 - nitropropane as the main product.

Statement-II: $AgNO_2$ is an ionic compound and hence both oxygen and nitrogen electrons are available for reaction.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: C

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210. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: Bromoethane of treatment with NaCN gives ethyl carbamine as the main product.

Statement-II: Cyanide is an ambident ion.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: D

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211. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: Bromobenzene upon reaction with Br_2 / Fe gives 1,4-dibromobenzene as the major product.

Statement-II: In bromobenzene, the inductive effect of the bromo group is more dominant than the mesomeric effect in directing the incoming electrophile.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: C



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212. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: The presence of nitro group facilitates nucleophilic substitution reactions in aryl halides.

Statement-II: The intermediate carbanion is stabilized due to the presence of nitro group.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: A



213. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: Neopentyl alcohol on treatment with conc. HCl gives neopentyl chloride.

Statement-II: Neopentyl cation does not rearrange to 2-methylbutyl cation

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is false.

Answer: D



214. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I:p-Dichlorobenzene is more soluble in organic solvents than the corresponding o-isomer.

Statement-II:o-Dichlorobenzene is polar while p-dichlorobenzene is not.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: A



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215. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: SN1 reaction is basically a solvolysis reaction.

Statement-II: Polar protic solvents help the substrate to ionize and thus get involved in SN1 reaction.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: A

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216. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: Ethyl chloride is more reactive than vinyl chloride towards nucleophilic substitution reactions.

Statement-II: Vinyl group is electron-donation.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: C



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217. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: Tertiary haloalkanes are more reactive than primary haloalkanes towards elimination reactions.

Statement-II: In Case of E_1 reaction the intermediate is carbocation.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: B

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218. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: $CH_3CH_2OCH_2Cl$ reacts faster when treated with water than $CH_3CH_2OCH_2CH_2Cl$

Statement-II: Carbonium Ion formed by the ionization of $CH_3CH_2OCH_2Cl$ is stabilized by resonance.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: A

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219. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: The rate of hydrolysis of methyl chloride to methanol is higher in DMF than in water.

Statement-II: Hydrolysis of methyl chloride follows second order kinetics.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: A



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220. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: Benzyl bromide when kept in acetone water produces benzyl alcohol.

Statement-II: The reaction follows SN1 mechanism.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: C

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221. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: 2-Bromobutane on reaction with sodium ethoxide in ethanol gives 2-butene as a major product.

Statement-II: 2-Butene is more stable than-1-butene.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: A



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222. This question has statement I and Statement II . Of the four choices given after the statements, choose the one that best describes the two Statements.

Statement-I: Chloral reacts with phenyl chloride to form DDT.

Statement-II: It is an electrophilic substitution reaction.

- A. Statement-I is true, Statement-II is true, Statement-II is a correct explanation of Statement-I.
- B. Statement -I is true, Statement -II is true, Statement-II is not a correct explanation of Statement -I.
- C. Statement-I is true, Statement -II is false.
- D. Statement-I is false, Statement-II is true.

Answer: A

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