



CHEMISTRY

BOOKS - AIIMS PREVIOUS YEAR PAPERS

AIIMS 2009

Chemistry

1. KF combines with HF to form KHF_2 . The compound contains the species

A. K^+ , F^- and H^+

B. K^+ , F^- and HF

C. K^+ and $[HF_2]^-$

D. $[KHF]^+$ and F_2

Answer: C



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2. For a dilute solution, Raoult's law states that

- A. The relative lowering of vapour pressure is proportional to the amount of solute in solution
- B. The relative lowering of vapour pressure is equal to the mole fraction of solute
- C. The lowering of vapour pressure is equal to the mole fraction of the solute
- D. The vapour pressure of the solution is equal to the mole fraction of the solvent.

Answer: B



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3. To a 25mL of H_2O_2 solution, excess of acidified solution of KI was added. The iodine liberated required 20mL of 0.3 N $\text{Na}_2\text{S}_2\text{O}_3$ solution. Calculate the volume strength of H_2O_2 solution.

A. 1.344g/L

B. 3.244g/L

C. 5.4g/L

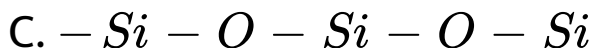
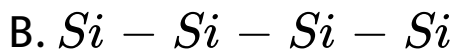
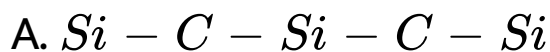
D. $4.08\text{g} / \text{L}$

Answer: D



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4. Which of the following shows bond in silicone?



D. $Si - C - Si - O - Si$.

Answer: C



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5. pH of a 0.01 M solution ($K_a = 6.6 \times 10^{-4}$)

A. 7.6

B. 8

C. 2.6

D. 5

Answer: C



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6. In a homogenous reaction $A \rightarrow B + C + D$ the initial pressure was P_0 and after time t it was P . Expression for rate constant k in terms of P_0 , P and t will be

$$\text{A. } k = \frac{2.303}{t} \log. \frac{2P_0}{3P_0 - P}$$

$$\text{B. } k = \frac{2.303}{t} \log. \frac{2P_0}{P_0 - p}$$

$$\text{C. } k = \frac{2.303}{t} \log. \frac{3P_0 - P}{2P_0}$$

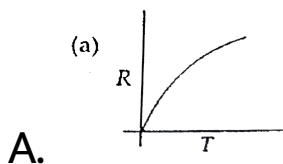
$$D. k = \frac{2.303}{t} \log. \frac{2P_0}{3P_0 - 2P}$$

Answer: A

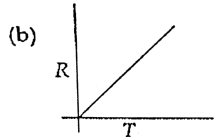


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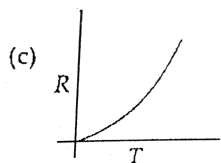
7. Which curve corresponds to the temperature dependence of the rate R of a simple one step reaction ?



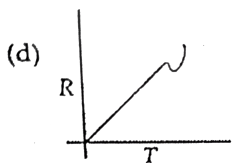
B.



C.



D.



Answer: B



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8. A vessel of one litre capacity containing 1 mole of SO_3 is heated till a state of

equilibrium is attained.



At equilibrium, 0.6 moles of SO_2 had formed.

The value of equilibrium constant is

A. 0.18

B. 0.36

C. 0.45

D. 0.68

Answer: D



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9. A 0.1 molal solution of an acid is 4.5% ionized. Calculate freezing point. (molecular weight of the acid is 300).

$$K_f = 1.86 \text{ K mol}^{-1}\text{kg}.$$

A. -0.199°C

B. 2.00°C

C. 0°C

D. -0.269°C

Answer: D



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10. Which of the following is an example of chain silicates?

A. Kaolinite

B. Zircon

C. Benitonite

D. Diopside

Answer: D



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11. Which of the element shows +4 oxidation state?

A. Sn

B. Ra

C. Fr

D. Sc

Answer: A



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12. Tincture of iodine is :

- A. aqueous solution of I_2
- B. solution of I_2 is aqueous KI
- C. alcoholic solution of I_2
- D. aqueous solution of KI.

Answer: B



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13. The specific conductance of a N/10 KCl at $25^{\circ}C$ is $0.0112 \text{ ohm}^{-1}\text{cm}^{-1}$. The resistance of cell containing solution at the same temperature was found to be 55 ohms. The cell constant will be:

A. 6.16cm^{-1}

B. 0.616cm^{-1}

C. 0.0616cm^{-1}

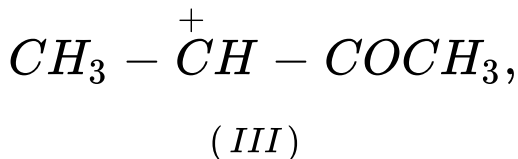
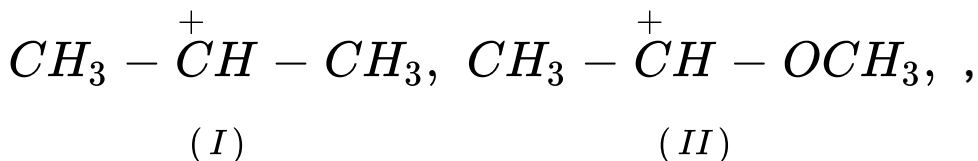
D. 616cm^{-1}

Answer: B



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14. The decreasing order of the stability of the ions



A. (i) gt (ii) gt (iii)

B. (ii) gt (i) gt (iii)

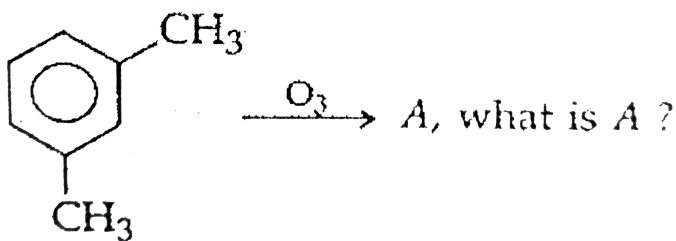
C. (ii) gt (iii) gt (i)

D. (iii) gt (i) gt (ii)

Answer: B

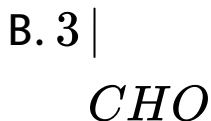
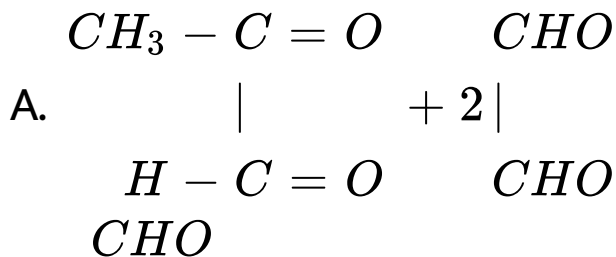


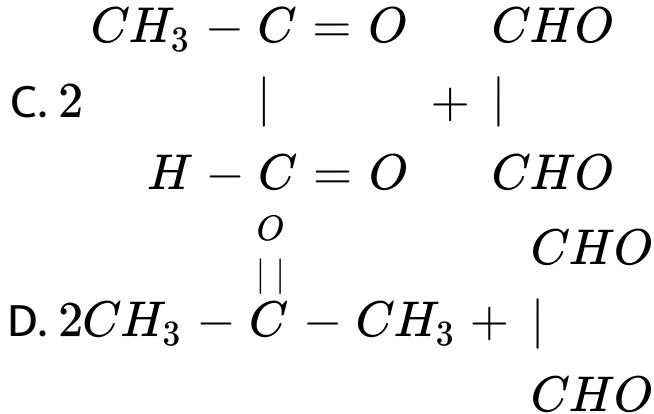
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What

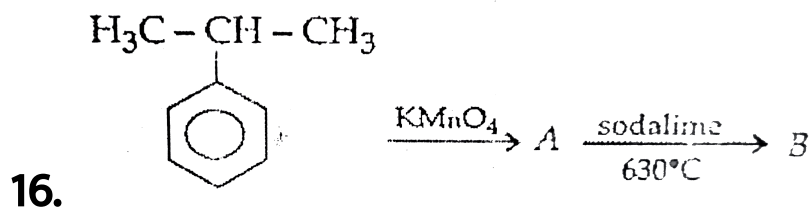
is A ?



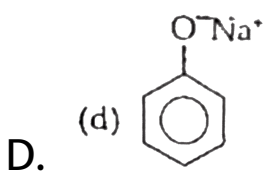
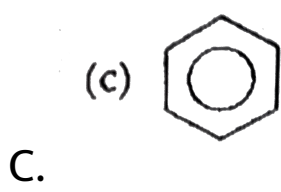
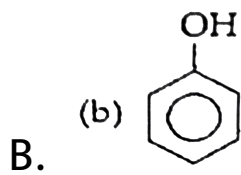
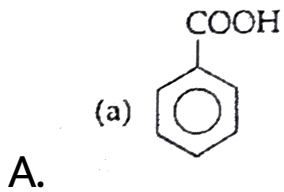


Answer: C

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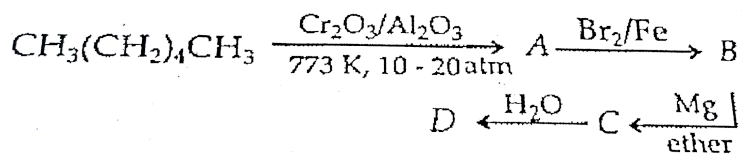
What is B ?



Answer: C

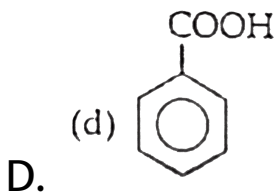
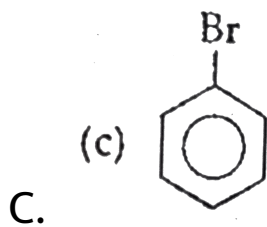
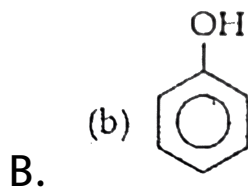
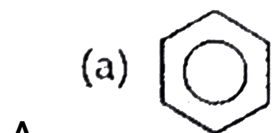


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17.

What is D ?

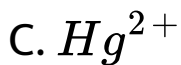
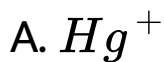


Answer: A



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18. Mercurous chloride exists in the form of

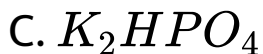
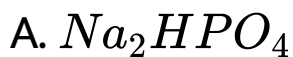


Answer: B



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19. Formula of mirccosmic salt is



Answer: B



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20. What is the molarity of H_2SO_4 solution that has a density 1.84 g/cc at $35^\circ C$ and contains 98% by weight?

A. 4.18 M

B. 8.14 M

C. 18.4 M

D. 18 M

Answer: C



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21. A mixture of two miscible liquids A and B is distilled under equilibrium conditions at 1 atm pressure. The mole fraction of A in solution and vapour phase are 0.30 and 0.60 respectively. Assuming ideal behaviour of the solution and the vapour, calculate the ratio of the vapour pressure of pure A to that of pure B.

A. 4

B. 3.5

C. 2.5

D. 1.85

Answer: B



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22. The variation of volume V , with temperature T , keeping pressure constant is called the coefficient of thermal expansion (α)

of a gas, i.e., $\alpha = \frac{1}{V} = \left(\frac{\delta V}{\delta T} \right)_P$.

For an ideal gas α is equal to

A. T

B. $1/T$

C. P

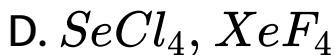
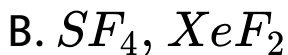
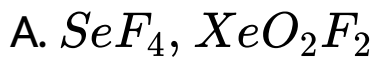
D. $1/P$

Answer: B



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23. The molecules having the same hybridization, shape and number of lone pairs of electrons are



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24. The correct order of stability for the following superoxides is



Answer: C



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25. Schottky defect to crystals is observed when

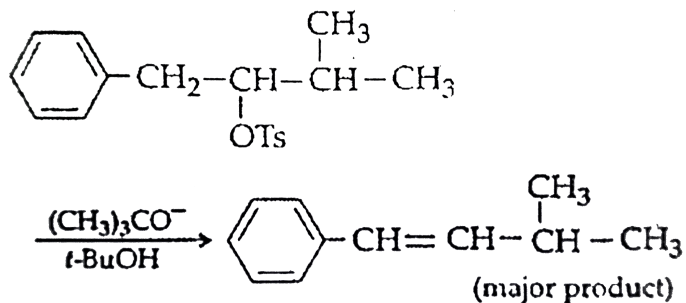
- A. unequal number cations and anions are missing from the lattice
- B. equal number of cations and anions are missing from the lattice
- C. an ion leaves its normal site and occupies an interstitial site
- D. density of the crystal is increased

Answer: B



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26. Consider the reaction



The correct explanation is

- A. The product is formed due to nucleophilic substitution
- B. The product is formed according to Saytzeff's rule

C. Conjugated double bond product is formed due to higher stability because of resonance stabilization

D. $(CH_3)_3CO^-$ is a better leaving group

Answer: C



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27. 2.5 g of the carbonate of a metal was treated with 100 ml of $1N H_2SO_4$. After the completion of the reaction, the solution was

boiled off to expel CO_2 and was then titrated against 1 N NaOH solution. The volume of alkali that would be consumed, if the equivalent weight of the metal is 20.

A. 50

B. 25

C. 75

D. 100

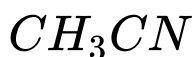
Answer: A



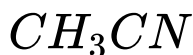
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28. In solvents like DMSO, acetonitrile, F^- ion of dissolved NaF is more reactive than in methyl alcohol. Explain

A. CH_3OH is more polar than DMSO and



B. CH_3OH is less polar than DMSO and



C. unsolvated F^- ion is DMSO or CH_3CN

acts more efficiently as nucleophile

D. $-OH$ group is a better leaving group than F^- ion

Answer: C



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29. Which of the following fluorides has the lowest melting point?

A. BaF_2

B. SrF_2

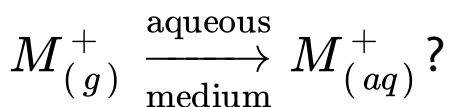


Answer: D



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30. Which of the following has the highest tendency to give the reaction,



A. Na

B. Li

C. K

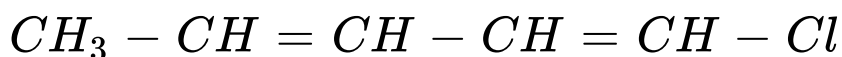
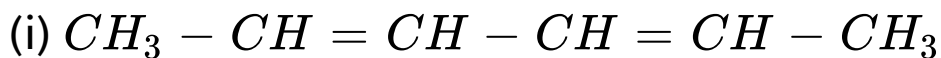
D. Rb

Answer: B



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31. How many geometrical isomers are possible in the following two alkenes?



A. 4 and 4

B. 4 and 3

C. 3 and 3

D. 3 and 4

Answer: D



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32. The equilibrium constant for mutarotation

$\alpha - \text{D Glucose} \rightleftharpoons \beta - \text{D Glucose}$ 1.8. What

percentage of α form remains at equilibrium?

A. 35.7

B. 64.3

C. 55.6

D. 44.4

Answer: A



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33. 2 phenylethylbromide when heated with NaOEt, elimination takes place. No deuterium exchange takes place when the reaction is

carried out in C_2H_5OD solvent. The mechanism will be

- A. E1 elimination
- B. E2 elimination
- C. E1cB elimination
- D. E2 or E1cB

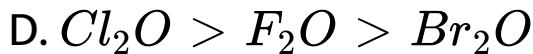
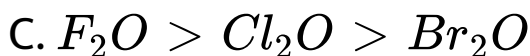
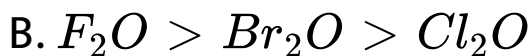
Answer: B



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34. The $M - O - M$ bond angles in M_2O

(where M is halogen) is in the order



Answer: A



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35. Hydrofluoric acid is a weak acid. At $25^{\circ}C$, the molar conductivity of 0.002 M HF is $176.2\Omega^{-1}\text{cm}^2\text{mol}^{-1}$. If its $\Lambda_m^{\circ} = 405.2\Omega^{-1}\text{cm}^2\text{mol}^{-1}$. Equilibrium constant at the given concentration is

A. $6.7 \times 10^{-4}M$

B. $3.2 \times 10^{-4}M$

C. $6.7 \times 10^{-5}M$

D. $3.2 \times 10^{-5}M$

Answer: A





36. In Oppenauer's oxidation,

A. secondary alcohol is oxidised to carboxylic acid in acetone solvent using aluminium tertiary butoxide

B. secondary alcohol is oxidised to carboxylic acid without affecting the $C = C$ or $C \equiv C$ bond by aluminium tertiary butoxide in acetone solvent

C.

D. secondary alcohol is oxidised to ketone
by chromic acid - pyridine complex.

Answer: C



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37. Incorrect statement about Ge is

A. GeO_2 is weakly acidic

B. $Ge(OH)_2$ is a amphoteric

C. $GeCl_2$ is more stable than $GeCl_4$

D. $Ge - Ge$ bond energy is lesser than that of $Si - Si$

Answer: C



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38. In an isobaric process, when temperature changes from T_1 to T_2 , ΔS is equal to

A. $2.303C_p \log(T_2 / T_1)$

B. $2.303C_p \ln(T_2 / T_1)$

C. $C_p \ln(T_1 / T_2)$

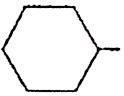
D. $C_V \ln(T_2 / T_1)$

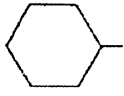
Answer: A

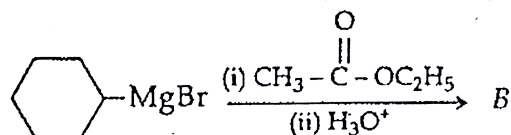
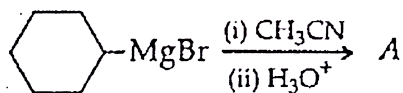


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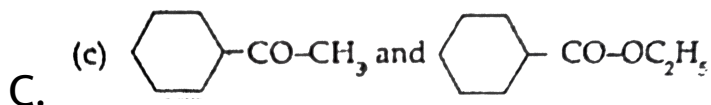
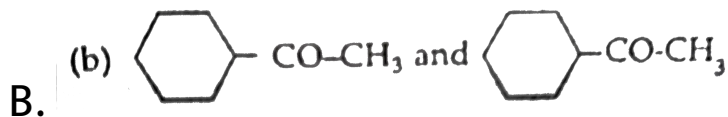
39. In one reaction,

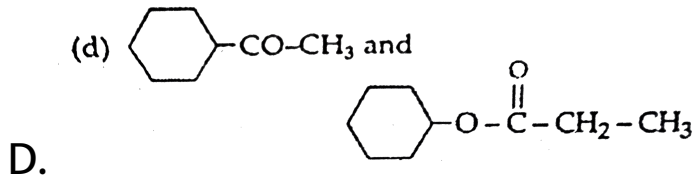
-Mg-Br is treated with CH_3CN and then hydrolysed. In another reaction

-Mg-Br is treated with ethyl acetate and then hydrolysed.



A and B are

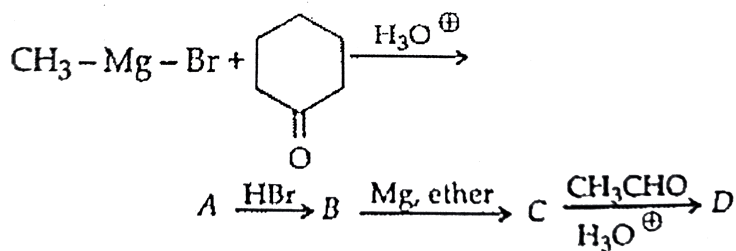




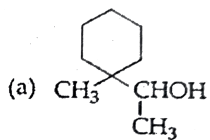
Answer: B

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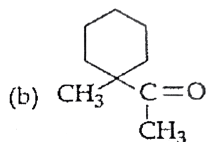
40. In the following sequence of the reactions, identify the final product.



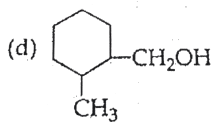
A.



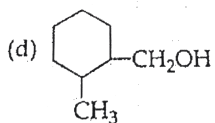
B.



C.



D.



Answer: A



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41. Assertion : Electromeric effect is brought into play only at the requirement of the reagent.

Reason : It is a temporary effect in which bond pair is shifted to one of the constituent atoms.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of

assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A



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42. Statement-1: In fused state, calcium chloride cannot be used to dry alcohol or NH_3 .

Statement-2: Anhy. $CaCl_2$ is not a good desiccant.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: C



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43. Assertion : Heat of neutralisation of nitric acid with NaOH is same to that of HCl and NaOH.

Reason : In both cases strong acid and strong bases are neutralised.



A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A



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44. Assertion : C is -2- butene gives meso-2, 3-butenediol with dilute alkaline $KMnO_4$ solution.

Reason : Dilute alkaline $KMnO_4$ solution gives trans addition with alkenes.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: C



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45. Assertion : Ethers can be dried by using sodium wire.

Reason : Ethers do not react with sodium.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A



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46. Assertion : In rate law, unlike in the expression for equilibrium constants, the exponents for concentration do not necessarily match the stoichiometric coefficients.

Reason : It is the mechanism and not the

balanced chemical equation for the overall change that governs the reaction rate.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A



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47. Assertion : The presence of Ag^+ enhance the solubility of alkenes in water.

Reason : Alkenes are weakly polar in nature.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: B



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48. Assertion (A): A reaction which is spontaneous and accompanied by decreases of randomness must be exothermic.

Reason (R) : All exothermic reactions are accompanied by decrease of randomness.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of

assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: C



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49. Assertion: Compressibility factor for hydrogen varies with pressure with positive slope at all pressures.

Reason: Event at low pressures, repulsive forces dominate hydrogen gas.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A



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50. Assertion: $p - N, N -$
dimethylaminobenzaldehy under-goes benzoin
condensation

Reason : The aldehydic ($-CHO$) group is
meta directing.

A. If both assertion and reason are true
and reason is the correct explanation of

assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: B



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51. Assertion :The S-S-S bond in S_8 molecule is 105° .

Reason : S_8 has V-shape.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: C



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52. Assertion: In sodium formate, both the $C - O$ bonds have same value 1.27\AA

Reason : Equal bond length is due to the phenomenon of resonance.

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

Answer: A



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53. Assertion (A) : C_2H_5Br and alcoholic silver nitrite react to give nitroethane as a major product.

Reason (R) : NO_2^- is an ambident nucleophile.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: B



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54. Assertion : Ice \rightleftharpoons water , if pressure is applied water will evaporate.

Reason : Increases of pressure pushes the equilibrium towards the side in which number of gaseous molecule increases.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of

assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: D



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55. Assertion : Ebonite is highly vulcanised rubber.

Reason : Perlon is used in the manufacture of fibres.

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

Answer: B



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56. Assertion : All forms $[AlF_6]^{3-}$ but B does not form $[BF_6]^{3-}$.

Reason : B does not react with fluorine.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: C



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57. Assertion: Esters which contain α – hydrogens undergo Claisen condensation.

Reason : $LiAlH_4$ reduction of esters gives acids

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

Answer: C



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58. Assertion : In an acid-base titration involving strong base and a weak acid, methyl orange can be used as an indicator.

Reason : Methyl orange changes its colour in pH range of 7 to 9.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: D



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59. Assertion : Millon's test is on test for the identification of proteins.

Reason : Millon's reagent is a solution of mercurous nitrate and mercuric in nitric acid containing a little nitrous acid.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of

assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: B



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60. Assertion : $Cu(OH)_2$ is soluble in NH_4OH but not in $NaOH$.

Reason : $Cu(OH)_2$ forms a soluble complex with NH_3 .

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: A



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