



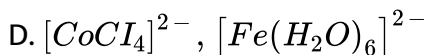
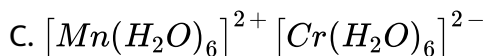
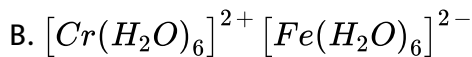
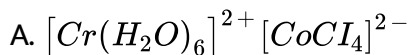
CHEMISTRY

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Chemistry

1. The pair in which both species have same magnetic moment (spin only value) is .



Answer: b



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2. The pair in which both the species have iron is:

- A. nitrogenase, cytochromes
- B. carboxypeptidase, haemoglobin
- C. haemocyanin. Nitrogenase
- D. haemoglobin, cytochromes.

Answer: d



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3. Borax is used as a cleaning agent because on dissolving in water, it gives

- A. alkaline solution
- B. acidic solution

C. bleaching solution

D. basic solution.

Answer: a

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4. The incorrect statement among the following is

A. C_{60} is an allotropic form of carbon.

B. O_3 is an allotropic form of oxygen

C. S_8 is only allotropic form of sulphur

D. red phosphorus is more stable in air than white phosphorus.

Answer: c

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5. The pair whose both species are used in acid medicinal preparation is:

- A. NaHCO_3 and $\text{Mg}(\text{OH})_2$
- B. Na_2CO_3 and $\text{Ca}(\text{HCO}_3)_2$
- C. $\text{Ca}(\text{HCO}_3)_2$ and $\text{Mg}(\text{OH})_2$
- D. $\text{Ca}(\text{OH})_2$ and NaHCO_3

Answer: a



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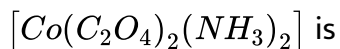
6. The colour imparted by $\text{Co}(\text{II})$ compound to glass is

- A. green
- B. deep-blue
- C. yellow
- D. red

Answer: b

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7. The number of possible isomers of an octahedral complex



A. 1

B. 2

C. 3

D. 4

Answer: c

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8. The ligands in anti – cancer drug cisplatin are

A. NH_3 , Cl

B. NH_3 , H_2O

C. Cl , H_2O

D. NO , Cl

Answer: a

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9. Given below, catalyst and corresponding process/reaction are matched.

The mismatch is

A. $[RhCl(PPh_3)_2]$: hydrogenation

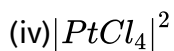
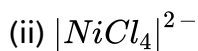
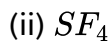
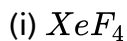
B. $TiCl_4 + Al(C_2H_5)_3$: polymerization

C. V_2O_5 : Haber-Bosch process

D. nickel : hydrogenation.

Answer: c

10. Among the following , the species having square planar geometry for central atoms are



A. (i) and (iv)

B. (i) and (ii)

C. (ii) and (iii)

D. (iii) and (iv)

Answer: a

11. Tincture iodine is :

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

Answer: b



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12. In $[Ag(CN)_2]^-$, the number of π bonds is

- A. 2
- B. 3
- C. 4
- D. 6

Answer: c

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13. The compound which has molecular nature in gas phase but ionic in solid state is



Answer: a

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14. Which two of the following salts are used for preparing iodized salt?

(i) KIO_3 , (ii) KI (iii) I_2 (iv) HI

A. (i) and (ii)

B. (i) and (iii)

C. (ii) and (iv)

D. (iii) and (iv)

Answer: a



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15. The compound used in enrichment of uranium for nuclear power plant is

A. U_3O_5

B. UF_6

C. $UO_2(NO_3)_2$

D. UCl_4

Answer: a

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16. The de Broglie wavelength associated with a ball of mass 1kg having kinetic energy 0.5J is

A. $6.626 \times 10^{-34}\text{m}$

B. $13.20 \times 10^{-34}\text{m}$

C. $10.38 \times 10^{-21}\text{m}$

D. $6.626 \times 10^{-34}\text{\AA}$

Answer: a

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17. Dominance of strong repulsive forces among the molecules of the gas ($Z =$ compressibility factor)

A. depends on Z and indicated by $Z=1$

B. depends on Z and indicated by $Z > 1$

C. depends on Z and indicated by $Z < 1$

D. is independent of Z.

Answer: b

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18. 40 ml of 0.1 M ammonia is mixed with 20 ml of 0.1M HCl. What is the pH of the mixture ? (pK_b of ammonia solution is 4.74.)

A. 4.74

B. 2.36

C. 9.26

D. 5.00

Answer: c

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19. For a spontaneous process the correct statement is -

- A. entropy of the system always increases
- B. free energy of the system always increases
- C. total entropy change is always negative
- D. total entropy change is always positive.

Answer: d



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20. The Ca^{2+} and F^{-} ions are located in CaF_2 crystal respectively at face centred cubic lattice points and in

- A. tetrahedral voids
- B. half of tetrahedral voids
- C. octahedral voids

D. half of octahedral voids.

Answer: a

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21. The charge required for the reduction of 1 mol of MnO_4^- to MnO_2 is

A. 1 F

B. 3 F

C. 5 F

D. 6 F

Answer: b

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22. For the reaction $2N_2O_5 \rightarrow NO_2 + O_2$ rate of reaction is :

A. $\frac{1}{2} \frac{d}{dt} [N_2O_5]$

B. $2 \frac{d}{dt} [N_2O_5]$

C. $\frac{1}{4} \frac{d}{dt} [NO_2]$

D. $4 \frac{d}{dt} [NO_2]$

Answer: c



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23. For a phase change:



$0^\circ C, 1 \text{ bar}$

A. $\Delta G = 0$

B. $\Delta S = 0$

C. $\Delta H = 0$

D. $\Delta U = 0$

Answer: a



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24. A 5% solution (by mass) of cane sugar in water has freezing point of 271 K. Calculate the freezing point of a 5% glucose (by mass) in water. The freezing point of pure water is 273.15 K.

A. 271 K

B. 273.15 K

C. 269.07 K

D. 277.23 K

Answer: c



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25. The energy gaps (E_g) between valence band and conduction band for diamond, silicon and germanium are in the order

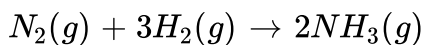
- A. E_g (diamond) $>$ E_g (silicon) $>$ E_g (germanium)
- B. E_g (diamond) $<$ E_g (silicon) $<$ E_g (germanium)
- C. E_g (diamond) $=$ E_g (silicon) $=$ E_g (germanium)
- D. E_g (diamond) $>$ E_g (germanium) $>$ E_g (silicon).

Answer: a



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26. The enthalpy change (ΔH) for the reaction



is -92.38kJ at 298K . The internal energy change ΔU at 298K is

- A. -92.38kJ
- B. -87.42kJ

C. -97.34kJ

D. -89.9kJ

Answer: b

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27. The products formed when an aqueous solution of NaBr is electrolysed in a cell having inert electrodes are :

A. Na and Br_2

B. Na and O_2

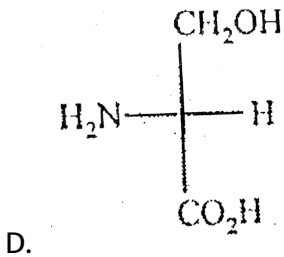
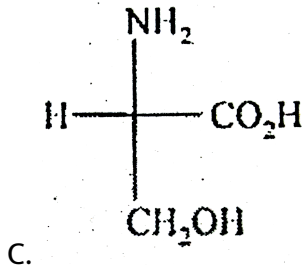
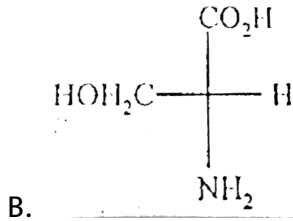
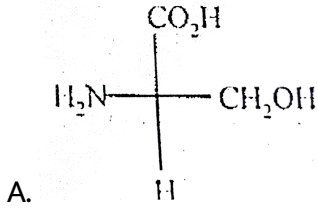
C. H_2 , Br_2 and NaOH

D. H_2 and O_2

Answer: c

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28. Among the following, *L* – serine is

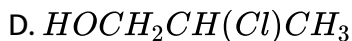
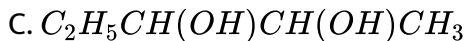
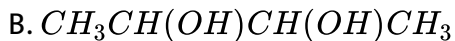
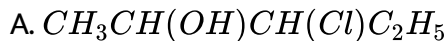


Answer: c



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29. Among the following which one can have a meso form?



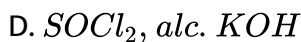
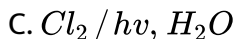
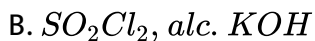
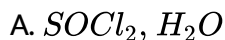
Answer: b



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30. Which of the following sequence of reaction (reagents) can be used

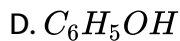
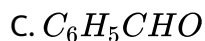
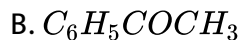
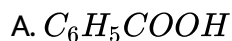
for conversion of $C_6H_5CH_2CH_3$ into $C_6H_5CH = CH_2$?



Answer: b

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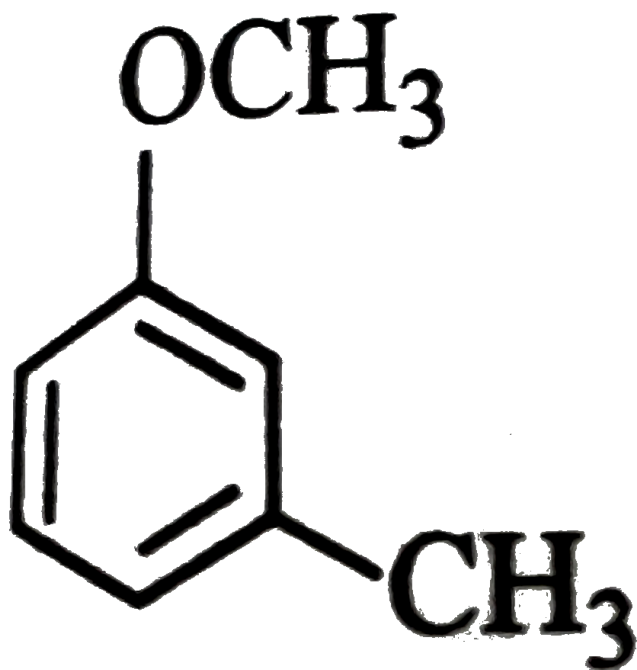
31. Isopropylbenzene on air oxidation in the presence of dilute acid gives



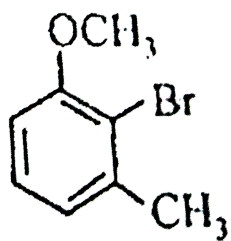
Answer: d

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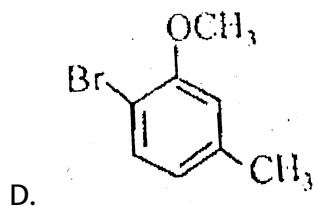
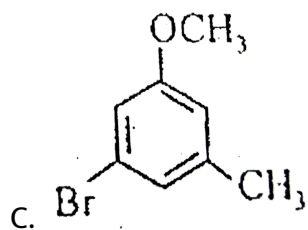
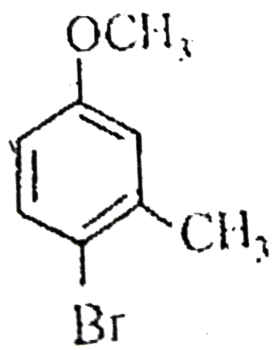
32. The major product obtained on monobromination (with $Br_2 / FeBr_3$) of the following compound A is



A



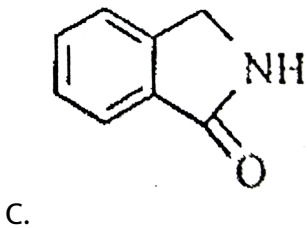
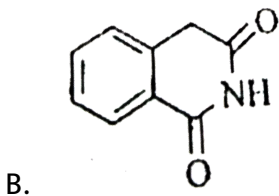
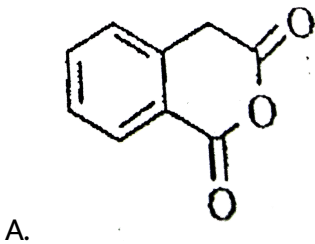
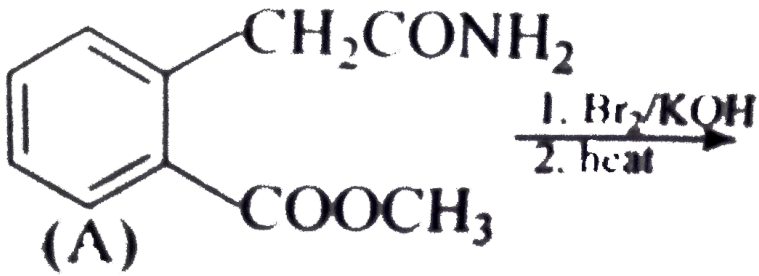
A.

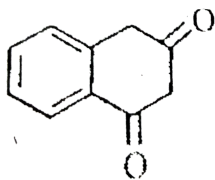


Answer: b

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33. The following sequence of reactions on *A* gives



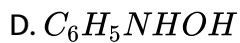
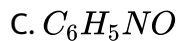
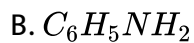
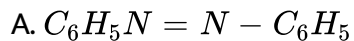


D.

Answer: c

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34. Nitrobenzene on treatment with zinc dust and aqueous ammonium chloride gives



Answer: d

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35. Thymine is

- A. 5-methyluracil
- B. 4-methyluracil
- C. 3-methyluracil
- D. 1-methyluracil.

Answer: a



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36. Lysine is least soluble in water in the pH range.

- A. 3 to 4
- B. 5 to 6
- C. 6 to 7
- D. 8 to 9

Answer: d

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37. Methyl- α -*D*-glucoside and methyl- β -*D*-glucoside are:

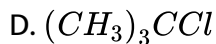
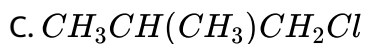
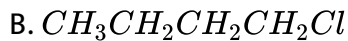
- A. epimers
- B. anomers
- C. enantiomers
- D. conformational diastereomers.

Answer: b

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38. Which of the following compounds has the highest boiling point ?

- A. $CH_3CH_2CH_2Cl$

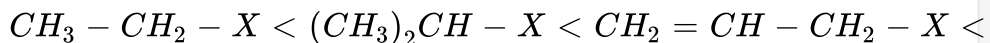


Answer: b

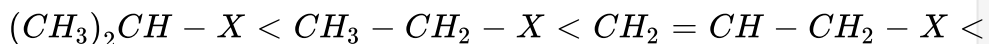
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39. The correct increasing order of the reactivity of halides for S_N1 reaction is:

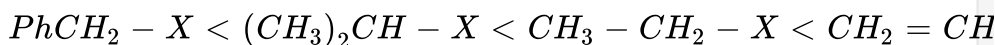
A.



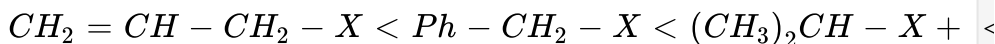
B.



C.



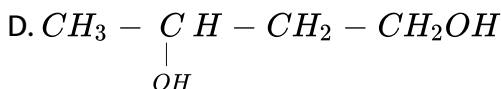
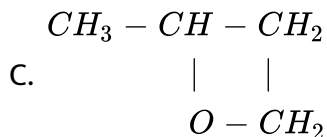
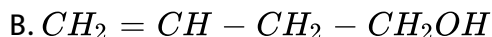
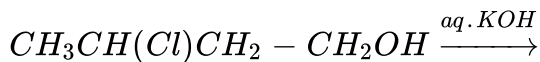
D.



Answer: a

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40. The major product formed in the following reaction is



Answer: d

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41. Assertion : In the iodometric titration, starch is used as an indicator.

Reason : Starch is a polysaccharide.

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

Answer: b

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42. Assertion : Nitrogen is less reactive than molecular oxygen.

Reason: Bond length of N_2 is shorter than that of oxygen.

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

Answer: a



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43. These questions consist of two statements each, printed as Assertion and Reason. While answering these questions you are required to choose any one of the following four responses:

Assertion: $[Co(NO_2)_3(NH_3)_3]$ does not show optical isomerism.

Reason: It has a plane of symmetry.

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

Answer: a



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44. Assertion: E° for Mn^{3+} / Mn^{2+} is more positive than Cr^{3+} / Cr^{2+}

Reason: The third ionisation energy of Mn is larger than that of Cr .

- A. if both Assertion and Reason are true and reason is the correct explanation of the assertion.

- B. if both assertion and reason are true but reason is not the correct explanation of the assertion
- C. if assertion is true, reason is false
- D. both assertion and reason are false statements.

Answer: b

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45. Assertion: $K_2Cr_2O_7$ is used as primary standard in volumetric analysis.

Reason: It has a good solubility in water.

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

D. both assertion and reason are false statements.

Answer: c

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46. Assertion: Silicones are hydrophobic in nature.

Reason: $Si - O - Si$ linkage are moisture sensitive.

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

Answer: c

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47. According to the transition state theory, for the formation of an activation complex, one of the vibrational degrees of freedom is converted into the transition degree of freedom.

Reason (R): The energy of the activated complex is higher than the energy of the reactant molecules.

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

Answer: a



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48. Assertion :- Water in liquid state is more stable than ice at room temperature.

Reason :- Water in liquid form has higher entropy than ice.

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

Answer: a



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49. Assertion : Sb_2S_3 is not soluble in yellow ammonium sulphide.

Reason : The common ion effect due to S^{2-} ions reduces the solubility of



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

Answer: d



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50. Assertion (A) : Graphite is an example of tetragonal crystal system.

Reason (R) : For a tetragonal system, $a = b \neq c$ and $\alpha = \beta = 90^\circ, \gamma = 120^\circ$.

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

Answer: d

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51. Assertion : For the Daniel cell, $Zn/Zn^{2+} || Cu^{2+}/Cu$ with $E_{cell} = 1.1V$ results into flow of electron from cathode to anode.

Reason : Zn is deposited at anode and Cu is dissolved at cathode.

- A. if both Assertion and Reason are true and reason is the correct explanation of the assertion.

- B. if both assertion and reason are true but reason is not the correct explanation of the assertion
- C. if assertion is true, reason is false
- D. both assertion and reason are false statements.

Answer: b

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52. Assertion : Fe^{3+} ions can be used for the coagulation of As_2S_3 sol.

Reason : Fe^{3+} ions react with As_2S_3 give Fe_2S_3 .

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

D. both assertion and reason are false statements.

Answer: c

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53. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer according to the instruction given below:

STATEMENT - 1 : If red blood cells were removed from the body and placed in pure water, pressure inside the cell increases.

STATEMENT - 2 : The concentration of the salt content in the cells increases.

A. if both Assertion and Reason are true and reason is the correct explanation of the assertion.

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

C. if assertion is true, reason is false

D. both assertion and reason are false statements.

Answer: c



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54. Assertion : Change in colour of the acidic solution of breath is used as a test for drunken driver.

Reason : Change in colour is due to complexation of alcohol with potassium dichromate.

A. if both Assertion and Reason are true and reason is the correct explanation of the assertion.

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

C. if assertion is true, reason is false

D. both assertion and reason are false statements.

Answer: c

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55. Assertion : Anilinium choride is more acidic than ammonium chloride.

Reason : Anilinium ion is resonance-stabilised.

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

Answer: c

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56. Assertion: Diastereoisomers have different physical properties.

Reason: They are non-superimposable mirror images.

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

Answer: c



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57. Assertion : The presence of nitro group facilitates nucleophilic substitution reactions in aryl halides. Reason : The intermediate carbanion is stabilised due to the presence of nitro group.

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

Answer: a



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58. Assertion : 1, 3 – Butadiene is the monomer for natural rubber.

Reason : Natural rubber is formed through anionic addition polymerization.

- A. if both Assertion and Reason are true and reason is the correct explanation of the assertion.

- B. if both assertion and reason are true but reason is not the correct explanation of the assertion
- C. if assertion is true, reason is false
- D. both assertion and reason are false statements.

Answer: d

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59. A) Addition of HBr on 2-butene gives two isomeric products.

R) Addition of HBr on 2-butene follows Markownikoff's rule.

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

D. both assertion and reason are false statements.

Answer: d



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60. Statement - The water pouch of instant cold pack for treating athletic injuries breaks when squeezed and NH_4NO_3 dissolves lowering the temperature.

Explanation - Addition of non-volatile solute into solvent results into depression of freezing point of solvent.

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

Answer: a



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