IIT-JEE-2011

PAPER–I

CHEMISTRY

SECTION–I

1. Geometrical shapes of the complexes formed by the reaction of Ni_2 with $ClCN^-$, and HO_2 , respectively, are

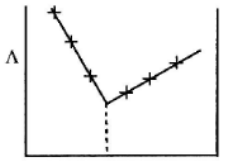
(A) octahedral, tetrahedral and square

(B) tetrahedral, square planar and octahedral

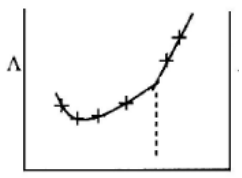
(C) square planar, tetrahedral and octahedral

(D) octahedral, square planar and octahedral

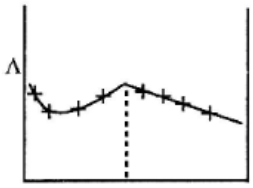
2. $AgNO_3$ (aq.) was added to an aqueous KCI solution gradually and the conductivity of the solution was measured. The plot of conductance $(\quad)$ versus the volume of $AgNO_3$ is



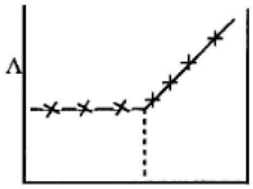
(P)



(Q)



(R)



(S)

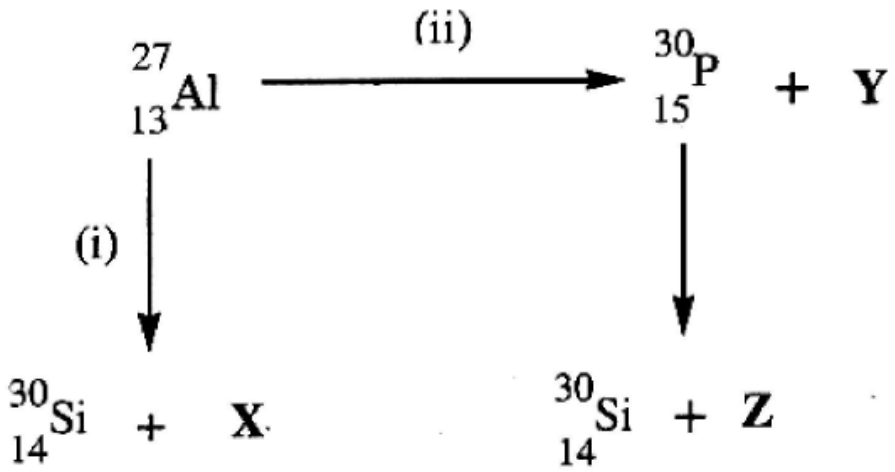
(A) (P)

(B) (Q)

(C) (R)

(D) (S)

3. Bombardment of aluminum by □~ particle leads to its artificial disintegration in two ways, (i) and (ii) as shown. Products **X**, **Y** and **Z** respectively are



(A) proton, neutron, positron

(B) neutron, positron, proton

(C) proton, positron, neutron

(D) positron, proton, neutron

4. Extra pure N_2 can be obtained by heating

(A) NH_3 with CuO

(B) NH_4NO_3

(C) $(NH_4)_2Cr_2O_7$

(D) $Ba(N_3)_2$

5. Among the following compounds. the most acidic is

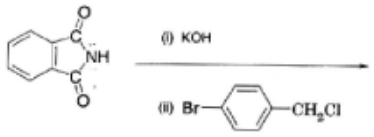
(A) *p*-nitrophenol

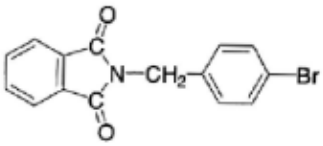
(B) *p*-hydroxybenzoic acid

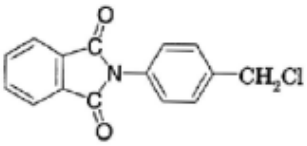
(C) *o*-hydroxybenzoic aicd

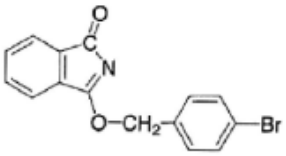
(D) *p*-toluic acid

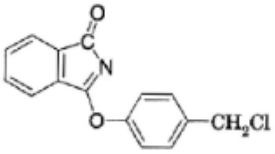
6. The major product of the following reaction is



(A) 

(B) 

(C) 

(D) 

7. Dissolving 120 g of urea (mol. wt, 60) in 1000 g of water gave a solution of density $1.15 g/mL$. The molarity of the solution is

(A) 1.78M

(B) 2.00M

(C) 2.05M

(D) 2.22M

SECTION–II

Multiple Correct Answer Type

8. Extraction of metal from the ore **casiterite** involves

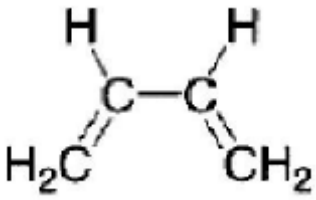
(A) carbon reduction of an oxide ore

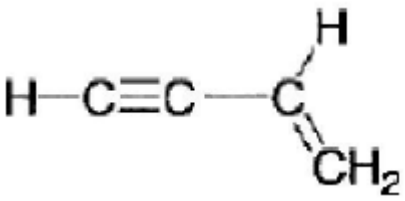
(B) self-reduction of a sulphide ore

(C) removal of copper

(D) removal of iron impurity

9. Amongst the given options, the compound(s) in which all the atoms are in one plane in all the possible conformations (if any), is (are)

(A) 

(B) 

(C) $H_2C=C=O$

(D) $H_2C=C=CH_2$

10. The correct statement (s) pertaining to the adsorption of a gas on a solid surface is (are)

(A) Adsorption is always exothermic

(B) Physisorption may transform into chemisorption at high

(C) Physisorption increases with increasing temperature but chemisorption decreases with increasing temperature

(D) Chemisorption is more exothermic than physisorption, however it is very slow due to higher energy of activation.

11. According to kinetic theory of gases

(A) collision are always elastic

(B) heavier molecules transfer more momentum to the wall of the container

(C) only a small number of molecules have very high velocity

(D) between collision the molecules move in straight lines with constant velocities.

SECTION–III

Paragraph Type

Paragraph for Question.

When a metal rod M is dipped into an aqueous colourless concentrated solution of compound N, the solution hum light blue. Addition of aqueous $NaCl$ to the blue solution gives a white precipitate O, Addition of aqueous NH_3 dissolves O and gives an intesne blue solution.

12. The metal rod M is

(A) Fe

(B) Cu

(C) Ni

(D) CO

13. The compound N is

(A) $AgNO_3$

(B) $Zn(NO_3)$

(C) $Al(NO_3)_3$

(D) $Pb(NO_3)_2$

14. The final solution contains

(A) $\left[Pb\left(NH_3\right)_4\right]^{2+}$ and $\left[CoCl_4\right]^{2-}$

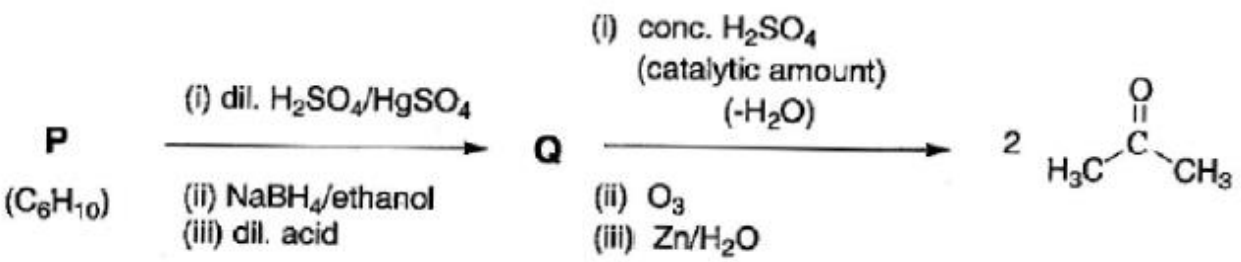
(B) $\left[Al\left(NH_3\right)_4\right]^{3+}$ and $\left[Cu\left(NH_3\right)_4\right]^{2+}$

(C) $\left[Ag\left(NH_3\right)_2\right]^{+}$ and $\left[Cu\left(NH_3\right)_4\right]^{2+}$

(D) $\left[Ag\left(NH_3\right)_2\right]^{+}$ and $\left[Ni\left(Ni\left(NH\right)_3\right)_6\right]^{2+}$

Paragraph for Question. Nis. 15 to16

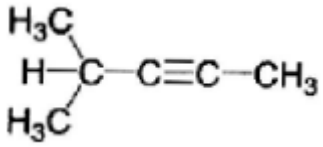
An acyclic hydrocarbon P . having molecular formula C_6H_{10} gave acetone as the only organic product through th following sequence of reactions, in which Q is an intermediate organo

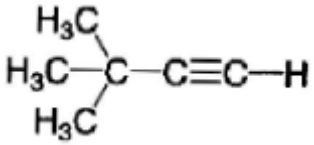


15. The structure of compound P is

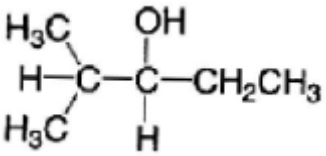
(A) $CH_3CH_2CH_2-C\equiv C-H$

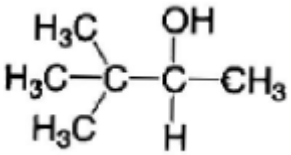
(B) $H_3CH_2C-C\equiv C-C-CH_2CH_3$

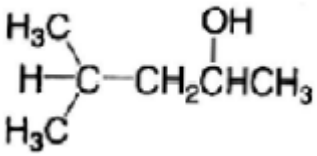
(C) 

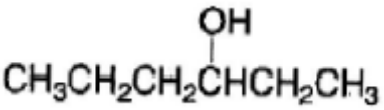
(D) 

16. The structure of the compound Q is

(A) 

(B) 

(C) 

(D) 

SECTION–IV

Integer Answer Type

17. Reaction of Br_2 with Na_2CO_3, in aqueous solution gives sodium bromide and sodium bromate with evolution of CO_2 gas. The number of sodium bromide molecules involved in the balanced chemical euqation is

18. The difference in the oxidation numbers of the two types of sulphur atoms in $Na_2S_4O_6$ is

19. The maximum number of electrons that can have principal quantum number, $n = 3$, and spin quantum number $m_5 == -\frac{1}{2}$, is

20. A decapeptide (Mol. Wt 796) on complete hydrolysis gives glycine (Mol. Wt. 75). alanine and phenylanine. Glycine contributes 47.0% to the total weight of the hydrolysis products. The number of glycine units present in the decapeptide is

21. To an evacuated vessel with movable piston under external pressure of $1 atm$, 0.1 mol of He and 1.0 mol. of an unknown compound (vapour pressure 0.68 atm. at $0°C$) are introduced. Considering the ideal gas behaviour, the total volume (in litre) of the gases at $0°C$ is close to

22. The total number of alkenes possible by dehydrogenation of 3- bromo-3-cyclopentylhexane using alcoholic KOH is

23. The work function (ϕ) of some metals is listed below, The number of metals which will show photoelectric effec when light of 300 mn wavelength falls on the metal is

Metal	Li	Na	K	Mg	Cu	Ag	Fe	Pt	W
$\phi(\text{eV})$	2.4	2.3	22	3.7	4.8	4.3	4.7	6.3	4.75