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Previous Year Paper

Chemistry - 2015

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Multiple Choice Questions

1. The number of lone pairs of electrons on the central atoms of H_2O , SnCl_2 , PCl_3 and XeF_2 respectively are
- A. 2, 1, 1, 3
B. 2, 2, 1, 3
C. 3, 1, 1, 2
D. 2, 1, 2, 3

Answer

2. Consider the following salts : NaCl , HgCl_2 , Hg_2Cl_2 , CuCl_2 , CuCl and AgCl .
Identify the correct set of insoluble salts in water.

- A. Hg_2Cl_2 , CuCl , AgCl
B. HgCl_2 , CuCl , AgCl
C. Hg_2Cl_2 , CuCl_2 , AgCl
D. Hg_2Cl_2 , CuCl , NaCl

Answer

3. In the following compound, the number of sp -hybridised carbons are
 $\text{CH}_2=\text{C}=\text{CH}-\text{CH}(\text{CN})-\text{C}\equiv\text{CH}$

- A. 2
B. 3
C. 4
D. 5

Answer

4. At a certain temperature, the value of the slope of the plot of osmotic pressure (π) against concentration (C in mol L^{-1}) of a certain polymer solution is $291R$. The temperature at which osmotic pressure is measured, is (R is gas constant)
- A. 271°C
B. 18°C
C. 564 K
D. 18 K

Answer

5. The RMS velocity of CO gas molecules at 27°C is approximately 1000 m/s . For N_2 molecules at 600 K , the RMS velocity is approximately

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B. 1414 m/s

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C. 1000 m/s

D. 1500 m/s

Answer

6. A gas can be liquefied at temperature T and pressure p provided.A. $T = T_c$ and $p < p_c$ B. $T < T_c$ and $p > p_c$ C. $T > T_c$ and $p > p_c$ D. $T > T_c$ and $p < p_c$

Answer

7. The dispersed phase and dispersion medium of fog respectively are

A. solid, liquid

B. liquid, liquid

C. liquid, gas

D. gas, liquid

Answer

8. The decreasing order of basic character of K_2O , BaO , CaO and MgO isA. $K_2O > BaO > CaO > MgO$ B. $K_2O > CaO > BaO > MgO$ C. $MgO > BaO > CaO > K_2O$ D. $MgO > CaO > BaO > K_2O$

Answer

9. Among Be, B, Mg and Al, the second ionisation potential is maximum for

A. B

B. Be

C. Mg

D. Al

Answer

10. For the reaction,

 $2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$ at 300 K, the value of ΔG° is $-690.9 R$. The equilibrium constant value for the reaction at that temperature is (R is gas constant)A. 10 atm^{-1} B. 10 atm

C. 10

D. 1

Answer

11. At a particular temperature, the ratio of equivalent conductance to specific conductance of a
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A. 10^5 cm^3

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B. 10^3 cm^3

C. 10 cm^3

D. 10^5 cm^2

Answer

12. The units of surface tension and viscosity of liquids respectively are

A. $\text{kg m}^{-1}\text{s}^{-1}$, Nm^{-1}

B. kg s^{-2} , $\text{kg m}^{-1}\text{s}^{-1}$

C. Nm^{-1} , $\text{kg m}^{-1}\text{s}^{-2}$

D. kg s^{-1} , $\text{kg m}^{-2}\text{s}^{-1}$

Answer

13. The ratio of volumes of CH_3COOH 0.1 N to CH_3COONa 0.1 N required to prepare a buffer solution of pH 5.74 is (Given, pK_a of CH_3COOH is 4.74)

A. 10 : 1

B. 5 : 1

C. 1 : 5

D. 1 : 10

Answer

14. For the reaction, $\text{X}_2\text{Y}_4 (\text{l}) \rightarrow 2\text{XY}_2 (\text{g})$ at 300 K, the values of ΔU and ΔS are 2 kcal and 20 cal K^{-1} respectively. The value of ΔG for the reaction is

A. -3400 cal

B. 3400 cal

C. -2800 cal

D. 2000 cal

Answer

15. Within the list shown below, the correct pair of structures of alanine in pH ranges 2-4 and 9-11 is

I. $\text{H}_3\text{N}^+ - \text{CH}(\text{CH}_3)\text{CO}_2\text{H}$

II. $\text{H}_2\text{N} - \text{CH}(\text{CH}_3)\text{CO}_2^-$

III. $\text{H}_3\text{N}^+ - \text{CH}(\text{CH}_3)\text{CO}_2^-$

IV. $\text{H}_2\text{N} - \text{CH}(\text{CH}_3)\text{CO}_2\text{H}$

A. I and II

B. I and III

C. II and III

D. III and IV

A. Calcium	p. Brick red
B. Strontium	q. Apple green
C. Barium	r. Crimson

A. A - p; B - r; C - q

B. A - r; B - p; C - q

C. A - q; B ; r; C - p

D. A - p; B - q; C - r

Answer

17. 1,4-dimethylbenzene on heating with anhydrous AlCl_3 and HCl produces

A. 1, 2-dimethylbenzene

B. 1, 3-dimethylbenzene

C. 1,2, 3-trimethylbenzene

D. ethylbenzene

Answer

18. Best reagent for nuclear iodination of aromatic compounds is

A. $\text{KI}/\text{CH}_3\text{COCH}_3$ B. $\text{I}_2/\text{CH}_3\text{CN}$ C. $\text{KI}/\text{CH}_3\text{COOH}$ D. I_2/HNO_3

Answer

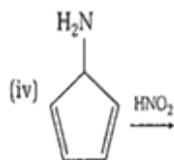
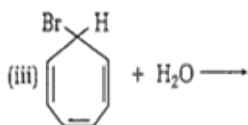
19. Addition of sodium thiosulphate solution to a solution of silver nitrate gives X as white precipitate, insoluble in water but soluble in excess thiosulphate solution to give Y. On boiling in water, Y gives Z. X, Y and Z respectively are

A. $\text{Ag}_2\text{S}_2\text{O}_3$, $\text{Na}_3[\text{Ag}(\text{S}_2\text{O}_3)_2]$, Ag_2S B. Ag_2SO_4 , $\text{Na}[\text{Ag}(\text{S}_2\text{O}_3)_2]$, Ag_2S_2 C. $\text{Ag}_2\text{S}_2\text{O}_3$, $\text{Na}_5[\text{Ag}(\text{S}_2\text{O}_3)_3]$, AgS D. Ag_2SO_3 , $\text{Na}_3[\text{Ag}(\text{S}_2\text{O}_3)_2]$, Ag_2O

Answer

20. The total number of aromatic species generated in the following reactions is

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

Answer

21. Optical isomerism is exhibited by (ox= oxalate anion; en= ethylenediamine).

- A. cis-[CrCl₂(ox)₂]³⁻
B. [Co(en)₃]³⁺
C. trans-[CrCl₂(ox)₂]³⁻
D. [Co(ox)(en)₂]⁺

Answer

22. In a mixture, two enantiomers are found to be present in 85% and 15% respectively. The enantiomeric excess (ee) is

- A. 85%
B. 15%
C. 70%
D. 60%

Answer

23. In the Lassaigne's test for the detection of nitrogen in an organic compound, the appearance of blue coloured compound is due to

- A. ferric ferricyanide
B. ferrous ferricyanide
C. ferric ferrocyanide
D. ferrous ferrocyanide

Answer

24. Extraction of gold (Au) involves the formation of complex ions X and Y.

Gold ore $\rightarrow$ CN⁻, H₂O, O₂ Roasting $\text{HO}^- + \text{X} \rightarrow \text{Zn Y} + \text{Au}$

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A. $\text{Au}(\text{CN})_2^-$ and $\text{Zn}(\text{CN})_4^{2-}$
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B. $\text{Au}(\text{CN})_4^{3-}$ and $\text{Zn}(\text{CN})_4^{2-}$

C. $\text{Au}(\text{CN})_3^-$ and $\text{Zn}(\text{CN})_6^{2-}$

D. $\text{Au}(\text{CN})_4^-$ and $\text{Zn}(\text{CN})_3^-$

Answer

25. The atomic number of cerium (Ce) is 58. The correct electronic configuration of Ce^{3+} ion is

A. $[\text{Xe}]4f^1$

B. $[\text{Kr}]4f^1$

C. $[\text{Xe}]4f^{13}$

D. $[\text{Kr}]4d^1$

Answer

26. Sulphuryl chloride (SO_2Cl_2) reacts with white phosphorus (P_4) to give

A. PCl_5 , SO_2

B. OPCl_3 , SOCl_2

C. PCl_5 , SO_2 , S_2Cl_2

D. OPCl_3 , SO_2 , S_2Cl_2

Answer

27. For the reaction $\text{A} + 2\text{B} \rightarrow \text{C}$, the reaction rate is doubled, if the concentration of A is doubled. The rate is increased by four times when concentrations of both A and B are increased by four times. The order of the reaction is

A. 3

B. 0

C. 1

D. 2

Answer

28. In aqueous alkaline solution, two electrons reduction of HO_2^- gives

A. HO^-

B. H_2O

C. O_2

D. O_2^-

Answer

29. Cold ferrous sulphate solution on absorption of NO develops brown colour due to the formation of

A. paramagnetic $[\text{Fe}(\text{H}_2\text{O})_5(\text{NO})]\text{SO}_4$

B. diamagnetic $[\text{Fe}(\text{H}_2\text{O})_5(\text{NO})]\text{SO}_4$

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D. diamagnetic $[\text{Fe}(\text{H}_2\text{O})_4(\text{SO}_4)]\text{NO}_3$

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Answer

30. Suppose the mass of a single Ag-atom is m . Ag metal crystallises in fcc lattice with unit cell of length a . The density of Ag metal in terms of a and m is
- $4ma^3$
 - $2ma^3$
 - ma^3
 - $m4a^3$

Answer

31. At temperature of 298K, the emf of the following electrochemical cell,

will be (Given, $E^\circ_{\text{cell}} = -1.562 \text{ V}$)

- -1.532 V
- -1.503 V
- 1.532 V
- -3.06 v

Answer

32. Roasted copper pyrite on smelting with sand produces
- FeSiO_3 as fusible slag and Cu_2S as matte
 - CaSiO_3 as infusible slag and Cu_2O as matte
 - $\text{Ca}_3(\text{PO}_4)_2$ as fusible slag and Cu_2S as matte
 - $\text{Fe}_3(\text{PO}_4)_2$ as infusible slag and Cu_2S as matte

Answer

33. Ionisation potential values of noble gases decrease down the group with increase in atomic size. Xenon forms binary fluorides by the direct reaction of elements. Identify the correct statement(s) from below.
- Only the heavier noble gases form such compounds
 - It happens because the noble gases have higher ionisation energies
 - It happens because the compounds are formed with electronegative ligands
 - Octet of electrons provide the stable arrangements

Answer

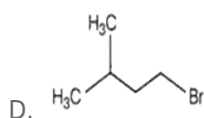
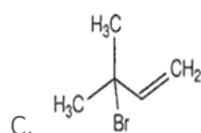
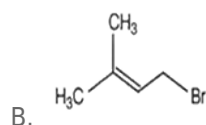
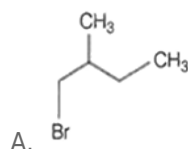
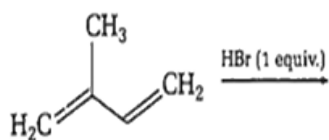
34. The increase in rate constant of a chemical reaction with increasing temperature is (are) due to the fact(s) that
- the number of collisions among the reactant molecules increases with increasing temperature
 - the activation energy of the reaction decreases with increasing temperature

C. the concentration of the reactant molecules increases with increasing temperature
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increasing temperature

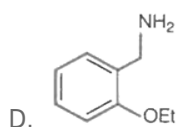
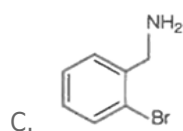
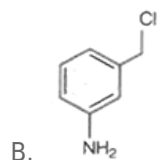
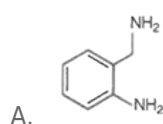
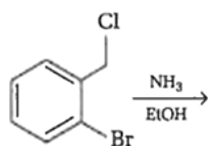
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35. The major product of the above reaction is-

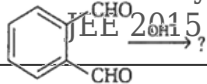


Answer

36. The product of the above reaction is



Answer



37.

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The product of the above reaction is

- A.
- B.
- C.
- D.

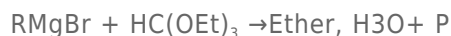
Answer

38. The reaction of methyltrichloroacetate ($\text{Cl}_3\text{CCO}_2\text{Me}$) with sodium methoxide (NaOMe) generates

- A. carbocation
B. carbene
C. carbanion
D. carbon radical

Answer

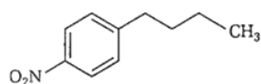
39. In the reaction, the product P is



- A. RCHO
B. R_2CHOEt
C. R_3CH
D. $\text{RCH}(\text{OEt})_2$

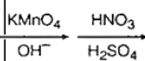
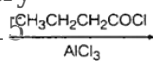
Answer

40. Identify the correct method for the synthesis of the compound shown below from the following alternatives.



- A.
- B.
- C.

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