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Previous Year Paper

Chemistry - 2006

Multiple Choice Questions

1. What is the correct order of spin only magnetic moment (in BM) of Mn^{2+}, Cr^{2+} and V^{2+} ?

   A. $Mn^{2+} > V^{2+} > Cr^{2+}$

   B. $V^{2+} > Cr^{2+} > Mn^{2+}$

   C. $Mn^{2+} > Cr^{2+} > V^{2+}$

   D. $Cr^{2+} > V^{2+} > Mn^{2+}$

   Answer

2. A molecule (X) has

   (i) four sigma (σ) bonds formed by the overlap of sp^2 and s orbitals

   (ii) one sigma (σ) bond formed by sp^2 and sp^2 orbitals and

   (iii) one π bond formed by p_x and p_z orbitals.

   Which of the following is X?

   A. C_2H_6

   B. C_2H_3Cl

   C. $C_2H_2Cl_2$

   D. C_2H_4

   Answer

3. Which of the following is not correct?

   A. $3O_2 \rightleftarrows^{\text{silent electric discharge}} 2O_3$; $\Delta H = -284.5$ kJ

   B. Ozone undergoes addition reaction with unsaturated carbon compounds

   C. Sodium thuosulphate reacts with I_2 to form sodium tetrathionate and sodium iodide.

   D. Ozone oxidises lead sulphide to lead sulphate.

   Answer

4. Observe the following statements :

   I. The physical and chemical properties of elements are periodic functions of their electronic configuration.

   II. Electronegativity of fluorine is less than the electronegativity of chlorine.

   III. Electropositive nature decreases from top to bottom in a group.

   The correct answer is :

   A. I, II and III are correct

B. only I is correct
C. only I and II is correct
D. only II and III are correct

Answer

5. The uncertainties in the velocities of two particles A and B are 0.05 and 0.02 m/s^{-1} respectively. The mass of B is five times to that of mass A. What is the ratio of uncertainities ΔxAΔxB in their positions?

A. 2
B. 0.25
C. 4
D. 1

Answer

6. The energy of a photon is 3×10^{-12} ergs. What is its wavelength in nm ?

(h = 6.62×10^{-27} ergs ; c = 3×10^{10} cm/s)

A. 662
B. 1324
C. 66.2
D. 6.62

Answer

7. Which of the following set of variables give a straight line with a negative slope when plotted? (P = vapour pressure ; T = Temperature in K)

y - axis	x - axis
P	T

$\log_{10}$ P	T

$\log_{10}$ P	1T

$\log_{10}$ P	$\log_{10}$ 1T

Answer

8. Which of the following is not a characteristic property of chemical equilibrium ?

A. Rate of forward reaction is equal to rate of backward reaction at equilibrium.
B. After reaching the chemical equilibrium, the concentrations of reactants and products remain unchanged with time.

C. For A (g) ⇌ B (g), K_c is 10^{-2}. If this reaction is carried out in the presence of catalyst, the value of K_c decreases.

D. After reaching the equilibrium, both forward and backward reactions continue to take place.

Answer

9. The concentration of oxalic acid is 'x' mol L^{-1}. 40 mL of this solution reacts with 16 mL of 0.05 M acidified $KMnO_4$. What is the pH of 'x' M oxalic acid solution ? (Assume that oxalic acid dissociates completely)

   A. 1.3

   B. 1.699

   C. 1

   D. 2

   Answer

10. Which of the following is not correct ?

    A. Nuclei of atoms participate in nuclear reactions

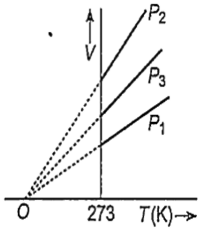
    B. $_{20}Ca^{40}$ and $_{18}Ar^{40}$ are isotones

    C. 1 amu of mass defect is approximately equal to 931.5 MeV.

    D. Uranium (U^{238}) series is known as (4n + 2) series.

    Answer

11. The volume-temperature graphs of a given mass of an ideal gas at constant pressures are shown below. What is the correct order of pressures?



    A. $P_1 > P_3 > P_2$

    B. $P_1 > P_2 > P_3$

    C. $P_2 > P_3 > P_1$

    D. $P_2 > P_1 > P_3$

    Answer

12. Identify the reaction for which $\Delta H \neq \Delta E$:

    A. S(rhombic) + O_2 (g) → SO_2 (g)

    B. N_2 (g) + O_2 (g) → 2NO (g)

    C. H_2 (g) + Cl_2 (g) → 2HCl (g)

    D. CO (g) + $12O_2$ (g) → CO_2 (g)

    Answer

13. Which of the following is used for making optical instruments ?

A. SiO_2

B. Si

C. SiH_4

D. SiC

Answer

14. Which of the following reaction can produce aniline as main product?

A. $C_6H_5NO_2$ + Zn/ KOH

B. $C_6H_5NO_2$ + Zn/ NH_4Cl

C. $C_6H_5NO_2$ + $LiAlH_4$

D. $C_6H_5NO_2$ + Zn/ HCl

Answer

15. Which of the following reagents when heated with ethyl chloride, forms ethylene ?

A. Aqueous KOH

B. Zn/ HCl

C. Alcoholic KOH

D. HI

Answer

16. Which of the following statements is not correct?

A. In oxyhaemoglobin Fe^{2+} is paramagnetic.

B. During respiration the size of Fe^{2+} increases when it changes from diamagnetic to paramagnetic state.

C. Four heme groups are present in haemoglobin

D. Heme is the prosthetic group and it is non-protein part.

Answer

17. $CFCl_3$ is responsible for the decomposition of ozone to oxygen. Which of the following reacts with ozone to form oxygen ?

A. Cl_2

B. Cl^-

C. F^-

D. Cl^*

Answer

18. At T (K), 100 L of dry oxygen is present in a sealed container. It is subjected to silent electric discharge, till the volumes of oxygen and ozone become equal. What is the volume (in litres) of ozone formed at T (K) ?

A. 50

B. 60

C. 30

D. 40

Answer

19. Observe the following statements:

I. Bleaching powder is used in the preparation of chloroform.

II. Bleaching powder decomposes in the presence of $CoCl_3$ to liberate O_3.

III. Aqueous KHF_2 is used in the preparation of fluorine.

The correct combination is :

A. I, II and III are correct

B. Only II is correct

C. Only I and III are correct

D. Only I and II are correct

Answer

20. Which of the following reacts with benzene in presence of anhydrous aluminum chloride and forms acetophenone ?

A. CH_3Cl

B. CH_3COOH

C. CH_3CHO

D. CH_3COCl

Answer

21. Which of the following reactions does not liberate gaseous product ?

A. $AlCl_3 + NaOH \rightarrow$

B. $NaOH + P(white) + H_2O \rightarrow$

C. $Al + NaOH \rightarrow \Delta$

D. $Zn + NaOH \rightarrow \Delta$

Answer

22. $CH_3CH_2OH \rightarrow$Step- 1Cl2 $CH_3CHO \rightarrow$Step-23Cl2 Cl_3CCHO

In the above reaction, the role of Cl_2 in Step-1 and Step-2 respectively is:

A. oxidation, chlorination

B. reduction, chlorination

C. oxidation, addition

D. reduction,substitution

Answer

23. The number of sigma (σ) and pi (π) bonds present in benzene respectively are :

A. 12, 6

B. 6, 6

C. 6, 12

D. 12, 3

Answer

24. The standard reduction potentials of Zn^{2+}| Zn, Cu^{2+}| Cu and Ag^{+}| Ag are respectively -0.76, 0.34 and 0.8 V. The following cells were constructed :

(1) Zn | Zn^{2+} || Cu^{2+} | Cu

(2) Zn | Zn^{2+} || Ag^{+} | Ag

(3) Cu | Cu^{2+} || Ag^{+} |Ag

What is the correct order of Ecell° of these cells?

A. 2 > 3 > 1

B. 2 > 1 > 3

C. 1 > 2 > 3

D. 3 > 1 > 2

Answer

25. What is the time (in sec) required for depositing all the silver present in 125 mL of 1 M $AgNO_3$ solution by passing a current of 241.25 A? (1F = 96500 coulombs)

A. 10

B. 50

C. 1000

D. 100

Answer

26. The disperse phase, dispersion medium and nature of colloidal solution (lyophilic or lyophobic) of 'gold sol' respectively are :

A. solid, solid, lyophobic

B. liquid, liquid, lyophobic

C. solid, liquid, lyophobic

D. solid, liquid, lyophilic

Answer

27. Electrolysis of X gives Y at anode. Vacuum distillation of Y gives H_2O. The number of peroxy (O-O) bonds present in X and Y respectively are :

A. 1, 1

B. 1, 2

C. zero, 1

D. zero, zero

Answer

28. AB is an ionic solid. The ionic radii of A^{+} and B^{-} are respectively r_c and r_a. Lattice energy of AB is proportional to :

A. rcra

B. $(r_c + r_a)$

C. rarc

D. 1rc + ra

Answer

29. The rate constant of a first order reaction at 27°C is 10^{-3} min^{-1}. The temperature coefficient of this reaction is 2. What is the rate constant (in min^{-1}) at 17°C for this reaction ?

A. 10^{-3}

B. 5×10^{-4}

C. 2×10^{-3}

D. 10^{-2}

Answer

30. What is the correct order of occurrence (% by weight) in air of Ne, Ar and Kr ?

A. Ne > Ar > Kr

B. Ar > Ne > Kr

C. Ar > Kr > Ne

D. Ne > Kr > Ar

Answer

31. Assertion (A) : A current of 96.5 A is passed into aqueous $AgNO_3$ solution for 100 s. The weight of silver deposited is 10.8 g (At. wt. of Ag = 108)

Reason (R) : The mass of a substance deposited during the electrolysis of an electrolyte is inversely proportional to the quantity of electricity passing through the electrolyte.

The correct answer is :

A. Both (A) and (R) are true and (R) is the correct explanation of (A).

B. Both (A) and (R) are true but (R) is not the correct explanation of (A).

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer

32. Hydrolysis of NCl_3 gives NH_3 and X. Which of the following is X?

A. $HClO_4$

B. $HClO_3$

C. HOCl

D. $HClO_2$

Answer

33. What are the metal ions present in carnallite?

A. Mg, K

B. Al, Na

C. Na, Mg

D. Zn, Hg

Answer

34. Which of the following is added to chloroform to slowdown its aerial oxidation in presence of light?

A. Carbonyl chloride

B. Ethyl alcohol

C. Sodium hydroxide

D. Nitric acid

Answer

35. Which of the products is formed when acetone is reacted with barium hydroxide solution ?

A. CH_3 - C||O - CH_2 - C||OHCH3 - CH_3

B. CH_3 - C||O - CH|CH3 - CH|OH - CH_3

C. CH_3 - C||O - CH|OH - CH|CH3 - CH_3

D. CH_3 - C||CH3OH - C||CH3OH - CH_3

Answer

36. When acetaldehyde is heated with Fehling solution, a red precipitate is formed. Which of the following is that ?

A. Cu_2O

B. Cu

C. CuO

D. $CuSO_4$

Answer

37. Match the following lists:

List- I	List- II
A. Grignard reagent	1. H_2/ Pd-$BaSO_4$
B. Clemmensen reduction	2. N_2H_4 | KOH | $(CH_2)_2$-OH
C. Rosenmund reduction	3. CH_3Mg X
D. Wolff-Kishner reduction	4. Zn-Hg | conc. HCl 5. H_2| Ni

A. A - 3; B - 4; C - 2; D - 1

B. A - 3; B - 4; C - 1; D - 2

C. A - 2; B - 1; C - 4; D - 5

D. A - 5; B - 3; C - 2; D - 1

Answer

38. Which of the following compounds when heated with CO at 150°C and 500 atm pressure in

presence of BF_3 forms ethyl propionate ?

A. C_2H_5OH

B. CH_3OCH_3

C. $C_2H_5OC_2H_5$

D. $CH_3OC_2H_5$

Answer

39. When compound X is oxidised by acidified potassium dichromate, compound Y is formed. Compound Y on reduction with $LiAlH_4$ gives X. X and Y respectively are :

A. C_2H_5OH, CH_3COOH

B. CH_3COCH_3, CH_3COOH

C. C_2H_5OH, CH_3COCH_3

D. CH_3CHO, CH_3COCH_3

Answer

40. Ethyl chloride reacts with sodium ethoxide to form a compound A. Which of the following reactions also yields A ?

A. C_2H_5Cl, KOH (alc.), Δ

B. $2C_2H_5OH$, conc. H_2SO_4, 140°C

C. C_2H_5Cl, Mg (dry ether)

D. C_2H_2, dilute H_2SO_4, $HgSO_4$

Answer