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Previous Year Paper

Chemistry - 2007



Match The Following

1. Match the following :

A. Elevation of boiling point	(i) Tetrahedral arrangement of atoms
B. Hydrogen fluoride	(ii) Le-Chatelier's principle
C. Diamond	(iii) Aluminium
D. Diamond	(iv) Relative lowering of vapour pressure
E. Cryolite	(v) Hydrogen bond

Answer



Fill In the Blanks

2. Fill in the blanks by choosing the appropriate words from those given in brackets :

[Acidic, basic, neutral, salt hydrolysis, common ion effect, buffer action, increases, decreases, ortho-para, beta, homolytic, heterolytic, gamma, meta, addition, elimination, four, substitution, zero, three].

(i) When an element loses an alpha particle and aparticle, its atomic number decreases by one unit and its atomic mass decreases by.....units.

(ii) Solubility of silver chloride.....in the presence of sodium chloride because ofeffect.

(iii) In the benzene ring, the distribution of the nitro group is.....directing, while, the distribution of the chloro group is.....directing.

(iv) The reaction of chlorine with methane is a.....reaction which involves fission of C-H bond.

(v) Ammonia chloride solution is because of.....

Answer



Multiple Choice Questions

3. Complete the following statements by selecting the correct alternative from the choices given:

Homolytic fission of covalent bond results in the formation of :

A. Carbonium ions

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C. Carbanions

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D. Carbanions

Answer

4. Complete the following statements by selecting the correct alternative from the choices given:

The compound which gives a positive Haloform test and a positive Fehling solution test is :

- A. Acetone
- B. Acetaldehyde
- C. Formaldehyde
- D. Formaldehyde

Answer

5. Complete the following statements by selecting the correct alternative from the choices given:

Benzaldehyde, when heated with an alcoholic solution of potassium cyanide, forms :

- A. Benzyl alcohol
- B. Benzoin
- C. Hydrobenzamide
- D. Hydrobenzamide

Answer

6. Complete the following statements by selecting the correct alternative from the choices given:

An acidic buffer can be prepared by mixing :

- A. CH_3COONa and CH_3COOH
- B. Na_2SO_4 and H_2SO_4
- C. NaCl and NaOH
- D. NaCl and NaOH

Answer

7. Complete the following statements by selecting the correct alternative from the choices given:

Phosphorous pentachloride reacts with sulphur dioxide to form :

- A. Chlorosulphonic acid
- B. Phosphoric acid
- C. Thionyl chloride
- D. Thionyl chloride

Answer



Short Answer Type

8. Correct the following statements :

The enthalpy of a system is an intensive property i.e. its value depends on the amount of matter in the system.

Answer

9. Correct the following statements : Make Notes. Print - Your Favourite Questions. Join www.zigya.com

10. Correct the following statements:

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In a nitrogen molecule, two nitrogens are linked together by three sigma bonds.

[Answer](#)

11. Correct the following statements:

Chloroacetic acid is more acidic than acetic acid because of the - M effect.

[Answer](#)

12. Correct the following statements:

When acetone is treated with bleaching powder, acetaldehyde is obtained.

[Answer](#)

13. The molecular weights of sodium chloride and glucose are determined by the Depression of freezing point method. Compared to their theoretical molecular weights, what will be their observed molecular weights when determined by the above method ? Justify your answer.

[Answer](#)

14. An aqueous solution containing 1.70 g of cane sugar in 100 ml water begins to freeze at -0.093°C . The cryoscopic constant (molal depression constant) of water is $1.86 \text{ K Kg mole}^{-1}$. Calculate the molecular weight of cane sugar. [Answer](#)

15. A decinormal solution of sodium chloride exerts an osmotic pressure of 4.82 atmosphere at 27°C . Calculate the degree of dissociation of sodium chloride. [Answer](#)

16. The half life of a radioactive isotope is 10 hours. How many atoms of this isotope will be left after 4 hours if initially 1 gm mole of the radioactive isotope was taken ? [Answer](#)

17. ${}_{90}\text{Th}^{234}$ emits 7alpha particles and 6 beta particles. What will be the atomic number and mass number of the resulting atom. [Answer](#)

18. What is the function of the moderator and the control rod in nuclear reactor ? [Answer](#)

19. The melting point of pure silver and pure lead is 961°C and 327°C respectively. A molten mixture of the two metals on cooling at a constant temperature forms a eutectic mixture with a composition of approximately 5% silver and 95% lead at 305°C . Draw a schematic phase diagram for the silver-lead system. Label all the parts of the diagram. Indicate the number of components, phases and degrees of freedom present at the eutectic point. [Answer](#)

20. An aqueous solution of an organic compound contains 10 g of solute per litre. When 1 litre of this solution is treated with 100 ml of ether, 6 g of the organic solute is extracted. How much of the solute will be extracted from the aqueous solution by adding further 100 ml of ether ? (Assume that the molecular state of the solute is the same in ether and water.) [Answer](#)

21. Define molecularity of a reaction. Give one difference between the order of a reaction and its molecularity. [Answer](#)

22. Which one of the following is not a valid reason for a reaction to be spontaneous? Justify your answer.

23. Draw the electron dot diagrams or any other suitable representation of chloric acid and hypochlorous acid. [Answer](#)

24. (i) How many sodium ions and chloride ions are present in a unit cell of sodium chloride ?
(ii) What is the co-ordination number of sodium and chloride ions in sodium chloride crystals ?

[Answer](#)

25. Give a reason for each of the following :

(i) Specific conductance decreases with dilution whereas equivalent conductance increases with dilution.

(ii) Lead is precipitated as PbS while zinc is not precipitated when H₂S gas is passed through an acidic solution of lead nitrate and zinc nitrate.

[Answer](#)

26. Mention any two factors that influence the rate of a chemical reaction [Answer](#)

27. (i) Enthalpy change and entropy change of a chemical reaction at 25°C are 177.0 KJ and 160.4 JK⁻¹ respectively. Calculate free energy change of the reaction and predict whether the reaction is spontaneous or nonspontaneous.

(ii) 2 moles of an ideal gas at 27°C expand reversibly from 2 litres to 20 litres. Find the entropy change for the reaction.

(iii) State the second law of thermodynamics in terms of entropy of the universe.

[Answer](#)

28. If enthalpies of formation for C₂H₄, CO₂ and H₂O at 25°C and 1 atm. pressure are 52 KJ/mole, -394 KJ/mole and -286 KJ/mole respectively, calculate the enthalpy of combustion of C₂H₄. [Answer](#)

29. Explain the mechanism for the reaction of primary alkyl chloride with aqueous potassium hydroxide. [Answer](#)

30. Aniline is a weaker base than ammonia whereas methyl amine is a stronger base than ammonia. Explain. [Answer](#)

31. Write balanced equations for each of the following reactions :

(i) Dilute hydrochloric acid is added to sodium thiosulphate solution.

(ii) Sodium hydroxide solution is added to silver nitrate solution

[Answer](#)

32. Explain the following with at least one example :

(i) Keto-enol tautomerism.

(ii) Carbylamine reaction.

(iii) Rosenmund's reduction.

(iv) Haloform reaction.

[Answer](#)

33. Give one reason each for the following :

(i) Acetone reacts with hydroxylamine to form only one product which has no geometrical

isomer, but acetaldehyde reacts with hydroxylamine to form a product which has two isomers. Like. Share. Bookmark. Download. Make Notes. Print - Your Favourite Questions. Join www.zigya.com

(ii) Direct nitration of aniline is not possible.

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Answer

34. Write balanced equations for the preparation of:

- (i) DDT
- (ii) Urotropine
- (iii) Biuret

Answer

35. Give balanced equations for the reactions given below:

- (i) Urea is warmed with a dilute solution of sodium hydroxide.
- (ii) Methyl isocyanide is warmed with dilute hydrochloric acid.
- (iii) Sucrose is warmed with concentrated nitric acid.
- (iv) Aniline is treated with a mixture of NaNO_2 and excess of HCl at low temperature.

Answer

36. How would you convert the following :

- (i) Methyl amine to ethyl amine
- (ii) Benzoic acid to benzene
- (iii) Glucose to fructose

Answer

37. Give a chemical test to distinguish between :

- (i) Urea and oxalic acid
- (ii) Acetaldehyde and acetone.

Answer

38. i) What is a specific rotation ?

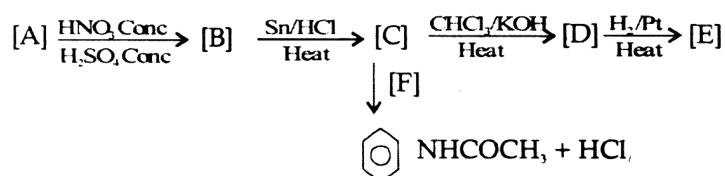
(ii) 1. What is optical activity ?

2. Name the apparatus used to measure optical activity.

3. State the two necessary conditions for a compound to show optical activity. Give one example of a compound which shows optical activity.

Answer

39. Give the name and formula of each A, B, C, D, E and F in the following conversion reactions :



Answer

40. What are polyolefins ? Give the reaction for the preparation of polythene a polyolefin. Answer



Long Answer Type

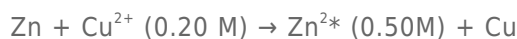
41. (i) Calculate the solubility of AgCl in 0.2 M solution of sodium chloride.
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(ii) A current of 10 A is passed for 80 min. and 27 seconds through a cell containing dilute sulphuric acid.

- How many moles of oxygen gas will be liberated at the anode ?
- Calculate the amount of zinc deposited at the cathode when another cell containing $ZnSO_4$ solution is connected in series ($Zn = 65$).

(iii) Calculate:

E_{cell} at $25^\circ C$ for the reaction



Given :

$$E^\circ (Zn^{2+}/Zn) = - 0.76 \text{ volt } E^\circ (Cu^{2+}/Cu) = 0.34 \text{ volt}$$

Answer

42. Copper pyrites is an ore of copper.

- Describe the process by which copper pyrites is concentrated.
- Describe all the steps, with equations, to convert the concentrated ore to blister copper.
- Describe the process of conversion of blister copper to pure copper.

Answer

43. (i) How is iodine manufactured from sea weeds ?

(ii) How is hydrogen peroxide prepared in the laboratory ?

(iii) Give a balanced equation for a reaction in which hydrogen peroxide acts as a reducing agent and one in which it acts as an oxidizing agent.

Answer