

Short Answers and Questions

Q 1: Define analytical chemistry:

Answer

Analytical chemistry is the branch of chemistry which deals with the separation and analysis of a sample to identify its components.

Q2: What is Qualitative analysis?

Answer

The analysis which provides the identity of a substance i.e. chemical composition of the substance is called qualitative analysis.

Q3: What is Quantitative analysis?

Answer

The analysis which determines the amount of each component present in the sample is called quantitative analysis.

Q4: Why does formaldehyde dissolve in water?

Answer

Formaldehyde CHO , is unstable as a pure gas, readily forming a mixture of substance called trioxane and a polymer called paraformaldehyde, that is why it is dissolve in water.

Q5: What is spectroscopy?

Answer

Spectroscopy involved using instruments to examine the radiation emitted or absorbed by chemicals giving information about their molecular structure.

Q6: What is Infrared spectroscopy?

Answer

Infrared spectroscopy is the spectroscopy which measures the bonds and have wavelength longer than visible light i.e 2500nm and 25000nm.

Q7: Which bond give rise to the peak just below 3000cm^{-1} ?

Answer

The weaker absorption at 3000cm^{-1} corresponds to the C—H bond.

Q8: Which bond give rise to the peak at about 3400cm^{-1} ?

Answer

The peak at about 3400cm is from the bond.

Q9: Which bond give rise to the peak at about 1720cm^{-1} ?

Answer

The strong peak at about 1720cm^{-1} corresponds to the $\text{C}=\text{O}$ bond.

Q10: What do you mean by visible and ultraviolet spectroscopy?

Answer

It is an example of H C visible emission spectrum, where a substance emit certain visible frequencies when its electrons have been excited by heating or by an electrical discharge these radiations may be in the visible as well as in ultraviolet and visible spectroscopy.

Q 11 : What does the colour of the transition element shows?

Answer

The colour of transition elements shows incompletely filled d — orbitals in the transition metal ion.

Q12: What is TMS?

Answer

TMS is tetramethyl silane, $\text{Si}(\text{CH}_3)_4$ and is unreactive substance because its proton gives a single peak.

Q13: What is Spin-Spin coupling?

Answer

The splitting of protons on neighboring carbon atoms due to spin coupling is called spin-spin coupling.

Q 14: What are quartet peaks?

Answer

When external magnetic field is applied CH₂ protons give four different peaks very close to one another. These are called quartet peaks.

Q 15: What are triplet peaks?

Answer

When external magnetic field is applied CH₃ protons gives slightly three different peaks close to one another is called triplet peak.

Q16: What is the general rule splitting?

Answer

A group carrying n protons will cause the protons on a neighboring group to split into $n + 1$ peaks.

Q17: What is atomic emission spectroscopy?

Answer

Atomic emission spectroscopy pertains to electronic transitions in atoms which use an excitation source like flames sparks.

Q18: What is principal of atomic emission spectroscopy?**Answer**

The course vaporizers the sample causes electronic excitation of elementary particles in the gas. Exited molecules in the gas phase emit bond spectra. Thus a molecule in an exited state of energy E_2 undergoes a transition state of lower energy E_1 and a photon of energy $h\nu$ is admitted

$$E_2 - E_1 = h\nu$$

Q19: Enlist major advantages of emission spectroscopy?**Answer**

- i) Metalloids have been identified with this technique.
- ii) Perform either in solid or liquid state.
- iii) Just require 30sec to one minute.

Q20: Give disadvantages of Emission spectroscopy:**Answer**

- i) Radiation intensities are not always be reproducible.
- ii) Relative error exceeds 1 to 2%.
- iii) The accuracy and precision are not high.

Q21 : Give some applications of emission spectroscopy.**Answer**

- i) Alloys of Zn, Cu, Pb, Al, Mg and Sn have been analyzed.

- ii) In petroleum industry oil is analyzed for V, Ni, Fe in the presence which make fuel poor.
- iii) Traces of Co, Ni, MO and V in Graphite may be synthesize.

Q22: What is atomic absorption spectroscopy?

Answer

Atomic absorption spectroscopy involves the study of the absorption of radiant energy usually visible by natural atoms in the gaseous states.

Q23: What is mass spectroscopy?

Answer

The mass spectroscopy is an instrument which turns atoms and molecules into ions and measure their mass and its study is mass spectroscopy.

Q24: Why does the magnet have the same attraction for all the balls?

Answer

Wooden balls of different sizes but with identical iron coves, roll down a sloping plain. At the bottom of the slope a powerful magnet attracts the iron coves and the moving balls are deflected. All balls have identical iron coves, they are all attracted equally by the magnet.

Q25: Which size ball will be deflected the most? Why?

Answer

The smaller balls are lighter the balls collect in different compartments depends on their mass.

Q26: Name the five main stages of mass spectrometer.

Answer

- i) Vapourization
- ii) Ionization
- iii) Acceleration
- iv) Deflection
- v) Detection

Q27: Name the four different zones of a flame?

Answer

- i) Blue zone
- ii) Dark zone
- iii) Luminous zone
- iv) Non luminous zone

Q28: What is luminous zone?

Answer

In luminous zone incomplete combustion takes place has the temperature of 600 — 8500C.

Q29: What is non - luminous zone?

Answer

None—luminous zone is the zone where complete combustion takes place has the temperature of about 2000°C.

Q30: Red colour of a flame explains what?**Answer**

In fire then the red colour is most, it suggests that the lack of oxygen is there where the flame is burned and the flame temperature is from 600 — 850°C. As a result, lot of carbon non-oxide is formed and cause greater risk of backdraft.

Q31: What is forensic chemistry?**Answer**

Forensic chemistry is the application of chemistry to criminal investigation and involves the examination of physical traces such as body fluids, bones, fibres and drugs.

Q32: What is the market value of global life science and chemical instrumentation?**Answer**

The global life science and chemical instrumentation market was estimated to be \$30, 2 billion in the year 2011 and is expected to grow at a CAGR of 8.4% from 2011 to 2016 to reach \$45.2 billion.

Q33: What is chromatography?**Answer**

Chromatography is the collective term for a set of laboratory techniques for the separation of mixtures and for the detection of small amounts of material present in those mixtures.

Q34: What is mass spectrometry?**Answer**

It is an analytical technique that measures the mass to charge ratio of charged particles. It is used for determining masses of the particles, elemental composition of molecules and elucidation of the chemical structure of the molecules such as peptides.

Q35: What is gas chromatography-mass spectrometry (GC-MS)?**Answer**

(GC-MS) is the method that combines the features of gas-liquid chromatography and mass-spectrometry to identify different substances even present in small amounts within a test sample.

Q36: What is Liquid-chromatography-mass spectrometry (LC-MS) or (HPLC-MS)?**Answer**

(LC-MS) is a technique that combines the physical separation capabilities of liquid chromatography with the mass analysis capabilities of mass spectroscopy. Used for very high sensitivity and selectivity.

