Neon Chemistry Questions with Solutions

Q-1: The term "neon" comes from the Greek word "neos," which means

a) Bright
b) New
c) Old
d) Current

Answer: b) New

Q-2: The extraction of neon is accomplished using fractional distillation of

a) Liquid gas
b) Liquid air
c) Liquid H_2
d) Liquid N_2

Answer: b) Liquid air

Q-3: Give the names of the three stable neon isotopes.

Answer:

Isotopes are the elements that have the same atomic number but different mass number.

The three isotopes of Neon are:

1) ^{20}Ne
2) ^{21}Ne
3) ^{22}Ne

Among all, ^{20}Ne is the most abundant (90.5%).

Q-4: The cryogenic refrigerant liquid neon is utilised in the cooling of

a) Nitrogen gas
b) Chlorine gas
c) Helium gas
d) Argon gas

Answer: c) Helium gas

Explanation: Neon's qualities as an inert gas prevent it from reacting or mixing with other substances. These characteristics, combined with its extremely low boiling point, make it an excellent refrigerant.

Q-5: What are the main characteristics of Neon?

Answer: The main properties of Neon are:

1) It's a colourless, odourless, and tasteless inert gas.
2) In a vacuum tube, it turns to a reddish-orange appearance.
3) It has no chemical activity.
4) Its liquid range is the smallest of any element.
5) Neon is an inert element that can be used to make unusual compounds with Fluorine in laboratories. In addition, it produces an unstable hydrate.

Q-6: Why do HF and Ne have different boiling points?

Answer: Boiling point depends on the strength of the forces of attraction that exist between atoms of an element or molecule. More is the strength more is the boiling point.

HF is polar covalent and has hydrogen bonding(strongest force), dipole-dipole, and dispersion forces, whereas Ne solely possesses dispersion forces. Hydrogen bond requires more energy to break.Thus, Ne has less boiling point when compared to HF.

Q-7: Calculate the volume occupied by neon at 0.45 bar pressure and 70°C, if a sample of neon gas occupies a volume of 300 mL at 1.2 bar pressure and 5°C.

Answer:
According to combined gas law,

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

P_1 = 1.2 bar
V_1= 300 mL
T_1 = 5°C=278.15 K
P_2 = 0.45 bar
T_2= 70°C= 343.15 K
V_2= ?

Substitute the values in the formula,

$$\frac{1.2\ bar \times 300\ mL}{278.15\ K} = \frac{0.45\ bar \times V_2}{343.15\ K}$$

V_2= 987 mL

Q-8: State three uses of Neon.

Answer:

1. Neon is primarily used in a variety of light sources, such as signs and lasers.
2. High-voltage indicators, television tubes, wave metre tubes, and lightning arrestors are all made with it.
3. Due to the helium being less soluble in blood than nitrogen at high pressure, marine divers utilise a mixture of helium and neon for breathing.

Q-9: Neon gives a distinct reddish-orange glow when used in

a) Neon lamps
b) Vacuum Discharge tube
c) Neon Advertising signs
d) All of the above

Answer: d) All of the above

Q-10: How many electrons are present in Neon?

Answer: The atomic number of neon is 10. The number of protons in an atom's nucleus is measured by its atomic number. The number of protons in a neutral atom is equal to the number of electrons it possesses. This demonstrates that neon contains ten electrons.

Q-11: Calculate how many atoms are in 50 g of Neon.

Answer:

Number of moles of neon = Given weight/Atomic mass
= (50 g)/ (20 g/mol)
= 2.5 mol

No of atoms in 1 mole of Neon = 6.022×10^{23} atoms

Number of atoms in 2.5 mol of Neon = $6.022\times10^{23}\times2.5$
= 15.055×10^{23} atoms

Q-12: Is there any lustre to Neon?

Answer: No.

Explanation: Lustre is the property shown only by metals. Neon is a gas. Thus making it non lustrous.

Q-13: How are you going to account for neon's inertness?

Answer: The tendency of an element to lose or absorb electrons determines its chemical reactivity.The electronic configuration of Neon is $1s^2\ 2s^2\ 2p^6$. It does not gain or lose electrons since it has a fully filled valence shell. As a result, it is monoatomic, stable and does not participate in any chemical reactions.

Q-14: Which noble gas has the highest electron gain enthalpy?

a) Helium
b) Argon
c) Xenon
d) Neon

Answer: d) Neon

Q-15: What percentage of earth 's atmosphere is made up of Neon?

Answer: Neon make up only 0.0018 percent of the Earth's atmosphere.

Practise Questions on Neon

Q-1: Is neon environmentally hazardous?

Answer: Because neon is a noble gas, it is non-reactive and does not readily form compounds. As a result, neon gas does not pose a significant risk to the environment. However, the neon element has numerous applications.

Q-2: At 20°C, the state of neon is

a) Liquid
b) Solid
c) Gas
d) Plasma

Answer: c) Gas

Q-3: 70.6 g dioxygen(O_2) and 167.5 g neon (Ne) make up a neon-dioxygen combination. Calculate the mole fraction and partial pressure of neon in the mixture if the pressure of the mixture of gases in the cylinder is 25 bar?

Answer: Moles = Given weight/Atomic mass

Number of moles of neon,Ne = Given weight of neon/Atomic weight of Neon
=(167.5 g)/(20 g/mol) = 8.375 mol

Number of moles of dioxygen, O_2= Given weight of O_2 /Atomic weight of O_2
= (70.6 g)/(32 g/mol) = 2.21 mol

Mole fraction of Ne = Moles of neon/Total moles = 8.375/(8.375+2.21) = 0.79

Partial Pressure of Neon = Mole fraction of Ne × total pressure = 0.79 × 25 bar = 19.75 bar

Q-4: Calculate the average atomic mass of neon. Refer to the following data.

Isotopes	% abundance	Atomic Masses(in u)
^{20}Ne	90.51	19.99
^{21}Ne	0.27	20.99
^{22}Ne	9.22	21.99

Answer:

Average atomic mass = $\sum_{i=1}^{n}$ ($mass_i$)($Abundance_i$)/100

Average atomic mass of Ne= (19.99×90.51+20.99×0.27+21.99×9.22)/100 = 20.18 u

Q-5: Calculate the mass of one atom of Neon.

Answer:

Atomic mass of Neon = 20 g/mol
This shows, Mass of 1 mol = 20g

We also know that,
1 mol of element contains 6.022×10^{23} atoms

Hence,

Mass of 6.022×10^{23} atoms of Neon = 20 g
Mass of one atom of Neon = $20/(6.022\times10^{23}) = 3.32\times10^{-23}$ g