CHJM 112: General Inorganic Chemistry

1:The maximum number of electrons that can be accommodated by p orbital is?
a:2
b:6
c:10
d:14
2:An element has 18 electrons, and 20 neutrons. Its charge is -2. What is its mass number?
a:38
b:39
c:40
d:42
3:Which one of the following species has the same electronic configuration as the Al^{3+}cation?
a:F^-
b:Cl^-
c:S^{2-}
d:O^-
4:How many electrons are there in the valence shell of the O^{2-} ion?
a:2
b:8
c:10
d:16
5:Which statement about chromium is incorrect?
a:chromium is a transition metal
b:the electronic configuration of chromium atoms is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$ $3d^5$
c:the electronic configuration of chromium atoms is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$
d:chromium has an atomic number of 24
6:Electrons enter the 4s sub-level before the 3d sub-level because...
a:there is only one 4s orbital and there are 5 3d orbitals
b:the 4s orbital is spherical
c:the 4s orbital has a lower energy
d:the 3d orbitals have a lower energy
7:Which of the following statements about s orbital is incorrect?
a:They are found in all principal energy levels
b:They are spherical in shape
c:They can hold only one electron
d:The maximum number of s orbital in any principal level is 1
8:The Aufbau principle states that ….
a:Only two electrons can occupy an orbital
b:Electrons enters the lowest available energy level
c:Electrons remains unpaired if possible
d:Orbitals are regions in space where one is likely to find an electron
9:Which one of the following statements is correct?
a:The 3d sub level is filled before the 4s sub level
b:The 3rd principal energy level only contains 8 electrons
c:The principal energy levels get closer together as they get further from the nucleus
d:Orbitals are always filled in numerical order
10:Hund's rule states that….
a:You must not sit next to another person on a bus
b:Electrons enter the lowest available energy level
c:An orbital can hold up to two electrons
d:Electrons in similar energy orbitals remain unpaired as far as possible
11:Which of the following sub shell is not possible?
a:2s
b:4f
c:1p
d:3d

12:Which one of the following statements about d orbitals is incorrect?
a:They are not found in the first two principal energy levels
b:They are associated with transition elements
c:There are 5 types of d orbital
d:d orbitals are filled before p orbitals in the same principal energy level
18:The order of filling orbitals is ___
a:1s, 2s , 2p, 3s, 3p, 3d, 4s, 4p
b:1s, 2s, 2p, 3s, 3p, 3d, 4p, 3d
c:1s, 2s, 2p, 3s, 3p, 4s, 3d, 4p
d:4p, 4s, 3d, 3p, 3s, 2p, 2s, 1s
13:Electronic configuration is the arrangement of electrons in
a:nucleus
b:shells
c:both A and B
d:sub-shells
20:After filling 3s sub-shell, you begin to fill ___
a:3p
b:3d
c:3f
d:none of above
21:The lowest energy orbital among the following is
a:2s
b:2p
c:3s
d:3p
22:How many orbitals are in a 3d subshell?
a:10
b:2
c:6
d:5
23:What values of ℓ are permitted for an electron with n = 4?
a:1, 2, 3
b:1, 2, 3, 4
c:0, 1, 2, 3
d:0, 1, 2, 3, 4
25:In the periodic table the element that has the last 3d electron is ___
a:Ar
b:Na
c:Zn
d:K
26:What is the number of unpaired electrons in an atom of nitrogen?
a:3
b:0
c:4
d:2
27:What is the maximum number of unpaired electrons in a p subshell?
a:1
b:3
c:2
d:d
28:What values of m are permitted for an electron with ℓ = 3?
a:0, 1, 2
b:-2, -1, 0, 1, 2
c:-3, -2, -1, 0, 1, 2, 3
d:-3, -2, -1, 1, 2, 3
29:For the hydrogen atom, which of the following orbitals has the lowest energy

a:4s
b:4p
c:4d
d:They all have the same energy
32:Which of the atom pairs both have only three unpaired electrons in their d orbitals?
a:Ti and V
b:Ti and Co
c:V and Cr
d:V and Co
33:Which of the following has the greatest number of unpaired electrons?
a:Ti
b:V
c:Cr
d:Mn
34:What values of ℓ are permitted for an electron with n = 4?
a:1, 2, 3
b:1, 2, 3, 4
c:0, 1, 2, 3
d:0, 1, 2, 3, 4
36:What is the maximum number of electrons in a given atom that can have the quantum numbers n = 3, ℓ = 1
a:23
b:18
c:10
d:28
39:Which of the following atoms has three unpaired electrons?
a:B
b:C
c:O
d:N
40:Which of the following atoms has the greatest number of unpaired electrons?
a:Ti
b:V
c:Mg
d:Cr
41:Which atom has the lowest number of unpaired electrons?
a:Cr
b:Co
c:Sc
d:Ti
42: _____ quantum number describes the shape of an orbital or a sub shell and type of orbital.
a:principal quantum number
b:electron spin quantum number
c:azimuthal quantum number
d:magnetic quantum number
44:Elements of D-block are mainly
a:transitional elements
b:metals
c:alkali
d:noble gases
45: Whenever there is no empty orbital available within a sub-shell, electrons are
a:deflected
b:reflected
c:paired
d:charged

46: How many electrons are there in the "p" orbitals of the **last** shell (principal energy level) of silicon, atomic number 14?
a:4
b:6
c:0
d:2
48:↑↓ ↑↓ ↑↓ ↑↓ ↑_ this arrangement represents the electronic configuration of which of the following atoms?
a:Cl
b:Na
c:C
d:F
49:The atomic orbital illustrated below is of what type?

a:2p
b:3s
c:3p
d:3d
50:Two electrons occupying the same orbital with parallel spins (↑↑ or ↓↓) are not allowed, why?
a:because they will different set of quantum numbers
b:because they will have the same set of quantum numbers
c:because they will have opposite spins
d:because the electrons will enter the lowest energy level
101:The first scientist to postulate atom was ----------
a:Thomson
b:Moseley
c:Democritusd:Chadwick
102:How many elements were there in Newland's law of octave?
a:23
b:35
c:40
d:55
103:Modern periodic law states that periodic properties are a function of
a:atomic mass
b:atomic number
c:atomic structure
d:mass number
104:The nucleus of every atom contains
a:electron and neutron
b:electron and proton
c:electron, neutron and proton
d:neutron and proton
105:Which of these pairs contains elements that are liquid at room temperature?
a: Bromine and Mercury
b: Bromine and Iodine
c: Fluorine and Chlorine
d: Mercury and Zinc
106:Atomic size _____ across the periods and _____ down the groups.
a:decreases, decreases

b:decreases, increases
c:increases, decreases
d:increases, increases
108:_____ is the ability of an atom to attract electron.
a:electron affinity
b:electronegativity
c:electropositivity
d:ionization energy
109:Electrical and thermal conductivities _____ across the periods and _____ down the groups.
a:decrease, decrease
b:decrease, increase
c:increase, decrease
d:increase, increase
110:Group IIA elements are generally called the
a:Alkali earth metals
b:Alkali metals
c:Halogens
d:Noble gases
111:In the modern periodic table, elements are arranged into rows otherwise called ---------- and into columns otherwise called ----------
a:periods, periods
b:periods, groups
c:groups, periods
d:groups, groups
112:The following elements belong to the first transition series EXCEPT
a:Titanium
b:Aluminium
c:Iron
d:Copper
113:The characteristics of transition elements include the following EXCEPT
a:Formation of coloured compounds
b:Variable oxidation state
c:Formation of complex ions
d:Formation of salt and water
114:Which of the following is NOT a periodic property?
a:Enthalpy change
b:Ionization energy
c:Electron affinity
d:Electronegativity
115:Group IIA elements are divalent because
a:they have two electrons
b:they react with cold water and steam to liberate hydrogen
c:they have two valence electrons
d:they are reducing agents

116:Moseley X-ray emission spectra vary with
a:atomic number
b:atomic mass
c:mass number
d:nucleon number
117:The unreactive nature of group 0 elements is due to their
a:boiling points
b:electronic configuration
c:mass number
d:ionization energy
118:The following elements are gases at room temperature EXCEPT
a:Iodine
b:Fluorine
c:Chlorine
d:Bromine
119:Atomic number equals
a:number of electrons
b:number of neutrons
c:number of protons
d:mass number
120:Which of the following elements can be found in group IV, period 3 in the periodic table?
a:Silicon
b:Fluorine
c:Carbon
d:Beryllium
125:Which of the following halogens is least electronegative?
a:Bromine
b:Chlorine
c:Fluorine
d:Iodine
126:Which of the following periodic table contains 63 elements only?
a:Dobreiner triads
b:Mendeleev and Meyer
c:Modern periodic table
d:Newland's law of octave
130:The following elements can be attracted and repelled by a magnetic force EXCEPT
a:aluminium
b:cobalt
c:iron
d:nickel
131:Which of the following pairs naturally exists as liquids at room temperature and pressure?
a:hydrogen, lithium
b:bromine and mercury
c:bromine and chlorine
d:mercury and silver
132:The following are general properties of metals EXCEPT

a:low melting and boiling point
b:reducing agents
c:ductility
d:high density
133:Hydrogen belongs to s-block as neon belongs to
a:s-block
b:p-block
c:d-block
d:f-block
134:The first member of lanthanide family is Lanthanium while the last member is
a:actinium
b:lawrencium
c:luthetium
d:uranium
135:Electron affinity _____ from left to right across the period and _____ down the group
a:decreases, decreases
b:decreases, increases
c:increases, increases
d:increases, decreases
136:Which of the following elements reacts vigorously with cold water to liberate hydrogen gas and form alkali?
a:calcium
b:lithium
c:magnesium
d:sodium
137:The elements in the list belongs to group IIA EXCEPT
a:beryllium
b:boron
c:calcium
d:magnesium
138:Which is NOT a characteristics of transition metals?
a:ability to form coloured ions
b:ability to form complex ions
c:low density
d:some of their compounds are used as catalysts
139:Actinides can be found in _____ in the periodic table.
a:period 6
b:period 7
c:group VIA
d:group VIIA
140:The following elements are natural magnets EXCEPT
a:beryllium
b:cobalt
c:iron
d:nickel
141:Arrange the elements Na, Al, Mg, Cl in order of increasing atomic size.
a:Al, Cl, Mg, Na
b:Na, Mg, Cl, Al
c:Na, Mg, Cl, Al
d:Na, Mg, Al, Cl
142:Which of the following elements is the most electronegative?

a:Oxygen
b:Chlorine
c:Fluorine
d:Neon
143:Oxygen is slightly soluble in water while sulphur is
a:slightly soluble
b:soluble
c:insoluble
d:slightly insoluble
144:The chemical combination between sodium atom and chlorine atom is
a:covalent
b:electrovalent
c:dative
d:hydrogen bonding
145:The shell electronic configuration of an element [sup]12[/sup][sub]6[/sub]C is
a:2, 4
b:2, 6
c:2, 8
d:2, 8, 2
146:Which is the odd-one out?
a:bronze
b:brass
c:steel
d:iron
147:In the industrial manufacturing process of ammonia, which of the following is used as catalyst?
a:Vanadium oxide
b:Finely divided iron
c:Charcoal
d:Silicon oxide
148:Most actinides are
a:electronegative
b:oxidative
c:radioactive
d:metalloids
149:Which of the following scientists discovered the atomic number, Z via the X-ray emission spectra?
a:Moseley
b:Rutherford
c:Thomson
d:Priestley
150:The elements below are metalloids EXCEPT
a:Silicon
b:Germanium
c:Aluminium
d:Antimony
151: When atoms approach one another to form a chemical bond, their nuclei and electrons interact and tends to distribute themselves in such a way that
a: Total energies of the group of atoms is less than the sum of the energies of the component atoms

b: Total energies of the group of atoms is greater than the sum of the energies of the component atoms
c: Total energies of the group of atoms is equal to the sum of the energies of the component atoms
d: Energy will not involve in bond formation
152: Which of the following is correct?
a: Multiple bond has 2 electrons
b: Multiple bond has either 4 or 8 electrons
c: Multiple bond has 4 electrons
d: Multiple bond has either 4 or 6 electrons
153: Which of the following atoms does not involve in chemical bonding?
a: Silicon
b: Sulphur
c: Neon
d: Carbon
155: Which of the following pairs of atoms have similar Lewis dot symbols?
a: Calcium and Magnesium
b: Boron and Helium
c: Sodium and Calcium
d: Oxygen and Nitrogen
156: Atom may attain a stable electronic configuration through the following ways except
a: By losing electron
b: By gaining electron
c: By sharing electron
d: By exciting electron
157: The type of bond between two electronegative elements is ___
a: Ionic
b: Covalent
c: Metallic
d: None of the above
158: The number of valence electron in potassium is ___
a: 2
b: 3
c: 4
d: None of the above
160: Which of the following could be formed through dative bonding?
a: Hydrogen molecule
b: Water molecule
c: Ammonium ion
d: F2
161: The electronegativity of polar covalent bond is within the range
a: 0.4 – 1.7
b: 1.5 – 1.7
c: 0- 0.4

d: < 0.3
163: Predict the nature of the bond between Hydrogen and Chlorine. [Take electronegativity of H = 2.2; Cl =3.16]
a: Non-polar covalent
b: Polar covalent
c: Ionic
d: None of the above
164: Double bond consists of ____
a: two sigma and one pi bonds
b: one sigma and one pi bonds
c: two sigma and two pi bonds
d: one sigma and two pi bonds
165: Which of the following statements is TRUE about VSEPR-theory?
a: It predicts the chemical composition of mixture
b: It shows the image of element
c: It predicts the molecular shape and geometry
d: It predicts the bond length
166: The tendency of electron-electron repulsion between electron pairs [lone pair (LP) and bond pair (BP)] is ___
a: LP-BP > LP-LP > BP-BP
b: BP-LP > BP- BP > LP-BP
c: LP-LP > LP –BP > BP-BP
d: None of the above
167: The steric number of CO2 molecule is ___
a: 2
b: 3
c: 4
d: 5
168: The shape of BF3molecule is ___
a: Tetrahedral
b: Octahedral
c: Linear
d: Trigonal planar
169: The steric number of SF6 molecule is ____
a: 3
b: 6
c: 7
d: 5
170: What is the formal charge of Sulphur in SO2
a: 6
b: 0
c: 4
d: -1
171: How many lone pairs of electrons are located on Oxygen in the Lewis structure of H2O?

a: 2
b: 3
c: 4
d: 0
174: All the following are types of intermolecular bond EXCEPT
a: Dipole-dipole interaction
b: Hydrogen bond
c: London dispersion forces
d: Ionic bond
176: The bond order of H[sub]2[/sub] is ____
a: 7
b: 1
c: 0
d: 2
177: Molecular orbital theory predicts N[sub]2[/sub] molecule to be ___
a: Paramagnetic
b: Triamagnetic
c: Diamagnetic
d: None of the above
178: Paramagnetic molecules have ___
a: ONE unpaired electron
b: AT LEAST ONE unpaired electrons
c: TWO unpaired electrons
d: NO unpaired electron
179: When two atomic orbitals overlap, they interact in two extreme ways to form two molecular orbitals known as
a: Bonding & Antibonding molecular orbitals
b: s & p molecular orbitals
c: Sigma & Pi molecular orbitals
d: Ionic & covalent molecular orbitals
180: Lone pairs of electrons are used by atoms for _____
a: Coordinate covalent bonding
b: Metallic bonding
c: Ionic bonding
d: London dispersion bonding
181: Lewis structure allows the prediction of many properties of molecules except
a: formal charge
b: molecular shape
c: molecular stability
d: electrolysis
183. The variation in geometry of molecules with the same steric number is described using ___
a: Bent rule
b: Molecular rule
c: Hund’s rule
d: Charles principle

184: Chemical bonding enables atom to attain a stable electronic configuration
a: True
b: False
c: True and false
d: None of the above
185: pi-bond is present in the following molecules EXCEPT
a: Ethene
b: carbonmonoxide
c: carbondioxide
d: ammonia
186: Which of the following molecules have the lowest bond angle?
a: water
b: ammonia
c: methane
d: Carbondioxide
188: The best Lewis structure for a molecule is arranged with formal charge of each atom ……
a: greater than one as possible
b: less than zero as possible
c: close to zero as possible
d: greater than two as possible
190: How many orbitals are involved in the mixing of sp[sup]2[/sup] hybridized orbitals?
a: 5
b: 4
c: 3
d: 2
192: The electronegativity of H-F bond is 1.9. What is the nature of the bond?
a: ionic
b: Metallic
c: polar covalent
d: non-polar covalent
193: Hydrogen bonding could be found in the following molecules EXCEPT
a: HCl
b: water
c: HF
d: butane
194: The higher the bond order is
a: the less stable is the bond
b: the less stable is the electron
c: the more stable is the bond
d: The more stable is the electron
195: Which of the following statement is TRUE?
a: π-bond is formed from overlapping of s and p orbitals
b: π-bond is formed from overlapping of s and sp orbitals

c: π-bond is formed from mixing of p and p orbitals
d: π-bond is formed from overlapping of p and p orbitals
196: Which of the following statement is CORRECT?
a: Electrons are closer to highly electronegative element in polar covalent bond
b: Electrons are closer to highly electropositive element in polar covalent bond
c: Electrons are equally shared between atoms in polar covalent bond
d: Electron is transferred from one atom to another in polar covalent bond
197: Which of the following statement about *homonuclei diatomic molecules* is CORRECT?
a: They have polar covalent bond
b: They have non-polar covalent bond
c. The electronegativity of their bond is greater than 1.7
d. The electronegativity of their bond is greater than 1.9
198: The following molecules possess π-bond EXCEPT
a: propene
b: ethanoic acid
c: water
d: ethane
199: Ionic bond can be constituted between the following pair
a: group IV and group VI elements
b: group IA elements and group VIIA
c: Carbon and Sulphur
d: Hydrogen and halogens
200: Lewis dot Symbol is used to represents ____
a: the electronic configuration of an atom
b: the atomic structure of an atom
c: valence electron of an atom
d: the molecular orbital theory
201: Which of the following bond theories provides information on bond order?
a: Lewis theory
b: Molecular orbital theory
c: Valence bond theory
d: VSEPR theory