

GPLUS EDUCATION

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
CHEMISTRY

CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES

Single Correct Answer Type

- Born Haber cycle is used to determine:
a) Lattice energy b) Electron affinity c) Ionization energy d) Either of them
- The electronic configurations of four elements L, P, Q and R are given below,
 $L = 1s^2, 2s^2 2p^4$ $Q = 1s^2, 2s^2 2p^6, 3s^2 3p^5$
 $P = 1s^2, 2s^2 2p^6, 3s^1$ $R = 1s^2, 2s^2 2p^6, 3s^2$
The formula of the ionic compounds that can be formed between these elements are:
a) L_2P, RL, PQ, R_2Q b) LP, RL, PQ, RQ c) P_2L, RL, PQ, RQ_2 d) LP, R_2L, P_2Q, RQ
- The element with strong electropositive nature is:
a) Cu b) Cs c) Cr d) Ba
- Octet rule is not valid for the molecule:
a) CO_2 b) H_2O c) O_2 d) CO
- The correct order of reactivity of halogens is
a) $F > Br > Cl > I$ b) $F > Cl > Br > I$ c) $I > Br > Cl > F$ d) $Cl > I > Br > F$
- NH_3 has higher boiling point than expected, because :
a) With water it forms NH_4OH
b) It has strong intermolecular hydrogen bonds
c) It has strong intermolecular covalent bonds
d) Its density decreases in freezing
- The screening effect of d -electrons is:
a) Equal to the p -electrons
b) Much more than p -electrons
c) Same as f -electrons
d) Less than p -electrons
- Which has the largest first ionisation energy?
a) Li b) Na c) K d) Rb
- In which of the following molecules are all the bonds not equal?
a) AlF_3 b) NF_3 c) ClF_3 d) BF_3
- The bond between two identical non-metal atoms has a pair of electrons:
a) Unequally shared between the two
b) Equally shared between the two
c) Transferred fully from one atom to another
d) None of the above
- The number of unpaired electrons in a paramagnetic diatomic molecule of an element with atomic number 16 is:
a) 4 b) 1 c) 2 d) 3
- In NO_3^- ion, number of bond pair and lone pair electrons are respectively:
a) 2, 2 b) 3, 1 c) 1, 3 d) 4, 8
- Which element of second period forms most acidic oxide?
a) Carbon b) Nitrogen c) Boron d) Fluorine
- The electronic configuration of four elements are given below. Which element does not belong to the same

- family?
- a) $[\text{Xe}]4f^{14}5d^{10}6s^2$ b) $[\text{Kr}] 4d^{10}5s^2$ c) $[\text{Ne}]3s^23p^5$ d) $[\text{Ar}] 3d^{10}4s^2$
15. For the four successive transition elements (Cr, Mn, Fe and Co), the stability of +2 oxidation state will be there in which of the following order?
(At. no. Cr = 24, Mn = 25, Fe = 26, Co = 27)
- a) $\text{Cr} > \text{Mn} > \text{Co} > \text{Fe}$ b) $\text{Mn} > \text{Fe} > \text{Cr} > \text{Co}$ c) $\text{Fe} > \text{Mn} > \text{Co} > \text{Cr}$ d) $\text{Co} > \text{Mn} > \text{Fe} > \text{Cr}$
16. Which is correct in the following?
- a) Radius of Cl atom is 0.99 Å, while that of Cl^+ ion is 1.54 Å
 b) Radius of Cl atom is 0.99 Å, while that of Na atom is 1.54 Å
 c) The radius of Cl atom is 0.95 Å, while that of Cl^- ion is 0.81 Å
 d) Radius of Na atom is 0.95 Å, while that of Na^+ ion is 1.54 Å
17. The linear structure is possessed by:
- a) SnCl_2 b) NCO^- c) NO_2^+ d) CS_2
18. Which of the following has largest ionic radius?
- a) Na^+ b) K^+ c) Li^+ d) Cs^+
19. In the cyanide ion, the formal negative charge is on:
- a) C
 b) N
 c) Both C and N
 d) Resonate between C and N
20. The size of ionic species is correctly given in the order:
- a) $\text{Cl}^{7+} > \text{Si}^{4+} > \text{Mg}^{2+} > \text{Na}^+$
 b) $\text{Na}^+ > \text{Mg}^{2+} > \text{Si}^{4+} > \text{Cl}^{7+}$
 c) $\text{Na}^+ > \text{Mg}^{2+} > \text{Cl}^{7+} > \text{Si}^{4+}$
 d) $\text{Cl}^{7+} > \text{Na}^+ > \text{Mg}^{2+} > \text{Si}^{4+}$
21. Which statement is wrong?
- a) 2nd ionisation energy shows jump in alkali metals
 b) 2nd electron affinity for halogens is zero
 c) Maximum electron affinity exists for F
 d) Maximum ionization energy exists for He
22. Which of the following atoms has minimum covalent radius?
- a) Si b) N c) C d) B
23. The second electron affinity is zero for
- a) Alkali metals b) Halogens c) Noble gases d) Transition metal
24. For alkali metals, which one of the following trends is incorrect?
- a) Hydration energy : $\text{Li} > \text{Na} > \text{K} > \text{Rb}$ b) Ionisation energy : $\text{Li} > \text{Na} > \text{K} > \text{Rb}$
 c) Density : $\text{Li} < \text{Na} < \text{K} < \text{Rb}$ d) Atomic size : $\text{Li} < \text{Na} < \text{K} < \text{Rb}$
25. Na_2O , MgO , Al_2O_3 and SiO_2 have heat of formation equal to -416 , -602 , -1676 and -911 kJ mol^{-1} respectively. The most stable oxide is
- a) Na_2O b) MgO c) Al_2O_3 d) SiO_2
26. If Aufbau rule is not followed, K-19 will be placed in
- a) s-block b) p-block c) d-block d) f-block
27. The electronegativity order of O, F, Cl and Br is:
- a) $\text{F} > \text{O} > \text{Cl} > \text{Br}$ b) $\text{F} > \text{Cl} < \text{Br} > \text{O}$ c) $\text{Br} > \text{Cl} > \text{F} > \text{O}$ d) $\text{F} < \text{Cl} < \text{Br} < \text{O}$
28. Which has the minimum bond energy?
- a) H – Br b) H – I c) I – I d) H – H
29. The bond angle in H_2S (for H – S – H) is:
- a) Same as that of Cl – Be – Cl in BeCl_2
 b) Greater than H – N – H bond angle in NH_3
 c) Greater than H – Se – H and less than H – O – H

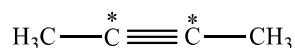
- d) Same as Cl – Sn – Cl in SnCl₂
30. In which of the following arrangements, the sequence is not strictly according to the property written against it?
- CO₂ < SiO₂ < SnO₂ < PbO₂ : increasing oxidising power
 - HF < HCl < HBr < HI : increasing acid strength
 - NH₃ > PH₃ < AsH₃ < SbH₃ : increasing basic strength
 - B < C < O < N : increasing first ionisation enthalpy
31. The tenth elements in the Periodic Table resembles with the
- First period
 - Second period
 - Fourth period
 - Ninth period
32. Which is not the correct order for the stated property?
- Ba > Sr > Mg ; atomic radius
 - F > O > N ; first ionisation enthalpy
 - Cl > F > I; electron affinity
 - O > Se > Te; electronegativity
33. The unequal sharing of bonded pair of electrons between two atoms in a molecule gives rise to:
- Ionic bond
 - Polar covalent bond
 - Non-polar covalent bond
 - None of the above
34. Which of the following oxides is most acidic in nature?
- BeO
 - MgO
 - CaO
 - BaO
35. In the formation of NaCl by combination of Na and Cl:
- Sodium and chlorine both lose electrons
 - Sodium and chlorine both gain electrons
 - Sodium loses but chlorine gains electrons
 - Sodium gains but chlorine loses electrons
36. The molecule having three folds of axis of symmetry is:
- NH₃
 - PCl₅
 - SO₂
 - CO₂
37. The covalent compound HCl has the polar character because:
- The electronegativity of hydrogen is greater than that of chlorine
 - The electronegativity of hydrogen is equal to than that of chlorine
 - The electronegativity of chlorine is greater than that of hydrogen
 - Hydrogen and chlorine are gases
38. If the bond has zero percent ionic character, the bond is:
- Pure covalent
 - Partial covalent
 - Partial ionic
 - Coordinate covalent
39. In piperidine  N-H, N atom has hybridization:
- sp
 - sp²
 - sp³
 - dsp²
40. Mendeleef's Periodic Table is upset by the fact that
- Many elements has several isotopes
 - Noble gases do not form compounds
 - Some groups stand divided into two sub groups A and B
 - Atomic weights of elements are not always whole numbers
41. The incorrect statement among the following is:
- The first ionization potential of Al is less than the first ionization potential of Mg
 - The second ionization potential of Mg is greater than the second ionization potential of Na
 - The first ionization potential of Na is less than the first ionization potential of Mg
 - The third ionization potential of Mg is greater than the third ionization potential of Al
42. Which one of the following is an amphoteric oxide?
- ZnO
 - Na₂O
 - SO₂
 - B₂O₃
43. The shape of ClO₄⁻ ion is:
- Square planar
 - Square pyramidal
 - Tetrahedral
 - Trigonal bipyramidal
44. Which one is correct?

- a) Dinitrogen is paramagnetic
 b) Dihydrogen is paramagnetic
 c) Dioxygen is paramagnetic
 d) Dioxygen is diamagnetic
45. In which one of the following pairs the radius of the second species is greater than that of the first?
 a) Na, Mg b) O^{2-} , N^{3-} c) Li^+ , Be^{2+} d) Ba^{2+} , Sr^{2+}
46. Atomic radii of fluorine and neon in angstrom unit are respectively given by:
 a) 0.72, 1.60 b) 1.60, 1.60 c) 0.72, 0.72 d) 1.60, 0.72
47. According to IUPAC nomenclature, a newly discovered element has been named as Uun. The atomic number of the element is
 a) 111 b) 112 c) 109 d) 110
48. The correct order of increasing electron affinity of halogens is
 a) $F < Cl < Br < I$ b) $I < Br < F < Cl$ c) $I > Br > Cl > F$ d) $Br > I > F > Cl$
49. Al element X has 3 electrons in *p*-orbitals and also belongs to III period. Its molecular formula should be:
 a) X b) X_2 c) X_4 d) X_5
50. Which of the following sequence regarding ionisation potential of coinage metal is correct:
 a) $Cu > Ag > Au$ b) $Cu < Ag < Au$ c) $Cu > Ag < Au$ d) $Ag > Cu < Au$
51. The bond length is maximum in:
 a) H_2S b) HF c) H_2O d) Ice
52. Which of the following is the most electropositive element?
 a) P b) S c) Mg d) Al
53. Which group of atoms have nearly same atomic radius?
 a) Na, K, Rb, Cs b) Li, Be, B, C c) Fe, Co, Ni, Cu d) F, Cl, Br, I
54. Which of the following statements is wrong?
 a) Metals are more than non-metals.
 b) There are only few metalloids.
 c) Hydrogen can be placed with alkali metals as well as with halogen in Periodic Table.
 d) Non-metals are more than metals.
55. Which one of the following has the lowest ionisation energy?
 a) $1s^2 2s^2 2p^6$ b) $1s^2 2s^2 2p^6 3s^1$ c) $1s^2 2s^2 2p^5$ d) $1s^2 2s^2 2p^3$
56. The set representing the correct order of first ionisation potential is:
 a) $K > Na > Li$ b) $Be > Mg > Ca$ c) $B > C > N$ d) $Ge > Si > C$
57. Which one of the following belongs to representative group of elements in the Periodic Table?
 a) Aluminium b) Chromium c) Argon d) Lanthanum
58. The shape of NO_3^- is planar. It is formed by the overlapping of oxygen orbitals with ... orbitals of nitrogen .
 a) sp^3 -hybridized b) sp^2 -hybridized c) Three *p*-orbitals d) None of these
59. If a molecule MX_3 has zero dipole moment the sigma bonding orbitals used by M (at. no. < 21) is:
 a) Pure *p* b) *sp*-hybrid c) sp^2 -hybrid d) sp^3 -hybrid
60. 1,3-butadiene has:
 a) 6σ and 2π -bonds b) 2σ and 2π -bonds c) 9σ and 2π -bonds d) 6σ and 2π -bonds
61. Which of the following transitions involves maximum amount of energy?
 a) $M^-(g) \rightarrow M(g)$ b) $M(g) \rightarrow M^+(g)$ c) $M^+(g) \rightarrow M^{2+}(g)$ d) $M^{2+}(g) \rightarrow M^{3+}(g)$
62. Which of the following molecular species has unpaired electron(s)?
 a) N_2 b) F_2 c) O_2^- d) O_2^{2-}
63. The element having lowest ionisation energy among the following is:
 a) $1s^2, 2s^2 2p^3$ b) $1s^2, 2s^2 2p^6, 3s^1$ c) $1s^2, 2s^2 2p^6$ d) $1s^2, 2s^2 2p^5$
64. Which of the following has largest ionic radius?
 a) Li^+ b) K^+ c) Na^+ d) Cs^+
65. Which will not conduct electricity?
 a) Aqueous KOH solution

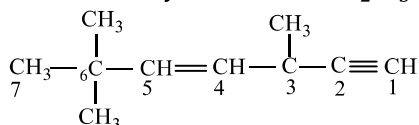
- b) Fused NaCl
c) Graphite
d) KCl in solid state
66. The bond order is maximum in:
a) H_2 b) H_2^+ c) He_2 d) He_2^+
67. The isoelectronic species among the following are:
I – CH_3^+ ; II – NH_2^+ ; III – NH_4^+ ; IV – NH_3
a) I, II, III b) II, III, IV c) I, II, IV d) II, I
68. The screening effect of *d*-electros is
a) Equal to that of *p*-electrons b) More than that of *p*-electrons
c) Same as *f*-electrons d) Less than *p*-electrons
69. OF_2 is:
a) Linear molecule and *sp*-hybridized
b) Tetrahedral molecule and *sp*³-hybridized
c) Bent molecule and *sp*³-hybridized
d) None of the above
70. Be and Al exhibit diagonal relationship. Which of the following statement about them is/are not true?
I. Both react with HCl to liberate H_2
II. They are made passive by HNO_3
III. Their carbides given acetylene on treatment with water
IV. Their oxides are amphoteric
a) (iii) and (iv) b) (i) and (iii) c) (i) only d) (iii) only
71. Which is not linear?
a) CO_2 b) HCN c) C_2H_2 d) H_2O
72. In which of the following bond angle is maximum?
a) NH_3 b) NH_4^+ c) PCl_5 d) SCl_2
73. The molecule which has pyramidal shape is:
a) PCl_3 b) SO_3 c) CO_3^{2-} d) NO_3^-
74. The complex ion which has no '*d*' electrons in the central metal atom is:
a) $[MnO_4]^-$ b) $[Co(NH_3)_6]^{3+}$ c) $[Fe(CN)_6]^{3-}$ d) $[Cr(H_2O)_6]^{3+}$
75. For the formation of covalent bond, the difference in the value of electronegativities should be:
a) Equal to or less than 1.7
b) More than 1.7
c) 1.7 or more
d) None of the above
76. Strongest bond is in:
a) NaCl b) CsCl c) Both (a) and (b) d) None of these
77. The formation of the oxide ion O^{2-} (g) requires first an exothermic and then an endothermic step as shown below,
 $O(g) + e \rightarrow O^-(g); \Delta H = -142 \text{ kJ/mol}$
 $O^-(g) + e \rightarrow O^{2-}(g); \Delta H = 844 \text{ kJ/mol}$
These is because:
a) O^- ion has comparatively larger size than oxygen atom
b) Oxygen has high electron affinity
c) O^- ion will lead to resist the addition of another electron
d) Oxygen is more electronegative
78. Which among the following has the largest dipole moment?
a) NH_3 b) H_2O c) HI d) SO_3
79. The correct order of radii is
a) $N < Be < B$ b) $F^- < O^{2-} < N^{3-}$ c) $Fe^{3+} < Fe^{2+} < Fe^{4+}$ d) $Na < Li < K$

80. Diagonal relationship is for
 a) Li-Na b) Be-Mg c) Si-C d) B-Si
81. Bond order of 1.5 is shown by:
 a) O_2^{2-} b) O_2 c) O_2^+ d) O_2^-
82. Which one of the following is an amphoteric oxide?
 a) ZnO b) Na_2O c) SO_2 d) B_2O_3
83. Among, Al_2O_3 , SiO_2 , P_2O_3 and SO_2 the correct order of acid strength is
 a) $SO_2 < P_2O_3 < SiO_2 < Al_2O_3$ b) $SiO_2 < SO_2 < Al_2O_3 < P_2O_3$
 c) $Al_2O_3 < SiO_2 < SO_2 < P_2O_3$ d) $Al_2O_3 < SiO_2 < P_2O_3 < SO_2$
84. Point out the wrong statement. On moving horizontally from left to right across a period in the Periodic Table
 a) Metallic character decreases
 b) Electronegativity increases
 c) Gram atomic volume first decreases and then increases
 d) Size of the atoms increases for normal elements
85. The correct increasing bond angles order is:
 a) $BF_3 < NF_3 < PF_3 < ClF_3$
 b) $ClF_3 < PF_3 < NF_3 < BF_3$
 c) $BF_3 \approx NF_3 < PF_3 < ClF_3$
 d) $BF_3 < NF_3 < PF_3 > ClF_3$
86. The incorrect statement among the following is
 a) The first ionisation potential of Al is less than the first ionisation potential of Mg
 b) The second ionisation potential of Mg is greater than the second ionisation potential of Na
 c) The first ionisation potential of Na is less than the first ionisation potential of Mg
 d) The third ionisation potential of Mg is greater than that of Al
87. Concept of bond order in the molecular orbital theory depends on the number of electrons in the bonding and antibonding orbitals. The bond order:
 a) Can have a -ve value
 b) Has always an integral value
 c) Is a non-zero quantity
 d) Can assume any +ve value, including zero
88. Which hybridization results non-polar orbitals?
 a) sp b) sp^2 c) sp^3 d) dsp^2
89. The total number of valency electrons for PO_4^{3-} ion is:
 a) 32 b) 16 c) 28 d) 30
90. Intramolecular hydrogen bonding is found in:
 a) Salicylaldehyde b) Water c) Acetaldehyde d) Phenol
91. Amphoteric oxide combinations are in
 a) ZnO, K_2O , SO_3 b) ZnO, P_2O_5 , Cl_2O_7 c) SnO_2 , Al_2O_3 , ZnO d) PbO_2 , SnO_2 , SO_3
92. Chlorine atom tends to acquire the structure of:
 a) He b) Ne c) Ar d) Kr
93. Which of the following ion is the smallest ion?
 a) O_2 b) O_2^+ c) O_2^- d) O_2^{2-}
94. Variable valency is characteristic of:
 a) Noble gas
 b) Alkali metals
 c) Transition metals
 d) Non-metallic elements
95. Which force is strongest?
 a) Dipole-dipole forces

- b) Ion-ion forces
 c) Ion-dipole forces
 d) Ion-induced dipole forces
96. Identify the transition element.
 a) $1s^2, 2s^2 2p^6, 3s^2 3p^6, 4s^2$
 b) $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^2, 4s^2$
 c) $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^2 4p^2$
 d) $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^2 4p^1$
97. For a covalent solid, the units which occupy lattice points are:
 a) Atoms b) Ions c) Molecules d) Electrons
98. Which is not true in case of ionic bond?
 a) It is linear bond
 b) It is 100% ionic
 c) It is formed between two atoms with large electronegativity difference
 d) None of the above
99. In the following molecule, the two carbon atoms marked by asterisk (*) possess the following type of hybridized orbitals:



- a) sp^3 -orbital b) sp^2 -orbital c) sp -orbital d) s-orbital
100. The element which exists in both hard and soft form is:
 a) Fe b) Si c) C d) Al
101. Resonance is not shown by:
 a) C_6H_6 b) CO_2 c) CO_3^{2-} d) SiO_2
102. The hybridization of P in PO_4^{3-} is same as in:
 a) I in ICl_4^- b) S in SO_3 c) N in NO_3^- d) S in SO_4^{2-}
103. Dipole moment is highest for:
 a) CHCl_3 b) CH_4 c) CHF_3 d) CCl_4
104. What is the correct decreasing order of ionic radii of following ions? $\text{N}^{3-}, \text{O}^{2-}, \text{F}^-, \text{Na}^+, \text{Mg}^{2+}$
 a) $\text{N}^{3-} > \text{O}^{2-} > \text{F}^- > \text{Mg}^{2+} > \text{Na}^+$ b) $\text{N}^{3-} > \text{O}^{2-} > \text{F}^- > \text{Na}^+ > \text{Mg}^{2+}$
 c) $\text{N}^{3-} > \text{O}^{2-} > \text{Mg}^{2+} > \text{Na}^+ > \text{F}^-$ d) $\text{Na}^+ > \text{F}^- > \text{O}^{2-} > \text{Mg}^{2+} > \text{N}^{3-}$
105. In which of the following crystals of ionic compounds would you expect maximum distance between the centres of cations and anions
 a) LiF b) CsF c) CsI d) LiI
106. Which of the following has lowest bond angle?
 a) BeF_2 b) H_2O c) NH_3 d) CH_4
107. The state of hybridization of $\text{C}_2, \text{C}_3, \text{C}_5$ and C_6 of the hydrocarbon,



Is in the following sequence:

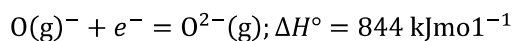
- a) sp, sp^2, sp^3 and sp^2 b) sp, sp^3, sp^2 and sp^3 c) sp^3, sp^2, sp^2 and sp d) sp, sp^2, sp^2 and sp^3
108. Among the following elements Ca, Mg, P and Cl the order of increasing atomic radius is:
 a) $\text{Mg} < \text{Ca} < \text{Cl} < \text{P}$ b) $\text{Cl} < \text{P} < \text{Mg} < \text{Ca}$ c) $\text{P} < \text{Cl} < \text{Ca} < \text{Mg}$ d) $\text{Ca} < \text{Mg} < \text{P} < \text{Cl}$
109. Alkali metals in each period have:
 a) Largest size
 b) Lowest *IE*
 c) Highest *IE*
 d) Highest electronegativity
110. The critical temperature of water is higher than that of O_2 because H_2O molecules has:
 a) Fewer electrons than O_2
 b) Two covalent bonds

- c) V-shape
d) Dipole moment
111. For diatomic species are listed below. Identify the correct order in which the bond order is increasing in them:
- a) $\text{NO} < \text{O}_2^- < \text{C}_2^{2-} < \text{He}_2^+$
b) $\text{O}_2^- < \text{NO} < \text{C}_2^{2-} < \text{He}_2^+$
c) $\text{C}_2^{2-} < \text{He}_2^+ < \text{O}_2^- < \text{NO}$
d) $\text{He}_2^+ < \text{O}_2^- < \text{NO} < \text{C}_2^{2-}$
112. Which of the following is least ionic?
- a) CaF_2 b) CaBr_2 c) CaI_2 d) CaCl_2
113. The bond order of individual carbon-carbon bonds in benzene is:
- a) One
b) Two
c) Between 1 and 2
d) One and two alternately
114. The total number of valency electrons in PH_4^+ ion is:
- a) 8 b) 9 c) 6 d) 14
115. Pauling's equation for determining the electronegativity of an element, is
 X_A, X_B = electronegativity values of elements A and B
 Δ = represents polarity of A – B bond
- a) $X_A - X_B = 0.208\sqrt{\Delta}$ b) $X_A + X_B = 0.208\sqrt{\Delta}$ c) $X_A - X_B = 0.208\Delta^2$ d) $X_A - X_B = \sqrt{\Delta}$
116. The set representing the correct order of ionic radius is:
- a) $\text{Na}^+ > \text{Li}^+ > \text{Mg}^{2+} > \text{Be}^{2+}$
b) $\text{Li}^+ > \text{Na}^+ > \text{Mg}^{2+} > \text{Be}^{2+}$
c) $\text{Mg}^{2+} > \text{Be}^{2+} > \text{Li}^+ > \text{Na}^+$
d) $\text{Li}^+ > \text{Be}^{2+} > \text{Na}^+ > \text{Mg}^{2+}$
117. The pair having similar geometry is :
- a) BF_3, NH_3 b) $\text{BF}_3, \text{AlF}_3$ c) $\text{BeF}_2, \text{H}_2\text{O}$ d) $\text{BCl}_3, \text{PCl}_3$
118. The attraction that non-polar molecules have for each other is primarily caused by:
- a) Hydrogen bonding
b) Difference in electronegativities
c) High ionisation energy
d) Van der Waals' forces
119. The structure of ICl_2^- is:
- a) Trigonal
b) Octahedral
c) Square planar
d) Distorted trigonal bipyramid
120. The correct order of increasing oxidising power is
- a) $\text{F}_2 < \text{Cl}_2 < \text{I}_2 > \text{Br}_2$ b) $\text{F}_2 < \text{Br}_2 < \text{Cl}_2 < \text{I}_2$ c) $\text{Cl}_2 < \text{Br}_2 < \text{F}_2 < \text{I}_2$ d) $\text{I}_2 < \text{Br}_2 < \text{Cl}_2 < \text{F}_2$
121. Which of the following oxides is not expected to react with sodium hydroxide?
- a) BeO b) B_2O_3 c) CaO d) SiO_2
122. In which molecule, the central atom does not use sp^3 -hybrid orbitals in its bonding?
- a) NH_2^- b) BeF_3^- c) SO_2Cl_2 d) SO_4^{2-}
123. Which element has the lowest electronegativity?
- a) Li b) F c) Cl d) Fe
124. Amongst the following elements the configuration having the highest ionization energy is:
- a) $[\text{Ne}]3s^2 3p^1$ b) $[\text{Ne}]3s^2 3p^3$ c) $[\text{Ne}]3s^2 3p^2$ d) $[\text{Ar}]3d^{10} 4s^2 4p^3$
125. Which species does not exist?
- a) $(\text{SnCl}_6)^{2-}$ b) $(\text{GeCl}_6)^{2-}$ c) $(\text{CCl}_6)^{2-}$ d) $(\text{SiCl}_6)^{2-}$

126. Which one of the following has not triangular pyramidal shape?
 a) NH_3 b) NCl_3 c) PF_3 d) BCl_3
127. Among NH_3 , BeCl_2 , CO_2 and H_2O , the non-linear molecules are:
 a) BeCl_2 and H_2O b) BeCl_2 and CO_2 c) NH_3 and H_2O d) NH_3 and CO_2
128. When the hybridization state of carbon atom changes from sp^3 to sp^2 and finally to sp , the angle between the hybridized orbitals:
 a) Decreases gradually
 b) Decreases considerably
 c) Is not affected
 d) Increases progressively
129. Which is distilled first?
 a) Liquid H_2 b) Liquid CO_2 c) Liquid O_2 d) Liquid N_2
130. The equilateral triangle shape has:
 a) sp -hybridization b) sp^2 -hybridization c) sp^3 -hybridization d) sp^3d -hybridization
131. Which atomic orbital is always involved in sigma bonding only?
 a) s b) p c) d d) f
132. Two ice cubes are pressed over each other and unite to form one cube. Which force is responsible for holding them together?
 a) van der Waals' forces
 b) Covalent attraction
 c) Hydrogen bond formation
 d) Dipole-dipole attraction
133. The decreasing values of bond angles from $\text{NH}_3(106^\circ)$ to $\text{SbH}_3(101^\circ)$ down group-15 of the periodic table is due to:
 a) Increasing $bp - bp$ repulsion
 b) Increasing p -orbital character in sp^3
 c) Decreasing $lp - bp$ repulsion
 d) Decreasing electronegativity
134. The bond that determines the secondary structure of a protein is:
 a) Coordinate bond b) Covalent bond c) Hydrogen bond d) Ionic bond
135. Which is not an exception to octet rule?
 a) BF_3 b) SnCl_4 c) BeI_2 d) ClO_2
136. Higher is the bond order, greater is:
 a) Bond dissociation energy
 b) Covalent character
 c) Bond length
 d) Paramagnetism
137. Highest electron affinity among the following is
 a) Fluorine b) Chlorine c) Sulphur d) Xenon
138. According to molecular orbital theory for O_2^+ :
 a) Bond order is less than O_2 and O_2^+ is paramagnetic
 b) Bond order is more than O_2 and O_2^+ is paramagnetic
 c) Bond order is less than O_2 and O_2^+ is diamagnetic
 d) Bond order is more than O_2 and O_2^+ is diamagnetic
139. Which of the following has fractional bond order?
 a) O_2^+ b) O_2^- c) F_2^- d) H_2^-
140. Which of the following is not isostructural with SiCl_4 ?
 a) PO_4^{3-} b) NH_4^+ c) SCl_4 d) SO_4^{2-}
141. The correct order of decreasing second ionisation enthalpy of Ti (22), V (23), Cr (24) and Mn (25) is:
 a) $\text{V} > \text{Mn} > \text{Cr} > \text{Ti}$ b) $\text{Mn} > \text{Cr} > \text{Ti} > \text{V}$ c) $\text{Ti} > \text{V} > \text{Cr} > \text{Mn}$ d) $\text{Cr} > \text{Mn} > \text{V} > \text{Ti}$

142. The electrons used in bonding atoms:
 a) Belong to outermost shell
 b) Belong to penultimate shell
 c) Belong to outermost shell and sometimes penultimate shell
 d) Belong to penultimate shell and sometimes to outermost shell
143. The discovery of which of the following group of elements gave death blow to the Newland's law of octaves?
 a) Inert gases b) Alkaline earths c) Rare earths d) Actinides
144. Generally, the first ionisation energy increases along a period. But there are some exceptions. One which is not an exception is
 a) N and O b) Na and Mg c) Mg and Al d) Be and B
145. Which one of the following orders presents the correct sequence of the increasing basic nature of the given oxides?
 a) $Al_2O_3 < MgO < Na_2O < K_2O$ b) $MgO < K_2O < Al_2O_3 < Na_2O$
 c) $Na_2O < K_2O < MgO < Al_2O_3$ d) $K_2O < Na_2O < Al_2O_3 < MgO$
146. The basis of keeping the elements in the groups of The Periodic Table is
 a) Ionisation potential b) Electronegativity
 c) Electron affinity d) Number of valence electrons
147. 1st and IInd IE of Mg are 7.646 and 15.035 eV respectively. The amount of energy needed to convert all the atoms of magnesium into Mg^{2+} ions present in 12 mg of magnesium vapours is [Given, $1eV = 96.5 \text{ kJ mol}^{-1}$]
 a) 1.5 b) 2.0 c) 1.1 d) 0.5
148. $K^+, Cl^-, Ca^{2+}, S^{2-}$ ions are isoelectronics. The decreasing order of their size is:
 a) $S^{2-} > Cl^- > K^+ > Ca^{2+}$
 b) $Ca^{2+} > K^+ > Cl^- > S^{2-}$
 c) $K^+ > Cl^- > Ca^{2+} > S^{2-}$
 d) $Cl^- > S^{2-} > Ca^{2+} > K^+$
149. The first four ionisation energy values of an element are 191, 578, 872 and 5962 kcal. The number of valence electrons in the element is
 a) 1 b) 2 c) 3 d) 4
150. Which are true statements among the following?
 (1) PH_5 and $BiCl_5$ does not exist
 (2) $p\pi - d\pi$ bonds are present in SO_2
 (3) Electrons travel with speed of light
 (4) SeF_4 and CH_4 has same shape
 (5) I_3^+ has bent geometry
 a) 1, 3 b) 1, 2, 5 c) 1, 3, 5 d) 1, 2, 4
151. Correct increasing order of first ionisation potential is
 a) $Na < Mg > Al < Si$ b) $Na < Mg < Al < Si$ c) $Na > Mg > Al > Si$ d) $Na < Mg < Al > Si$
152. Which pair represents isostructural species?
 a) CH_3^- and CH_3^+ b) NH_4^+ and NH_3 c) SO_4^{2-} and BF_4^- d) NH_2^- and BeF_2
153. The first ionisation potential (eV) of Be and B respectively are
 a) 8.29 eV, 8.29 eV b) 8.29 eV, 9.32 eV c) 9.32 eV, 9.32 eV d) 9.32 eV, 8.29 eV
154. The correct order according to size is
 a) $O > O^- > O^{2-}$ b) $O^- > O^{2-} > O$ c) $O^{2-} > O^- > O$ d) $O > O^{2-} > O^-$
155. The correct order of electron affinity is
 a) $B < C < O > N$ b) $B > C > N > O$ c) $O > C > B > N$ d) $O < C < B < N$
156. Which of the following is a false statement?
 a) Fluorine is more electronegative than chlorine b) Nitrogen has greater IE_1 than oxygen
 c) Lithium is amphoteric d) Chlorine is an oxidising agent

157. Solid NaCl is a bad conductor of electricity because:
 a) In solid NaCl there are no ions
 b) Solid NaCl is covalent
 c) In solid NaCl there is no velocity of ions
 d) In solid NaCl there are no electrons
158. Which of the following configuration is associated with biggest jump between 2nd and 3rd IE?
 a) $1s^2, 2s^2 2p^2$ b) $1s^2, 2s^2 2p^6, 3s^1$ c) $1s^2, 2s^2 2p^6, 3s^2$ d) $1s^2, 2s^2 2p^1$
159. Consider the ions K^+ , S^{2-} , Cl^- and Ca^{2+} . The radii of these ionic species follow the order
 a) $Ca^{2+} > K^+ > Cl^- > S^{2-}$ b) $Cl^- > S^{2-} > K^+ > Ca^{2+}$
 c) $Ca^{2+} > Cl^- > K > S^{2-}$ d) $S^{2-} > Cl^- > K^+ > Ca^{2+}$
160. The correct order of ionisation energy for comparing carbon, nitrogen and oxygen is
 a) $C < N > O$ b) $C > N < O$ c) $C > N > O$ d) $C < N < O$
161. A π -bond is formed by sideways overlapping of:
 a) s - s orbitals b) p - p orbitals c) s - p orbitals d) s - p - s orbitals
162. Which oxide of nitrogen is isoelectronic with CO_2 ?
 a) NO_2 b) N_2O c) NO d) N_2O_2
163. In which of the following pairs of molecules/ions, the central atom has sp^2 -hybridization?
 a) NO_2 and NH_3 b) BF_3 and NO_2^- c) NH_2^- and H_2O d) BF_3 and NH_2^-
164. Which of the following has largest ionic radius?
 a) Cs^+ b) Li^+ c) Na^+ d) K^+
165. Boron cannot form which one of the following anions?
 a) BF_6^{3-} b) BH_4^- c) $B(OH)_4^-$ d) BO_2^-
166. Most covalent halide of aluminium is:
 a) $AlCl_3$ b) AlI_3 c) $AlBr_3$ d) AlF_3
167. The shape of ClO_3^- according to VSEPR model is:
 a) Planar triangle b) Pyramidal c) Tetrahedral d) Square planar
168. The correct order of increasing bond angles in the following triatomic species is:
 a) $NO_2^- < NO_2 < NO_2^+$ b) $NO_2^+ < NO_2 < NO_2^-$ c) $NO_2^+ < NO_2^- < NO_2$ d) $NO_2^- < NO_2^+ < NO_2$
169. Which of the following pairs has both members from the same group of the Periodic Table?
 a) Mg – Ba b) Mg – Cu c) Mg – K d) Mg – Na
170. Silicon has 4 electrons in the outermost orbit. In forming the bond:
 a) It gains electrons b) It losses electrons c) It shares electrons d) None of these
171. sp^2 -hybridization is shown by:
 a) $BeCl_2$ b) BF_3 c) NH_3 d) XeF_2
172. A p -block element in which last electron enters into s -orbitals of valence shell instead of p -orbital is:
 a) As b) Ga c) No such element exist d) He
173. Which of the following are not correct?
 a) Lone pair of electrons present on central atom can give rise to dipole moment
 b) Dipole moment is vector quantity
 c) CO_2 molecule has dipole moment
 d) Difference in electronegativities of combining atoms can lead to dipole moment
174. The order of first ionisation energies of the element Li, Be, B, Na is
 a) $Li > Be > B > Na$ b) $Be > B > Li > Na$ c) $Na > Li > B > Be$ d) $Be > Li > B > Na$
175. Differentiating electron in inner transition elements enters the..... orbital.
 a) s b) p c) d d) f
176. Which is expected to conduct electricity?
 a) Diamond b) Molten sulphur c) Molten KCl d) Crystalline NaCl
177. Elements whose electronegativities are 1.2 and 3.0, form:
 a) Ionic bond b) Covalent bond c) Coordinate bond d) Metallic bond
178. Which is the correct order of ionic sizes?) At. no. : Ce = 58, Sn = 50, Yb = 70 and Lu = 71)



This is because

- a) Oxygen is more electronegative
- b) Oxygen has high electron affinity
- c) O^- ion will tend to resist the addition of another electron
- d) O^- has comparatively larger size than oxygen atom

198. Which of the following statements is correct?

- a) X^- ion is larger in size than X -atom
- b) X^+ ion is larger in size than X -atom
- c) X^+ ion is larger in size than X^- ion
- d) X^+ and X^- ions are equal in size

199. Number of elements presents in the fifth period of periodic table is

- a) 32
- b) 10
- c) 18
- d) 8

200. The compound possessing most strongly ionic nature is:

- a) $SrCl_2$
- b) $BaCl_2$
- c) $CaCl_2$
- d) $CsCl$

201. What is the name of element with atomic number 105?

- a) Kurchatovium
- b) Dubnium
- c) Nobelium
- d) Holmium

202. Among the following which is the strongest oxidising agent?

- a) Cl_2
- b) F_2
- c) Br_2
- d) I_2

203. The outermost electronic configuration of the most electronegative element is

- a) ns^2np^3
- b) ns^2np^4
- c) ns^2np^5
- d) ns^2np^6

204. The incorrect statements regarding bonding molecular orbitals because:

- a) Bonding molecular orbital possess less energy than combining atomic orbitals.
- b) Bonding molecular orbitals have low electron density between the two nuclei.
- c) Every electron in bonding molecular orbitals contributes to attraction between atoms.
- d) They are formed when the lobes of the combining atomic orbitals have same sign.

205. Which of the following has largest size?

- a) Al
- b) Al^+
- c) Al^{2+}
- d) Al^{3+}

206. Carbon atoms in $C_2(CN)_4$ are:

- a) sp -hybridized
- b) sp^2 -hybridized
- c) sp -and sp^2 - hybridized
- d) sp, sp^2 and sp^3 - hybridized

207. The common feature among the species CN^- , CO and NO^+ are:

- a) Bond order three and isoelectronic
- b) Bond order three and weak filed ligands
- c) Bond order two and π -acceptors
- d) Isoelectronic and weak filed ligands

208. Which one of the elements has the maximum electron affinity?

- a) F
- b) Cl
- c) Br
- d) I

209. The internuclear distance in H_2 and Cl_2 molecules are 74 and 198 pm respectively. The bond length of H – Cl may be:

- a) 272 pm
- b) 70 pm
- c) 136 pm
- d) 248 pm

210. PCl_5 exists but NCl_5 does not because:

- a) Nitrogen has no vacant $2d$ -orbitals
- b) NCl_5 is unstable
- c) Nitrogen atom is much smaller than p
- d) Nitrogen is highly highly inert

211. Which one of the following process requiring absorption of energy?

- a) $Cl \rightarrow Cl^-$
- b) $H \rightarrow H^-$
- c) $O \rightarrow O^{2-}$
- d) $F \rightarrow F^-$

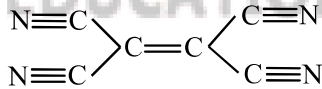
212. The hybridization of carbon in diamond, graphite and acetylene is:

- a) sp^3, sp^2, sp
- b) sp^3, sp, sp^2
- c) sp^2, sp^3, sp
- d) sp, sp^3, sp^2

213. Which ionisation potential (IP) in the following equations involves the greatest amount of energy?

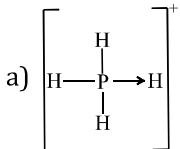
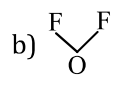
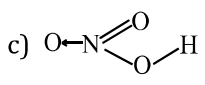
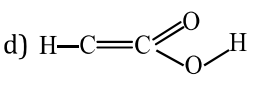
- a) $K^+ \rightarrow K^{2+} + e^-$
- b) $Na \rightarrow Na^+ + e^-$
- c) $C^{2+} \rightarrow C^{3+} + e^-$
- d) $Ca^+ \rightarrow Ca^{2+} + e^-$

214. The pairs of bases in DNA are held together by:
 a) Hydrogen bonds b) Ionic bonds c) Phosphate groups d) Deoxyribose groups
215. The energy of σ_{2s} -orbital is greater than σ^*_{1s} orbital because:
 a) σ_{2s} orbital is bigger than σ_{1s} orbital
 b) σ_{2s} orbital is a bonding orbital whereas, σ^*_{1s} an antibonding orbital
 c) σ_{2s} orbital has a greater value of n than σ^*_{1s} orbital
 d) None of the above
216. Who developed the long form of Periodic Table?
 a) Niels Bohr b) Moseley c) Mendeleef d) Lothar Meyer
217. At ordinary temperature and pressure, among halogens, the chlorine is a gas, bromine is a liquid and iodine is a solid. This is because:
 a) The specific heat is in the order $\text{Cl}_2 > \text{Br}_2 > \text{I}_2$
 b) Intermolecular forces among molecules of chlorine are the weakest and those in iodine are the strongest
 c) The order of density is $\text{I}_2 > \text{Br}_2 > \text{Cl}_2$
 d) The order of stability is $\text{Cl}_2 > \text{Br}_2 > \text{I}_2$
218. The radii F , F^- , O and O^{2-} are in the order of
 a) $\text{F}^- > \text{O}^{2-} > \text{F} > \text{O}$ b) $\text{F} > \text{F}^- > \text{O} > \text{O}^{2-}$ c) $\text{O}^{2-} > \text{F}^- > \text{O} > \text{F}$ d) $\text{F} > \text{O} > \text{F}^- > \text{O}^{2-}$
219. Which of the following is the smallest in size?
 a) Na^+ b) F^- c) O^{2-} d) N^{3-}
220. Which of the following pairs show reverse properties on moving along a period from left to right and from top to down in a group?
 a) Nuclear charge and electron affinity b) Ionisation energy and electron affinity
 c) Atomic radius and electron affinity d) None of the above
221. Which of the following relation is correct?
 a) 1st IE of C > 1st IE of B b) 1st IE of C < 1st IE of B
 c) 2nd IE of C > 2nd IE of B d) Both (b) and (c)
222. KF combines with HF to form KHF_2 . The compound contains the species:
 a) K^+ , F^- and H^+ b) K^+ , F^- and HF c) K^+ and $[\text{HF}_2]^-$ d) $[\text{KHF}]^+$ and F^-
223. The bond angle between $\text{H}-\text{O}-\text{H}$ in ice is closest to:
 a) 115° b) $109^\circ 28'$ c) 110° d) 90°
224. Which has higher bond energy and stronger bond?
 a) F_2 b) Cl_2 c) Br_2 d) I_2
225. The example of the p - p -orbital overlapping is the formation of:
 a) H_2 molecule
 b) Cl_2 molecule
 c) Hydrogen chloride
 d) Hydrogen bromide molecule
226. In compound X , all the bond angles are exactly $109^\circ 28'$, X is:
 a) Chloromethane b) Iodoform c) Carbon tetrachloride d) Chloroform
227. Which of the following species has four lone pairs of electrons in its outer shell?
 a) I b) O^- c) Cl^- d) He
228. The type of bond formed between H^+ and NH_3 in NH_4^+ ion is:
 a) Ionic b) Covalent c) Dative d) Hydrogen
229. Which transition involves maximum amount of energy?
 a) $M^-(g) \rightarrow M(g) + e$
 b) $M^-(g) \rightarrow M^+(g) + 2e$
 c) $M^+(g) \rightarrow M^{2+}(g) + e$
 d) $M^{2+}(g) \rightarrow M^{3+}(g) + e$
230. The order of stability of metal oxides is

- a) $\text{Al}_2\text{O}_3 < \text{MgO} < \text{Fe}_2\text{O}_3 < \text{Cr}_2\text{O}_3$ b) $\text{Cr}_2\text{O}_3 < \text{MgO} < \text{Al}_2\text{O}_3 < \text{Fe}_2\text{O}_3$
 c) $\text{Fe}_2\text{O}_3 < \text{Cr}_2\text{O}_3 < \text{Al}_2\text{O}_3 < \text{MgO}$ d) $\text{Fe}_2\text{O}_3 < \text{Al}_2\text{O}_3 < \text{Cr}_2\text{O}_3 < \text{MgO}$
231. The first ionisation potential of Na, Mg, Al and Si are in the order
 a) $\text{Na} < \text{Mg} > \text{Al} < \text{Si}$ b) $\text{Na} > \text{Mg} > \text{Al} < \text{Si}$ c) $\text{Na} < \text{Mg} < \text{Al} > \text{Si}$ d) $\text{Na} > \text{Mg} > \text{Al} < \text{Si}$
232. The electronic configuration of 4 elements K, L, M and N are,
 $K = 1s^2, 2s^2 2p^1$ $L = 1s^2, 2s^2 2p^6$
 $M = 1s^2, 2s^2 2p^4$ $N = 1s^2, 2s^2 2p^3$
 The element that would form a diatomic molecule with double bond is:
 a) K b) L c) M d) N
233. In the formation of N_2^+ from N_2 , the electron is lost from:
 a) a σ -orbital b) a π -orbital c) a σ^* -orbital d) a π^* -orbital
234. Which of the following two are isostructural?
 a) $\text{XeF}_2, \text{IF}_2^-$ b) NH_3, BF_3 c) $\text{CO}_3^{2-}, \text{SO}_3^{2-}$ d) $\text{PCl}_5, \text{ICl}_5$
235. Which has sp^2 -hybridization?
 a) CO_2 b) SO_2 c) N_2O d) CO
236. Which of the following metal oxides is most basic?
 a) ZnO b) Al_2O_3 c) As_2O_3 d) K_2O
237. Which of the following phenomenon will occur when two atoms of same spin will react?
 a) Bonding will not occur
 b) Orbital overlap will not occur
 c) Both (a) and (b)
 d) None of the above
238. The bonds present in N_2O_5 are:
 a) Ionic
 b) Covalent and coordinate
 c) Covalent
 d) Ionic and covalent
239. How many σ - and π -bonds are there in the molecule of tetracyanoethylene?

 a) Nine σ - and nine π b) Five σ - and nine π c) Nine σ - and seven π d) Five σ - and eight π
240. The maximum valency of an element with atomic number 7 is
 a) 2 b) 3 c) 4 d) 5
241. Which of the following compounds has the lowest melting point?
 a) CaF_2 b) CaCl_2 c) CaBr_2 d) CaI_2
242. Nitrogen dioxide cannot be prepared by heating
 a) KNO_3 b) $\text{Pb}(\text{NO}_3)_2$ c) $\text{Cu}(\text{NO}_3)_2$ d) AgNO_3
243. Which of the following is correct order of increasing size?
 a) $\text{Br}^- > \text{S}^{2-} > \text{Cl}^- > \text{Na}^+ > \text{Mg}^{2+} > \text{Be}^{2+}$ b) $\text{Be}^{2+} > \text{Mg}^{2+} > \text{Na}^+ > \text{S}^{2-} > \text{Cl}^- > \text{Br}^-$
 c) $\text{S}^{2-} > \text{Cl}^- > \text{Br}^- > \text{Na}^+ > \text{Mg}^{2+} > \text{Be}^{2+}$ d) $\text{Na}^+ > \text{Mg}^{2+} > \text{Be}^{2+} > \text{Br}^- > \text{Cl}^- > \text{S}^{2-}$
244. The correct order of bond angles is:
 a) $\text{PF}_3 < \text{PCl}_3 < \text{PBr}_3 < \text{PI}_3$
 b) $\text{PF}_3 < \text{PBr}_3 < \text{PCl}_3 < \text{PI}_3$
 c) $\text{PI}_3 < \text{PBr}_3 < \text{PCl}_3 < \text{PF}_3$
 d) $\text{PF}_3 > \text{PCl}_3 < \text{PBr}_3 < \text{PI}_3$
245. Among the following metals interatomic forces are probably weakest in:
 a) Cu b) Ag c) Zn d) Hg
246. The element with atomic number 117 if discovered would be placed in
 a) Noble gas family b) Alkali family c) Alkaline earth family d) Halogen family

247. The element with atomic numbers 9, 17, 35, 53, 85 are all
 a) Noble gases b) Halogens c) Heavy metals d) Light metals
248. Acetic acid exists as dimer in benzene due to:
 a) Condensation reaction
 b) Hydrogen bonding
 c) Presence of carboxyl group
 d) Presence of hydrogen atom at α -carbon
249. In which of the following arrangements the order is not correct according to property indicated against it?
 a) Increasing size : $Al^{3+} < Mg^{2+} < Na^+ < F^-$
 b) Increasing IE_1 : $B < C < N < O$
 c) Increasing EA_1 : $I < Br < F < Cl$
 d) Increasing metallic radius: $Li < Na < K < Rb$
250. The forces present in the crystals of naphthalene are:
 a) Van der Waals' forces b) Electrostatic forces c) Hydrogen bonding d) None of these
251. Which has zero dipole moment?
 a) ClF b) PCl_3 c) SiF_4 d) $CFCl_3$
252. Which group of the Periodic Table contains coinage metal?
 a) IIA b) IB c) IA d) None of these
253. The bond angle and hybridization in ether (CH_3OCH_3) is:
 a) $106^\circ 51'$, sp^3 b) $104^\circ 31'$, sp^3 c) 110° , sp^3 d) None of these
254. Ionisation potential values of 'd' block elements as compared to ionisation potential values of 'f' block elements are:
 a) Higher b) Lower c) Equal d) Either of these
255. How many bonded electron pairs are present in IF_7 molecule?
 a) 6 b) 7 c) 5 d) 8
256. Formation of π -bond:
 a) Increases bond length
 b) Decreases bond length
 c) Distorts the geometry of molecule
 d) Makes homoatomic molecules more reactive
257. An element with atomic number 20 will be placed in which period of the Periodic Table?
 a) 1 b) 2 c) 3 d) 4
258. Which bond angle results in the minimum dipole moment for the triatomic molecule XY_2 shown below?
 a) 90° b) 120° c) 150° d) 180°
259. NH_3 has a net dipole moment, but boron trifluoride (BF_3) has zero dipole moment, because:
 a) B is less electronegative than N
 b) F is more electronegative than H
 c) BF_3 is pyramidal while NH_3 is planar
 d) NH_3 is pyramidal while BF_3 is trigonal planar
260. The geometry of PF_5 molecule is:
 a) Planar b) Square planar c) Trigonal bipyramidal d) Tetrahedral
261. The correct order of ionisation energy for comparing carbon, nitrogen and oxygen atom is
 a) $C > N > O$ b) $C > N < O$ c) $C < N > O$ d) $C < N < O$
262. In which of the following arrangements the order is not according to the property indicated against it?
 a) $Li < Na < K < Rb$ increasing metallic radius
 b) $I < Br < F < Cl$ increasing electron gain enthalpy (with negative sign)
 c) $B < C < N < O$ increasing first ionisation enthalpy
 d) $Al^{3+} < Mg^{2+} < Na^+ < F^-$ increasing ionic size
263. Pauling received Nobel Prize for his work on:
 a) Photosynthesis b) Atomic structure c) Chemical bonding d) Thermodynamics

264. For electron affinity of halogens, which of the following is correct?
 a) $F > Cl$ b) $F < I$ c) $Br > F$ d) $Br < Cl$
265. The correct electronegativity order is:
 a) C, N, Si, P b) N, Si, C, P c) Si, P, C, N d) P, Si, N, C
266. Which of the following properties show gradual decrease with increase in atomic number across a period in the Periodic Table?
 a) Electron affinity b) Ionisation potential c) Electronegativity d) Size of atom
267. Difference between S and S^{2-} as S^{2-} has
 a) Larger radii and larger size b) Smaller radii and larger size
 c) Larger radii and smaller size d) Smaller radii and smaller size
268. Two lone pairs of electrons and two bond pairs are present in:
 a) NH_3 b) BF_3 c) CO_3^{2-} d) NH_2^-
269. The lattice energy order for lithium halide is:
 a) $LiF > LiCl > LiBr > LiI$
 b) $LiCl > LiF > LiBr > LiI$
 c) $LiBr > LiCl > LiF > LiI$
 d) $LiI > LiBr > LiCl > LiF$
270. The number of σ and π -bonds in pent-4-en-1-yne are respectively:
 a) 3, 10 b) 9, 4 c) 4, 9 d) 10, 3
271. The correct increasing order of polarising power is:
 a) $Ca^{2+} < Mg^{2+} < Be^{2+} < K^+$
 b) $Mg^{2+} < Be^{2+} < K^+ < Ca^{2+}$
 c) $Be^{2+} < K^+ < Ca^{2+} < Mg^{2+}$
 d) $K^+ < Ca^{2+} < Mg^{2+} < Be^{2+}$
272. Increase in atomic size down the group is due to
 a) Increase in number of electrons
 b) Increase in number of protons and neutrons
 c) Increase in number of protons
 d) Increase in number of protons, neutrons and electrons
273. When the first ionisation energies are plotted against atomic number, the peaks are occupied by
 a) Alkali metals b) Halogens c) Transition metals d) Rare gases
274. Which of the following is non-metallic?
 a) B b) Be c) Mg d) Al
275. Structure of ICl_2^- is:
 a) Trigonal
 b) Octahedral
 c) Square planar
 d) Distorted trigonal pyramidal
276. Which compound does not contain double bond or triple bond?
 a) C_2H_4 b) H_2O c) N_2 d) HCN
277. The correct order of increasing oxidising power is
 a) $F_2 < Cl_2 < Br_2 < I_2$ b) $I_2 < F_2 < Cl_2 < Br_2$
 c) $Br_2 < I_2 < F_2 < Cl_2$ d) $I_2 < Br_2 < Cl_2 < F_2$
278. Which is soluble in water?
 a) AgF b) AgCl c) AgBr d) AgI
279. Highest energy will be absorbed to eject out the electron in the configuration
 a) $1s^2 2s^2 2p^1$ b) $1s^2 2s^2 2p^3$ c) $1s^2 2s^2 2p^2$ d) $1s^2 2s^2 2p^4$
280. Most acidic oxide is
 a) Na_2O b) ZnO c) MgO d) P_2O_5
281. The process requiring the absorption of energy is:

- a) $F \rightarrow F^-$ b) $H \rightarrow H^-$ c) $Cl \rightarrow Cl^-$ d) $O \rightarrow O^{2-}$
282. Each of the followings has non-zero dipole moment, except:
 a) C_6H_6 b) CO c) SO_2 d) NH_3
283. H-bonding is not present in:
 a) Glycerine b) Water c) H_2S d) HF
284. Which formulae does not correctly represent the bonding capacity of the atom involved?
- a)  b)  c)  d) 
285. The higher values of specific heat of water in comparison to other liquids is due to:
 a) High dielectric constant
 b) Polarity
 c) H-bonding
 d) None of the above
286. Which one of the following combinations represents a metallic element?
 a) 2, 8, 2 b) 2, 8, 4 c) 2, 8, 7 d) 2, 8, 8
287. Which bond has the highest bond energy?
 a) Coordinate bond b) Sigma bond c) Multiple bond d) Polar covalent bond
288. The increasing order of first ionisation enthalpies of the elements B, P, S and F (lowest first) is
 a) $F < S < P < B$ b) $P < S < B < F$ c) $B < P < S < F$ d) $B < S < P < F$
289. Which of the following pairs are isostructural?
 a) SO_3^{2-}, NO_3^- b) BF_3, NF_3 c) BrO_3^-, XeO_3 d) SF_4, XeF_4
290. The electronic configuration of transition elements is exhibited by
 a) $(n-1)d^{1-10}, ns^2$ b) $ns^2(n-1)d^{10}$ c) ns^1 d) ns^2, np^5
291. The bond strength in O_2^+, O_2, O_2^- and O_2^{2-} follows the order:
 a) $O_2^{2-} > O_2^- > O_2 > O_2^+$ b) $O_2^+ > O_2 > O_2^- > O_2^{2-}$ c) $O_2 > O_2^- > O_2^{2-} > O_2^+$ d) $O_2^- > O_2^{2-} > O_2^+ > O_2$
292. The first ionisation energy of oxygen is less than that of nitrogen. Which of the following is the correct reason for this observation?
 a) Lesser effective nuclear charge of oxygen than nitrogen
 b) Lesser atomic size of oxygen than nitrogen
 c) Greater interelectron repulsion between two electrons in the same *p*-orbital counter balances the increase in effective nuclear charge on moving from nitrogen to oxygen
 d) Greater effective nuclear charge of oxygen than nitrogen
293. A $C \equiv C$ bond is :
 a) Weaker than $C = C$ bond
 b) Weaker than $C - C$ bond
 c) Longer than $C - C$ bond
 d) Shorter than $C = C$ bond
294. Which is likely to have the highest melting point?
 a) He b) CsF c) NH_3 d) $CHCl_3$
295. Which of the two ions from the list given below that have the geometry that is explained by the same hybridization of orbitals, $NO_2^-, NO_3^-, NH_2^-, NH_4^+, SCN^-$?
 a) NO_2^- and NH_2^- b) NO_2^- and NO_3^- c) NH_4^+ and NO_3^- d) SCN^- and NH_2^-
296. Valency means:
 a) Combining capacity of an element
 b) Atomicity of an element
 c) Oxidation number of an element
 d) None of the above

297. The hybridization of carbon atoms in C – C single bond of $\text{HC} \equiv \text{C} - \text{CH} = \text{CH}_2$ is:
 a) $sp^3 - sp^3$ b) $sp^2 - sp^3$ c) $sp - sp^2$ d) $sp^3 - sp$
298. The IP_1 is maximum for:
 a) K b) Na c) Be d) He
299. Which of the following has highest bond angle?
 a) H_2O b) H_2S c) NH_3 d) PH_3
300. The halogen that most easily reduced is
 a) F_2 b) Cl_2 c) Br_2 d) I_2
301. The enhanced force of cohesion in metals is due to:
 a) The covalent linkages between atoms
 b) The electrovalent linkages between atoms
 c) The lack of exchange of valency electrons
 d) The exchange energy of mobile electrons
302. Which contains both polar and non-polar covalent bonds?
 a) NH_4Cl b) HCN c) H_2O_2 d) CH_4
303. Electron deficient species are known as:
 a) Lewis acids b) Hydrophilic c) Nucleophiles d) Lewis bases
304. Metallic bonds do not play a role in:
 a) Brass b) Copper c) Germanium d) Zinc
305. A number of ionic compounds, *e. g.*, AgCl , CaF_2 , BaSO_4 are insoluble in water. This is because:
 a) Ionic compounds do not dissolve in water
 b) Water has a high dielectric constant
 c) Water is not a good ionizing solvent
 d) These molecules have exceptionally high attractive forces in their lattice
306. Pauling's electronegativity values for elements are useful in predicting:
 a) Polarity of bonds in molecules
 b) Position of elements in electromotive series
 c) Coordination number
 d) Dipole moment of various molecules
307. Among the following elements, the most electronegative is:
 a) Oxygen b) Chlorine c) Nitrogen d) Fluorine
308. The correct order of decreasing first ionization potential is:
 a) $\text{C} > \text{B} > \text{Be} > \text{Li}$ b) $\text{C} > \text{Be} > \text{B} > \text{Li}$ c) $\text{B} > \text{C} > \text{Be} > \text{Li}$ d) $\text{Be} > \text{Li} > \text{B} > \text{C}$
309. Ionization potential of Na would be numerically the same as:
 a) Electron affinity of Na^+
 b) Electronegativity of Na^+
 c) Electron affinity of He
 d) Ionization potential of Mg
310. The atomic number of elements *A*, *B*, *C* and *D* are $Z - 1$, $Z + 1$, and $Z + 2$, respectively. If '*B*' is a noble gas, choose the correct answer from the following statements.
 V. '*A*' has higher electron affinity
 VI. '*C*' exists in +2 oxidation state
 VII. '*D*' is an alkaline earth metal
 a) I and II b) II and III c) I and III d) I, II and III
311. The type of hybridization of sulphur atom present in SO_2 and SO_3 is respectively:
 a) sp, sp^2 b) sp^2, sp^2 c) sp^2, sp^3 d) sp, sp^3
312. Dipole moment is exhibited by:
 a) 1, 4-dichlorobenzene
 b) 1, 2-dichlorobenzene
 c) *Trans*-1, 2-dichloroethene

- d) *Trans*-1, 2-dicloro-2-butene
313. The formation of the oxide ion $O^{2-}(g)$ requires first an exothermic and then an endothermic step as shown below $O(g) + e^{-} = O^{-}(g)$; $\Delta H^{\circ} = -142 \text{ kJ mol}^{-1}$
 $O^{-}(g) + e^{-} = O^{2-}(g)$, $\Delta H^{\circ} = 844 \text{ kJ mol}^{-1}$ This is because
 a) O^{-} ion will tend to resist the addition of another electron
 b) Oxygen has high electro affinity
 c) Oxygen is more electronegative
 d) O^{-} ion has comparatively larger size than oxygen atom
314. Which pair of the atomic numbers represents *s*-block elements?
 a) 3, 12 b) 6, 12 c) 7, 15 d) 9, 17
315. Which of the following does not reflect the periodicity of elements?
 a) Bonding behaviour b) Electronegativity c) Ionisation potential d) Neutron/proton ratio
316. In the Periodic Table metals usually used as catalyst belong to
 a) *f*-block b) *d*-block c) *p*-block d) *s*-block
317. Four diatomic species are listed below in different sequences. Which of these represents the correct order of their increasing bond order?
 a) $NO < C_2^{2-} < O_2^{-} < He_2^{+}$
 b) $C_2^{2-} < He_2^{+} < NO < O_2^{-}$
 c) $He_2^{+} < O_2^{-} < NO < C_2^{2-}$
 d) $O_2^{-} < NO < C_2^{2-} < He_2^{+}$
318. The increase in bond order results in:
 a) Decrease in bond length and increase in bond energy
 b) Decrease in bond length and bond energy
 c) Increase in bond length and bond energy
 d) None of the above
319. In which molecule all atoms are coplanar?
 a) CH_4 b) BF_3 c) PF_3 d) NH_3
320. Length of hydrogen bond ranges from 2.5 Å to:
 a) 3.0 Å b) 2.75 Å c) 2.6 Å d) 3.2 Å
321. XeF_6 is:
 a) Octahedral
 b) Pentagonal pyramidal
 c) Planar
 d) Tetrahedral
322. HCl molecule in the vapour state is an example of:
 a) Non-polar bond b) Ionic bond c) Polar covalent bond d) Pure covalent bond
323. Which of the following species has a linear shape?
 a) NO_2^{+} b) O_3 c) NO_2^{-} d) SO_2
324. Which represents a collection of isoelectronic species?
 a) Be, Al^{3+}, Cl^{-} b) Ca^{2+}, Cs^{+}, Br c) Na^{+}, Ca^{2+}, Mg^{2+} d) N^{3-}, F^{-}, Na^{+}
325. In which of the following molecules/ions are all the bonds not equal?
 a) SF_4 b) SiF_4 c) XeF_4 d) BF_4^{-}
326. Solid CH_4 is:
 a) Molecular solid b) Ionic solid c) Covalent solid d) Not exist
327. Which has the highest bond energy?
 a) Hydrogen bond b) Triple bond c) Double bond d) Single bond
328. The electron affinity values (in kJ mol^{-1}) of three halogens *X, Y* and *Z* are respectively $-349, -333$ and -325 . Then *X, Y* and *Z* respectively, are
 a) F_2, Cl_2 and Br_2 b) Cl_2, F_2 and Br_2 c) Cl_2, Br_2 and F_2 d) Br_2, Cl_2 and F_2
329. According to MO theory, which of the following lists ranks the nitrogen species in terms of increasing bond

order?

- a) $N_2^- < N_2^{2-} < N_2$ b) $N_2^- < N_2 < N_2^{2-}$ c) $N_2^{2-} < N_2^- < N_2$ d) $N_2 < N_2^{2-} < N_2^-$

330. Be resembles much with

- a) Li b) Al c) Zn d) Ra

331. The pair of species with the same bond order is:

- a) NO, CO b) N_2, O_2 c) O_2^{2-}, B_2 d) O_2^+, NO^+

332. Which molecule is planar?

- a) NH_3 b) CH_4 c) C_2H_4 d) $SiCl_4$

333. Which is present in peroxides?

- a) O_2 b) O^{2-} c) O_2^{2-} d) O_2^-

334. The number of valency electrons in carbon atom is:

- a) Zero b) 2 c) 6 d) 4

335. Which does not form two or more chlorides?

- a) Na b) Hg c) Cu d) Fe

336. CCl_4 is insoluble in water because:

- a) CCl_4 is non-polar and water is polar
b) Water is non-polar and CCl_4 is polar
c) Water and CCl_4 both are polar
d) None of the above

337. In the transition of Cu to Cu^{2+} , there is a decrease in :

- a) Atomic number
b) Atomic mass
c) Equivalent weight
d) Number of valency electrons

338. In coordinate bond, the acceptor atoms must essentially contain in its valency shell an orbitals:

- a) With paired electron b) With single electron c) With no electron d) With three electrons

339. Which one of the following statement is false?

- a) The electron affinity of chlorine is less than that of fluorine.
b) The electronegativity of fluorine is more than that of chlorine.
c) The electron affinity of bromine is less than that of chlorine.
d) The electronegativity of chlorine is more than that of bromine.

340. Which of the following halides is most acidic?

- a) CCl_4 b) PCl_3 c) $BiCl_3$ d) $SbCl_3$

341. Hybridization state of I in ICl_2^+ is:

- a) dsp^2 b) sp c) sp^2 d) sp^3

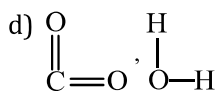
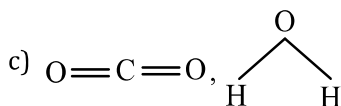
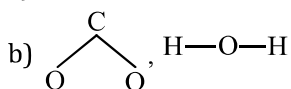
342. Identify the correct order in which the covalent radius of the following elements increases

(I)Ti (II) Ca (III) Sc

- a) (I), (II), (III) b) (III), (II), (I) c) (II), (I), (III) d) (I), (III), (II)

343. Experiment shows that H_2O has a dipole moment whereas, CO_2 has not. Point out the structures which best illustrate these facts:

- a) $O=C=O, H-O-H$



344. Which is chemically most active non-metal?

- a) S b) O₂ c) F₂ d) N₂
345. Electron affinity is the
 a) Energy released when an electron is added to an isolated atom in the gaseous state
 b) Energy absorbed when an electron is added to an isolated atom in the gaseous state
 c) Energy required to take out an electron from an isolated gaseous atom
 d) Power of an atom to attract an electron to itself
346. Which is paramagnetic?
 a) Cl₂O₆ b) Cl₂O₇ c) Cl₂O d) ClO₂
347. The bond length of LiF will be
 a) Equal to that of KF b) More than that of KF
 c) Equal to that of NaF d) Less than that of NaF
348. The bond order of CO molecule on the basis of molecular orbital theory is:
 a) Zero b) 2 c) 3 d) 1
349. Compounds formed by sp^3d^2 -hybridization will have configuration:
 a) Square planar
 b) Octahedral
 c) Trigonal bipyramidal
 d) Pentagonal bipyramidal
350. Ionic radii are:
 a) $\propto \frac{1}{\text{effective nuclear charge}}$
 b) $\propto \frac{1}{(\text{effective nuclear charge})^2}$
 c) $\propto \text{effective nuclear charge}$
 d) $\propto (\text{effective nuclear charge})^2$
351. The predominant intermolecular forces in hydrogen fluoride is due to:
 a) Dipole-induced dipole interaction
 b) Dipole-dipole interaction
 c) Hydrogen bond interaction
 d) Dispersion interaction
352. Which of the following species does not exist under normal conditions?
 a) Be²⁺ b) Be₂ c) B₂ d) Li₂
353. An element with atomic number 21 is a
 a) Halogen b) Representative element
 c) Transition element d) Alkali metal
354. Linear combination of two hybridized orbitals, belonging to two atoms and each having one electron leads to:
 a) Sigma-bond
 b) Double-bond
 c) Coordinate covalent bond
 d) Pi-bond
355. Which one of the following oxides is amphoteric in character?
 a) SnO₂ b) SiO₂ c) CO₂ d) CaO
356. The correct order in which the first ionisation potential increases is
 a) Na, K, Be b) K, Na, Be c) K, Be, Na d) Be, Na, k
357. The correct order of electron gain enthalpy with negative sign of F, Cl, Br and I, having atomic number 9, 17, 35 and 53 respectively, is
 a) Cl > F > Br > I b) F > Cl > Br > I c) I > Br > Cl > F d) I > Br > F > Cl
358. As the s-character of hybridization orbitals increases, the bond angle:
 a) Increases b) Decreases c) Does not change d) Becomes zero

359. Dipole-dipole attractive forces are strongest between the molecules of:
 a) He b) CH₄ c) CO₂ d) H₂O
360. Among Na⁺, Na, Mg and Mg²⁺, the largest particle is
 a) Mg²⁺ b) Mg c) Na d) Na⁺
361. If the IP of Na is 5.48 eV, the ionisation potential of K will be
 a) Same as that of Na b) 4.34 eV c) 5.68 eV d) 10.88 eV
362. The electronic configuration of the atom having maximum difference in first and second ionisation energies is
 a) 1s², 2s², 2p⁶, 3s¹ b) 1s², 2s², 2p⁶, 3s²
 c) 1s², 2s², 2p¹ d) 1s², 2s², 2p⁶, 3s², 3p¹
363. Amongst LiCl, RbCl, BeCl₂ and MgCl₂, the compounds with the greatest and the least ionic character respectively are:
 a) LiCl and RbCl b) RbCl and BeCl₂ c) RbCl and MgCl₂ d) MgCl₂ and BeCl₂
364. Pick the odd man out (The one having zero dipole moment):
 a) NH₃ b) H₂O c) BCl₃ d) SO₂
365. The property of attracting electrons by the halogen atoms in a molecule is called
 a) Ionisation potential b) Electrons affinity c) Electronegativity d) Electronic attraction
366. The oxide of an element whose electronic configuration is 1s², 2s², 2p⁶, 3s¹ is
 a) Neutral b) Amphoteric c) Basic d) Acidic
367. Which among the following elements has lowest value of ionisation energy?
 a) Mg b) Ca c) Ba d) Sr
368. The pair of elements which on combination are most likely to form an ionic compound is:
 a) Na and Ca b) K and O₂ c) O₂ and Cl₂ d) Al and I₂
369. A molecule which cannot exist theoretically is:
 a) SF₄ b) OF₂ c) OF₄ d) O₂F₂
370. The ions O²⁻, F⁻, Na⁺, Mg²⁺ and Al³⁺ are isoelectronic. Their ionic radii show
 a) A decrease from O²⁻ to F⁻ and then increase from Na⁺ to Al³⁺
 b) A significant increase from O²⁻ to Al³⁺
 c) A significant decrease from O²⁻ to Al³⁺
 d) An increase from O²⁻ to F⁻ and then decrease from Na⁺ to Al³⁺
371. A sudden large jump between the values of second and third ionisation energies of an element would be associated with the electronic configuration
 a) 1s², 2s², 2p⁶, 3s² b) 1s², 2s², 2p⁶, 3s¹
 c) 1s², 2s², 2p⁶, 3s², 3p¹ d) 1s², 2s², 2p⁶, 3s², 3p²
372. Among O, C, F, Cl, Br the correct order of increasing atomic radii is:
 a) F < O < C < Cl < Br b) F < C < O < Br < Cl c) F < Cl < Br < O < C d) C < O < F < Cl < Br
373. The correct order of radii is:
 a) N < Be < B b) F⁻ < O²⁻ < N³⁻ c) Na < Li < K d) Fe³⁺ < Fe²⁺ < Fe⁴⁺
374. The ionic radius of 'Cr' is minimum in which of the following compounds?
 a) CrO₂ b) K₂CrO₄ c) CrF₃ d) CrCl₃
375. Which molecule has trigonal planar geometry?
 a) IF₃ b) PCl₃ c) NH₃ d) BF₃
376. Which is the general outer electronic configuration of the coinage metals?
 a) ns²np⁶ b) (n - 1)d¹⁰ns¹ c) (n - 1)d¹⁰ns² d) (n - 1)d⁹ns²
377. Which among the following elements have lowest value of IE₁?
 a) Pb b) Sn c) Si d) C
378. The values of electronegativity of atom A and B are 1.20 and 4.0 respectively. The percentage of ionic character of A - B bond is
 a) 58.3% b) 48% c) 79.6% d) 73.6%
379. Which of the following element is most electropositive?

- a) Al b) Mg c) P d) S
380. Super octet molecule is:
 a) F_3Cl b) PCl_3 c) NH_3 d) None of these
381. Which of the following elements will have the lowest first ionisation energy?
 a) Li b) Mg c) Ca d) Rb
382. An element X which occurs in the first short period has an outer electronic structure s^2p^1 . What are the formula and acid-base character of its oxides?
 a) XO_3 , basic b) X_2O_3 , basic c) X_2O_3 , amphoteric d) XO_2 , acidic
383. The diamagnetic molecules are:
 a) B_2, C_2, N_2 b) O_2, N_2, F_2 c) C_2, N_2, F_2 d) B_2, O_2, N_2
384. Which of the following electronic configuration represents noble gas?
 a) ns^2np^6 b) ns^2np^5 c) ns^2np^4 d) ns^2np^3
385. The number of naturally occurring p - block elements that are diamagnetic is
 a) 18 b) 6 c) 5 d) 7
386. Which of the following element shows maximum valency?
 a) Carbon b) Barium c) Nitrogen d) Sulphur
387. The pair likely to form the strongest hydrogen bonding:
 a) H_2O_2 and H_2O
 b) $HCOOH$ and CH_3COOH
 c) CH_3COOH and CH_3COOCH_3
 d) SiH_4 and $SiCl_4$
388. Highest covalent character is found in which of the following?
 a) CaF_2 b) $CaCl_2$ c) CaI_2 d) $CaBr_2$
389. How many bridging oxygen atoms are present in P_4O_{10} ?
 a) 6 b) 4 c) 2 d) 5
390. Which element has the highest electronegativity?
 a) C b) O c) Mg d) S
391. Metallic nature and basic nature of the oxides..... as we move along a period
 a) Increases b) Decreases
 c) Remains constant d) First increases then decreases
392. In which block does 106th element belong?
 a) s -block b) p -block c) d -block d) f -block
393. Which of the following is more ionic?
 a) $NaCl$ b) KCl c) $MgCl_2$ d) $CaCl_2$
394. Which one of the following orders is not in according with the property stated against it?
 a) $F_2 > Cl_2 > Br_2 > I_2$: Electronegativity
 b) $F_2 > Cl_2 > Br_2 > I_2$: Bond dissociation energy
 c) $F_2 > Cl_2 > Br_2 > I_2$: Oxidising power
 d) $HI > HBr > HCl > HF$: Acidic property in water
395. Which one is electron deficient compound?
 a) NH_3 b) ICl c) BCl_3 d) PCl_3
396. Which of the following is largest ion?
 a) Na^+ b) Mg^{2+} c) O^{2-} d) F^-
397. Which of the following has the minimum bond length?
 a) O_2 b) O_2^+ c) O_2^- d) O_2^{2-}
398. Ionisation energy in group 1-A varies in the decreasing order as
 a) $Li > Na > K > Cs$ b) $Na > Li > K > Cs$ c) $Li > Cs > K > Na$ d) $K > Cs > Na > Li$
399. Paramagnetism is exhibited by molecules:
 a) Not attracted into a magnetic field
 b) Containing only paired electrons

- c) Carrying a positive charge
d) Containing unpaired electrons
400. The value of bond order in nitrogen and oxygen molecule is:
a) 3, 2 b) 4, 2 c) 2, 3 d) 1, 2
401. In third row of Periodic Table, the atomic radii from Na to Cl
a) Continuously decreases b) Continuously increases
c) Remains constant d) Increases but not continuously
402. Which has a giant covalent structure?
a) PbO_2 b) SiO_2 c) NaCl d) AlCl_3
403. Which has an odd electron and shows paramagnetic character?
a) NO b) SO_2 c) CO_2 d) H_2O
404. The correct order of increasing bond length of $\text{C}-\text{H}$, $\text{C}-\text{O}$, $\text{C}-\text{C}$ and $\text{C}=\text{C}$ is :
a) $\text{C}-\text{H} < \text{C}-\text{O} < \text{C}-\text{C} < \text{C}=\text{C}$
b) $\text{C}-\text{H} < \text{C}=\text{C} < \text{C}-\text{O} < \text{C}-\text{C}$
c) $\text{C}-\text{C} < \text{C}=\text{C} < \text{C}-\text{O} < \text{C}-\text{H}$
d) $\text{C}-\text{O} < \text{C}-\text{H} < \text{C}-\text{C} < \text{C}=\text{C}$
405. NF_3 is :
a) Non-polar compound
b) Electrovalent compound
c) Having low value of dipole moment than NH_3
d) Having more dipole moment than NH_3
406. Atomic radii of F and Ne, in Å, are given by
a) 0.72, 0.71 b) 0.72, 1.6 c) 1.6, 1.58 d) 0.71, 0.72
407. When an electron is removed from an atom, its energy
a) Increase b) Decrease c) Remains the same d) None of these
408. In which of the following $p\pi - d\pi$ bonding is observed?
a) NO_3^- b) SO_3^{2-} c) BO_3^{3-} d) CO_3^{2-}
409. In BrF_3 molecule, the lone pair occupy equatorial position to minimize :
a) Lone pair-bond pair repulsion only
b) Bond pair-bond pair repulsion only
c) Lone pair-lone pair repulsion and lone pair-bond pair repulsion
d) Lone pair-lone pair repulsion only
410. The number of lone pairs is same in PCl_3 and:
a) BCl_3 b) NCl_3 c) CCl_4 d) PCl_5
411. As a result of resonance:
a) Bond length decreases
b) Energy of the molecules decreases
c) Stability of the molecule increases
d) All are correct
412. The number of ions formed when a molecule of $\text{K}_4\text{Fe}(\text{CN})_6$ dissociate is:
a) 4 b) 5 c) 6 d) 2
413. Polar covalent compounds are soluble in:
a) Polar solvents b) Non-polar solvents c) Concentrated acids d) All solvents
414. The elements with atomic numbers 9, 17, 35, 53, 85 are all
a) Halogens b) Noble gases c) Heavy metals d) Light metals
415. Which among the following has highest ionic radius?
a) F^- b) B^{3+} c) O^{2-} d) Li^+
416. Strongest bond is formed by the head on overlapping of:
a) $2s$ - and $2p$ -orbitals b) $2p$ - and $2p$ -orbitals c) $2s$ - and $2s$ -orbitals d) All of these
417. $A \rightarrow A^+ + e, E_1$ and $A^+ \rightarrow A^{2+} + e, E_2$. The energy required to pull out the two electrons are E_1 and E_2

- respectively. The correct relationship between two energy would be
 a) $E_1 < E_2$ b) $E_1 > E_2$ c) $E_1 = E_2$ d) $E_1 \neq E_2$
418. The element having highest electron affinity is
 a) Bromine b) Iodine c) Fluorine d) Chlorine
419. Fluorine has low electron affinity than chlorine because of
 a) Bigger radius of fluorine, less density b) Smaller radius of fluorine, high density
 c) Smaller radius of chlorine, high density d) Smaller radius of chlorine, less density
420. The angle between two covalent bonds is maximum in:
 a) CH_4 b) H_2O c) CO_2 d) SO_3
421. Which species has lone pair on central atom?
 a) CCl_4 b) CH_4 c) NH_4^+ d) H_2O
422. The decreasing order of the second ionization energy of K, Ca and Ba is:
 a) $\text{K} > \text{Ca} > \text{Ba}$ b) $\text{Ca} > \text{Ba} > \text{K}$ c) $\text{Ba} > \text{K} > \text{Ca}$ d) $\text{K} > \text{Ba} > \text{Ca}$
423. Which contains both covalent and ionic bonds?
 a) CCl_4 b) KCN c) CaCl_2 d) H_2O
424. The covalency of nitrogen in HNO_3 is :
 a) Zero b) 3 c) 4 d) 5
425. The orbitals of same energy level providing the most efficient overlapping are:
 a) $sp^3 - sp^3$ b) $sp - sp$ c) $sp^2 - sp^2$ d) All of these
426. Which of the following has unchanged valency?
 a) H b) Na c) Fe d) O
427. The general electronic configuration of the transition elements is
 a) $(n - 1)d^{10}, (n + 1)s^2$ b) $(n - 1)d^{1-10}, (n + 1)s^{1-2}$
 c) $(n - 1)d^{1-10}, np^6, ns^2$ d) $(n - 1)d^{1-10}, ns^{1-2}$
428. The order of first electron affinity of O, S and Se is:
 a) $\text{O} > \text{S} > \text{Se}$ b) $\text{S} > \text{O} > \text{Se}$ c) $\text{Se} > \text{O} > \text{S}$ d) $\text{Se} > \text{S} > \text{O}$
429. Which of the following oxides doesn't react with both of an acid and alkali, is?
 a) ZnO b) SnO_2 c) Al_2O_3 d) BeO
430. Which of the following is isoelectronic with carbon atom?
 a) Na^+ b) Al^{3+} c) O^{2-} d) N^+
431. The ionic radii of isoelectronic species N^{3-} , O^{2-} and F^- are in the order?
 a) 1.36, 1.40, 1.71 b) 1.36, 1.71, 1.40 c) 1.71, 1.40, 1.36 d) 1.71, 1.36, 1.40
432. Which bond angle, θ would result in the maximum dipole moment for the triatomic molecule XY_2 shown below?
 a) $\theta = 90^\circ$ b) $\theta = 120^\circ$ c) $\theta = 150^\circ$ d) $\theta = 180^\circ$
433. The electronegativity values of C, H, O, N and S are 2.5, 2.1, 3.5, 3.0 and 2.5 respectively. Which of the following bonds is most polar?
 a) C - H b) N - H c) S - H d) O - H
434. Which of the following sequence correctly represents the decreasing acidic nature of oxides?
 a) $\text{Li}_2\text{O} > \text{BeO} > \text{CO}_2 > \text{N}_2\text{O}_3 > \text{B}_2\text{O}_3$ b) $\text{CO}_2 > \text{N}_2\text{O}_3 > \text{B}_2\text{O}_3 > \text{LiO} > \text{BeO}$
 c) $\text{N}_2\text{O}_3 > \text{CO}_2 > \text{B}_2\text{O}_3 > \text{BeO} > \text{Li}_2\text{O}$ d) $\text{CO}_2 > \text{BeO} > \text{Li}_2\text{O} > \text{B}_2\text{O}_3 > \text{N}_2\text{O}_3$
435. In which of the following compounds, the bonds have the largest percentage of ionic character:
 a) H_2O b) HF c) IBr d) N_2O_4
436. Which ion has a higher polarizing power?
 a) Mg^{2+} b) Al^{3+} c) Ca^{2+} d) Na^+
437. The first ionisation potential is maximum for
 a) B b) N c) O d) Be
438. The highest first ionisation potential is of
 a) Carbon b) Boron c) Oxygen d) Nitrogen
439. The ionic radii (\AA) of C^{4-} and O^{2-} respectively are 2.60 and 1.40. The ionic radius of the isoelectronic ion

- N^{3-} would be
 a) 2.6 b) 1.71 c) 1.4 d) 0.95
440. In a multi-electron atom, the energy of a 2 *p*-orbital is :
 a) Less than that of 2*s*-orbital
 b) More than that of 2*s*-orbital
 c) Equal to that of 2*s*-orbital
 d) Double that of 2*s*-orbital
441. The bond angle in PH_3 is:
 a) Much lesser than NH_3
 b) Equal to that in NH_3
 c) Much greater than in NH_3
 d) Slightly more than in NH_3
442. The dipole moment of $CHCl_3$ is 1.05 debye while that of CCl_4 is zero, because CCl_4 is:
 a) Linear b) Symmetrical c) Planar d) Regular tetrahedral
443. The high boiling point of water is due to:
 a) Weak dissociation of water molecules
 b) Hydrogen bonding among water molecules
 c) Its high specific heat
 d) Its high dielectric constant
444. The number of unpaired electrons in O_2 molecule is:
 a) Zero b) 1 c) 2 d) 3
445. Variable valency in general, is exhibited by
 a) Transition elements b) Gaseous elements c) Non-metals d) *s*-block elements
446. Which statement is true?
 a) Absolutely pure water does not contain any ion.
 b) Some covalent compounds may also give ions in aqueous solution.
 c) In aqueous solution only electrovalent compounds give ions.
 d) Very sparingly soluble substances do not dissociate in aqueous solution
447. The bond strength increases:
 a) With increasing bond order
 b) With increasing extent of overlapping of orbitals
 c) With decreasing difference between energies of overlapping orbitals
 d) All of the above
448. If the ionic radii of K^+ and F^- are about 1.34 Å each, then the expected values of atomic radii of K and F should be respectively:
 a) 1.34 and 1.34 Å b) 2.31 and 0.64 Å c) 0.64 and 2.31 Å d) 2.31 and 1.34 Å
449. Which species is paramagnetic?
 a) O_2^- b) CH_3^- c) CO d) NO^+
450. Chemical bond formation takes place when:
 a) Energy is absorbed
 b) Forces of attraction overcome forces of repulsion
 c) Forces of repulsion overcome forces of attraction
 d) Forces of attraction are equal to forces of repulsion
451. H_2O has a net dipole moment, while BeF_2 has zero dipole moment, because:
 a) H_2O molecule as linear while BeF_2 is bent
 b) BeF_2 molecule is linear while H_2O is bent
 c) Fluorine is more electronegative than oxygen
 d) Be is more electronegative than oxygen
452. Which has the smallest size?
 a) Na^+ b) Mg^{2+} c) Al^{3+} d) P^{5+}

453. Observe the following statement

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

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

X. 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

454. The only non-metal which is liquid at ordinary temperature is

a) Hg

b) Br₂

c) NH₃

d) None of these

455. Which has triangular planar shape?

a) CH₃⁺

b) ClO₂⁻

c) H₃O⁺

d) ClO₃⁻

456. With respect to chlorine, hydrogen will be

a) Electropositive

b) Electronegative

c) Neutral

d) None of these

457. In the case of alkali metals, the covalent character decreases in the order:

a) MI > MBr > MCl > MF

b) MCl > MI > MBr > MF

c) MF > MCl > MBr > MI

d) MF > MCl > MI > MBr

458. The set representing the correct order of ionic radius is

a) Li⁺ > Be²⁺ > Na⁺ > Mg²⁺

b) Na⁺ > Li⁺ > Mg²⁺ > Be²⁺

c) Li²⁺ > Na⁺ > Mg²⁺ > Be²⁺

d) Mg²⁺ > Be²⁺ > Li⁺ > Na⁺

459. Which element has maximum electron affinity?

a) Na

b) Mg

c) Al

d) S

460. Ionisation potential is lowest for

a) Alkali metals

b) Inert gas

c) Halogens

d) Alkaline earth metals

461. It is thought that atoms combine with each other such that the outermost orbit acquires a stable configuration of 8 electrons. If stability were attained with 6 electrons rather than with 8, what would be the formula of the stable fluoride ions?

a) F³⁺

b) F⁺

c) F⁻

d) F²⁻

462. The outermost configuration of the least reactive element is

a) ns²p³

b) ns²p⁴

c) ns²p⁵

d) ns²p⁶

463. Elements of the same vertical group of the Periodic Table have

a) Same atomic number

b) Same atomic size

c) Same number of atoms

d) Same number of electrons in outermost shell

464. Ionisation potential for a noble gas is

a) Maximum in a period

b) Minimum in a period

c) Either minimum or maximum

d) Constant

465. Which of the following possess maximum hydration energy?

a) MgSO₄

b) RaSO₄

c) SrSO₄

d) BaSO₄

466. The correct order of hybridization of the central atom in the following species NH₃, [PtCl₄]²⁻, PCl₅ and BCl₃ is:

a) dsp², dsp³, sp², sp³

b) sp³, dsp², dsp³, sp²

c) dsp², sp², sp³, dsp³

d) dsp², sp³, sp², dsp³

467. Following statements regarding the periodic trends of chemical reactivity to the alkali metals and the halogens are given. Which of these statements gives the correct picture?

a) The reactivity decreases in the alkali metals but increases in the halogens with increase in atomic number down the group.

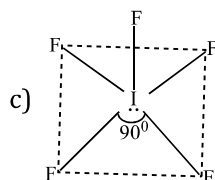
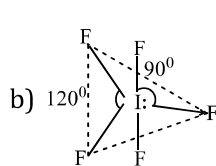
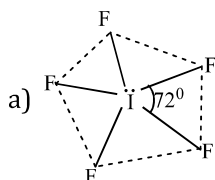
b) In both the alkali metals and the halogens the chemical reactivity decreases with increase in atomic number down the group

- c) Chemical reactivity increases with increase in atomic number down the group in both the alkali metals and halogens.
- d) In alkali metals the reactivity increases but in the halogens it decreases with increase in atomic number down the group.
468. The correct order of ionisation energy of C, N, O, F is
 a) $F < O < N < C$ b) $F < N < C < O$ c) $C < N < O < F$ d) $C < O < N < F$
469. Which has minimum ionic radius?
 a) N^{3-} b) K^+ c) Na^+ d) F^-
470. In the isoelectronic species the ionic radii (\AA) of N^{3-} , O^{2-} and F^- are respectively given by
 a) 1.71, 1.40, 1.36 b) 1.71, 1.36, 1.40 c) 1.36, 1.40, 1.71 d) 1.36, 1.71, 1.40
471. The ionisation potential order for which set is correct?
 a) $Cs < Li < K$ b) $Cs < Li > B$ c) $Li > K > Cs$ d) $B > Li < K$
472. The correct sequence which shows decreasing order of the ionic radii of the elements is
 a) $Al^{3+} > Mg^{2+} > Na^+ > F^- > O^{2-}$ b) $Na^+ > Mg^{2+} > Al^{3+} > O^{2-} > F^-$
 c) $Na^+ > F^- > Mg^{2+} > O^{2-} > Al^{3+}$ d) $O^{2-} > F^- > Na^+ > Mg^{2+} > Al^{3+}$
473. Among HX, the maximum dipole moment is of:
 a) HF b) HCl c) HBr d) HI
474. Compound formed by sp^3d -hybridization will have structure:
 a) Trigonal bipyramidal
 b) T-shaped
 c) Linear
 d) Either of these depending on number of lone pair of electrons of central atom
475. The energy change accompanying the process given below is,
 $Na^+(g) + Cl^-(g) \rightarrow NaCl(s)$
 a) Hydration energy b) Ionization energy c) Electron affinity d) Lattice energy
476. Ice has an open structure compared to water due to which it floats on water and occupies a greater volume of space. The open structure of ice is due to:
 a) Solid state of ice b) Its low density c) Crystalline nature d) Hydrogen bonding
477. The electrons in an incomplete outershell are known as :
 a) Kernel electrons b) Valency electrons c) Shell electrons d) None of the above
478. Which of the following is not a correct statement?
 a) Every AB_5 molecule does in fact have square pyramid structure
 b) Multiple bonds are always shorter than corresponding single bonds
 c) The electron-deficient molecules can act as Lewis acids
 d) The canonical structures have no real existence
479. Van der Waals' forces are applied to:
 a) Inert gases only
 b) Rare gases only
 c) Mixture of gases
 d) Elementary gases only
480. The correct order of dipole moment is:
 a) $CH_4 < NF_3 < NH_3 < H_2O$
 b) $NF_3 < CH_4 < NH_3 < H_2O$
 c) $NH_3 < NF_3 < CH_4 < H_2O$
 d) $H_2O < NH_3 < NF_3 < CH_4$
481. Which of the following species contains three bond pairs and one lone pair around the central atom?
 a) NH_2^- b) PCl_3 c) H_2O d) BF_3
482. In H_2^- ion, the bond order is:
 a) Zero b) $1/2$ c) $-1/2$ d) 1
483. Which statement is correct?

- a) Pi-bond always exists with sigma-bond
 b) Pi-bond can exist independently
 c) Sigma-bond is weaker than pi-bond
 d) Pi-bond is less reactive than sigma-bond
484. Which is highest melting point halide?
 a) NaCl b) NaBr c) NaF d) NaI
485. The following compounds have been arranged in order of their increasing thermal stabilities. Identify the correct order:
 K_2CO_3 (I) $MgCO_3$ (II)
 $CaCO_3$ (III) $BeCO_3$ (IV)
 a) I < II < III < IV b) IV < II < III < I c) IV < II < I < III d) II < IV < III < I
486. Elements of which group form anions most readily?
 a) Halogens b) Alkali metals c) Oxygen family d) Nitrogen group
487. The bond order of C_2^+ is:
 a) 1 b) 2 c) 3/2 d) 1/2
488. Which is not a scale of measuring electronegativity?
 a) Stevenson's scale b) Mulliken's scale
 c) Allred-Rochow's scale d) Pauling scale
489. In the series ethane, ethylene and acetylene, the C – H bond energy is :
 a) The same in all the three compounds
 b) Greatest in ethane
 c) Greatest in ethylene
 d) Greatest in acetylene
490. Which ion is not isoelectronic with O^{2-} ?
 a) N^{3-} b) Na^+ c) F^- d) Ti^+
491. The ionic radii of N^{3-} , O^{2-} and F^- are respectively given by:
 a) 1.36, 1.40, 1.71 b) 1.36, 1.71, 1.40 c) 1.71, 1.40, 1.36 d) 1.71, 1.36, 1.40
492. During change of O_2 to O_2^- ion, the electron adds on which one of the following orbitals?
 a) π^* orbital b) π orbital c) σ^* orbital d) σ orbital
493. Which of the following has largest size?
 a) Al b) Al^+ c) Al^{2+} d) Al^{3+}
494. The correct order of increasing bond angles in the following species is:
 a) $Cl_2O < ClO_2 < ClO_2^-$ b) $ClO_2 < Cl_2O < ClO_2^-$ c) $Cl_2O < ClO_2^- < ClO_2$ d) $ClO_2^- < Cl_2O < ClO_2$
495. In the Periodic Table metallic character of elements shows one of the following trend
 a) Decreases down the group and increases across the period
 b) Increases down the group and decreases across the period
 c) Increases across the period and also down the group
 d) Decreases across the period and also down the group
496. When sodium and chlorine react, energy is:
 a) Released and ionic bond is formed
 b) Released and covalent bond is formed
 c) Absorbed and covalent bond is formed
 d) Absorbed and ionic bond is formed
497. In third row of Periodic Table from Na to Cl
 a) Electronegativity increases b) Electronegativity decreases
 c) Ionisation energy decreases d) Atomic volume increases
498. The molecule having smallest bond angle is:
 a) $AsCl_3$ b) $SbCl_3$ c) PCl_3 d) NCl_3
499. Which of the following statements regarding carbon monoxide is correct?
 a) It involves *sp*-orbitals of carbon

- b) It contains a lone pair only on carbon
 c) It contains a lone pair only on oxygen
 d) It carbonyl, oxygen end is attached to the metal atoms
500. The hydration of ionic compounds involves:
 a) Evolution of heat
 b) Weakening of attractive forces
 c) Dissociation into ions
 d) All of the above
501. Ionic radii are
 a) Inversely proportional to effective nuclear charge
 b) Inversely proportional to square of effective nuclear charge
 c) Directly proportional to effective nuclear charge
 d) Directly proportional to square of effective nuclear charge
502. Which of the following is the atomic number of a metal?
 a) 32 b) 34 c) 36 d) 38
503. The electronic configurations of four elements are given below. Arrange these elements in the correct order of the magnitude (without sign) of their electron affinity.
 XI. $2s^2 2p^5$
 XII. $3s^2 3p^5$
 XIII. $2s^2 2p^4$
 XIV. $3s^2 3p^4$
 Select the correct answer using the codes given below
 a) (i) < (ii) < (iv) < (iii) b) (ii) < (i) < (iv) < (iii) c) (i) < (iii) < (iv) < (ii) d) (iii) < (iv) < (i) < (ii)
504. Which statement is correct?
 a) X^+ ion is larger than X^- ion
 b) X^- ion is larger in size than X atom
 c) X^+ and X^- have the same size
 d) X^+ ion is larger in size than X atom
505. The correct order of size of iodine species is
 a) $I > I^- > I^+$ b) $I^- > I > I^+$ c) $I^+ > I > I^-$ d) $I^- > I^+ > I$
506. Which of the following statement is wrong?
 a) The stability of hydrides increase from NH_3 to BiH_3 in group 15 of the periodic table.
 b) Nitrogen cannot form $d\pi - p\pi$ bond.
 c) Single N—N bond is weaker than the single P—P bond
 d) N_2O_4 has two resonance structure
507. Methanol and ethanol are miscible in water due to:
 a) Covalent character
 b) Hydrogen bonding character
 c) Oxygen bonding character
 d) None of the above
508. Bond order of N_2^- anion is :
 a) 3.0 b) 2.0 c) 2.5 d) 1.5
509. Among the following, the number of elements showing only one non-zero oxidation state is
 O, Cl, F, N, P, Sn, Tl, Na, Ti
 a) 1 b) 2 c) 3 d) 4
510. The structure of IF_5 can be best demonstrated as:

d) None of these



511. The correct decreasing order of first ionisation enthalpies of five elements of the second period is
 a) $\text{Be} > \text{B} > \text{C} > \text{N} > \text{F}$ b) $\text{N} > \text{F} > \text{C} > \text{B} > \text{Be}$ c) $\text{F} > \text{N} > \text{C} > \text{Be} > \text{B}$ d) $\text{N} > \text{F} > \text{B} > \text{C} > \text{Be}$
512. The correct order of second ionisation potential of carbon, nitrogen, oxygen and fluorine is:
 a) $\text{C} > \text{N} > \text{O} > \text{F}$ b) $\text{O} > \text{N} > \text{F} > \text{C}$ c) $\text{O} > \text{F} > \text{N} > \text{C}$ d) $\text{F} > \text{O} > \text{N} > \text{C}$
513. Of the following elements, which one has the highest electronegativity?
 a) F b) Cl c) Br d) I
514. A molecule in which sp^2 -hybrid orbitals are used by the central atom in forming covalent bond is:
 a) He_2 b) SO_2 c) PCl_5 d) N_2
515. The hydrogen bonding is strongest in:
 a) $\text{O} - \text{H} \cdots \text{S}$ b) $\text{S} - \text{H} \cdots \text{O}$ c) $\text{F} - \text{H} \cdots \text{F}$ d) $\text{F} - \text{H} \cdots \text{O}$
516. In which of the following process energy is liberated?
 a) $\text{Cl} \rightarrow \text{Cl}^+ + e$ b) $\text{HCl} \rightarrow \text{H}^+ + \text{Cl}^-$ c) $\text{Cl} + e \rightarrow \text{Cl}^-$ d) $\text{O}^- + e \rightarrow \text{O}^{2-}$
517. A covalent bond is formed between the atoms by the overlapping of orbitals containing:
 a) Single electron
 b) Paired electron
 c) Single electron with parallel spin
 d) Single electron with opposite spin
518. Which main group elements have a different number of outermost electrons than their group number?
 a) Alkali metals b) Noble gases c) Halogens d) None of these
519. Which one of the following has the highest electronegativity?
 a) Br b) Cl c) P d) Si
520. If the ionization potential for hydrogen atom is 13.6 eV, then the ionization potential for He^+ ion should be:
 a) 72.2 eV b) 54.4 eV c) 6.8 eV d) 13.6 eV
521. Which property is commonly exhibited by a covalent compound?
 a) High solubility in water
 b) Low m. p.
 c) High electrical conductivity
 d) High b. p.
522. The energy of antibonding molecular orbitals is:
 a) Greater than the bonding M. O.
 b) Smaller than the bonding M. O.
 c) Equal to that of bonding M. O.
 d) None of the above
523. Which is not characteristic of π -bond?
 a) π -bond is formed when a sigma bond already formed
 b) π -bond is formed from hybrid orbitals
 c) π -bond may be formed by the overlapping of p -orbitals
 d) π -bond results from lateral overlap of atomic orbitals
524. An atom with atomic number 20 is most likely to combine chemically with the atom whose atomic number is:
 a) 11 b) 16 c) 18 d) 10
525. How does the ionisation energy of 1st group elements vary?
 a) Increases down the group b) Decreases down the group
 c) Remains unchanged d) Variation is not regular

526. Which one of the following pairs is isostructural (*i. e.*, having the same shape and hybridization)?
 a) $[\text{NF}_3 \text{ and } \text{BF}_3]$ b) $[\text{BF}_4^- \text{ and } \text{NH}_4^+]$ c) $[\text{BCl}_3 \text{ and } \text{BrCl}_3]$ d) $[\text{NH}_3 \text{ and } \text{NO}_3^-]$
527. Which shows the highest lattice energy?
 a) RbF b) CsF c) NaF d) KF
528. The hybridization of phosphorus in POCl_3 is same as in:
 a) P in PCl_3 b) S in SF_6 c) Cl and ClF_3 d) B in BCl_3
529. Which does not have pyramidal geometry?
 a) SO_3^{2-} b) NO_3^- c) NH_3 d) $\text{C}(\text{C}_6\text{H}_5)_3^-$
530. Dative bond is present in:
 a) SO_3 b) NH_3 c) BaCl_2 d) BF_3
531. Amongst H_2O , H_2S , H_2Se and H_2Te , the one with highest boiling point is:
 a) H_2O because of hydrogen bonding
 b) H_2Te because of higher molecular weight
 c) H_2S because of hydrogen bonding
 d) H_2Se because of lower molecular weight
532. Which of the following halides is least stable and has doubtful existence?
 a) Cl_4 b) GeI_4 c) SnI_4 d) PbI_4
533. Which property of halogens increases from F to I?
 a) Electronegativity
 b) First ionisation energy
 c) Bond length in the molecule
 d) None of the above
534. Which has highest melting point?
 a) LiCl b) BeCl_2 c) BCl_3 d) CCl_4
535. Which of the following phenomenon will occur when two atoms of an element with same spin of electron in orbitals approach each other?
 a) Orbitals will overlap
 b) Orbitals will not overlap
 c) Bonding will take place
 d) A diatomic molecule will be formed
536. The least stable ion among the following is
 a) Li^- b) Be^- c) B^- d) C^-
537. The electron affinity values for the halogens show the following trend
 a) $\text{F} < \text{Cl} > \text{Br} > \text{I}$ b) $\text{F} < \text{Cl} < \text{Br} < \text{I}$ c) $\text{F} > \text{Cl} > \text{Br} > \text{I}$ d) $\text{F} < \text{Cl} > \text{Br} < \text{I}$
538. CO_2 has the same geometry as:
 (A) HgCl_2 , (B) NO_2 , (C) SnCl_4 , (D) C_2H_2
 a) A and C b) B and D c) A and D d) C and D
539. In which of the following molecule, the central atom does not have sp^3 -hybridization?
 a) CH_4 b) SF_4 c) BF_4^- d) NH_4^+
540. The elements present in the core of earth are collectively known as
 a) Lithophiles b) Nucleophiles c) Chalcophiles d) Siderophiles
541. In the Modern Periodic Table, elements are arranged
 a) Alphabetically b) With increasing volume
 c) With increasing mass d) With increasing atomic number
542. Which of the ions has the largest ionic radius?
 a) Be^{2+} b) Mg^{2+} c) Ca^{2+} d) Sr^{2+}
543. The elements having the electronic configuration $[\text{Kr}] 4d^{10} f^{14}, 5s^2 p^6 d^2, 6s^2$ belongs to
 a) s-block b) p-block c) d-block d) f-block
544. Some of the properties of the two species, NO_3^- and H_3O^+ are described below. Which one of them is correct?

- a) Dissimilar in hybridization for the central atom with different structure
 b) Isostructural with same hybridization for the central atom
 c) Isostructural with different hybridization for the central atom
 d) Similar is hybridization for the central atom with different structure
545. Which compound shows hydrogen bonding?
 a) HCl b) C₂H₆ c) RCH₂CHO d) RCH₂NHCH₃
546. The ionization potential order for which set is correct?
 a) Li > K > Cs b) B > Li > K c) Cs > Li > B d) Cs < Li < K
547. Which shows non-directional bonding?
 a) BCl₃ b) CsCl c) NCl₃ d) BeCl₃
548. Maximum number of covalent bonds between two like atoms can be:
 a) Three b) Two c) Four d) One
549. *o*-hydroxy benzaldehyde, although contains enolic group but does not give test of group with FeCl₃ because:
 a) It is steam volatile
 b) Of intermolecular H-bonding
 c) Of intermolecular H-bonding
 d) All of the above
550. Bond energy of covalent O – H bond in water is :
 a) Greater than bond energy of hydrogen bond
 b) Equal to bond energy of hydrogen bond
 c) Less than bond energy of hydrogen bond
 d) None of the above
551. Which is expected to show paramagnetism?
 a) ClO₂ b) SO₂ c) CO₂ d) SiO₂
552. Which pair has both members from the same period of Periodic Table?
 a) Cl, Br b) Ca, Cl c) Na, Ca d) Na, Cl
553. In which of the following arrangements, the sequence is not strictly according to the property written against it?
 a) HF < HCl < HBr < HI : increasing acid strength
 b) NH₃ < PH₃ < AsH₃ < SbH₃ : increasing basic strength
 c) B < C < O < N : increasing first ionization enthalpy
 d) CO₂ < SiO₂ < SnO₂ < PbO₂ : increasing oxidizing power
554. The half of the difference between the number of electrons in bonding molecular orbitals and antibonding molecular orbitals is known as:
 a) Bond order b) Proton order c) Molecular order d) Electron order
555. Which can be described as a molecule with residual bonding capacity?
 a) N₂ b) CH₄ c) NaCl d) BeCl₂
556. The intermolecular attractive forces vary in the order:
 a) water < alcohol < ether
 b) water > alcohol > ether
 c) alcohol > water < ether
 d) ether > water > alcohol
557. Which have zero dipole moment?
 a) 1, 1-dichloroethene
 b) *Cis*-1, 2-dichloroethene
 c) *Trans*-1, 2-dichloroethene
 d) None of the above
558. When ionic compounds get dissolved in water:
 a) They involve heat changes

- b) Inter-ionic attraction is reduced
 c) Ions show dipole-ion attraction with water molecules
 d) All are correct
559. H_2O boils at higher temperature than H_2S because it is capable of forming:
 a) Ionic bonds b) Covalent bonds c) Hydrogen bonds d) Metallic bonds
560. Which one of the following elements has the highest ionisation energy?
 a) $[\text{Ne}]3s^23p^1$ b) $[\text{Ne}]3s^23p^3$ c) $[\text{Ne}]3s^23p^2$ d) $[\text{Ar}]3d^{10},4s^24p^2$
561. Which element exist as a solid at 25°C and 1 atm pressure among the following?
 a) Br b) Cl c) Hg d) P
562. In allene structure, three carbon atoms are joined by:
 a) Three σ -and three π -bonds
 b) Two σ -and one π -bond
 c) Two σ -and two π -bonds
 d) Three π -bonds only
563. Among the following statement, the correct statement about PH_3 and NH_3 is:
 a) NH_3 is a better electron donor because the lone pair of electron occupies spherical s-orbital and is less directional
 b) PH_3 is a better electron donor because the lone pair of electron occupies sp^3 -orbital and is more directional
 c) NH_3 is a better electron donor because the lone pair of electron occupies sp^3 -orbital and more directional
 d) PH_3 is a better electron donor because the lone pair of electron occupies spherical s-orbital and is less directional
564. Which of the following pairs show reverse properties on moving along a period from left to right and from top to down in a group?
 a) Nuclear charge and electron affinity b) Ionisation radius and electron affinity
 c) Atomic radius and electron affinity d) None of the above
565. Covalent radius of Li is 123 pm. The crystal radius of Li will be:
 a) > 123 pm b) < 123 pm c) $+123$ pm d) $= \frac{123}{2}$ pm
566. Bond length decreases with:
 a) Decrease in size of the atom
 b) Increase in the number of bonds between the atoms
 c) Decrease in bond order
 d) Decrease in the number of bonds between the atoms
567. Which of the following statements is most correct?
 Effective nuclear charge of an atom depends on:
 a) The atomic number of the atom
 b) The charge on the ion
 c) The shielding effect
 d) Both the actual nuclear charge and the shielding effect
568. Which of the following oxides is most basic?
 a) Na_2O b) SiO_2 c) SO_2 d) All are equally basic
569. Which one of the following ions has the highest value of ionic radius?
 a) Li^+ b) B^{3+} c) O^{2-} d) F^-
570. Which has the lowest bond angle?
 a) NH_3 b) BeF_2 c) H_3O^+ d) CH_4
571. Pauling's electronegativity values for elements are useful in predicting
 a) Polarity of bonds in molecules b) Position of elements in electromotive series
 c) Coordination number d) Dipole moment of various molecules

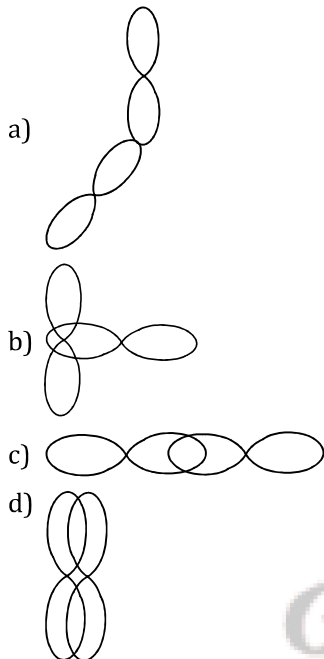
572. The correct order of decreasing polarisability of ion is:
 a) Cl^- , Br^- , I^- , F^- b) F^- , I^- , Br^- , Cl^- c) I^- , Br^- , Cl^- , F^- d) F^- , Cl^- , Br^- , I^-
573. Strongest oxidising agent among halogens is
 a) I_2 b) Br_2 c) Cl_2 d) F_2
574. Which contains a coordinate and covalent bond?
 a) BaCl_2
 b) NH_4Cl
 c) HCl
 d) H_2O
575. Which of the following acts sometimes as a metal and sometimes as a non-metal?
 a) Hg b) Cl c) K d) At
576. The lowest ionization energy would be associated with the electronic structure:
 a) $1s^2, 2s^2 2p^6, 3s^1$ b) $1s^2, 2s^2 2p^5$ c) $1s^2, 2s^2 2p^6$ d) $1s^2, 2s^2 2p^6, 3s^2$
577. IP is influenced by:
 a) Size of atom
 b) Charge on nucleus
 c) Electrons present in inner shells
 d) All of the above
578. The bond between chlorine and bromine in BrCl_3 is:
 a) Ionic
 b) Non-polar
 c) Polar with negative end on Br^-
 d) Polar with negative end on Cl^-
579. The hydration energy of Mg^{2+} is larger than that of:
 a) Al^{3+} b) Na^+ c) Be^{2+} d) None of these
580. Which of the following characteristics regarding halogens is not correct?
 a) Ionization energy decreases with increase in atomic number.
 b) Electronegativity decreases with increase in atomic number.
 c) Electron affinity decreases with increase in atomic number.
 d) Enthalpy of fusion increases with increase in atomic number.
581. IP_2 for an element is invariably higher than IP_1 because :
 a) The size of cation is smaller than its atom
 b) It is difficult to remove 'e' from cation
 c) Effective nuclear charge is more for cation
 d) All of the above
582. Which of the following is correct?
 a) Decreases in bond length means increase in bond strength
 b) Covalent radius of carbon is less than that of nitrogen
 c) Single bonds are stronger than double bonds
 d) Fe (III) chloride cannot exist in the dimeric form Fe_2Cl_6
583. Molecular orbitals theory was proposed by:
 a) Werner b) Kossel c) Moseley d) Mullikan
584. Proton plays an important role in ... bonding .
 a) Electrovalent b) Hydrogen c) Covalent d) Coordinate
585. Which cannot exist on the basis of M. O. theory?
 a) C_2 b) He_2^+ c) H_2^+ d) He_2
586. Which of the following statement is correct?
 a) Polarization of an anion is maximum by high charged cation
 b) Small sized cation minimises the polarisation
 c) A small anion brings about a large degree of polarization

- d) A small anion undergoes a high degree of polarization
587. The double bonds between the two carbon atoms in ethylene consists of:
- Two sigma-bonds at right angles to each other.
 - One sigma-bond and one pi-bond
 - Two pi-bonds at right angles to each other
 - Two pi-bonds at an angle of 60° to each other
588. Which compound among the following has more covalent character?
- AlCl_3
 - AlI_3
 - MgI_2
 - NaI
589. Iron is tougher than sodium because:
- Iron atom is smaller
 - Iron atoms are more closely packed
 - Metallic bonds are stronger in iron
 - None of the above
590. In HCHO carbon atom has hybridisation:
- sp
 - sp^2
 - sp^3
 - None of these
591. Amongst the elements with following electronic configurations, which one of them may have the highest ionization energy?
- $\text{Ne}[3s^2 3p^1]$
 - $\text{Ne}[3s^2 3p^3]$
 - $\text{Ne}[3s^2 3p^2]$
 - $\text{Ar}[3d^{10} 4s^2 4p^3]$
592. In which pair, the first atom or ion is not larger than the second?
- N, F
 - Cl^- , Cl
 - O, S
 - Fe^{2+} , Fe^{3+}
593. The correct order of ionic radii is:
- $\text{Fe} > \text{Fe}^{2+} > \text{Fe}^{3+}$
 - $\text{O}^{2-} > \text{O}^- > \text{O}^+$
 - $\text{I}^- > \text{I} > \text{I}^+$
 - All of these
594. Greater the dipole moment:
- Greater is the ionic nature
 - Lesser the polarity
 - Smaller the ionic nature
 - None of these
595. The element with the electronic configuration as $[\text{Ar}]3d^{10}4s^24p^3$ represents a
- Metal
 - Non-metal
 - Metalloid
 - Transition element
596. Bonded electron pairs present in octahedral SF_6 molecule:
- 3
 - 4
 - 6
 - 5
597. First ionisation energy is highest for
- Noble gases
 - Platinum metals
 - Transition elements
 - Inner-transition elements
598. According to the Periodic Law of elements, the variation in properties of elements is related to their
- Atomic masses
 - Nuclear masses
 - Atomic masses
 - Nuclear neutron-proton number ratios
599. The angle between the overlapping of one s -orbital and one p -orbital is:
- 180°
 - 120°
 - $109^\circ 28'$
 - $120^\circ 60'$
600. The ionisation energy will be maximum for the process:
- $\text{Ba} \rightarrow \text{Ba}^{2+}$
 - $\text{Be} \rightarrow \text{Be}^{2+}$
 - $\text{Cs} \rightarrow \text{Cs}^+$
 - $\text{Li} \rightarrow \text{Li}^+$
601. Ionization energy of nitrogen is more than oxygen because:
- Nucleus has more attraction for electrons
 - Half-filled p -orbitals are more stable
 - Nitrogen atom is small
 - More penetration effect
602. One would expect the elemental form of Cs at room temperature to be:
- A network solid
 - A metallic solid
 - Non-polar liquid
 - An ionic liquid
603. The carbon atom in graphite is:
- sp^2 -hybridized
 - sp^3 - hybridized
 - sp -hybridized
 - None of these

604. Which involves a bond forming process?
 a) Stretching rubber
 b) Dissolution of sugar in water
 c) Rusting of iron
 d) Emission of γ -rays by radioactive iron
605. Which element has highest electronegativity?
 a) F b) He c) Ne d) Na
606. The trivalent ion having largest size in lanthanide series is
 a) Ti b) Zr c) Hf d) La
607. PF_3 molecule is:
 a) Square planar b) Trigonal bipyramidal c) Tetrahedral d) Trigonal pyramidal
608. When an element of very low ionisation potential is allowed to react with an element of very high electron affinity, we get:
 a) A weak ionic bond b) A strong ionic bond c) A polar covalent bond d) No bond
609. Which of the following is an amphoteric oxide?
 a) SO_3 b) MgO c) Al_2O_3 d) P_4O_{10}
610. In which element shielding effect is not possible?
 a) H b) Be c) B d) N
611. One mole of magnesium in the vapour state absorbed 1200 kJmol^{-1} of energy. If the first and second ionisation energies of Mg are 750 and 1450 kJmol^{-1} respectively, the final composition of the mixture is
 a) $31\% \text{Mg}^+ + 69\% \text{Mg}^{2+}$ b) $69\% \text{Mg}^+ + 31\% \text{Mg}^{2+}$
 c) $86\% \text{Mg}^+ + 14\% \text{Mg}^{2+}$ d) $14\% \text{Mg}^+ + 86\% \text{Mg}^{2+}$
612. The $\text{Cl} - \text{C} - \text{Cl}$ angle in 1, 1, 2, 2-tetrachloroethene and tetrachloromethane respectively will be about:
 a) 109.5° and 90° b) 120° and 109.5° c) 90° and 109.5° d) 109.5° and 120°
613. In which of the following pairs bond angle is $109^\circ 28'$?
 a) $[\text{NH}_4^+]$, $[\text{BF}_4^-]$ b) $[\text{NH}_4^+]$, $[\text{BF}_3]$ c) $[\text{NH}_3]$, $[\text{BF}_4^-]$ d) $[\text{NH}_3]$, $[\text{BF}_3]$
614. Polarization of electrons in acrolein may be written as:
 a) $\overset{\delta^-}{\text{C}}\text{H}_2 = \text{CH} - \overset{\delta^+}{\text{C}}\text{H} = \text{O}$ b) $\overset{\delta^-}{\text{C}}\text{H}_2 = \text{CH} - \overset{\delta^-}{\text{C}}\text{H} = \overset{\delta^+}{\text{O}}$ c) $\overset{\delta^-}{\text{C}}\text{H}_2 = \overset{\delta^+}{\text{C}}\text{H} - \overset{\delta^-}{\text{C}}\text{H} = \text{O}$ d) $\overset{\delta^+}{\text{C}}\text{H}_2 = \text{CH} - \overset{\delta^-}{\text{C}}\text{H} = \overset{\delta^-}{\text{O}}$
615. Molecular shape of SF_4 , CF_4 and XeF_4 are:
 a) The same with 2, 0 and 1 lone pair of electrons respectively
 b) The same with 1, 1 and 1 lone pair of electrons respectively
 c) Different with 0, 1 and 2 lone pairs of electrons respectively
 d) Different with 1, 0 and 2 lone pairs of electrons respectively
616. Which one is the weakest bond?
 a) Hydrogen b) Ionic c) Covalent d) Metallic
617. Which has the lowest anion to cation size ratio?
 a) LiF b) NaF c) CsI d) CsF
618. Which set has strongest tendency to form anions?
 a) Ga, In, Te b) Na, Mg, Al c) N, O, F d) V, Cr, Mn
619. Which one is most polar?
 a) CCl_4 b) CHCl_3 c) CH_3Cl d) CH_3OH
620. Acetate ion contains:
 a) One C, O single bond and one C, O double bond
 b) Two C, O single bonds
 c) Two C, O double bonds
 d) None of the above
621. The nodal plane in the π -bond of ethane is located in:
 a) The molecular plane
 b) A plane parallel to the molecular plane

- c) A plane perpendicular to the molecular plane which bisects the carbon-carbon σ -bond at right angle
d) A plane perpendicular to the molecular plane which contains the carbon-carbon σ -bond
622. Which of the following isoelectronic ions has lowest ionisation energy?
a) Cl^- b) Ca^{2+} c) K^+ d) S^{2-}
623. The electronegativity difference between N and F is greater than that between N and H yet the dipole moment of NH_3 (1.5 D) is larger than that of NF_3 (0.2 D). this is because:
a) In NH_3 as well as NF_3 the atomic dipole and bond dipole are in opposite directions.
b) In NH_3 the atomic dipole and bond dipole are in the opposite directions whereas in NF_3 these are in the same direction.
c) In NH_3 as well as in NF_3 the atomic dipole and bond dipole are in the same direction.
d) In NH_3 the atomic dipole and bond dipole are in the same direction whereas in NF_3 these are in opposite directions.
624. In the electronic structure of acetic acid there are:
a) 16 shared and 8 unshared valency electrons
b) 8 shared and 16 unshared valency electrons
c) 12 shared and 12 unshared valency electrons
d) 18 shared and 6 unshared valency electrons
625. Van der Waals' forces between molecules depend upon:
a) Number of electrons b) Charge on nucleus c) Radius of atoms d) All of these
626. IP_1 and IP_2 of Mg are 178 and 348 kcal mol^{-1} . The energy required for the reaction,
 $\text{Mg} \rightarrow \text{Mg}^{2+} + 2\text{e}^-$ is:
a) +170 kcal b) +526 kcal c) -170 kcal d) -526 kcal
627. Among NaF, NaCl, NaBr and NaI, the NaF has highest melting point because :
a) It has maximum ionic character
b) It has minimum ionic character
c) It has associated molecules
d) It has least molecular weight
628. Which does not show hydrogen bonding?
a) $\text{C}_2\text{H}_5\text{OH}$ b) Liquid NH_3 c) H_2O d) Liquid HBr
629. A trend common to both group I and VII elements in the Periodic Table as atomic number increases is
a) Atomic radius increases b) Oxidising power increases
c) Reactivity with water increases d) Maximum valency increases
630. What is the dominant intermolecular force or bond that must be overcome in converting liquid CH_3OH to a gas?
a) London dispersion force
b) Hydrogen bonding
c) Dipole-dipole interaction
d) Covalent bond
631. Which among the following elements has lowest value of ionisation energy?
a) Pb b) Sn c) Si d) C
632. Which of the atomic number pairs represents elements of s-block?
a) 7, 15 b) 5, 12 c) 9, 17 d) 3, 12
633. The correct order of decreasing first ionisation energy is
a) $\text{C} > \text{B} > \text{Be} > \text{Li}$ b) $\text{C} > \text{Be} > \text{B} > \text{Li}$ c) $\text{B} > \text{C} > \text{Be} > \text{Li}$ d) $\text{Be} > \text{Li} > \text{B} > \text{C}$
634. The total number of bonds in acetylene molecules is:
a) One b) Two c) Three d) Five
635. The elements X, Y, Z and T have the indicated electronic configuration. Starting with the innermost shell, which is the most metallic element?
a) $X = 2, 8, 4$ b) $Y = 2, 8, 8$ c) $Z = 2, 8, 8, 1$ d) $T = 2, 8, 8, 7$
636. Maximum covalence of an atom of an element is equal to:

- a) Number of unpaired electrons in the s -and p -orbitals of valency shell
 b) Number of unpaired electrons in the p -orbitals of valency shell
 c) Total number of electrons in the s -and p -orbitals of valency shell
 d) Total number of electrons in the p -orbitals of valency shell
637. How many unpaired electrons are present in N_2^+ ?
 a) 1 b) 2 c) 3 d) 4
638. Which of the following has shortest carbon-carbon bond length?
 a) C_6H_6 b) C_2H_6 c) C_2H_4 d) C_2H_2
639. Which of the following is largest?
 a) Cl^- b) S^{2-} c) Na^+ d) F^-
640. Which p -orbitals overlapping would give the strongest bond?



641. $H - O - H$ bond angle in H_2O is 104.5° and not $109^\circ 28'$ because of:
 a) High electronegativity of oxygen
 b) Bond pair-bond pair repulsion
 c) Lone pair-lone pair repulsion
 d) Lone pair -bond pair repulsion
642. Which of the following statements is wrong?
 a) The stability of hydrides increases from NH_3 to BiH_3 in group 15 of the Periodic Table.
 b) Nitrogen cannot form $d\pi - p\pi$ bond.
 c) Single $N - N$ bond is weaker than the single $P - P$ bond.
 d) N_2O_4 has two resonance structures.
643. The ratio of σ and π -bonds in benzene is:
 a) 2 b) 6 c) 4 d) 8
644. In which one of the following species, the central atom has the type of hybridization which is not the same as that present in other three?
 a) SF_4 b) I_3^- c) $SbCl_5^{2-}$ d) PCl_5
645. Which is correct order for electron gain enthalpy?
 a) $S < O < Cl < F$ b) $O < S < F < Cl$ c) $Cl < F < S < O$ d) $F < Cl < O < S$
646. The first ionisation energy of lithium will be
 a) Greater than Be b) Less than Be c) Equal to that of Na d) Equal to that of F
647. When two atomic orbitals combine, they form:
 a) One molecular orbitals

- b) Two molecular orbitals
 c) Two bonding molecular orbitals
 d) Two antibonding molecular orbitals
648. The set representing the correct order of first ionisation energy is
 a) $K > Na > Li$ b) $Be > Mg > Ca$ c) $B > C > N$ d) $Ge > Si > C$
649. The electronic configuration of the element with maximum electron affinity is
 a) $1s^2, 2s^2, 2p^3$ b) $1s^2, 2s^2, 2p^5$ c) $1s^2, 2s^2, 2p^6, 3s^2, 3p^5$ d) $1s^2, 2s^2, 2p^6, 3s^2, 3p^3$
650. Which of the following has regular tetrahedral shape?
 a) $[Ni(CN)_4]^{2-}$ b) SF_4 c) $[BF_4]^-$ d) XeF_4
651. The smallest among the following ions is
 a) Na^+ b) Mg^{2+} c) Ba^{2+} d) Al^{3+}
652. Coordinate compounds are formed by:
 a) Transfer of electrons
 b) Sharing of electrons
 c) Donation of electron pair
 d) None of the above
653. The statement that is true for the long form of the Periodic Table is
 a) It reflects the sequence of filling the electrons in the order of sub-energy levels s, p, d and f
 b) It helps to predict the stable valency states of the elements
 c) It reflects trends in physical and chemical properties of the elements
 d) All of the above
654. Which of the following elements never show positive oxidation number?
 a) O b) Fe c) Ga d) F
655. The energy released when a neutral gaseous atom takes up an electron is called:
 a) Ionization energy b) Solvation energy c) Electronegativity d) Electron affinity
656. The structure of XeF_4 is:
 a) Planar b) Tetrahedral c) Square planar d) Pyramidal
657. Which one of the following is expected to have largest size?
 a) F^- b) O^{2-} c) N^{3-} d) Al^{3+}
658. Debye an unit of dipole moment is of the order of:
 a) 10^{-10} esu cm b) 10^{-18} esu cm c) 10^{-6} esu cm d) 10^{-12} esu cm
659. Among $LiCl, BeCl_2, BCl_3$ and CCl_4 , the covalent bond character follows the order:
 a) $LiCl > BeCl_2 > BCl_3 > CCl_4$
 b) $LiCl < BeCl_2 < BCl_3 < CCl_4$
 c) $LiCl > BeCl_2 > CCl_4 > BCl_3$
 d) $LiCl < BeCl_2 < BCl_3 > CCl_4$
660. Which one of the following elements has lower value of ionisation energy?
 a) Mg b) Rb c) Li d) Ca
661. Identify the least stable ion amongst the following:
 a) Li^- b) Be^- c) B^- d) C^-
662. For the type of interactions: (I) Covalent bond, (II) van der Waals' forces, (III) Hydrogen bonding, (IV) Dipole-dipole interaction, which represents the correct order of increasing stability?
 a) (I) < (III) < (II) < (IV)
 b) (II) < (III) < (IV) < (I)
 c) (II) < (IV) < (III) < (I)
 d) (IV) < (II) < (III) < (I)
663. According to Fajan's rule polarization is more when:
 a) Small cation and large anion
 b) Small cation and small anion
 c) Large cation and large anion

- d) Large cation and small anion
664. Which is correct about ionisation potential?
 a) It is independent of atomic radii
 b) It increases with increase in atomic radii
 c) It remains constant with increase in atomic radii
 d) It decreases with increase in atomic radii
665. A sudden large jump between the value of first and second ionisation energies of elements would be associated with which of the following electronic configurations?
 a) $1s^2, 2s^2 2p^6, 3s^1$ b) $1s^2, 2s^2 2p^6, 3s^2 3p^1$ c) $1s^2, 2s^2, 2p^6, 3s^1 3p^2$ d) $1s^2, 2s^2 2p^6, 3s^2$
666. The pair of amphoteric hydroxides is
 a) $\text{LiOH}, \text{Al}(\text{OH})_3$ b) $\text{Be}(\text{OH})_2, \text{Mg}(\text{OH})_2$ c) $\text{B}(\text{OH})_2, \text{Be}(\text{OH})_2$ d) $\text{Be}(\text{OH})_2, \text{Zn}(\text{OH})_2$
667. Which one has more tendency to form covalent compounds?
 a) Ba b) Be c) Mg d) Ca
668. The electron affinity for inert gases is likely to be:
 a) High b) Small c) Zero d) Positive
669. Increasing order (lower first) of size of the various hybridised orbitals is:
 a) sp, sp^2, sp^3 b) sp^3, sp^2, sp c) sp^2, sp^3, sp d) sp^2, sp, sp^3
670. Shape of molecules is decided by:
 a) Sigma bond
 b) π -bond
 c) Both sigma and π -bonds
 d) Neither sigma nor π -bonds
671. Which statement is wrong?
 a) Hybridization is the mixing of atomic orbitals prior to their combining into molecular orbitals
 b) sp^2 -hybrid orbitals are formed from two p -atomic orbitals and one s -atomic orbitals
 c) dsp^2 - hybrid orbitals are all at 90° to one another
 d) d^2sp^3 -hybrid orbitals are directed towards the corners of a regular tetrahedron
672. Which one of the following has maximum ionisation potential?
 a) K b) Be c) Na d) Mg
673. In OF_2 , number of bond pairs and lone pairs of electrons are respectively:
 a) 2, 6 b) 2, 8 c) 2, 10 d) 2, 9
674. Which is the correct order of electronegativity?
 a) $F > N < O > C$ b) $F > N > O > C$ c) $F > N > O < C$ d) $F < N < O = C$
675. Which of the following has maximum bond energy?
 a) Cl_2 b) F_2 c) Br_2 d) I_2
676. In which molecule sulphur atom is not sp^3 -hybridized?
 a) SO_4^{2-} b) SF_4 c) SF_2 d) None of these
677. Hydrogen fluoride is a liquid unlike other hydrogen halides because:
 a) HF molecules associate due to hydrogen bonding
 b) F_2 is highly reactive
 c) HF is the weakest acid of all hydrogen halides
 d) Fluorine atom is the smallest of all halogens
678. The O – H bond distance in water molecule is:
 a) 1.0 Å b) 1.33 Å c) 0.96 Å d) 1.45 Å
679. Van der Waals' forces are maximum in:
 a) HBr b) LiBr c) LiCl d) AgBr
680. The increasing order of the ionic radii of the given isoelectronic species is:
 a) $\text{S}^{2-}, \text{Cl}^-, \text{Ca}^{2+}, \text{K}^+$ b) $\text{Ca}^{2+}, \text{K}^+, \text{Cl}^-, \text{S}^{2-}$ c) $\text{K}^+, \text{S}^{2-}, \text{Ca}^{2+}, \text{Cl}^-$ d) $\text{Cl}^-, \text{Ca}^{2+}, \text{K}^+, \text{S}^{2-}$
681. Which of the following exhibits diamagnetic behavior:
 a) NO b) O_2^- c) O_2^+ d) O_2

682. The electronic configuration of sodium and chlorine justifies:
 a) Their physical state
 b) Their reactivity
 c) The formation of electrovalent compound NaCl
 d) None of the above
683. Identify the correct order of solubility of Na_2S , CuS and ZnS in aqueous medium:
 a) $\text{CuS} > \text{ZnS} > \text{Na}_2\text{S}$ b) $\text{ZnS} > \text{Na}_2\text{S} > \text{CuS}$ c) $\text{Na}_2\text{S} > \text{CuS} > \text{ZnS}$ d) $\text{Na}_2\text{S} > \text{ZnS} > \text{CuS}$
684. The correct order of radii is
 a) $\text{N} < \text{Be} < \text{B}$ b) $\text{F}^- < \text{O}^{2-} < \text{N}^{3-}$ c) $\text{Na} < \text{Li} < \text{K}$ d) $\text{Fe}^{3+} < \text{Fe}^{2+} < \text{Fe}^{4+}$
685. The compound showing maximum covalent character is:
 a) BI_3 b) BCl_3 c) BF_3 d) BBr_3
686. The nature of bonding in CCl_4 and CaH_2 :
 a) Electrovalent in both CCl_4 and CaH_2
 b) Covalent in CCl_4 and electrovalent in CaH_2
 c) Electrovalent in CCl_4 and covalent in CaH_2
 d) None of the above
687. In which of the following pairs the two species are not isostructural?
 a) PCl_4^+ and SiCl_4 b) PF_5 and BrF_5 c) AlF_6^{3-} and SF_6 d) CO_3^{2-} and NO_3^-
688. The pair of species having identical shape of both species:
 a) BF_3 , PCl_3 b) PF_5 , IF_5 c) CF_4 , SF_4 d) XeF_2 , CO_2
689. Which of the following halogen acids is least basic?
 a) HF b) HCl c) HBr d) HI
690. Beryllium shows diagonal relationship with
 a) Mg b) Na c) B d) Al
691. The compound with the maximum dipole moment among the following is:
 a) *p*-dichlorobenzene b) *m*-dichlorobenzene c) *o*-dichlorobenzene d) Carbon tetrachloride
692. Which of the following molecules is covalent and shows expanded octet in its formation?
 a) HF b) NF_3 c) BF_3 d) ClF_3
693. Correct order of first ionisation potential among the following elements Be, B, C, N, O is
 a) $\text{B} < \text{Be} < \text{C} < \text{O} < \text{N}$ b) $\text{B} < \text{Be} < \text{C} < \text{N} < \text{O}$ c) $\text{Be} < \text{B} < \text{C} < \text{N} < \text{O}$ d) $\text{Be} < \text{B} < \text{C} < \text{O} < \text{N}$
694. For making good quality mirrors, plates of float glass are used. These are obtained by floating molten glass over a liquid metal which does not solidify before glass. The metal used can be
 a) Mercury b) Tin c) Sodium d) Magnesium
695. Which of the following pairs has both members of the same period of the Periodic Table?
 a) Na – Cl b) Na – Ca c) Ca – Cl d) Cl – Br
696. The increasing order of the first ionization enthalpies of the elements B, P, S and F (lower first) is:
 a) $\text{F} < \text{S} < \text{P} < \text{B}$ b) $\text{P} < \text{S} < \text{B} < \text{F}$ c) $\text{B} < \text{P} < \text{S} < \text{F}$ d) $\text{B} < \text{S} < \text{P} < \text{F}$
697. Which of the following element has higher ionisation energy?
 a) Boron b) Carbon c) Oxygen d) Nitrogen
698. The correct order of acidic strength
 a) $\text{Cl}_2\text{O}_7 > \text{SO}_2 > \text{P}_4\text{O}_{10}$ b) $\text{K}_2\text{O} > \text{CaO} > \text{MgO}$
 c) $\text{CO}_2 > \text{N}_2\text{O}_5 > \text{SO}_3$ d) $\text{Na}_2\text{O} > \text{MgO} > \text{Al}_2\text{O}_3$
699. Which of the following element is metalloid?
 a) Bi b) Sn c) Ge d) C
700. The number of lone pairs of electron on Xe in XeOF_4 is:
 a) 1 b) 2 c) 3 d) 4
701. Which of the following metals exhibits more than one oxidation state?
 a) Na b) Mg c) Al d) Fe
702. Among the following which has the highest cation to anion size ratio?
 a) CsI b) CsF c) LiF d) NaF

703. The correct order of ionic radius is
 a) $Ti^{4+} < Mn^{7+}$ b) $^{35}Cl^{-} > ^{37}Cl^{-}$ c) $K^{+} > Cl^{-}$ d) $P^{3+} > P^{5+}$
704. An electrovalent compound does not exhibit space isomerism due to:
 a) Presence of ions
 b) High melting point
 c) Strong electrostatic forces between constituent ions
 d) Non-directional nature of electrovalent bond
705. The element with the lowest ionisation potential is
 a) Na b) K c) Rb d) Cs
706. Which has the largest distance between the carbon hydrogen atom?
 a) Ethane b) Ethene c) Ethyne d) Benzene
707. Which one pair of atoms or ions will have same configuration?
 a) Li^{+} and He^{-} b) Cl^{-} and Ar c) Na and K d) F^{+} and Ne
708. Atoms or group of atoms which are electrically charged are known as:
 a) Anions b) Cations c) Ions d) Atoms
709. The element with atomic number 36 belongs to ...block in the Periodic Table.
 a) *p* b) *s* c) *f* d) *d*
710. Which bond is more polar?
 a) Cl – Cl b) N – F c) C – F d) O – F
711. If the electronegativity difference between two atoms *A* and *B* is 2.0, then the percentage of covalent character in the molecule is
 a) 54% b) 46% c) 23% d) 72%
712. In the following, the element with the highest ionisation energy is
 a) $[Ne]3s^23p^1$ b) $[Ne]3s^23p^3$ c) $[Ne]3s^23p^2$ d) $[Ne]3s^23p^4$
713. Ionization potential is lowest for:
 a) Halogens b) Inert gases c) Alkaline earth metals d) Alkali metals
714. Electron affinity is positive, when
 a) O changes into O^{-} b) O^{-} changes into O^{2-}
 c) O changes into O^{+} d) Electron affinity is always negative
715. A bond with maximum covalent character between non-metallic elements is formed:
 a) Between identical atoms
 b) Between chemically similar atoms
 c) Between atoms of widely different electro-negativities
 d) Between atoms of the same size
716. A sp^3 -hybrid orbital contains :
 a) 1/4 *s*-character b) 1/2 *s*-character c) 2/3 *s*-character d) 3/4 *s*-character
717. In a crystal, the atoms are located at the positions of:
 a) Maximum potential energy
 b) Minimum potential energy
 c) Zero potential energy
 d) Infinite potential energy
718. Water has high heat of vaporization due to:
 a) Covalent bonding b) H-bonding c) Ionic bonding d) None of the above
719. The $IP_1, IP_2, IP_3, IP_4,$ and IP_5 of an element are 7.1, 14.3, 34.5, 46.8, 162.2, eV respectively. The element is likely to be:
 a) Na b) Si c) F d) Ca
720. Stability of hydrides generally increases with:
 a) Increase in bond angle
 b) Decrease in bond angle
 c) Decrease in resonance

- d) None of these
721. The radii of F, F⁻, O and O²⁻ are in the order of:
 a) O²⁻ > F⁻ > F > O b) F⁻ > O²⁻ > F > O c) O²⁻ > O > F⁻ > F d) O²⁻ > F⁻ > O > F
722. Which one is the strongest bond?
 a) Cl – F b) F – F c) Br – F d) Br – Cl
723. The low solubility of BaSO₄ in water is due to:
 a) Low dissociation energy
 b) Ionic bonds
 c) High value of lattice energy
 d) None of the above
724. The metal having highest melting point is?
 a) Cr b) Ag c) Diamond d) W
725. Which one species has the longest bond length?
 a) NO⁺ b) O₂⁻ c) O₂⁺ d) N₂⁺
726. Arrange the following compound in order of increasing dipole moment:
 Toluene (I) *m* – dichlorobenzene (II)
o – dichlorobenzene (III) *p* – dichlorobenzene (IV)
 a) I < IV < II < III b) IV < I < II < III c) IV < I < III < II d) IV < II < I < III
727. The correct order regarding the electronegativity of hybrid orbitals of carbon is:
 a) *sp* < *sp*² > *sp*³ b) *sp* < *sp*² < *sp*³ c) *sp* > *sp*² < *sp*³ d) *sp* > *sp*² > *sp*³
728. Molecular size of ICl and Br₂ is nearly same, but boiling point of ICl is about 40°C higher than Br₂. This might be due to:
 a) I – Cl bond is stronger than Br – Br bond
 b) Ionisation energy of I < ionisation energy of Br
 c) ICl is polar where as Br₂ is non-polar
 d) The size of I > size of Br
729. The pair of elements having approximately equal ionisation potential is
 a) Al, Ga b) Al, Si c) Al, Mg d) Al, B
730. Elements having six electrons in its outermost orbit generally form:
 a) Complex ion b) Negative ion c) Positive ion d) Zwitter ion
731. In which of the following molecules/ions BF₃, NO₂⁻, NH₂⁻, and H₂O the central atom is *sp*² hybridized?
 a) BF₃ and NO₂⁻ b) NO₂⁻ and NH₂⁻ c) NH₂⁻ and H₂O d) NO₂⁻ and H₂O
732. Na⁺, Mg²⁺, Al³⁺, Si⁴⁺ are isoelectronics. Their ionic size follows the order:
 a) Na⁺ < Mg²⁺ < Al³⁺ < Si⁴⁺
 b) Na⁺ > Mg²⁺ < Al³⁺ < Si⁴⁺
 c) Na⁺ < Mg²⁺ > Al³⁺ > Si⁴⁺
 d) Na⁺ > Mg²⁺ > Al³⁺ > Si⁴⁺
733. Which of the following is false?
 a) Methane molecule is tetrahedral in shape
 b) Nickel tetrachloride is square planar in shape
 c) P₂O₅ is like two pyramids joined at their apices
 d) Acetylene is non-linear
734. In a double bond connecting two atoms there is a sharing of:
 a) 2 electrons b) 4 electrons c) 1 electron d) All electrons
735. As we go from left to right in period two of the Periodic Table, gram atomic volume of the elements
 a) Will change indefinitely b) Decreases
 c) Increases at a constant rate d) First increases then decreases
736. Which of the following bond requires the largest amount of energy to dissociate the bond concerned?
 a) H – H bond in H₂ b) C – H bond in CH₄ c) N ≡ N bond in N₂ d) O = O bond in O₂
737. Which does not show inert pair effect?

- a) Al b) Sn c) Pb d) Thallium
738. Resonance is due to:
 a) Delocalization of σ -electrons
 b) Delocalization of π -electrons
 c) Migration of H atoms
 d) Migration of protons
739. The ICl molecule is:
 a) Purely covalent
 b) Purely electrovalent
 c) Polar with negative end on chlorine
 d) Polar with negative end on iodine
740. H – B – H bond angle in BH_4^- is:
 a) 180° b) 120° c) 109° d) 90°
741. The lowest bond energy exist in the following bonds for:
 a) C – C b) N – N c) H – H d) O – O
742. Which of the following electronic configurations in the outermost shell is characteristic of alkali metals?
 a) $ns^2p^6d^1$ b) $(n - 1)s^2p^6, ns^1$ c) $(n - 1)s^2p^6, ns^2p^1$ d) $(n - 1)s^2p^6d^{10}, ns^1$
743. In PCl_5 molecule, P is:
 a) sp^3 -hybridized b) dsp^2 -hybridized c) ds^3p -hybridized d) sp^3d -hybridized
744. In dry ice there are ... in between molecules.
 a) Ionic bond b) Covalent bond c) Hydrogen bond d) None of these
745. The solubility of KCl is relatively more in (where D is dielectric constant):
 a) C_6H_6 (D = 0) b) $(\text{CH}_3)_2\text{CO}$ (D = 2) c) CH_3OH (D = 32) d) CCl_4 (D = 0)
746. The 1st IEs of four consecutive elements present in the second period of Periodic Table are 8.3, 11.3, 14.5 and 13.6 eV respectively. Which of these is the IE of nitrogen?
 a) 13.6 b) 8.3 c) 14.5 d) 11.3
747. Which oxide is amphoteric in nature?
 a) ZnO b) CaO c) Na_2O d) BaO
748. The correct ionic radii order is:
 a) $\text{N}^{3-} > \text{O}^{2-} > \text{F}^- > \text{Na}^+ > \text{Mg}^{2+} > \text{Al}^{3+}$
 b) $\text{N}^{3-} > \text{Na}^+ > \text{O}^{2-} > \text{F}^- > \text{Mg}^{2+} > \text{Al}^{3+}$
 c) $\text{Na}^+ > \text{O}^{2-} > \text{N}^{3-} > \text{F}^- > \text{Mg}^{2+} > \text{Al}^{3+}$
 d) $\text{O}^{2-} > \text{F}^- > \text{Na}^+ > \text{N}^{3-} > \text{Mg}^{2+} > \text{Al}^{3+}$
749. Which is a good solvent for ionic and polar covalent compounds?
 a) H_2O b) CH_3COOH c) CCl_4 d) Liquid NH_3
750. For which of the following hybridization the bond angle is maximum?
 a) sp^2 b) sp c) sp^3 d) dsp^2
751. Which of the following does not involve covalent bond?
 a) PH_3 b) CsF c) HCl d) H_2S
752. The correct increasing covalent nature is:
 a) $\text{NaCl} < \text{LiCl} < \text{BeCl}_2$ b) $\text{BeCl}_2 < \text{NaCl} < \text{LiCl}$ c) $\text{BeCl}_2 < \text{LiCl} < \text{NaCl}$ d) $\text{LiCl} < \text{NaCl} < \text{BeCl}_2$
753. The bond between atoms of two elements of atomic number 37 and 53 is:
 a) Covalent b) Ionic c) Coordinate d) Metallic
754. The species having octahedral shape is:
 a) SF_6 b) BF_4^- c) PCl_5 d) BO_3^{3-}
755. Which of the following is not isoelectronic?
 a) NO^- b) CN^- c) N_2 d) O_2^+
756. In which of the following gaseous molecules, the ionic character of the covalent bond is greatest?
 a) HCl b) HBr c) HI d) HF
757. What bond order does O_2^{2-} have?

- a) 1 b) 2 c) 3 d) 1/2
758. Chlorine atom differs from chloride ion in the number of:
 a) Protons b) Neutrons c) Electrons d) Protons and electrons
759. Which molecule is T-shaped?
 a) BeF_2 b) BCl_3 c) NH_3 d) ClF_3
760. The successive ionisation energy values for an element 'X' are given below
 XV. 1st ionisation energy = 410 kJ mol^{-1}
 XVI. 2nd ionisation energy = 820 kJ mol^{-1}
 XVII. 3rd ionisation energy = 1100 kJ mol^{-1}
 XVIII. 4th ionisation energy = 1500 kJ mol^{-1}
 XIX. 5th ionisation energy = 3200 kJ mol^{-1}
 Find out the number of valence electron for the atom 'X'
 a) 4 b) 3 c) 5 d) 2
761. Organic compounds soluble in water contain:
 a) C, H, Cl b) C, H c) C, H, O d) C, S
762. Which of the following is most stable?
 a) Pb^{2+} b) Ge^{2+} c) Si^{2+} d) Sn^{2+}
763. Which of the following sets represents the collection of isoelectronic species?
 a) $\text{Na}^+, \text{Mg}^{2+}, \text{Al}^{3+}, \text{Cl}^-$ b) $\text{Na}^+, \text{Ca}^{2+}, \text{Sc}^{3+}, \text{F}^-$ c) $\text{K}^+, \text{Cl}^-, \text{Mg}^{2+}, \text{Sc}^{3+}$ d) $\text{K}^+, \text{Ca}^{2+}, \text{Sc}^{3+}, \text{Cl}^-$
764. Which one of the following sets of ions represents a collection of isoelectronic species?
 a) $\text{K}^+, \text{Cl}^-, \text{Ca}^{2+}, \text{Sc}^{3+}$ b) $\text{Ba}^{2+}, \text{Sr}^{2+}, \text{K}^+, \text{Ca}^{2+}$ c) $\text{N}^{3-}, \text{O}^{2-}, \text{F}^-, \text{S}^{2-}$ d) $\text{Li}^+, \text{Na}^+, \text{Mg}^{2+}, \text{Ca}^{2+}$
765. Which one of the following arrangements represents the correct order of electron gain enthalpy (with negative sign) of the given atomic species?
 a) $\text{Cl} < \text{F} < \text{S} < \text{O}$ b) $\text{O} < \text{S} < \text{F} < \text{Cl}$ c) $\text{S} < \text{O} < \text{Cl} < \text{F}$ d) $\text{F} < \text{Cl} < \text{O} < \text{S}$
766. Which of the following molecules does not possess a permanent electric dipole moment?
 a) H_2S b) SO_2 c) SO_3 d) CS_2
767. Which one of the following has the highest electronegativity?
 a) Si b) P c) Cl d) Br
768. The electronic configuration, $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^9$ represents a
 a) Metal atom b) Non-metal atom c) Non-metallic anion d) Metallic cation
769. The bond order in O_2^+ is equal to bond order in:
 a) N_2^+ b) CN^- c) CO d) NO^+
770. The molecule having permanent dipole moment is:
 a) SF_4 b) XeF_4 c) SiF_4 d) BF_3