SECTION-A (1M × 20 = 20M)

Answer all the questions by selecting the most suitable alternative.

1) Which of the following radiation has highest wavelength?
   A) X-rays
   B) IR
   C) Gama rays
   D) UV radiation

2) What is the energy content per photon (J) for light frequency $4.2\times10^{14}s^{-1}$
   A) 2.8×10^{-21}
   B) 2.5×10^{-19}
   C) 2.8×10^{-19}
   D) 2.5×10^{-21}

3) The number of electrons ejected per second from the metal surface depends up on
   A) Intensity of incident radiation
   B) Frequency of incident radiation
   C) Both A&B
   D) Kinetic energy

4) What is the atomic number of an element '**X**' would have to become so that fourth orbit around '**X**' would fit inside the first Bohr orbit of '**H**'-atom
   A) 1 B) 4 C) 16 D) 64

5) For principal quantum number n=4 ,the total number of orbitals having l=2 are
   A) 3 B) 5 C) 7 D) 9

6) The line spectrum observed when electron jumps from higher level to "M" level is known as
   A) Lyman series B) Balmer series C) paschen series D) Brackett series

7) The orientation of an atomic orbital is governed by
   A) Principal quantum number
   B) Azimuthal quantum number
   C) Magnetic quantum number
   D) Spin quantum number

8) If the nitrogen atom had electronic configuration $1s^7$,it would have energy lower than that of the normal ground state configuration $1s^2s^22p^3$,because the electrons would be closer to the nucleus. Yet ,$1s^7$ is not observed because it violates?
   A) Heisenberg's uncertainty principle
   B) Paulis exclusion principle
   C) Hunds rule
   D) Bohr postulates of stationary orbits

9) Long form of periodic table is based on the properties of the elements as a function of
   A) Atomic size
   B) Atomic mass
   C) Electronegativity
   D) Atomic number

10) A The name of the element with atomic number 112 is
   A) ununbiium
   B) ununbium
   C) ununbeum
   D) ununbieum

11) In which of the following pairs ,the first atom or ion is not larger than second
   A) Br, Br^-
   B) K, K^+
   C) S,O
   D) N,O

12) Predict position of element in the periodic table satisfying the electronic configuration (n-1) d^1ns^2 for n=4

A) 3^{rd} group
B) 4^{th} group
C) 5^{th} group
D) 6^{th} group

13) In a given shell ,the order of screening effect is

A) f>d>p>s
B) s>p>d>f
C) p>d>s>f
D) d>f>s>p

14) The set representing the correct order of first ionization enthalpy is

A) K>Na>Li
B) Be>Mg>Ca
C) B>C>N
D) Ge>Si>C

15) Maximum number of bonds between two atoms of covalent bond can be

A) 1 B) 2 C) 3 D) 4

16) Which of the following molecule is not exception to octet rule

A) BF_3 B) PF_5 C) CO_2 D) IF_7

17) For Which of the following hybridisation the bond angle is maximum

A) sp
B) sp^2
C) sp^3d
D) sp^3d^2

18) Which of the following molecule has net dipole moment

A) CCl_4
B) H_2O
C) BF_3
D) CO_2

19) The formal charge of central oxygen atom in ozone molecule is

A) 0 B) -1 C) +1 D) -2

20) The Bond length in the species O_2, O_2^+, O_2^- follows the order

A) $O_2^+ < O_2 < O_2^-$
B) $O_2 < O_2^+ < O_2^-$
C) $O_2^- < O_2 < O_2^+$
D) $O_2^+ < O_2^- < O_2$

SECTION –B (2×5M=10M)

Answer any two of the following questions

1) a) Explain Heisenberg's uncertainty principle 2M
b) A microscope using suitable photons is employed to locate an electron in an atom within a distance of 0.1A° .What is the uncertainty involved in the measurement of its velocity. 3M

2) a) Define ionization enthalpy. 1M
b) How it vary in a group and in a period .Explain. 4M

3) Explain $\mathbf{sp^2}$ hybridisation with suitable example. 5M

4) a) Define coordinate covalent bond. 1M
b) Even though both NH_3 and NF_3 are pyramidal, NH_3 has higher dipole moment compared to NF_3.Why? 4M

End of Question Paper