**MODULE -3**

**1.**Which of the following is also known as X-ray photoelectron spectroscopy?

1. Auger electron spectroscopy
2. Electron impact spectroscopy
3. **Electron spectroscopy for chemical analysis**
4. Secondary ion mass spectroscopy
5. Which of the following methods use soft X-rays to eject electrons from inner shell

orbitals?

1. Auger electron spectroscopy
2. Electron impact spectroscopy
3. X-ray crystallography
4. **X-ray photoelectron spectroscopy**

**3.** The energy required to remove an electron from the highest occupied atomic orbital is

known as \_\_\_\_\_\_\_\_\_\_

1. **Ionization energy**
2. Kinetic energy
3. Binding energy
4. Vibrational energy

4.X-ray diffractometers are not used to identify the physical properties of which of the

following?

1. Metals
2. **Liquids**
3. Polymeric materials
4. Solids

5. The Bragg’s equation for diffraction of X-rays is \_\_\_\_\_\_

1. nλ = 2d2sinθ
2. **nλ = 2dsinθ**
3. nλ = 2dsin2θ
4. nλ = d2sinθ

6. Obtain a Miller indices of a plane whose intercepts are 4, 4 and 2 units along the three axes.

1. (122)
2. (211)
3. (121)
4. **(112)**

7.The size of Mo is very similar to W due to**\_\_\_\_\_\_\_**

1. Shielding effect
2. Actinide contraction
3. **Poor Shielding by 4f electrons**
4. Poor shielding by 4d electrons

8.Choose the correct order ionization energy

1. N > O > F
2. F > O > N
3. **N > O < F**
4. O > F > N

9.Choose the incorrect order with respect to the properties indicated

1. Electro negativity F >Cl> Br
2. Electron affinity Cl> F > Br
3. Oxidizing power F2> Cl2> Br2
4. **Bond enthalpy F2> Cl2> Br2**

10. Choose the correct statement

1. **As shielding effect increases electro negativity decreases**
2. As shielding effect increases electro negativity increases
3. As ionization potential increases metallic property increases
4. As +ve charge on species increases ionic radii increases

11. Choose the correct statement with respect to oxidising property of F

1. It is the strongest oxidising agent because it has highest electron gain enthalpy
2. It is the strongest oxidising agent due to its small size
3. **It is the strongest oxidising agent because it has maximum electron negativity**
4. It is the strongest oxidising agent due to high lattice enthalpy.

12. In a period with increase in atomic number, the metallic character of an element

1. **Decrease across period increases in group**
2. increase across period& decreases in group
3. increase across period& increases in group
4. Decrease across period and decreases in group

13. Which of the following species has the highest ionization potential?

1. **Li+**
2. Mg+
3. Al+
4. Ne

14.. The source for XPS is -------------------

1. Mercury- arc
2. Nernst glower
3. Globar source
4. **AlKα**

15. Compute the miller indices for the intercepts X 1/4, Y=1 and Z=1/2

1. **(412)**
2. (632)
3. (101)
4. (110)

16. The correction factor for modified Van der Waals equation of state is

1. a/b
2. **a/V2**
3. a/V
4. V-nb

17. The second ionisation energy is always higher than the first ionization energy because

the

1. electron is attracted more by the core electrons
2. **electron is more tightly bound to the nucleus in an ion**
3. becomes more stable attaining the octet or duplet configuration
4. atomic radii is large

18. In XPS, the primary and secondary beams consist of

1. **X-ray photon, electron**
2. electrons, X-ray photon
3. electrons, electrons
4. UV-photons, electrons

19. Repeatable entity of a crystal structure is known as

1. crystal
2. Lattice
3. **unit cell**
4. miller indices

20.If the angle of incidence is 30°, then the wavelength for first-order spectrum is equal to \_\_\_\_\_\_\_\_\_\_

1. **d**
2. 2d
3. d/2
4. d/3

21.The most electronegative element possesses the electronic configuration?

1. ns2 np2
2. ns2 np4
3. **ns2 np5**
4. ns2 np3

22. Minimum interplanar spacing required for Bragg’s diffraction is \_\_\_\_\_

1. λ/4
2. **λ/2**
3. 4λ
4. 2λ

23.The first, 2ndand 3rdionization enthalpies of gallium are 579KJmol–1, 1979 KJmol1and 2962

KJmol–1even though the 3rd I.P is highest, Ga3+is the most stable because

1. The energy loss is maximum resulting greater stability
2. The size of Ga3+ is smallest
3. Ga3+ is most reactive
4. **It attains a stable configuration**

24.The co-ordination number and oxidation number of X in [X(SO4)(NH3)5]Cl is

1. 10 and 3
2. 2 and 6
3. **6 and 3**
4. 6 and 4

25.If the angle of incidence is 30°, then the wavelength for first-order spectrum is

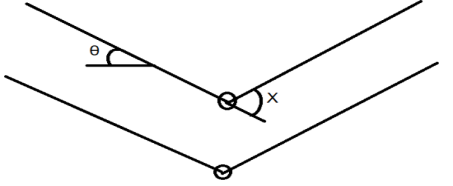
equal to \_\_\_\_\_\_\_\_\_\_

**a) d**

b) 2d

c) d/2

d) d/3

26.What should be the value of X?

a) θ

b) θ/2

**c) 2θ**

d) θ/3

**27. X-ray photoelectron spectroscopy is also known as**

* 1. EPS
  2. ECS
  3. **ESCA**
  4. EAS

28. Which energy is responsible to release the electron in XPS?

* 1. rotational energy
  2. gibbs energy
  3. **binding energy**
  4. free energy

29. In XPS, the photon ejects electrons from which orbital?

1. **1s electron**
2. 3s electron
3. 2s electron
4. 2p electron

30. In Bragg’s equation [nλ = 2.d.sinθ], d is the:

1. **interplanar spacing**
2. inter spacing
3. planar spacing
4. extraplanar spacing

31. Which bond is weaker?

* 1. **van der Waals bond**
  2. sigma bond
  3. coordination bond
  4. Ionic bond

32. Particles those are responsible for most of the properties

* 1. Nucleons
  2. Protons
  3. Shell electrons
  4. **Valence shell electrons**

33. Which is correct?

* 1. d sinθ = nλ
  2. d = nλsinθ
  3. d = nλsinθ
  4. **2d sinθ = nλ**

34. Which of the following elements has completely filled two shells?

* 1. Ni
  2. **Ne**
  3. Na
  4. No

35. Electronic configuration 2,8 is related to

* 1. Al+
  2. Al+2
  3. **Al+3**
  4. Al+4

36. Periodic table gives a platform for studying

* 1. physical properties only
  2. chemical properties only
  3. not any property
  4. **physical and chemical properties both**

37. The nature of bond between two dissimilar atoms having different charges

* 1. **polar only**
  2. non-polar only
  3. polar and non-polar both
  4. neutral

38.The geometry of [PtCl4]2- is

* 1. tetrahedral
  2. octahedral
  3. **square planar**
  4. pyramidal

39. Miller indices is indicated by

* 1. **(hkl)**
  2. (h,k,l)
  3. [h,k,l]
  4. {h,k,l}

40. What is the value of average kinetic energy per molecule \_\_\_\_\_\_\_.

1. **(3/2)kT**
2. (3/2) RT
3. (½)kT
4. (1/2) RT

41. Which one has the highest value of first ionisation energy \_\_\_\_\_\_\_.

1. Hydrogen
2. **Helium**
3. Lithium
4. Sodium

42. Choose the correct option regarding the formation of a chemical bond \_\_\_\_\_\_\_.

1. Energy is always absorbed
2. **Energy in always released**
3. More energy is released than is absorbed
4. Energy is neither released nor absorbed

43. The correct statement about the atomic of the alkaline earth metals is \_\_\_\_\_\_\_.

1. **it is smaller than corresponding alkali metals in the same periods**
2. it is larger than corresponding alkali metals in the same periods
3. It is same as the corresponding alkali metals in the same periods
4. None of the above

44. The general electronic configuration of outermost orbital in the elements of Group 13 is \_\_\_\_\_\_\_.

1. ns2 np2
2. ns2
3. **ns2 np1**
4. ns2 np3

45. The correct statement about the variation of electronegativity in a group of the periodic table

1. It increases
2. **It decreases**
3. It remains constant
4. All of the above

46.The correct reason for the increase in the electronegativity across a period in periodic table

1. **attraction between the valence electrons and the nucleus increases**
2. attraction between the valence electrons and the nucleus decreases
3. increase in the atomic weight
4. decrease in the atomic weight

47. What is the reason for variable valency of transition metals

1. Release of electrons from ns orbitals
2. Release of electrons from np orbitals
3. **Release of electrons from (n-1)d orbitals**
4. Release of electrons from (n-1)d& ns orbitals

48. Which of the following outer electronic configurations is characteristic of alkali metals

1. ns1
2. ns2
3. ns2np6
4. ns2np2

49. Group 2 elements are

1. **oxidizing agents**
2. reducing agents
3. oxidizing as well reducing agents
4. microbial agents

50. Paramagnetism is common in

1. p- block elements
2. **d- block elements**
3. s- block elements
4. f- block elements

51. d- block elements form coloured ions because

1. They absorb some energy for d – s transition
2. They absorb some energy for p – d transition
3. **They absorb some energy for d – d transition**
4. They do not absorb any energy

52. Which of the following elements involves gradual filling of 5f level

1. Lanthanides
2. **Actinides**
3. Transition metals
4. Coinage metals

53. The hardness of water is measure by

1. **EDTA method**
2. Distillation method
3. Conductivity method
4. Viscosity method

54.Which method is used in XRD?

1. Lawe method
2. Leue method
3. Liue method
4. **Laue method**

55. Which one is having largest atomic radii?

* 1. Oxygen
  2. **Nitrogen**
  3. Fluorine
  4. Lithium

56. Bond angle in PCl5 molecule are \_\_\_\_\_\_\_\_\_\_\_\_

1. 1200 and 600
2. **1200 and 900**
3. 1200 and 1800
4. None of these

57. Shape of H2O molecule is \_\_\_\_\_\_\_\_\_\_\_\_\_

1. Tigonal Planar
2. Linear
3. **Angular or bent structure**
4. Tetrahedral

58.Which dissolves in water according to Fajans rule?

1. **silver fluoride**
2. silver fluoride
3. silver bromide
4. silver iodide

59. Ion etching technique provides the …………….. from the surface.

1. **depth profiling**
2. round profiling
3. vertical profiling
4. horizontal profiling

60 X-ray diffractometers cannotanalyse ………

1. Metals
2. **Liquids**
3. Polymers
4. Solids

61. XRD can be used to analyze the samples ….………………..

1. quantitatively
2. qualitatively
3. **quantitatively and qualitatively both**
4. Either quantitatively or qualitatively

62. The reason for greater strength of diamond as compared to graphite is \_\_\_\_\_\_\_.

1. Difference in layers of atoms
2. **Tetrahedral structure of diamond**
3. Difference of crystalline structures
4. Lusture of diamond

63. Polythene is industrially manufactured from \_\_\_\_\_\_\_.

1. Methane
2. Styrene
3. Acetylene
4. **Ethylene**

64. The correct statement about methane is \_\_\_\_\_\_\_.

1. The largest reservoir of methane on earth is under the permafrost at arctic and Antarctic

2. Methane has a tetrahedral structure and known as Hydrogen Carbide

3. Methane can be produced by Serpentinite method

Select the correct option from codes given below:

1. Only 1 & 2
2. Only 1 & 3
3. **Only 2 & 3**
4. 1, 2 & 3