QUESTION BANK

CLASS: III - B.Sc., CHEMISTRY   **SEMESTER:VI**

SUBJECT: INORGANIC CHEMISTRY-I V   **SUB.CODE: CH615**

NAME OF THE STAFF: B.CHRISTINA, B.KANIMOZHI

UNIT-I & II

SECTION-A   **1 MARK**

1. Nuclides having same mass number but different atomic numbers are called
   a) Isotopes
   b) Isobars
   c) isotones
   d) isomers

2. Which of the following is the source of the solar energy
   a)U + no →Ba + Kr +3no + energy
   b) Be + He → U + n0
   c) 4H → He + 2 e +

   d) none of the these

3. 18F undergoes 90% radioactive decay in 360.6 minutes. The t1/2 of 18F is
   a)100.2min
   b) 108.6 min
   c) 102.8 min
   d) 105.2 min
4. Packing fraction (D) is _____.

5. The nuclear process that occurs in sun is _____

6. An electron has _____
   a) Unit +ve charge and unit mass
   b) Unit -ve charge and unit mass
   c) Unit −ve charge and no mass

d) Unit +ve charge and no mass

7. β– particle is _____

    a) An electron

    b) A proton

    c) A neutron

    d) A photon

8. In nuclear reactor, graphite act as _____

    a)Moderator

    b) Absorber

    c)Accelerator

    d) Name of the above

9._____ are the isotopes of hydrogen.

SECTION-B   2MARKS

1. Define packing fraction?
2. What is averge life of a radioactive element?
3. What is artificial radioactivity?
4. What is breeder reactor?

SECTION- C   5MARKS

1 .An isotope of uranium 92 U 238 emits one α – particle followed by the emission of two β – particles. Label final element in this consecutive nuclear reactions.

2. Explain Magic Numbers.

3. Find out the n/p ratio of the followings

  (a)8B5 (b)30Al13 (c)49Ca20 (d)195Hg 80

4. Calculate the average B.E of 147N and 157N and predict their relative stabilities. [Mass of one proton = 1.007276470amu, Mass of one neutron = 1.008664904 amu] Experimental mass of 147N= 14.00307 amu, 15 7N = 15.00011.

5. Name the different radioactive series you know. To which radioactive series does 82Pb266 and 89Ac228 belong.

6. Discuss 'Group displacemnet law' with suitable examples

7. How the n/p ratio is important for the stability of a nuclei? Give details.

8. What are the salient points of 'Liquid drop model?'

9. Define accelerator and explain linear accelerator with diagram.

10. Explain nuclear fission with suitable example.

11. Calculate the binding energy per nucleon of O. given mass of O = 15.9949

    a.m.u, mass of H = 1.007825 a.m.u, mass of n = 1.008665 a.m.u

12. Discuss shell model to explain stability of nucleus.
13. Write the uses of radioactive isotopes in agriculture.
14. What is nuclear fission. What is a nuclear reactor? Give the design of

     nuclear reactor.
15. Describe the following method for detection and measurement of

 radioactivity
16. Wilson cloud chamber (2)
17. Geiger – muller counter (3)
18. Scintillation counter (2)

UNIT-III

SECTION-A   1 MARK

1. Haemoglobin is an octahedral complex of

   a) Fe^{2+}

   b) Fe^{3+}

   c) Co^{2+}

   d) Mg^{2+}

2. Chlorophyll is a square planar complex with

   a) K^+

   b) Na^+

   c) Mg^{2+}

   d) Fe^{2+}

3. Corrin ring is present in

   a) Haemoglobin

   b) Vitamin B12

   c) Carboxypeptidase

d) Chlorophyll

4. The function of hydrophobic chain in chlorophyll is

   a) Anchor the ring in cytoplasm

   b) Absorbs energy

   c) Retain symmetry

   d) None of these

5. Hb and Mb are co-operative in their

   a) O_2 binding nature

   b) CO_2removing nature

   c) Respiratory nature

   d) Absorbing nature

6. Chlorophyll absorbs low-energy light in the

   a) Near-Red

   b) Far-red

   c) UV

   d) Near UV

7. The reversible oxidation of Haemoglobin occurs;

   a) In the presence of excess of oxygen

   b) In the absence of protective polypeptide chain

   c) In the absence of Mb in its neighbourhood

   d) In the absence of CO_2

8. The oxidation state of iron in haemoglobin is

   a) 0   b) +1   c) +2   d) +3

9. Which of the following metals in enzyme is not involved in the nitrogen cycle?

   a) Fe   b) Ni   c) Cu   d) Mo

10. The oxidation of Zinc in carbonic anhydrase is;

   a) 0   b) +1   c) +2   d) +3

11. The dioxygen in Oxy-haemoglobin is in --------------- oxidation state

   a) 0   b) +2   c) -1   d) +3

12. The metal ion present in Carboxy pepetidase is

   a) Mg(II)   b) Cu(II)   c) Co(II)   d) Zn(II)

FILL IN THE BLANKS: **1 MARK**

   1. Haemoglobin acts as ---------

   2. Lack of vitamin B12 leads to ---------

   3. Each haemoglobin molecule has --------- group which are bound to globin on its surface.

   4. The ability of chlorophyll to absorb sunlight in the visible region is due to the extended --------------

   5. ---------------- strong inhibitor of O_2 binding by myoglobin and haemoglobin .

   6. The metal ion present in vitamin B_{12} is --------------- .

   7. -------------- is useful in oxygen storage.

                          SECTION-B   **2MARKS**

1. What is the role of Mg in Na-K pump?

2. How haemoglobin differs from myoglobin?

3. Write the role of Carboxy peptidase in the metabolism.

4. Draw the heme group present in haemoglobin.

5. Write a note on the biological role of Ca^{+2} .

                          SECTION-C   **5 MARKS**

1. Explain the Na-K pump.

2. Discuss the mechanism of the reversible hydration of CO_2 by carbonic

   anhydrase.

3. What is the active site structure in carboxypepetidase A?

4. Write a note on the biological role of $Ca^{+2.}$

5. Discuss the functioning of carbonic anhydrase.

6. Explain the main physiological role of carboxy peptidase with

   neat diagram.

7. i) Discuss the role of Mg^{2+} and Ca^{2+} in Biological systems.

   ii) Write a short note on carbonic anhydrase.

UNIT-IV

SECTION-A   **1 MARK**

1. TEL is

   a) Organolithium compound

   b) Organolead compound

   c) Grignard reagent

   d) None of the above

2. Most stable oxidation state of the lanthanides is

   a) +5

   b) +3

   c) +4

d) +2

3. RhCl(PPh$_3$)^3 is a

      a) 14 electron species

      b) 15 electron species

      c) 16 electron species

      d) 18 electron species

4. The transition elements from the organomettalic compounds with

      a) Sigma bonding ligands

      b) Pi bonding ligands

      c) Pi antibonding ligands

      d) Non- bonding ligands

5. Ce and Tb exhibit stable oxidation state

      a) +2

      b) +3

      c) +4

      d) +5

6. The common oxidation state of lanthanides is -----------

      a) +2   b) +3   c) +4   d) +5

7. The hapticity of cyclopentadienyl legends in a stable ferrocene is;

      a) 2   b) 4   c) 5   d) 6

8. The stable oxidation state of Cerium is ----------

      a) +2   b) +3   c) +4   d) +5

9. Square planar complexes have ------------- electrons for their stability

      a) 8   b) 16   c) 18   d) 32

10. The carbene ligand donates -------------

a) 8 electrons   b) 6 electrons   c) 4 electrons   d) 2 electrons

11. Which one of the following elements shows maximum number of different oxidation states in its compounds?
            a) Eu b) La c) Gd d) Am

FILL IN THE BLANKS: **1 MARK**

12. Minerals related with lanthanides and actinides are --------

13. Eu is stable in +2 oxidation state because of -------- configuration

14. Electronic spectra of f-block elements exhibit -------- bands.

15. In the lanthanoid series, the basic strength of their hydroxides ----------- with the increase in atomic number.

16. The formula of ferrocene is --------------.

17. The f-block elements are otherwise called ----------.

18. The Neptunium series ends with --------------.

<div align="center">

SECTION-B   **2MARKS**
</div>

1. Discuss the spectral properties of Lanthanides.

2. What is hapicity?

3. List out the reasons of lanthanide contraction?

4. Write about the oxidation states of Cerium, Germanium.

5. What is Zeise's salt?

6. What are the consequences of lanthanide contraction?

7. The d^3 octahedral organometallic compounds do not obey the 18 electron

   rule; but still they are stable. Explain.

<div align="center">

SECTION-C   **5 MARKS**
</div>

1. What are the consequences of lanthanide contraction.

2. Account for the colour of lanthanides.

3. Discuss the various oxidation states of lanthanides.

4. Define 18-electron rule.

5. Give an example of carbene complex.

6. Write atleast 2 types of legends with examples which are classified on the number of C atoms through which the ligand is attached to the metal atom.

7. How ligands are classified.

8. What is EAN rule?

9. Discuss about the colour in lanthanides.

10. Write about the magnetic properties of f-block elements.

11. Draw the structure of $Ti(C_5H_5)_4$ & $Fe_2(CO)_9$

12. Write a note on oxidation state of lanthanides.

13. Write a note on the magnetic property and oxidation state of

   tripositive lanthanides.
14. Give any four comparison of lanthanides with that of d-block

   elements .
15. Explain the bonding and preparation of Alkylidynes.
16. What are carbene conplexes? Give examples.
17. Calculate the EAN of $Fe(CO)5$
18. Write the propertiesof organolithium compounds.
19. Give the important oxidation states of Lanthanides. How would you account for them? Why is +3 most stable?
20. Compare the properties of lanthanides and actinides.
21. Write the preparation of organometalic compounds of Mg (Grignard reagent)
22. Discuss the following properties of Lanthanides.
   i)Spectral properties
   ii)Magnetic properties

UNIT-V

SECTION-A   1 MARK

1. Hydroformylation of alkene reaction proceeds in the presence of

   a)Repee's catalyst

   b) Wilkinson's catalyst

c) $Co_2(CO)_8$

d) $HCo(CO)_8$

2. Wilkinson's catalyst is

   a) [RhCl(PPh3)3]

   b) [Rh(PPh3)3]Cl

   c) [RhCl(PEt3)3]

   d) [Ru(PPh3)3]Cl

3. The reaction L2M-CH2-CH2-R ‹→R-CH2=CH2 +LnMH is known as

   a) Reduction

   b) Elimination

   c) B- elimination

   d) None of the above

4. Reppe's catalyst is used in the

   a) Hydrogenation of olefins

   b) Hydroformylation process

   c) Polymerization process

   d) Cyclooligomerisation

5. Condition to be satisfied by a metal to act as a catalyst is

   a) It must have two moderately stable oxidation states

   b) It must be capable of forming moderately stable co-ordinatively

      unsaturated complexes.

   c) It must have the ability to match the substrate orbitals.

   d) All the above

6. $C_2H_4 + ½ O_2$→

a) Ketone

b) Ethane

c) Acetaldehyde

d) No reaction

7. Hydroformylation involves conversion of -------- into --------.

8. In oxo process ------------- catalyst is used.

a) Platinum   b) Nickel   c) Palladium   d) Cobalt

9. Propene is converted to propanal by --------------

a) Wilkinson catalyst

b) Oxo process

c) Wacker's process

d) All of the above

10. An ethane is converted to ethanal by

a) Wilkinson catalyst

b) Oxo process

c) Wacker's reaction

d) Reppe's catalyst

11. Reppe's catalyst is used in the

a) Hydrogenation of olefins

b) Hydroformylation of olefins

c) Polymerization process

d) Cyclooligomerization

FILL IN THE BLANKS: **1 MARK**

1. The wacker's process is primarily used to produce -------- from the oxidation of

   ethylene by palladium(II)-copper(II) chloride solution.

2. Hydroformylation involves conversion of ------ into--------

3. Addition of H_2 and Co to an olefin to produce an aldehyde is called -------
reaction.

4. In Wilkinson's catalyst, the oxidation state of Rhodium oscillates between the
oxidation states of --------- and ---------.

5. Repee's catalyst is -----------.

6. ------------- is Zeigler-Natta catalyst.

7. The shift reagent used in the organic compound analysis is having --------------
elements.

<p align="center">**SECTION- B**   **2MARKS**</p>

8. Complete the reaction

$$C_2H_2+H_2O+ \quad PtCl_4-----\rightarrow$$
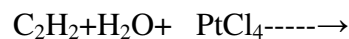
9. What is Repee's catalyst.

10. Wacker's process is carried out in the presence of Cu(II) salt. Explain.

11. What is Wilkinson's catalyst?

12. Give details of the term polymer bound catalyst.

13. Write a short note on cyclo oligomerizaion of acetylene using nickel catalyst.

<p align="center">**SECTION-C**   **5MARKS**</p>

1. Explain the oxidation of olefins to aldehydes and ketones by Wacker's process.

2. What is the role of palladium in catalyzing the oxidation of ethane to ethanal in
Wacker's process.

3. What are the conditions for a metal to act as a catalyst?

4. Describe the mechanism of hydrogenation of olefin.

5. Describe about polymer bound catalyst.

6. What is Zeigler – Natta catalyst? How does it catalyze the polymerization of

   olefins?
7. Discuss the cyclo oligomerization of acetylenes by Reppe's catalyst.
8. Discuss the role of Rh metal in Wilkinson's catalysis.
9. What is Repee's catalyst? Write briefly about wacker's process
10. Write a short note on Hydrogenations of alkene using wilkinsons catalyst.

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QUESTION BANK

CLASS: III-CHD.,   SEMESTER-VI

SUBJECT: INORGANIC CHEMISTRY-IV

SUBJECT CODE: CH615

NAME OF THE STAFF : Mr G. ANAND, Mr S. ALBERT NIKSON

UNIT-I

PART – A

1. The elements with atomic number greater than 103 are called_____
2. The energy which holds protons and neutrons in the nucleus together is known as_____
3. Radiation from co60 sources have been used in the treatment of_____
4. Which type of radioactive emission has the highest penetrating power_____
5. Packing fraction (D) is _____
6. Positron have_____
7. An electron has_____
8. _____are the isotopes of hydrogen

PART-B

1. Define Parking Fractions?
2. What is Artificial Radioactivity?
3. What is average life of a radioactive element?
4. How the N/P ratio is important for the stability of a nuclei?
5. Explain Magic Numbers?
6. Why do lighter elements generally undergo fusion while heavier elements show nuclear fission?
7. List few uses of Radioisotopes?
8. Define nuclear fission? Give Eg?
9. Define half-life period?
10. Define mass defect?
11. What is the relationship between average life and half life period?
12. Write the mathematical expression o mass belt?
13. Explain nuclear forces?

PART-C
1. Discuss the shell model to explain the stability of nucleus?
2. Discuss "Group Displacement law" with examples?
3. What are the salient points of "Liquid drop model"?
4. What is meant by rate of radioactive disintegration?

5. What is average life of a radioactive element? How is it related to disintegration constant?
6. Describe the importance of N/P ratio?
7. How will you detect and measure the radioactivity of an element?
8. Discuss the stability belt?

UNIT-II

PART-A

1. The "magic numbers" for atoms are

   (a) numbers of electrons that confer atomic stability.

   (b) numbers of protons and/or neutrons that confer nuclear stability.

   (c) n/p ratios that confer nuclear stability.

   (d) atomic masses that confer nuclear stability.

   (e) atomic masses that indicate fissile isotopes.

2. The actual mass of a ^{37}Cl atom is 36.966 amu. Calculate the mass defect (amu/atom) for a ^{37}Cl atom.

   (a) 0.623 amu

   (b) 0.388 amu

   (c) 0.263 amu

   (d) 0.341 amu

   (e) none of these

3. The mass defect for an isotope was found to be 0.410 amu/atom. Calculate the binding energy in kJ/mol of atoms. (1 J = 1 kg $\cdot$ m^2/s^2)

   (a) 3.69 x 10^{10} kJ/mol

(b) 1.23 x 10^{20} kJ/mol

(c) 3.69 x 10^{13} kJ/mol

(d) 1.23 x 10^3 kJ/mol

(e) 1.23 x 10^{23} kJ/mol

4. Calculate the binding energy per nucleon (in units of MeV) for ^{9}Be, for which the atomic mass is 9.01219 amu. Particle masses in amu are: proton = 1.007277; neutron = 1.008665; electron = 0.0005486. Conversion factor for E = mc^2 is 931 MeV/amu.

(a) 6.46 MeV

(b) 6.33 MeV

(c) 6.23 MeV

(d) 11.39 MeV

(e) 56.93 MeV

5. Which isotope below has the highest nuclear binding energy per gram? No calculation is necessary.

(a) ^{4}He

(b) ^{16}O

(c) ^{32}S

(d) ^{55}Mn

(e) ^{238}U

6. Which of the following statements is incorrect?

(a) Mass defect is the amount of matter that would be converted into energy if a nucleus were formed from initially separated protons and neutrons.

(b) Nuclear binding energy is the energy released in the formation of an atom from subatomic particles.

(c) Nuclei with highest binding energies are the most stable nuclei.

(d) Einstein postulated the Theory of Relativity in which he stated that matter and energy are equivalent.

(e) Mass number is the sum of all protons and electrons in an atom.

7. A positron has a mass number of _____, a charge of _____, and a mass equal to that of a(an) _____.

    (a) 0, 1+, proton

    (b) 1, 2+, proton

    (c) 0, 1+, electron

    (d) 1, 2+, electron

    (e) 0, 0, proton

8. Emission of which one of the following leaves both atomic number and mass number unchanged?

    (a) positron

    (b) neutron

    (c) alpha particle

    (d) gamma radiation

    (e) beta particle

9. Which type of radiation is the least penetrating?

    (a) alpha

(b) beta

(c) gamma

(d) x-ray

(e) neutron

10. A radioisotope of argon, ^{35}Ar, lies below the "band of stability: (n/p ratio too low). One   would predict that it decays via _____.

(a) neutron emission

(b) beta emission

(c) positron emission

(d) alpha emission

(e) fission

11. A Geiger-Muller tube is a _____ .

(a) gas ionization detector

(b) cloud chamber

(c) fluorescence detector

(d) spectrophotometer

(e) photographic detector

12.

The half life of ^{231}Pa is 3.25 x 10^4 years. How much of an initial 10.40 microgram sample remains after 3.25 x 10^5 years?

(a) 0.0102 micrograms

(b) 0.240 micrograms

(c) 2.18 micrograms

(d) 0.0240 micrograms

(e) 1.04 micrograms

13. Consider the case of a radioactive element X which decays by electron (beta) emission with a half-life of 4 days to a stable nuclide of element Z. Which of the following statements is CORRECT?

(a) After 8 days the sample will consist of one-fourth element Z and three-fourths element X.

(b) Element Z will weigh exactly the same as element X when decay is complete (weighed to an infinite number of significant figures).

(c) 2.0 g of element X is required to produce 1.5 g of element Z after 8 days (to 2 significant figures).

(d) If element X as an atomic number equal to n, then element X has an atomic number equal to n-1.

(e) None of the above.

14. Carbon-11 is a radioactive isotope of carbon. Its half-life is 20 minutes. What fraction of the initial number of C-11 atoms in a sample will have decayed away after 80 minutes?

(a) 1/16

(b) 1/8

(c) 1/4

(d) 7/8

(e) 15/16

15. How old is a bottle of wine if the tritium (^{3}H) content (called activity) is 25% that of a new wine? The half-life of tritium is 12.5 years.

(a) 1/4 yr

(b) 3.1 yr

(c) 25 yr

(d) 37.5 yr

(e) 50 yr

16. A Geiger counter registered 1000 counts/second from a sample that contained a radioactive isotope of polonium. After 5.0 minutes, the counter registered 281 counts/second. What is the half-life of this isotope in seconds?

(a) 87

(b) 110

(c) 164

(d) 264

(e) 2.18

17. The ^{14}C activity of some ancient Peruvian corn was found to be 10 disintegrations per minute per gram of C. If present-day plant life shows 15 dpm/g, how old is the Peruvian corn? The half-life of ^{14}C is 5730 years.

(a) 1455 years

(b) 1910 years

(c) 3350 years

(d) 3820 years

(e) 9080 years

18. Which of the following describes what occurs in the fission process?

(a) A heavy nucleus is fragmented into lighter ones.

(b) A neutron is split into a neutron and proton.

(c) Two light nuclei are combined into a heavier one.

(d) A proton is split into three quarks.

(e) A particle and anti-particle appear in an area of high energy density.

19. Which of the following statements about nuclear fission is always correct?

(a) Very little energy is released in fission processes.

(b) Nuclear fission is an energetically favorable process for heavy atoms.

(c) Due to its instability, ^{56}Fe readily undergoes fission.

(d) In fission reactions, a neutron is split into a proton and an electron.

(e) All nuclear fission reactions are spontaneous.

20. Which one of the following would be most likely to undergo thermonuclear fusion?

(a) ^{2}H

(b) ^{4}He

(c) ^{56}Fe

(d) ^{141}Ba

(e) ^{235}U

21. Which one of the following statements about nuclear reactions is false?

(a) Particles within the nucleus are involved.

(b) No new elements can be produced.

(c) Rate of reaction is independent of the presence of a catalyst.

(d) Rate of reaction is independent of temperature.

(e) They are often accompanied by the release of enormous amounts of energy.

22. Complete and balance the following equation. The missing term is _____ .

$$^{239}Pu + \text{alpha particle} \longrightarrow \underline{\quad} + \text{neutron}$$
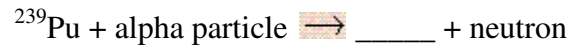
(a) $2\ ^{115}Ag$

(b) $2\ ^{106}Rh$

(c) ^{235}U

(d) ^{233}Pa

(e) ^{242}Cm

23. When ^{59}Cu undergoes positron emission, what is the immediate nuclear product?

(a) ^{59}Ni

(b) ^{58}Ni

(c) ^{58}Cu

(d) ^{59}Zn

(e) ^{58}Zn

24. As a result of the process of electron capture ("K-capture") by ^{211}At, the new isotope formed is:

(a) ^{210}At

(b) ^{212}At

(c) ^{211}Po

(d) ^{211}Rn

(e) ^{207}Bi

25. When ^{235}U is bombarded with one neutron, fission occurs and the products are three neutrons, 94Kr, and _____ .

    (a) ^{139}Ba

    (b) ^{141}Ba

    (c) ^{139}Ce

    (d) ^{139}Xe

    (e) ^{142}I

PART-B

1. What is nuclear energy?

2. What is nuclear fission reaction?

3. What is nuclear fusion reaction? Give one example.

4. Differentiate nuclear fission and fusion reaction ?

5. Define nuclear chain reaction ?

6.What are fissile and fertile nucleides?

PART-C

1. Discuss about nuclear reactor ?

2. Explain the type of nuclear reactions ?

3. Brifly discuss about fast breeder reaction ?

4. Explain nuclear fission and fusion ?

5. Distinguish between Nuclear fission and Nuclear fusion reaction ?

6. Define Nuclear fission reaction. Explain with one example in detail ?

7. Explain Nuclear Reactor-Power Generator with neat diagram./ Light Water Reactor ?

8. Explain Breeder reactor with reactions ?

UNIT-III

PART-A

1. Haemoglobin is an octahedral complex of
   a) Fe^{2+}
   b) Fe^{3+}
   c) Co^{2+}
   c) Mg^{2+}

2. Chlorophyll is a square planar complex with
   a) K^+
   b) Na^+
   c) Mg^{2+}
   d) Fe^{2+}

3. Corrin ring is present in
   a) Haemoglobin
   b) Vitamin B12
   c) Carboxypeptidase
   d) Chlorophyll

4. The function of hydrophobic chain in chlorophyll is
   a) Anchor the ring in cytoplasm
   b) Absorbs energy
   c) Retain symmetry

d)None of these

5. Hb and Mb are co-operative in their
   a) O2- binding nature
   b) Co2-removing nature
   c) Respiratory nature
   d) Absorbing nature

6. Chlorophyll absorbs low-energy light in the
   a) Near-Red
   b) Far-red
   c) UV
   d) Near UV

7. The transition elements from the organomettalic compounds with
   a) Sigma bonding ligands
   b) Pi bonding ligands
   c) Pi antibonding ligands
   d) Non- bonding ligands

8. The reversible oxidation of Haemoglobin occurs;

   a) In the presence of excess of oxygen

   b) In the absence of protective polypeptide chain

   c) In the absence of Mb in its neighbourhood

   d) In the absence of CO_2

9. The oxidation state of iron in haemoglobin is

a) 0   b) +1   c) +2   d) +3

10. Which of the following metals in enzyme is not involved in the nitrogen cycle?

a) Fe   b) Ni   c) Cu   d) Mo

11. The oxidation of Zinc in carbonic anhydrase is;

a) 0   b) +1   c) +2   d) +3

12. The dioxygen in Oxy-haemoglobin is in --------------- oxidation state

a) 0   b) +2   c) -1   d) +3

13. The metal ion present in Carboxy pepetidase is

a) Mg(II)   b) Cu(II)   c) Co(II)   d) Zn(II)

 14. Haemoglobin acts as ---------
 15. Minerals related with lanthanides and actinides are --------
 16. The whacker's process is primarily used to produce -------- from the oxidation of
      ethylene by palladium(II)-copper(II) chloride solution.
 17. Lack of vitamin B12 leads to ---------
 18. Eu is stable in +2 oxidation state because of -------- configuration
 19. Hydroformylation involves conversion of ------ into--------
 20. Each haemoglobin molecule has --------- group which are bound to globin on its
      surface.
 21. Electronic spectra of f-block elements exhibit -------- bands.
 22. Addition of H2 and Co to an olefin to produce an aldehyde is called -------reaction.
 23. The ability of chlorophyll to absorb sunlight in the visible region is due to the
      extended --------------
 24. ---------------- strong inhibitor of O_2 binding by myoglobin and haemoglobin .
 25. The metal ion present in vitamin B_{12} is --------------- .
 26. -------------- is useful in oxygen storage.

PART-B

 1. What is the role of Mg in Na-K pump?

 2. How haemoglobin differs from myoglobin?

 3. Write the role of Carboxy peptidase in the metabolism ?

 4. Draw the heme group present in haemoglobin ?

5. Write a note on the biological role of Ca^{+2} ?

PART-C

1. Discuss structure and function of hemoglobin ?
2. Discuss structure and function of myoglobin ?
3. Explain the metalo enzymes ?
4. Brifly discuss about carboxypeptidase ?
5. Brifly discuss about carbonicanhydrase
6. Explain the working of Sodium –Pottasium pump ?

UNIT-IV

PART-A

1. TEL is
   a) Organolithium compound
   b) Organolead compound
   c) Grignard reagent
   d) None of the above
2. Most stable oxidation state of the lanthanides is
   a) +5
   b) +3
   c) +4
   d) +2

3. $RhCl(PPh_3)^3$ is a
   a) 14 electron species
   b) 15 electron species
   c) 16 electron species
   d) 18 electron species

4. The reaction L2M-CH2-CH2-R <→R-CH2=CH2 +LnMH is known as
   a) Reduction
   b) Elimination
   c) B- elimination
   d) None of the above

5. The transition elements from the organomettalic compounds with
   e) Sigma bonding ligands
   f) Pi bonding ligands
   g) Pi antibonding ligands
   h) Non- bonding ligands

6. Ce and Tb exhibit stable oxidation state
   a) +2
   b) +3
   c) +4
   d) +5

7. C2H4 + ½ O2→
   a) Ketone
   b) Ethane
   c) Acetaldehyde
   d) No reaction

8. The hapticity of cyclopentadienyl legends in a stable ferrocene is;

a) 2   b) 4   c) 5   d) 6

9. The stable oxidation state of Cerium is ----------

a) +2   b) +3   c) +4   d) +5

10. The carbene ligand donates -------------

a) 8 electrons   b) 6 electrons   c) 4 electrons   d) 2 electrons

11. The common oxidation state of actinides is_____
12. The shift reagent used in the organic compound analysis is having_____ compound.
13. The metal carbonyl that violates 18 electron rule is_____
14. In the lanthanide series, the basic strength of their hydroxides_____ with the increase in atomic number.
15. The most stable oxidation states of lanthanides are_____

PART-B

1. Mention any two difference between an organomatallic compound and co-ordinating compound?
2. Predict and draw the structure of $\prod$-c5H5c2H4(CO)2?
3. Write a note on the magnetic property and oxidation state o tripositive lanthanides?
4. Calculate the EAN of Fe(Co)5?
5. What are metal alkyls? Give an suitable Example?
6. What are carbines? Give an example?
7. Discuss the spectral properties of lanthanides?
8. Write the properties of organolithium compounds?
9. The d3 octahedral organometallic compounds do not obey the 18 electron rue, but still they are stable. Explain?
10. Discuss the colour of lanthanides?

11. a) What are the consequences of lanthanide contraction.
       b) Account for the colour of lanthanides.

12.   c) Discuss the various oxidation states of lanthanides.
      a) Define 18-electron rule.

   b) Give an example of carbene complex.

   c) Write atleast 2 types of legends with examples which are classified on
13. How legends are classified.

b) What is EAN rule?

c) Discuss about the colour in lanthanides.

14. Write about the magnetic properties of f-block elements.

16. Draw the structure of
    i) $Ti(C_5H_5)_4$

    ii) $Fe_2(CO)_9$

    iii) Write a note on oxidation state of lanthanides.

PART-C

1. Give any four comparison of lanthanides with the of D-blocks elements?
2. Compare the properties o lanthanides and actinides?
3. Write the preparation of organometallic compounds of Mg (Grignard reagent)
4. Discuss the various oxidation state of lanthanides?
5. Discuss lanthanide contraction? Give its causes and its consequences?
6. How ligands are classified?
7. What are carbine complexes? Give examples?

UNIT-V

PART-A

1. $RhCl(PPh_3)^3$ is a
    e) 14 electron species
    f) 15 electron species
    g) 16 electron species
    h) 18 electron species

2. Hydroformylation of alkene reaction proceeds in the presence of
    a) Repee's catalyst

b) Wilkinson's catalyst

c) $Co_2(CO)_8$

d) $HCo(CO)_8$

3. Wilkinson's catalyst is
   a) [RhCl(PPh3)3]
   b) [Rh(PPh3)3]Cl
   c) [RhCl(PEt3)3]
   d) [Ru(PPh3)3]Cl

4. The reaction L2M-CH2-CH2-R <→R-CH2=CH2 +LnMH is known as
   e) Reduction
   f) Elimination
   g) B- elimination
   h) None of the above

5. Reppe's catalyst is used in the
   a) Hydrogenation of olefins
   b) Hydroformylation process
   c) Polymerization process
   d) Cyclooligomerisation

6. Condition to be satisfied by a metal to act as a catalyst is
   a) It must have two moderately stable oxidation states
   b) It must be capable of forming moderately stable co-ordinatively unsaturated complexes.
   c) It must have the ability to match the substrate orbitals.
   d) All the above

8. C2H4 + ½ O2→
   a)Ketone
   b)Ethane
   c)Acetaldehyde
   d)No reaction

9. Square planar complexes have ------------- electrons for their stability

   a) 8   b) 16   c) 18   d) 32

10. The carbene ligand donates ------------

   a) 8 electrons   b) 6 electrons   c) 4 electrons   d) 2 electrons

11.In oxo process ------------ catalyst is used.

   a) Platinum   b) Nickel   c) Palladium   d) Cobalt

12.Propene is converted to propanal by --------------

   a) Wilkinson catalyst   b) Oxo process   c) Wacker's process   d) All of the above

13.An ethane is converted to ethanal by

a) Wilkinson catalyst   b) Oxo process   c) Wacker's reaction   d) Reppe's catalyst

14.Reppe's catalyst is used in the

a) Hydrogenation of olefins   b) Hydroformylation of olefins

c) Polymerization process   d) Cyclooligomerization

15. The formula of ferrocene is --------------
16. The f-block elements are otherwise called ----------
17. The Neptunium series ends with --------------
18. In Wilkinson's catalyst, the oxidation state of Rhodium oscillates between the
     oxidation states of --------- and ---------
19. Repee's catalyst is -----------
20. ------------- is Zeigler-Natta catalyst

21. The shift reagent used in the organic compound analysis is having -------------- elements

PART-B

1. What is Repee's catalyst ?

2.Wacker's process is carried out in the presence of Cu(II) salt. Explain?

3.What is Wilkinson's catalyst?

4.Give details of the term polymer bound catalyst ?

5. What is Zeise's salt?

6. Explain hydrogenation of olefins ?

7. Explain the concept of hydroformylation with example ?

8. Explain the role of zigler –natta catalyst ?

9. Discuss wacker's process ?

10. Explain oxo process ?

PART-C

1. a) What are the consequences of lanthanide contraction.

   b) Account for the colour of lanthanides.

   c) Discuss the various oxidation states of lanthanides.

2. a) Define 18-electron rule.

   b) Give an example of carbene complex.

   c) Write atleast 2 types of legends with examples which are classified on the number of C atoms through which the ligand is attached to the metal atom.

3. a) How legends are classified.

   b) What is EAN rule?

   c) Discuss about the colour in lanthanides.

4. Write about the magnetic properties of f-block elements.

5. Draw the structure of

   i) Ti(C$_5$H$_5$)$_4$

   ii) Fe$_2$(CO)$_9$

   iii) Write a note on oxidation state of lanthanides.

6.Explain the oxidation of olefins to aldehydes and ketones by Wacker's process.

a) What is Fe-Mo protein?

b) What is the role of palladium in catalyzing the oxidation of ethane to ethanal in Wacker's   process.

c) What are the conditions for a metal to act as a catalyst?

7. Explain oxo process, wacker's process and hydroformylation ?