**VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST**
(Autonomous & Residential)
[Affiliated to Madurai Kamaraj University]

**B.Sc. (Bot. / Zoo.)** Degree (Semester) Examinations, April 2016
Part – III : Core Subject : Second Semester : Paper – II

**INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY – II**
Under CBCS – Credit 4

Time: **3** Hours Max. Marks: **75**

## SECTION – A

**Answer ALL Questions :** **(10 × 1 = 10)**

1. Which of the following is an acid?
   a) $H_2O_2$ b) HCl c) $H_2O$ d) $PCl_5$
2. Select the lewis base from the following.
   a) $H_2O_2$ b) $H_2SO_4$ c) $NH_3$ d) $KMnO_4$
3. Give any one example for an organic pesticide.
4. Define – Fungicide.
5. Write a water soluble vitamin.
6. Define peptide linkage in amino acids.
7. The hydrogen bond is present in _____.
   a) $CCl_4$ b) $CO_2$ c) Ice d) Ether
8. What type of bond is present in common salt?
9. The maximum component of air is _____.
   a) $O_2$ b) $N_2$ c) $H_2$ d) $NO_2$
10. Give the expansion of CFC.

## SECTION – B

**Answer ALL Questions :** **(5 × 7 = 35)**

11. a) Explain the concept of acid and base using Arrhenious concept with an example.
    **(OR)**
    b) Define the concept of acid and base using Cadey – Elscy concept with an example.
12. a) Give the mechanism of action and characteristics of pesticides.
    **(OR)**
    b) What are the action of sulphur, copper and mercury compounds in fungicidal activity?
13. a) What are the types of amino acid? and explain them.
    **(OR)**
    b) Discuss the properties of amino acids.
14. a) Explain the Born – Haber cycle.
    **(OR)**
    b) Define the term lattice energy and explain Fajan's rule with an example.
15. a) What are the sources of air pollution and classification of air pollutions?
    **(OR)**
    b) Write a note on ozone depletion and green house effect.

## SECTION – C

**Answer any THREE Questions :** **(3 × 10 = 30)**

16. Explain the following
    a) Lux flood concept b) Usinovich concept and c) $P^H$ concept
17. Elaborate the impact of pesticides on soil, plant and environment.
18. What is the biological role of vitamins? Explain them.
19. Write short notes on a) Ionic bond b) covalent bond
    c) Metallic bond and d) Hydrogen bond
20. Discuss elaborately the treatment of sewage water.

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**VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST**
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**B.Sc. Physics** Degree (Semester) Examinations, April 2016
Part – III : Allied Subject : Second Semester : Paper – II

**INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY – II**
Under CBCS – Credit 5

Time: **3** Hours Max. Marks: **75**

## SECTION – A

**Answer ALL Questions :** **(10 × 1 = 10)**

1. The atomic radius _____ from top to bottom in a group.
   a) Decrease b) increase c) remain the same d) none of these
2. _____ stops as soon as the incident radiation is cut off.
   a) chemiluminescence b) phosphorescence
   c) fluorescence d) none of these
3. The amorphous solid among the following is
   a) table salt b) diamond c) plastic d) graphite
4. The site of reduction in an electrochemical cell is
   a) the anode b) the cathode
   c) the electrode d) the salt bridge
5. Which one is adsorption chromatography
   a) Paper chromatography b) TLC
   c) Gas-liquid chromatography d) none of these
6. Define ionisation energy.
7. State quantum efficiency.
8. What is meant by centre of symmetry
9. Define specific conductance.
10. Define eluent.

## SECTION – B

**Answer ALL Questions :** **(5 × 7 = 35)**

11. a) Write notes on i) Electron affinity ii) Van der Waals' radius
    **(OR)**
    b) Explain how the elements are arranged in the long form of periodic table. What is meant by a group and a period?
12. a) Distinguish between thermal reactions and photochemical reactions.
    **(OR)**
    b) Explain briefly photophysical phenomena using Jabloanski diagram.
13. a) Describe different types of units cells.
    **(OR)**
    b) Write notes on i) polymorphism ii) interfacial angle
14. a) Describe the principle of determination of pH of a solution with help of a glass electrode.
    **(OR)**
    b) Write a note on Nernst equation for EMF of cells.
15. a) Explain the principle and preparation of TLC.
    **(OR)**
    b) What are the applications of column chromatography?

## SECTION – C

**Answer any THREE Questions :** **(3 × 10 = 30)**

16. i) Define electronegativity
    ii) Determine the electonegativity by Pauling methods.
17. Write notes on i) Bioluminescence
    ii) photosynthesis iii) Chemiluminescence
18. i) List out the difference between crystalline and amorphous solids
    ii) Write note on space lattice
19. Describe the construction and working principle of calomel electrode.
20. Discuss the ascending paper chromatographic technique for separation of mixtures.

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**VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST**
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**B.Sc. Chemistry** Degree (Semester) Examinations, April 2016
Part – III : Core Subject : Second Semester : Paper – I

**INORGANIC AND ORGANIC CHEMISTRY – I**
Under CBCS – Credit 3

Time: **3** Hours Max. Marks: **75**

## SECTION – A

**Answer ALL Questions :** **(10 × 1 = 10)**

1. What is bond angle between the hybrid orbitals in methane?
   a) 180° b) 120° c) 109.5° d) 115.5°
2. When an alkyl halide is heated with an alcoholic solution of the silver salt of carboxylic acid, it gives
   a) Carboxylic acid b) ethyl alcohol
   c) ester d) ethylene
3. Grain alcohol is another name for
   a) methyl alcohol b) isopropyl alcohol
   c) n-propyl alcohol d) ethyl alcohol
4. Organozinc compounds are involved in the _____.
   a) Friedel-crafts reaction b) Gattermann reaction
   c) Reformatsky reaction d) Knovenagal reaction
5. Which of the following compounds will give a white precipitate with alcoholic $AgNO_3$.
   a) Vinylbenzene b) chlorobenzene
   c) vinyl chloride d) allyl chloride
6. What happens when chloroform reacts with phenol in presence of NaOH?
7. How is nitroglycerine prepared?
8. $CH_3MgI + HCHO \xrightarrow{?}$ **?**
9. Define hybridisation.
10. How will you synthesize vinyl chloride from acetylene?

## SECTION – B

**Answer ALL Questions :** **(5 × 7 = 35)**

11. a) Write notes on i) sp hybridisation ii) s-s overlapping
    **(OR)**
    b) Describe the shape of the ammonia and water.
12. a) How will you convert chloroform into i) Phosgene ii) sodium formate iii) acetylene iv) carbon tetrachloride
    **(OR)**
    b) Discuss the mechanism of E2 and E1 reaction of alkyl halide.
13. a) How will you synthesize the following compounds from ethylene glycol i) Succinic acid ii) oxalic acid iii) Dioxane iv) formaldehyde
    **(OR)**
    b) Explain the preparation and properties of allyl alcohol.
14. a) Give a detailed account on the properties and applications of tetra ethyl lead.
    **(OR)**
    b) Describe the preparation and properties of dialkyl zinc.
15. a) Write notes on i) Westron ii) Freon
    **(OR)**
    b) Explain the preparation and properties of chlorobenzene.

## SECTION – C

**Answer any THREE Questions :** **(3 × 10 = 30)**

16. Explain the following on the basis of MO theory
    i) Oxygen molecule is paramagnetic.
    ii) Nitrogen molecule is diamagnetic.
17. a) Explain the preparation and properties of carbon tetrachloride.
    b) Discuss the mechanism of $S_N2$ reaction of alkyl halide.
18. a) Write the preparation and properties of ethyl alcohol.
    b) How will you prepare benzyl alcohol from benzene?
19. Discuss about the synthetic applications of Grignard reagents.
20. How is benzyl chloride prepared? Explain their properties and uses.

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**B.Sc. Chemistry** Degree (Semester) Examinations, April 2016
Part – III : Core Subject : Second Semester : Paper – II

**PHYSICAL CHEMISTRY**
Under CBCS – Credit 4

Time: **3** Hours Max. Marks: **75**

## SECTION – A

**Answer ALL Questions :** **(10 × 1 = 10)**

1. What are the constituents of the nucleus?
2. Define magic numbers.
3. Write a nuclear fission reaction of uranium.
4. Give the use of Projectiles.
5. How will you distinguish the crystalline and amorphous solid using melting point?
6. Define – Unit cell.
7. Give an example for cubic crystal.
8. Draw a schematic diagram for a body centered cubic system.
9. The value of Avogadro number is _____.
10. Graphite is a conductor of electricity. Why?

## SECTION – B

**Answer ALL Questions :** **(5 × 7 = 35)**

11. a) Write short notes on isobars, isotones and isomers with an example.

**(OR)**

b) Establish the stability of the nucleus using n/p ratio.

12. a) Explain the working of a cyclotron.

**(OR)**

b) Discuss elaborately the parts of a nuclear reactor.

13. a) Explain the law of rational indices and miller indices.

**(OR)**

b) Elaborately explain the law of inter facial angels and weiss indices.

14. a) Draw and explain the SCC, FCC and BCC systems.

**(OR)**

b) Derive Bragg's equation.

15. a) Explain the band theory in conductor, semiconductor and insulator.

**(OR)**

b) What are the defects in the crystals? Explain them.

## SECTION – C

**Answer any THREE Questions :** **(3 × 10 = 30)**

16. Discuss the different models of the nucleus.
17. Explain the applications of radioactive elements in various fields with examples.
18. Define symmetry element and explain the different symmetry operations.
19. Explain the experimental method of powder and rotating crystal method for the determination of inter planner distance.
20. What are the types of liquid crystals and their applications?

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**B.Sc. Chemistry** Degree (Semester) Examinations, April 2016
Part – III : Core Subject : Fourth Semester : Paper – I

**ORGANIC AND PHYSICAL CHEMISTRY**
Under CBCS – Credit 4

Time: **3** Hours Max. Marks: **75**

## SECTION – A

**Answer ALL Questions :** **(10 × 1 = 10)**

1. Which one of the following reaction can be used for the synthesis of α - amino acids?
   a) Gabriel phthalimide b) Erlenmeyer azlactone
   c) Strecker synthesis d) All these
2. Acetoacetic acid on heating gives _____.
   a) Pyruvic acid b) Lactol c) Lactic acid d) Acetone
3. Method used to ascent the aldoses series is known is _____.
   a) Killiani synthesis b) Zemplen's modification
   c) Wohl's degradation d) Ruff degradation
4. If a solute brings about a _____ of surface tension, its concentration at the surface of the solution is _____ than in the bulk of the solution.
   a) increase, more b) decrease, more
   c) decrease, less d) none of these
5. The distribution coefficient of silver between zinc and lead is _____ at $880^{o}$C.
   a) 100 b) 200 c) 300 d) 400
6. How is salicylic acid prepared?
7. How will you convert glyoxalic acid into oxalic acid?
8. Draw the structure of sucrose.
9. What is Dunstan rule?
10. State Nernst's distribution law.

## SECTION – B

**Answer ALL Questions :** **(5 × 7 = 35)**

11. a) i) Explain : Formic acid is stronger than acetic acid. **(3½ + 3½)**

ii) Explain : Trichloroacetic acid is a much stronger acid than actic acid.

**(OR)**

b) Explain the action of heat on α, β and γ - hydroxy acids.

12. a) How will you prepare the following compounds from acetoacetic ester? **(2 + 2 + 1½ + 1½)**

i) Hexane – 2, 5 – dione ii) β - Methylbutyric acid

iii) 3, 4 – Dimethylpentan – 2 – one iv) 3 – Methylpentan – 2 – one

**(OR)**

b) Starting from malonic ester, outline the synthesis of **(2+2+1½+1½)**

i) Isobutyric acid ii) cyclobutane carboxylic acid

iii) Barbituric acid iv) 3 – Phenylpropanoic acid

13. a) Narrate the applications of cellulose derivatives.

**(OR)**

b) Explain the following i) Mutarotation ii) Epimerization **(3½+3½)**

14. a) Discuss the use of parachor in elucidating structure.

**(OR)**

b) Explain the terms : **(3½ + 3½)**

i) Paramagnetic substances ii) Diamagnetic substances

15. a) Give a brief account of partition chromatography.

**(OR)**

b) Describe the limitations of distribution law.

## SECTION – C

**Answer any THREE Questions :** **(3 × 10 = 30)**

16. What is anthranilic acid? How will you prepare it from o – nitro benzoic acid? How does it react with

a) $CH_3COCl$

b) $CH_3OH/H^+$

c) $COCl_2$ in water

d) ICl

e) NaOH

17. Discuss any six synthetic applications of benzenediazonium chloride.

18. a) Narrate the configuration of fructose. **(4 + 6)**

b) Describe the structure of starch.

19. Explain the measurement of dipole moment of a substance.

20. Discuss in detail about : **(5 + 5)**

a) Distribution indicators

b) Multiple extraction

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**B.Sc. Chemistry** Degree (Semester) Examinations, April 2016
Part – III : Core Subject : Fourth Semester : Paper – II

**INORGANIC CHEMISTRY**
Under CBCS – Credit 4

Time: **3** Hours Max. Marks: **75**

## SECTION – A

**Answer ALL Questions :** **(10 × 1 = 10)**

1. The basic unit in sorosilicates is

   a) $[SiO_4]^{4-}$ b) $[Si_2O_7]^{6-}$ c) $[Si_6O_{18}]^{12-}$ d) $[Si_2O_5]^{2-}$

2. Which one of the following is pseudohalogen

   a) $ClF_3$ b) $HClO_4$ c) $(SeCN)_2$ d) $ClF$

3. According to the Lewis definition a base is

   a) Proton donor b) Electron pair donor

   c) Hydroxide acceptor d) Electron pair acceptor

4. Rhodamine – B is used in _____ spectroscopy.

   a) NMR b) IR c) fluorescence correlation d) mass

5. In hydroboration reaction, borane react with

   a) alcohol b) alkene c) ketone d) carboxylic acid

6. Write the molecular formula for bleaching powder _____.

7. Super acid is _____.

8. Write the structure of DMG _____.

9. The structure of the tetrahydroborate ion _____.

10. Diborane is used in _____.

## SECTION – B

**Answer ALL Questions :** **(5 × 7 = 35)**

11. a) i) Give the preparation of cyclic and chain silicones with equation and structure. **(5 + 2)**

ii) Write any two uses of silicones.

**(OR)**

b) Write a short note on three dimensional silicones and their classification and uses.

12. a) i) Why HF acid is normally handled in metal vessel? Give your explanation. **(3 + 4)**

ii) Explain the anomalous behavior of fluorine.

**(OR)**

b) i) Discuss about structure and properties of perchloric acids.

ii) Give the ascending order of acid strength of perchloric acid series. **(5 + 2)**

13. a) i) Define the symbiosis. **(2 + 3 + 2)**

ii) Why $F_3N$ is a much weaker base than $NH_3$ ?

iii) Why acetic acid is not an acid in $H_2SO_4$ ? Explain with equation.

**(OR)**

b) i) Differentiate the Hard-Soft acid and base. **(4 + 3)**

ii) Write Pearson's principle and explain with an example.

14. a) Write the structure and uses of following reagents.

i) Rhodamine _B ii) Cupron iii) Magnason iv) Alizarine

**(OR)**

b) Write short note on DMG, Aluminon and Uranyl zinc acetate.

15. a) Explain preparation, structure and bonding model in diborane.

**(OR)**

b) Give details of hydroboration reaction and commercial use of diborane.

## SECTION – C

**Answer any THREE Questions :** **(3 × 10 = 30)**

16. Explain the classification, properties and structures of silicates.

17. What are inter halogen compounds?
Give their types, preparation and general properties.

18. Write a brief note on physical and chemical properties of liquid ammonia as non-aqueous solvent.

19. How will you estimate *Mg and Ni* by using EDTA?
Explain with procedure.

20. a) Define the Wad's rule.

b) Find the structure of following compounds using Wad's rule.

i) Penta borane – 9 ii) Penta borane – 11

iii) Hexa borane – 10 iv) Deca borane – 14

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**B.Sc. Chemistry** Degree (Semester) Examinations, April – 2016
Part – III : Core Subject : Sixth Semester : Paper – I

**ORGANIC CHEMISTRY – III**
Under CBCS – Credit 4

Time: **3** Hours Max. Marks: **75**

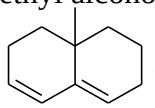
## SECTION – A

**Answer ALL Questions :** **(10 × 1 = 10)**

1. There is no loss of simple molecules like water, ammonia during
   a) addition polymerization b) condensation
   c) step growth polymerization d) All of these
2. Alkaloids are generally
   a) nitrogeneous compounds b) basic nature
   c) physiologically active substance d) All of these
3. During Beckmann rearrangement oxime is converted to
   a) amines b) amides c) alcohol d) acids
4. Which of the following is not a antibiotic?
   a) pencillin b) tetracycline c) streptomycin d) sulphathiazole
5. The UV region absorption is in the range of
   a) 400-800 nm b) 200-400 nm c) 100-200 nm d) 100-400 nm
6. What is the polymer unit present in natural rubber?
7. Give the order of reactivity of furan, thiophene and pyrrole.
8. What is meant by electric potential?
9. Draw the structure and uses of ascorbic acid.
10. Give the $^1$H NMR spectrum of acetaldehyde.

## SECTION – B

**Answer ALL Questions :** **(5 × 7 = 35)**

11. a) Explain addition and condensation polymerizations.
    **(OR)**
    b) How will you synthesise **(2 + 2 + 3)**
    i) PVC ii) Teflon iii) Terylene
12. a) i) Explain Bischler Napieralski synthesis **(3½ + 3½)**
    ii) Hantzch synthesis
    **(OR)**
    b) Discuss the structure of piperine.
13. a) Write **(2 + 2 + 3)**
    i) Wagner Meerwein ii) Fries iii) claisen rearrangements
    **(OR)**
    b) i) Explain Kolbe's reaction **(5 + 2)**
    ii) Draw current and potential curve
14. a) Elucidate the structure of testosterone.
    **(OR)**
    b) Prove the structure of geraniol.
15. a) i) Differentiate the hypsochromic shift and bathochromic shift.
    ii) What is fingerprint region? **(4 + 3)**
    **(OR)**
    b) i) Give the $^1$H NMR spectra of ethyl alcohol and toluene.
    ii) Calculate $\lambda_{max}$ the value of  **(2 + 2 + 3)**

## SECTION – C

**Answer any THREE Questions :** **(3 × 10 = 30)**

16. Calculate the weight average molecular weight and number average molecular weight of polymers.
17. a) Convert i) Pyrrole → 3-chloropyridine ii) Furan → pyrrole.
    b) Discuss i) Madelung synthesis of indole ii) Paul Knorr synthesis
18. Write note on a) Working electrode b) Supporting electrolyte
19. Elucidate the structure of camphor.
20. What is chemical shift? Discuss the factors influencing the chemical shift?

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**B.Sc. Chemistry** Degree (Semester) Examinations, April – 2016
Part – III : Core Subject : Sixth Semester : Paper – II

**PHYSICAL CHEMISTRY – IV**
Under CBCS – Credit 4

Time: **3** Hours Max. Marks: **75**

## SECTION – A

**Answer ALL Questions :** **(10 × 1 = 10)**

1. Reaction rates can change with
   a) Temperature b) The addition of catalyst
   c) Reactant concentration d) All of these
2. $PCl_5$ molecule belongs to the following point group
   a) $C_3V$ b) $D_3h$ c) $D_3d$ d) $C_2V$
3. Which of the following is an electromagnetic radiation?
   a) Alpha rays b) Beta rays c) Gamma rays d) Anode rays
4. Raman spectrum is due to
   a) Adsorption of energy by molecules
   b) Emission of energy by molecules
   c) Inelastic collisions d) None
5. ESR spectra are observed in _____ region.
   a) Microwave b) Radiofrequency c) UV/VIS d) X-ray
6. Define rate constant.
7. What is identity operation?
8. What are molecular energy levels?
9. Define Stokes' lines.
10. What is metastable peak?

## SECTION – B

**Answer ALL Questions :** **(5 × 7 = 35)**

11. a) Derive an expression for rate constant of first order reaction.

**(OR)**

b) Derive Arrhenius rate equation and its significance.

12. a) Explain the following i) Symmetry elements
ii) Symmetry operation iii) Center of inversion

**(OR)**

b) Explain diagrammatically that $H_2O$ molecule is Abelian whereas $NH_3$ molecule is non-Abelian.

13. a) What are absorption spectrum, emission spectrum and band spectrum?

**(OR)**

b) Discuss the different types of molecular spectrum.

14. a) List out the applications of IR Spectroscopy.

**(OR)**

b) Bring out the comparison between Raman and IR spectra.

15. a) i) Write the principle of ESR spectroscopy
ii) Draw the ESR spectrum of methyl radical

**(OR)**

b) Explain the following i) Nitrogen rule
ii) $M_c$ Lafferty rearrangement

## SECTION – C

**Answer any THREE Questions :** **(3 × 10 = 30)**

16. Write short notes on i) Pseudo unimolecular reactions
ii) Absolute reaction rate theory

17. a) Define the following terms
i) Group ii) Sub-group iii) Point group
b) Give the point group of the following molecules
i) $PH_3$ ii) $C_6H_6$ iii) NO iv) $H_2O_2$

18. Derive an expression for the rotational energy of a diatomic molecule taking it as a rigid rotator.

19. Discuss the rotation –vibration spectra of diatomic molecule.

20. Write short notes on i) Chemical shift
ii) Spin-spin coupling

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**B.Sc. Chemistry** Degree (Semester) Examinations, April – 2016
Part – III : Elective Subject : Sixth Semester : Paper – II

**NANO CHEMISTRY**
Under CBCS – Credit 4

Time: **3** Hours Max. Marks: **75**

## SECTION – A

**Answer ALL Questions :** **(10 × 1 = 10)**

1. The nano science is mostly associated with _____ behaviour.
   a) auantum b) liquid c) solid d) gas
2. The electron motion of metals in nano scale is
   a) not confined b) confined c) both a and b d) none of these
3. Quantum dots has
   a) one dimension b) two dimension
   c) three dimension d) zero dimension
4. Catalyst involved in the nano reaction
   a) increase the rate of reaction b) decrease the rate of the reaction
   c) both a and b d) None of the these
5. Optical properties of the nano crystals depend on their
   a) shape and size b) shape alone
   c) size alone d) none of these
6. Define nano science.
7. Give any two uses of metals in nano scale.
8. How will be the Fermi energy gap in nano scale for semiconductors?
9. Give the uses of nano adsorbent.
10. What is meant by aspect ratio of nanoparticle?

## SECTION – B

**Answer ALL Questions :** **(5 × 7 = 35)**

11. a) Write the historical perspective of nanoparticle.
    **(OR)**
    b) How will you relate chemistry and solid state physics?
12. a) How metal nano particles are prepared by electrochemical method?
    **(OR)**
    b) Give the catalytic growth method of metal nano particles.
13. a) Write a note on CdS nano rods.
    **(OR)**
    b) Explain the reverse micellar solution.
14. a) How nano catalyst particle be tailored?
    **(OR)**
    b) Discuss the role of nano structured adsorbents in water pollution.
15. a) Is it possible to use nano crystals as biological labels in medicine? Justify it.
    **(OR)**
    b) Discuss the device application of nano crystal.

## SECTION – C

**Answer any THREE Questions :** **(3 × 10 = 30)**

16. Explain the classification of nano materials.
17. What are the various routes to arrangements of metals in nanoscale a) self assembly method b) chemical bath deposition? **(5 + 5)**
18. a) Discuss CdTe nano crystals. **(6 + 4)**
    b) How will you stabilize nano particle?
19. Briefly discuss the applications of nano catalyst as new reagents.
20. Explain the role of nanocrystals as colorants and pigments.

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**B.A. / B.Sc.** Degree (Semester) Examinations, April 2016
Part – IV : Non-Major Elective Subject : Second Semester : Paper – I

**MEDICINAL CHEMISTRY – VACCINE PREVENTABLE DISEASES**
Under CBCS – Credit 2

Time: **2** Hours Max. Marks: **75**

## SECTION – A

**Answer ALL Questions :** **(10 × 1 = 10)**

1. Mumbs is a _____ disease.
   a) Water borne b) Air borne c) Insect borne d) None of these
2. Hereditary diseases is an example of
   a) Diabetes b) Plague c) Filiriasis d) None of these
3. Penicillin was discovered by
   a) Paul elrich b) Alexander Fleming
   c) Wakes Mann d) Fisher
4. Membrane bound receptors is an example of
   a) Kinase-linked receptors b) Reductase-linked receptors
   c) Kinase-Reductase linked receptors d) None of these
5. Cell surface carbohydrates are known as
   a) Glyco conjugates b) G-protein conjugates
   c) Leuco conjugates d) None of these
6. Write the symptoms of Mumps.
7. Distinguish between Hetetidary diseases and Infective diseases.
8. What are enzymes?
9. Distinguish the word Agonists and Antagonists.
10. What is meant by signal transduction?

## SECTION – B

**Answer ALL Questions :** **(4 × 10 = 40)**

11. a) What are drugs? Describe their classification of drugs.

**(OR)**

b) What are the bases involved in getting a drug to the market?

12. a) Discuss in detail insect borne diseases and their treatment.

**(OR)**

b) Explain the source, symptoms and prevention measurements of water borne diseases.

13. a) Explain the following?
   i) Enzyme inhibitors ii) Reversible inhibitors

**(OR)**

b) Discuss g-protein coupled receptors.

14. a) Write a note on cardiovascular drugs.

**(OR)**

b) Illustrate briefly about chemical messenger.

## SECTION – C

**Answer any TWO Questions :** **(2 × 12½ = 25)**

15. What is a disease? Describe classification of human diseases and explain air-borne diseases.
16. What are nucleic acids and explain DNA intercalators.
17. Discuss membrane bound receptors families.

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**VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST**
(Autonomous & Residential)
[Affiliated to Madurai Kamaraj University]

**B.Sc. Chemistry** Degree (Semester) Examinations, April 2016
Part – IV : Skill Based Subject : Fourth Semester : Paper – I

**CHEMISTRY IN ACTION**
Under CBCS – Credit 2

Time: **2** Hours Max. Marks: **75**

## SECTION – A

**Answer ALL Questions :** **(10 × 1 = 10)**

1. The most abundant element in human body by weight is
   a) Hydrogen b) Phosphorus c) Oxygen d) Nitrogen
2. One Nano second is
   a) $10^{-9}$ sec b) $10^{-12}$ sec c) $10^{-6}$ sec d) $10^{-15}$ sec
3. Which one of the following is explosive fertilizer?
   a) $NH_3$ b) $NH_4NO_3$ c) $(NH_4)_2 SO_4$ d) $(NH_2)_2 CO$
4. Which metal is responsible for Napoleon's death
   a) Arsenic b) Cadmium c) Mercury d) Chromium
5. Gamow's hypothesis is related with
   a) Theory of Relativity b) Big Bang Theory
   c) Photoelectric effect d) Compton effect
6. Mention the important elements for plant growth.
7. Write the expansion of LASER and IUPAC.
8. Define antacid.
9. Give the structure and uses of cis-platin.
10. What is the third liquid Element?

## SECTION – B

**Answer ALL Questions :** **(4 × 10 = 40)**

11. a) Why do Lakes Freeze from the top down? **(OR)**
    b) Discuss the essential elements and its importance to human.
12. a) What are the applications of Microwave ovens? **(OR)**
    b) Write short notes on Precipitation reaction.
13. a) Discuss the chemical fertilizers. **(OR)**
    b) Explain the manufacture of ammonia by Haber process.
14. a) Highlight the importance of sodium chloride. **(OR)**
    b) Write short notes on decaying papers.

## SECTION – C

**Answer any TWO Questions :** **(2 × 12½ = 25)**

15. i) Discuss the evidences of Big Bang Theory.
    ii) Define Hard water.
16. i) Write short notes on discovery of the Nobel gases.
    ii) Explain nuclear fission reaction.
17. i) Explain the Dental Filling Discomfort.
    ii) Discuss the Disappearance of the Dinosaurs.
    iii) Match the followings

| List I | List II |
|---|---|
| Green Pigment | Vitamin B12 |
| Fertilizer | Glucose |
| Paper | Carbon |
| Group 14 Element | Magnesium |
| Energy | Cellulose |
| Cobalt | Potassium |

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**VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST**
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**B.Sc. Chemistry** Degree (Semester) Examinations, April 2016
Part – IV : Skill Based Subject : Sixth Semester : Paper – I

**CHEMISTRY FOR COMPETITIVE EXAMINATION**
Under CBCS – Credit 2

Time: **2** Hours Max. Marks: **75**

## SECTION – A

**Answer ALL Questions :** **(75 × 1 = 75)**

1. Which of the following molecules has minimum dipole moment?
   a) HF b) HCl c) HBr d) HI
2. Glass is a
   a) polymeric mixture b) micro – crystalline solid
   c) super-cooled liquid d) gel
3. Which of the following formulae represents hydrophosphoric acid?
   a) $H_3PO_3$ b) $H_4P_2O_6$ c) $H_3PO_4$ d) $H_4P_2O_7$
4. Galena is an ore of
   a) Fe b) Cu c) Zn d) Pd
5. The only stable tetrahalide of lead is
   a) $PdF_4$ b) $PdCl_4$ c) $PdBr_4$ d) $PdI_4$
6. Silicones contain
   a) C, O and Si b) C and Si c) O and Si d) C, N, O and Si
7. Which of the following exhibit the lowest bonding energy?
   a) HF b) HCl c) HBr d) HI
8. Carborundum is
   a) $CaC_2$ b) $Fe_3C$ c) $CaCO_3$ d) SiC
9. Which of the following oxides is an amphoteric oxide?
   a) $CO_2$ b) $SiO_2$ c) $GeO_2$ d) $PdO_2$
10. Which of the following elements does not belong to Group 14?
    a) Carbon b) Silicon c) Germanium d) Arsenic
11. Which of the following metals has the largest abundance in the earth's crust?
    a) Aluminum b) Calcium c) Magnesium d)Sodium

12. The number of alkali metals known so far is
    a) 4 b) 5 c) 6 d) 7

13. Which of the following is boric acid
    a) $HBO_2$ b) $H_3BO_3$ c) $H_2B_4O_7$ d) $B_2O_3$

14. Which of the following is not the mineral of calcium?
    a) Gypsum b) Dolomite c) Talc d) Fluorspar

15. Quick lime is
    a) $CaCo_3$ b) $Ca(OH)_2$ c) CaO d) $CaSO_4$

16. Magnesium is recovered from seawater using
    a) Ammonia soda process b) Downs cell
    c) Dow process d) Castner-Kellner cell

17. Which of the following ions has the higher reduction potential?
    a) $Li^+$ b) $Na^+$ c) $K^+$ d) $Rb^+$

18. Hard water is
    a) $H_2O$ containing certain salts b) $D_2O$
    c)$T_2O$ d) a mixture of $D_2O$ and $T_2O$

19. The radioactive isotope of hydrogen as
    a) Protium b) Deuterium
    c) Tritium d) Deuterium at very high temperature

20. Cupellation is a process used for the refining of
    a) Silver b) lead c) copper d) iron

21. The composition of cuprite is
    a) $Cu_2S$ b) $CuFeS_2$ c) $Cu(OH)_2.CuCO_3$ d)$Cu_2O$

22. The main ore of aluminum is
    a) bauxite b) alumina c) potash alum d) cryolit

23. Which one of the following is the electropositive element?
    a) Sodium b) Calcium c) Aluminum d) Silicon

24. Which one of the following will have the least size?
    a) Lithium b) Beryllium c) Sodium d) Magnesium

25. The valence electrons in $_9F$ are
    a) 4 b) 5 c) 6 d) 7

26. The elements with atomic numbers 2, 10, 18, 36, 54 and 86 are all
    a) halogens b) nobels gases
    c) first transition element d) alkali metals



27. Which of the following enzymes convert starch into maltose?
    a) Maltase b) Diastase c) Zymase d) Invertase

28. Which of the following statement is not correct?
    a) Physical adsorption is monolayer
    b) Physical adsorption is reversible in nature
    c) Physical adsorption involves low activation energy
    d) The extent of physical adsorption decrease with increase in temperature

29. Chemisorption
    a) Involves the weak attraction interaction between the adsorption and adsorbate
    b) is irreversible in nature
    c) decreases with increase in temperature
    d) involves multilayer adsorption

30. Which one of the following characteristics is not correct for physical adsorption?
    a) Both enthalpy and entropy of adsorption are negative
    b) Adsorption on solids is reversible
    c) Adsorption increases with increase in temperature
    d) Adsorption is spontaneous

31. The use of a catalyst help in
    a) increasing the rate of forward reaction only
    b) increasing the rate of backward reaction only
    c) increasing the rates of both forward and backward reactions
    d) increasing the relative amounts of products

32. The units of rate constant and rate of reaction are identical of
    a) zero-order reaction b) first-order reaction
    c) second-order reaction d) reversible reaction

33. For a reaction A → products, following zero order kinetics, the change in concentration of A with time
    a) decrease linearly b) increase linearly
    c) decrease exponentially d) increase exponentially

34. The reaction involving two different reactants can never be a
    a) second order reaction b) bimolecular reactions
    c) unimolecular reaction d) first order reaction

35. The cell emf depends on
    a) temperature b) the size of anode
    c) the size cathode d) volume of the electrolytic solution

36. The anode of the cell might be
    a) Mn b) Fe c) Pt d) Hydrogen

37. The highest electrical conductivity of the following aqueous solution is of
    a) 0.1 M fluoroacetic acid b) 0.1 M difluoroacetic acid
    c) 0.1 M acetic acid d) 0.1 M chloroacetic acid

38. The ionic mobility of alkali metal ions in aqueous solution is maximum for
    a) $Na^+$ b) $K^+$ c) $Rb^+$ d) $Li^+$

39. The oxidation number of an oxidant in a redox reaction
    a) is increased b) is decreased
    c)does not change d) cannot be predicted

40. Which of the following expression is true?
    a) I = Qt b) I = Q/t c) I = 1/Qt d) I = t/Q

41. The compound that is not a Lewis acid is
    a) $BF_3$ b) $AlCl_3$ c) $BeCl_2$ d) $SnCl_4$

42. The solution of NaCN is
    a) acidic in nature b) alkaline in nature c) neutral in nature
    d) acidic at low temperature, neutral at room temperature and alkaline at high temperature

43. $EDTA^{4-}$ is ethylenediaminetetraacetate ion. The total number of N-Co-O bond angle in $[Co(EDTA)]^{1-}$ complex ion is
    a) 4 b) 2 c) 8 d) 10

44. Regular use of which of the following fertilizers increases the acidity of soil?
    a) Potassium nitrate b) Urea
    c) Superphosphate of lime d) Ammonium sulphate

45. For pure water,
    a) pH increases with increase in temperature
    b) pH decreases with increases temperature
    c) pH = 7 and is independent of temperature
    d) pH increases at low temperature but decrease at high temperature

46. When rain is accompanied by a thunderstorm the collected rain water will have a pH value
    a) Which depends on the amount of dust in air
    b) slightly lower than that of rain water without thunderstorm
    c) slightly higher than that when the thunderstorm is not there
    d) uninfluenced by occurrence of thunderstorm

47. KI in acetone, undergoes $S_N2$ reaction with each of P, Q, R and S. The rates of the reaction vary as
    a) P > Q > R > S  b) S > P > R > Q
    c) P > R > Q > S  d) R > P > S > Q

48. Concentrated nitric acid, upon long standing, turns yellow-brown due to the formation of
    a) NO  b) $NO_2$  c) $N_2O$  d) $N_2O_4$

49. Sulfide ores are common for the metals
    a) Ag, Cu and Pb  b) Ag, Cu and Sn
    c) Ag, Mg and Pb  d) Al, Cu and Pb

50. The equilibrium constant of a reaction depends on the
    a) temperature of the system  b) catalyst
    c) amount of species involved  d) volume of the system

51. Which of the following molecules is paramagnetic?
    a) $C_2$  b) $N_2$  c) $O_2$  d) $F_2$

52. Which of the following species has the shortest bond length?
    a) $N_2^+$  b) $N_2$  c) $N_2^-$  d) $N_2^{2-}$

53. According to the VSEPR theory, the arrangement of lone pair of an atom containing a total of five such pairs is
    a) trigonal planar  b) tetrahedron
    c) trigonaldipyramid  d) octahedron

54. In a N-type semiconductor, there are
    a) immobile negative ions  b) no minority carriers
    c) immobile positive ions  d) holes as majority carriers

55. Chlorine reacts with benzaldehyde to give
    a) benzyl chloride  b) benzal chloride
    c)benzoyl chloride  d) chlorobenzene

56. Upon treatment with ammonical $H_2S$, the metal ion that precipitates as a sulfide is
    a) Fe(III)  b) Al(III)  c) Mg(II)  d) Zn(II)

57. Benzene and naphthalene from an ideal solution at room temperature. For this process, the true statement(s) is
a) $\Delta G$ is positive b) $\Delta S_{system}$ is positive
c) $\Delta S_{surrounding} = 0$ d) $\Delta H = 0$

58. Which of the following molecules will have a permanent dipole moment?
a) $SiF_4$ b) $XeF_4$ c) $SF_4$ d) $BF_3$

59. Which of the following compounds is optically active?
a) $Pt(NH_3)Cl_2$ b) $Ni(CO)_2(PPh3)_2$
c) trans-$Co(en)_2Cl_2$ d) cis-$Co(en)_2Cl_2$

60. The formula of ethylene diamine tetraacetochromate(III) is:
a) $[Cr(EDTA)]^0$ b) $[Cr(EDTA)]^-$
c) $[Cr(EDTA)]^{2-}$ d) $[Cr(EDTA)]^{3-}$

61. $NO^{2+}$ is:
a) oxidizing agent b) Lewis acid c) non-inear d) nitrating agent

62. Sucrose is
a) α–glucopyranosyl-β –fructofuranosid
b) α–glucopyranosyl- α –fructofuranoside
c) β –glucopyranosyl- α –fructofuranoside
d) β –glucopyranosyl- β –fructofuranoside

63. Carbon-Carbon bond order in $C_2^{2-}$ is
a) 1 b) 2 c) 3 d) 4

64. Which of the following elements will form the least stable superoxide?
a) Na b) K c) Rb d) Cs

65. Which of the following statements regarding diborane is *NOT* correct?
a) It is an electron deficient molecule
b) There is free rotation about B-B bond
c) The bonding of two hydrogens is of one type whereas the bonding of the other four is of different type
d) Its final hydrolysis products are hydrogen and boric acid

66. Which of the following statements is *NOT* correct about freons?
a) They are gases at room temperature
b) They are hydrolysed by water c) They are thermally stable
d) they are chlorofluorocarbons



67. Which of the following statements is *NOT* correct?
a) Ionic azides are more stable than covalent azides
b) Azide ion has an angular shape
c) Hydrazine is thermally unstable
d) Hydrazine forms complexes with transition metal ions

68. FIBr and HI reduce $H_2SO_4$, FICl can reduce $KMnO_4$ and IlF can reduce
a) $H_2SO_4$ b) $KMnO_4$ c) $K_2Cr20_7$ d) None of the above

69. Malachite is a mineral of
a) manganese b) magnesium c) tin d) copper

70. Which of the following cations imparts violet colour to a Bunsen flame?
a) Sodium b) Potassium c) Calcium d) Barium

71. o-Nitrophenol is steam volatile whereas p-nitrophenol is not. This is due to :
a) the presence of intramolecular hydrogen bonding in p-nitrophenol
b) higher dipole moment of o-nitrophenol
c) the presence of intramolecular hydrogen bonding in o-nitrophenol
d) the presence of intermolecular hydrogen bonding in o-nitrophenol

72. Chloride of which of the following will be coloured?
a) Ag (I) b) Hg (II) c) Co(II) d) Zn(II)

73. Oppenauer oxidation is the reverse of :
a) Wolff-Kishner reduction b) Birch reduction
c) Ciemmensen reduction d) Meerwein-Ponndorf-Verley reduction

74. The number of amino acid unit in haemoglobin is
a) 554 b) 564 c) 574 d) 584

75. Which is an electrolyte?
a) $AgNO_3$ solution b) ethanol c) mercury d) sugar

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**B.Sc. Chemistry** Degree (Semester) Examinations, April 2016
Part – IV : Skill Based Subject : Sixth Semester : Paper – I

**ANALYTICAL METHODS IN CHEMISTRY**
Under CBCS – Credit 2

Time: **2** Hours Max. Marks: **75**

## SECTION – A

**Answer ALL Questions :** **(10 × 1 = 10)**

1. Among the following statement which is not correct about analytical methods
   a) it is very fast
   b) it is very expensive than the conventional methods
   c) always accurate d) atmospheric pressure
2. Column chromatography separates molecules according to their
   a) molecular size b) solubility c) polarity d) matrix
3. TLC is an example of _____ chromatography.
   a) adsorption b) partition c) ion exchange d) none of these
4. In cyclic voltammetry the potential applied in a _____ fashion.
   a) linear b) circular c) triangular d) pepenticular
5. The life time of fluorescence is _____ than/to the phosphorescence.
   a) greater b) smaller c) equal d) none of these
6. What do you mean by analytical methods?
7. Give comparisons between adsorption and partition chromatography.
8. What is current density?
9. Define molar absorptivity.
10. Give an example for fluorescent active molecule.

## SECTION – B

**Answer ALL Questions :** **(4 × 10 = 40)**

11. a) Discuss the advantages and limitations of instrumental methods.
    **(OR)**
    b) What is qualitative and quantitative analysis? Discuss with suitable example.
12. a) Write a note on column chromatography. Discuss how compounds can be separated and identified by column chromatography?
    **(OR)**
    b) i) What is $R_f$ value ii) What are the significances of $R_f$ value? iii) Discuss the factors affecting the $R_f$ value. **(2 + 4 + 4)**
13. a) Discuss the limitations of Beer-Lamber's law.
    **(OR)**
    b) Explain how spectro-analytical technique can be used as qualitative and quantitative analysis.
14. a) Illustrate fluorescence and phosphorescence with the help of Jablonski diagram.
    **(OR)**
    b) i) Describe the applications of fluorescence spectroscopy. **(5+5)**
    ii) Explain how the scan rate affects the current density in cyclic voltammetry.

## SECTION – C

**Answer any TWO Questions :** **(2 × 12½ = 25)**

15. Explain briefly about the thin layer chromatography. Mention its uses in analytical methods.
16. i) Discuss the principle and instrumentation of cyclic voltammetry.
    ii) How will you test the reversibility of a chemical species by cyclic voltammetry. **(6 + 4)**
17. i) Derive the equation of Beer-Lambert's law. **(5 + 5)**
    ii) How will you determine the concentration of nickel ion by spectro analytical technique?

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