07AT02

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

(Autonomous & Residential)

[Affiliated to Madurai Kamaraj University]

B.Sc. (Bot. / Zoo.) Degree (Semester) Examinations, April 2017

Part – III : Allied Subject : Second Semester : Paper – II

INORGANIC, ORGANIC & PHYSICAL CHEMISTRY

Under CBCS – Credit 4

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

SECTION – A

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

1. According to Bronsted-Lowry concept, an acid is a _____.
   a) proton – donor b) proton – acceptor
   c) conjugate acid – base pairs d) none of these
2. _____ is an example of Arrhenius concept in acids and bases.
3. _____ is also commonly used in agricultural and household pest control.
4. _____ is an example of organo phosphorous insecticides.
   a) Malathion b) DDT c) BHC d) Dieldrin
5. Aminoacids are the building blocks of _____.
   a) oil b) fat c) carbohydrate d) proteins
6. A protein which is present in the hair is _____.
7. _____ is defined as the energy released when one mole of a solid ionic crystal is formed from its gaseous ion.
8. _____ is the example of inter molecular hydrogen bonding.
   a) HF b) o – nitrophenol
   c) salicylaldehyde d) acetoacetic ester
9. Which is responsible for ozone depletion?
   a) $CFCs$ b) SO_2 c) H_2O d) All of these
10. Pollutants enter a biological system from _____.

SECTION – B

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

11. a) Write short notes on Arrhenius concept of acids and bases. Give a suitable example.

    (OR)

    b) Explain the SHAB principle and its applications.
12. a) Define pesticides. Discuss the classification of pesticides.

    (OR)

    b) Write the characteristics of pesticides.
13. a) Write a note on polypeptides.

    (OR)

    b) Explain the biological functions of Vitamin – A.
14. a) Discuss the importance of lattice energy.

    (OR)

    b) Define hydrogen bond. Explain the classification of hydrogen bond.
15. a) Explain the green house effect.

    (OR)

    b) Define water pollution. Discuss the classification of water pollution.

SECTION – C

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

16. Describe the Usanovich concept of acid- base reactions.
17. Explain the environmental effects of pesticides.
18. Write the sources and biological functions of vitamin – C.
19. Describe the brief account on Born- Haber cycle.
20. Explain the harmful effects of water pollution and the methods used to control it.

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

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B.Sc. Physics Degree (Semester) Examinations, April 2017

Part – III : Allied Subject : Second Semester : Paper – II

INORGANIC, ORGANIC & 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 not a periodic property?

   a) Atomic volume b) Ionisation energy

   c) Electron affinity d) Colour

2. Fluorescence starts as soon as the substance is exposed to _____.

   a) Heat b) Light c) Air d) None of these

3. The occurrence of the same substance in more than one crystalline forms is known as _____.

   a) Apomorphism b) Hypsomorphism

   c) Hypomorphism d) Polymorphism

4. Among the following equations, which one is Nernst equation?

   a) $E = E^o + \frac{2.303\ RT}{nF} \log K$ b) $E = E^o - \frac{2.303\ RF}{nT} \log K$

   c) $E = E^o - \frac{2.303\ RT}{nF} \log K$ d) $E^o = E - \frac{2.303\ RT}{nF} \log K$

5. In partition chromatography one of the liquids is _____.

   a) water or alcohol b) benzene or chloroform

   c) CCl_4 or ether d) $DMSO$ or dichloromethane

6. The van der Waals radius of hydrogen is _____.

7. Quantum efficiency may be defined as the number of _____ reacting per Einstein of the light absorbed.
8. Sugar and salt are _____ solids.
9. The calomel electrode is the most commonly used _____ standard reference electrode.
10. In adsorption chromatography the _____ phase is solid.

SECTION – B

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

11. a) Which element of the following pairs have the smaller ionization energy? Justify your answer. **(2½ + 2½ + 2)**

(i) *Ca or Be* (ii) *Ca or K* (iii) *Cl or I*

(OR)

b) Write brief notes on the following **(3½ + 3½)**

(i) Electron affinity (ii) Ionic radius

12. a) (i) State and explain Grotthus law. **(4 + 3)**

(ii) Explain the term phosphorescence.

(OR)

b) Write notes on the following **(3 ½ + 3 ½)**

(i) Chemiluminescence (ii) Photosynthesis

13. a) Explain the following terms used in crystallography.

(i) Face (ii) Edge (iii) Interfacial angle **(2 + 2½ + 2½)**

(OR)

b) Explain the terms **(2½ + 2½ + 2)**

(i) Allotropy (ii) Crystal lattice (iii) Space lattice

14. a) What are Faraday's law's of electrolysis? Discuss their importance.

(OR)

b) Explain what is meant by specific conductance and equivalent conductance. How are they related to one another?

15. a) Write explanatory note on column chromatography.

(OR)

b) Discuss briefly the principle underlying thin layer chromatography.

SECTION – C

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

16. What is meant by electronegativity of an element? Describe the determination of electronegativity by Pauling and Mulliken's methods.
17. a) Bring out the points of difference between thermochemical reactions and photochemical reactions. **(5 + 5)**

b) Discuss Lambert's law of transmission of light

18. a) List the points of difference between crystalline and amorphous solids. **(5 + 5)**

b) Describe different types of unit cells.

19. Discuss the experimental method giving details of the theory, for the determination of *pH* of a buffer solution by the use of quinhydrone electrode.
20. Describe the paper chromatographic technique for the separation of mixtures of compounds available in small amounts.

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VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

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[Affiliated to Madurai Kamaraj University]

B.Sc. Chemistry Degree (Semester) Examinations, April 2017

Part – III : Core Subject : Second Semester : Paper – I

INORGANIC & ORGANIC CHEMISTRY

Under CBCS – Credit 4

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

SECTION – A

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

1. What is bond order of N_2 molecule?

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

2. Which one act as anaesthetic agent

   a) Carbon tetrachloride b) ethyl chloride

   c) chloroform d) methyl chloride

3. Rectified spirit is

   a) 100% Ethyl alcohol b) 100% n – Propyl alcohol

   c) 100% Methyl alcohol d) 95 % Ethyl alcohol

4. Ketones react with Grignard reagents to form an addition product which on acid hydrolysis gives a

   a) Primary alcohol b) Secondary alcohol

   c) Tertiary alcohol d) Ketal

5. Freon is used for

   a) Refrigeration b) dry washing c) bleaching d) none of these

6. Define sigma and pi bonds.

7. How is CCl_4 prepared?

8. Write the preparation of benzyl alcohol.

9. What are organometallic compounds? How are they named?

10. How will you synthesize allyl iodide from glycerol?

SECTION – B

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

11. a) Draw the molecular orbital diagram of H_2 *and* O_2 molecules.

    (OR)

    b) Describe the VSEPR theory with suitable examples.

12. a) Write the preparation and properties of methyl chloride.

    (OR)

    b) Describe the mechanism of elimination reaction of alkyl halide.

13. a) Explain the preparation and properties of ethylene glycol.

    (OR)

    b) How will you synthesize the following compound from allyl alcohol

    i) Acrolein ii) 2,3-Dibromopropanol iii) Glycerol iv) 1-propanol

14. a) Write short notes on the properties and applications of dialkyl zinc.

    (OR)

    b) Describe the preparation, properties and uses of tetra ethyl lead.

15. a) Describe the preparation and properties of vinyl chloride.

    (OR)

    b) How are the following compounds obtained?

    i) Chloroprene ii) Benzyl chloride iii) Westron

SECTION – C

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

16. Explain the sp, sp^2 and sp^3 hybridisations, with suitable examples.

17. Discuss the mechanism of nucleophilic substitution of S_N1 and S_N2 reactions.

18. a) What happens when

    i) Glycerol is treated with oxalic acid at 260^oC.

    ii) Glycerol is treated with mixture of sulphuric acid and nitric acid.

    iii) Glycerol is treated with $KHSO_4$.

    b) Write any two chemical properties of benzyl alcohol.

19. Explain the preparation and properties of Grignard reagents.

20. How is chlorobenzene prepared? Explain its properties and uses.

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VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

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[Affiliated to Madurai Kamaraj University]

B.Sc. Chemistry Degree (Semester) Examinations, April 2017

Part – III : Core Subject : Second Semester : Paper – II

PHYSICAL CHEMISTRY – I

Under CBCS – Credit 4

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

SECTION – A

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

1. The same atomic weight and different atomic numbers is called

   a) isotopes b) isobars c) isotones d) none of these

2. Hydrogen bomb is an example of _____.

   a) nuclear fission b) nuclear fusion c) cyclotron d) All of these

3. The smallest part of a crystal is

   a) unit cell b) polymorphism c) space lattice d) none of these

4. The number of atoms in a fcc unit cell is

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

5. Molecular crystal is generally observed in

   a) ZnS b) KCl c) FeS d) H_2O

6. What is mass defect?

7. What is radioactive series?

8. What is meant by allotropy?

9. Sketch the 111 plane of a cubic crystal.

10. Mention the definition of covalent crystals.

SECTION – B

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

11. a) Illustrate: i) Packing fraction ii) Magic numbers

(OR)

b) Explain the detection and separation of isotopes.

12. a) State and explain the laws of radioactivity.

(OR)

b) Write note on cyclotron.

13. a) Explain the properties of solids.

(OR)

b) How are solids classified?

14. a) Derive the Bragg's equation.

(OR)

b) Discuss the crystal structure of X-ray by rotating crystal method.

15. a) Write note on ionic crystals.

(OR)

b) State and explain the band theory of solids.

SECTION – C

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

16. Define nuclear model. Explain its different models.
17. Discuss the applications of radioactivity in medicine and agriculture fields.
18. Describe the different laws of crystallography.
19. Explain the following a) Applications of X-ray

    b) Determination of wavelength of X-ray
20. Describe in detail about the various defects in crystals.

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B.Sc. Chemistry Degree (Semester) Examinations, April 2017

Part – III : Core Subject : Fourth Semester : Paper – I

ORGANIC CHEMISTRY 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 compounds will not give benzoic acid with $KM_nO_4 / \overset{\ominus}{O}H$.

   a) $C_6H_5CH(CH_3)_2$ b) $C_6H_5CH_2OH$

   c) $C_6H_5-C(CH_3)_2-CH_2OH$ d) $C_6H_5-CH(CH_3)-COOH$

2. On heating an aqueous solution of benzene diazonium chloride in presence of an excess of ethyl alcohol gives

   a) Dimethyl ether b) Methyl phenyl ether

   c) Ethyl phenyl ether d) Acetophenone

3. Oxidation of sucrose with concentrated nitric acid yields _____.

   a) Oxalic acid only b) Tartaric acid only

   c) Both oxalic acid and tartaric acid

   d) A mixture of oxalic acid, tartaric acid and D – glucaric acid

4. Rheochor is

   a) additive only b) constitutive only

   c) both additive and constitutive d) none of these

5. Henry's law may be mathematically expressed as

   a) $C = kp$ b) $C = kpT$ c) $C = kT$ d) $C = pT$

6. When glycine is treated with $Ba(OH)_2$, the product formed is _____.

7. Ethyl acetoacetate when reduced with sodium amalgam forms _____.
8. Sucrose reacts with acetic anhydride in the presence of sodium acetate to form _____.
9. A compound that can rotate the plane of polarized light is called _____.
10. In the multiple extraction process the _____ solution is first extracted with a portion of the solvent in a separatory funnel.

SECTION – B

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

11. a) i) Explain why mono, di and trichloro acetic acids are stronger than acetic acid? **(5 + 2)**

ii) Why is acetic acid weaker than formic acid?

(OR)

b) i) What are the products obtained on heating α, β *and* γ hydroxyl acids alone. **(5 + 2)**

ii) How would you prepare anthranilic acid from phthalimide?

12. a) Give a brief account of the formation and reactions of glyoxalic acid.

(OR)

b) Discuss the preparation and properties of acetoacetic acid.

13. a) How will you convert glucose into fructose and vice versa?

(OR)

b) i) Starting from glucose how will you prepare

(I) Sorbitol (II) Glucaric acid **(2 + 2)**

ii) Why glucose and fructose give the same osazone? **(3)**

14. a) i) How is parachor helpful in the elucidation of structure of molecules? **(5 + 2)**

ii) Dipole moment of carbon dioxide is zero, while that of sulphur dioxide is 1.6 D. Explain.

(OR)

b) Explain the terms i) Diamagnetism

ii) Paramagnetism iii) Molar refraction **(2 + 2 + 3)**

15. a) Give details of liquid – liquid chromatography.

(OR)

b) i) State and explain the Nernst's distribution law. **(4 + 3)**

ii) Narrate the limitations of distribution law.

SECTION – C

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

16. a) How would you convert salicylic acid into following compounds.

(i) Benzene (ii) Phenol (iii) Benzoic acid

(iv) Aspirin (v) Salol **(5 × 1½ = 7½)**

b) Formulate the reaction of alanine with the following reagents.

(i) Acetic anhydride (ii) Aq. NaOH **(1½ + 1 = 2½)**

17. How will you synthesise the following compounds from diethyl malonate. **(5 × 2 = 10)**

a) Crotonic acid b) Succinic acid c) Barbituric acid

d) Cyclopropane carboxylic acid e) Ethyl methyl ketone

18. a) Write a note on (i) Mutarotation (ii) Epimerization **(3 + 3)**

b) Discuss any two applications of cellulose derivatives. **(4)**

19. a) Define surface tension. What is the effect of temperature on the surface tension of a liquid? **(5 + 2½ + 2½)**

b) Write notes on (i) Dunstan Rule (ii) Molar viscosity

20. Discuss any four important applications of distribution law.

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B.Sc. Chemistry Degree (Semester) Examinations, April 2017

Part – III : Core Subject : Fourth Semester : Paper – II

INORGANIC CHEMISTRY – I

Under CBCS – Credit 4

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

SECTION – A

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

1. Which one of the following silicate is ortho silicate?

   a) $[Si_2O_7]^{6-}$ b) $[SiO_4]^{4-}$ c) $[Si_3O_9]^{6-}$ d) $[Si_2O_5]^{2-}$

2. Which one is damaging the ozone layer in the upper atmosphere?

   a) Freon b) UV ray c) CO_2 d) X ray

3. $BF_3 + NH_3 \rightarrow H_3N \rightarrow BF_3$ _____ acid-base concept is follow in this reaction.

   a) Bronsted-Lowry b) Arrhenius c) Lewis d) HSAB

4. Uranyl zinc acetate is used to identify _____ metal.

   a) Sodium b) Aluminium c) Chromium d) Potassium

5. Borane compounds are _____ compounds.

   a) Electron rich b) Electron deficient

   c) Ionic d) None of these

6. HF have higher boiling point than other hydrogen halides due to _____.

7. Zeolites act as _____ catalyst.

8. Aqua regia is a mixture of _____.

9. Write the structure of DMG.

10. Write any one use of Borane.

SECTION – B

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

11. a) Write the classification of silicates and their structure.

(OR)

b) Write short note on 3-D silicates, classification and their properties.

12. a) i) Explain the anomalous behavior of Fluorine. **(4 + 3)**

ii) Draw the structure and explain the bonding of $(ICl_3)_2$.

(OR)

b) i) What is the order of acid strength for the following HClO, $HClO_2$, $HClO_3$, $HClO_4$? Justify your answer. **(2 + 5)**

ii) What is inter halogen? Give any four examples and their properties.

13. a) i) Write note on the physical and chemical properties a liquid ammonia as a non-aqueous solvent.

ii) Why is color change occurred while an alkali metal is added to Liq- NH_3?

(OR)

b) Discuss the theoretical background, practical uses and limitation of SO_2 as non-aqueous solvent.

14. a) How do you use the following reagents in inorganic qualitative analysis? Explain with equations.

i) Magneson

ii) Aluminon reagent

iii) DMG

(OR)

b) Write the structure and uses of the following reagents

i) Cupron

ii) Rhodamine – B

iii) Dimethyl glyoxime

iv) Thiourea

15. a) i) Write the preparation of ammonia adduct of BH_3, and why direct reaction is not possible? **(3 + 4)**

ii) Define structure and bonding models of B_4H_{10}.

(OR)

b) i) Define the Wad's rule.

ii) Describe the structure of following compounds

a) B_5H_9 b) B_5H_{11} c) B_6H_{10} d) $B_{10}H_{14}$

SECTION – C

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

16. Brief note on preparation, properties and uses of silicones.

17. a) Explain the modern method of isolation of fluorine. **(4 + 3 + 3)**

b) Explain the basic nature of iodine.

c) Write short note on the biological importance of halides.

18. a) Explain the various theories of acid-base concept. **(5 + 5)**

b) Discuss about the Pearson"s HSAB concept.

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

20. Explain the preparation, properties, structure and bonding models of diborane.

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B.Sc. Chemistry Degree (Semester) Examinations, April 2017

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. Terylene is the polymer of

   a) Ethylene glycol and terephthalic acid

   b) Hexamethylenediamine and adipic acid

   c) Phenol and formaldehyde d) Urea and formaldehyde

2. The rearrangement of alkyl phenyl ethers to ortho – alkyl phenols is known as _____ rearrangement.

   a) Orton b) Claisen c) Curtius d) Benzidine

3. IUPAC name of furan is _____.

   a) Azole b) Azolidine c) Oxole d) Oxane

4. Which one of the following is required for normal pregnancy in female?

   a) Testosterone b) Ascorbic acid c) Sulphapyridine d) Progesterone

5. How many ^{1}H NMR signals you will get for 1, 1, 2 – tribromoethane?

   a) 1 b) 2 c) 3 d) 4

6. Define the term polymer.

7. What are supporting electrolytes?

8. How will you prepare thiophene?

9. Draw the structure of camphor.

10. What is meant by auxochrome?

SECTION – B

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

11. a) Differentiate between linear, branched and cross linked polymers.

(OR)

b) What are addition and condensation polymers?
Give examples of each.

12. a) Write briefly on the electro reduction of acetophenone.

(OR)

b) i) Narrate the mechanism of Wagner – Meeruion rearrangement.
ii) Write a note on working electrode. **(4 + 3)**

13. a) i) Discuss the extraction of alkaloids.
ii) Explain the aromatic character of pyrrole. **(4 + 3)**

(OR)

b) How are the following prepared?
i) Pyridine ii) Isoquinoline **(3 + 4)**

14. a) Describe the applications of sulphanilamide and sulphathiazole.

(OR)

b) Explain the importance of thyroxine and thiamine.

15. a) Discuss the factors influencing the chemical shift.

(OR)

b) i) Indicate what ^{1}H NMR spectra would you expect for the following compounds. a) Acetaldehyde b) Toluene **(2+2)**
ii) Discuss the electronic transations in the UV region. **(3)**

SECTION – C

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

16. Explain number average and weight average molecular weights of polymers.

17. Dicuss the mechanism of
a) Fries rearrangement
b) Hofmann rearrangement
c) Beckman rearrangement **(3 + 3 + 4)**

18. How are the following compounds synthesized?
a) Nicotine b) Quinine c) Indole **(4 + 4 + 2)**

19. a) Explain the general properties of terpenes.
b) Give the synthesis of Citral. **(5 + 3)**

20. Discuss the following
a) Finger print region in IR spectroscopy
b) Spin – spin coupling
c) Hypsochromic shift **(3 + 4 + 3)**

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B.Sc. Chemistry Degree (Semester) Examinations, April 2017

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. The time for half change is independent of the initial concentration of the reactant for a _____ order reaction.
   a) first b) second c) third d) zero
2. _____ is an example of second order reaction.
3. H_2O molecule belongs to the point group.
   a) C_{3V} b) C_{2V} c) D_{2d} d) D_{2h}
4. All the symmetry operations present in a molecule to form a group are generally called _____.
5. Which one of the following is microwave active?
   a) hydrogen b) carbondioxide
   c) hydrogen chloride d) oxygen
6. The study of the interaction of electromagnetic radiations with molecules is called _____.
7. Which one of the following is IR active?
   a) hydrogen b) carbondioxide c) benzene d) oxygen
8. The Raman lines of frequency lower than that of the incident beam are called _____.
9. The ESR spectrum is shown by
   a) benzene b) toluene c) methane d) methyl radical
10. The NMR spectrum of ethanol consists of _____ signals.

SECTION – B

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

11. a) Write a short note on: i) Order of a reaction
    ii) Molecularity of a reaction
    (OR)
    b) Discuss the characteristics of zero order reactions.
12. a) Define symmetry elements. Discuss the types of symmetry elements.
    (OR)
    b) Prove that C_{2V} is an abelian group.
13. a) Explain the condition for a molecule to be microwave active.
    (OR)
    b) How is determined the moment of inertia of diatomic molecule by rigid rotator model?
14. a) Explain the modes of vibrations and IR activity in the following molecules: i) CO_2 ii) H_2O
    (OR)
    b) Write the differences between Raman and IR spectra.
15. a) Explain the NMR spectra of ethanol molecule.
    (OR)
    b) Discuss the ESR spectra of hydrogen atom.

SECTION – C

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

16. Derive the rate constant of first order reaction.
    Discuss the unit and time for half change of first order reactions
17. Explain the point group for water and ammonia molecules.
18. Describe the theory of rotational spectra of diatomic molecules.
19. Explain the quantum theory of Raman effect.
20. Write short notes on: i) Nitrogen rule.
    ii) General principle of fragmentation pattern in Mass spectroscopy.

07EP62

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

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[Affiliated to Madurai Kamaraj University]

B.Sc. Chemistry Degree (Semester) Examinations, April 2017

Part – III : Elective Subject : Sixth Semester : Paper – II

NANOCHEMISTRY

Under CBCS – Credit 5

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

SECTION – A

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

1. Which of the following is best suited to get the surface view of an object?

   a) *SEM* b) *TEM* c) Both a and b d) none of these

2. 1 nanometer is _____.

   a) 10^{-9} b) 10^{-8} c) 10^{-7} d) 10^{-6}

3. The most important property of nanomaterials is

   a) force b) friction c) pressure d) temperature

4. _____ is used to molecular cell – assembly.

   a) nanosensor b) nanoscale c) nanorobot d) nanotube

5. _____ is used in single molecule detectors.

   a) nanosensor b) nanopores c) nanoparticles d) nanotube

6. What is nanoscale?
7. What is quantum dot?
8. What is semiconductor?
9. Define sensor.
10. Give the definition of nanoshells.

SECTION – B

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

11. a) Differences between the nanotechnology and biology.

    (OR)

    b) Write an account of *TEM*.

12. a) Write about the synthesis in confined media.

    (OR)

    b) Write note on the molecular precursors.

13. a) Define and explain the nanocrystals.

    (OR)

    b) Give a brief account of Nobel metal materials.

14. a) Explain in briefly the electrochemical sensors.

    (OR)

    b) Write short note on nano biosensors.

15. a) Explain about the nanotechnology in diagnostics applications.

    (OR)

    b) Write note on the nanopores.

SECTION – C

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

16. Discuss the principle and instrumentation of *SEM*.
17. Explain detail the synthesis and uses of quantum dots.
18. Discuss the applications of nanobiology.
19. Discuss the importances of sensor of the future.
20. Write note on a) gold nanoparticles b) magnetic nanoparticles

07NE21

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

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B.A. / B.Sc. Degree (Semester) Examinations, April 2017

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. Rubella is caused by

   a) Virus b) liver damage

   c) yellowish skin d) all the above

2. MMR is a

   a) Tablet b) vaccine c) pain killer d) non of there

3. Cholera is associated with

   a) Head ache b) tooth ache c) diarrhoea d) bleeding

4. The normal sugar level in Blood is _____.

   a) 30 mg in 100 ml b) 150 mg in 100ml

   c) 120 mg in 100ml d) 50 mg in 100ml

5. Penicillin was discovered by

   a) Paul Elrich b) Alexander Fleming

   c) Wakes Mann d) Fisher

6. What is mean by pharmacognesy?
7. Write the symptoms of tuberculosis?
8. What is Insulin?
9. What is systolic?
10. What is protein?

SECTION – B

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

11. a) Define: drug target, enzymes, receptors, carrier proteins.

    (OR)

    b) Distinguish between Heredity and Infective diseases with suitable example.

12. a) Write a note on mumps.

    (OR)

    b) Describe the symptoms, treatment and vaccination of rubella.

13. a) Discuss in detail about of typhoid fever.

    (OR)

    b) What are the prevention measures for cholera?

14. a) Write a note on Blood pressure.

    (OR)

    b) Discuss type I and type II diabetes.

SECTION – C

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

15. Define: a) Drug

    b) pharmacology

    c) pharmacokinetics

    d) phormacodynamics

    e) pharmacology

16. Discuss insect and air borne diseases.
17. What do you mean by hepatitis?

    Discuss the symptoms, treatment and vaccination of hepatitis.

07SB4A

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

(Autonomous & Residential)

[Affiliated to Madurai Kamaraj University]

B.Sc. Chemistry Degree (Semester) Examinations, April 2017

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 number of significant figures in 0.0500 are

   a) one b) three c) two d) four

2. Which of the following gases does not contribute to greenhouse effect?

   a) O_3 b) H_2O vapour c) O_2 d) N_2O

3. Newspaper contains a toxic material called?

   a) cadmium b) lead c) manganese d) mercury

4. Gamow's hypothesis is related with

   a) Theory of Relativity b) Big Bang Theory

   c) Photoelectric effect d) Compton effect

5. Water used as moderator in nuclear reactor is called

   a) hard water b) heavy water c) nuclear water d) critical water

6. What is the third liquid Element?

7. Vitamin B_{12} is a coordination compound of which metal?

8. Who killed Napoleon?

9. What is meant by the term 'Electron Microscopy'?

10. Define dental amalgam?

SECTION – B

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

11. a) i) Explain hard-boiled egg? ii) Give the function of Breathalyzer.

(OR)

b) Discuss the essential elements and its importance to human.

12. a) Does ice melt faster in water or air?

(OR)

b) i) Describe the biological significance of Mg and Ca.

ii) Give the uses of Laser.

13. a) Why do we add water to lead storage battery when the water released during discharging is used up in charging?

(OR)

b) i) Why do Lakes Freeze from the top down?

ii) Write the importance of NaCl.

14. a) Ozone is heavier than oxygen, then why it remains higher than O_2 in atmosphere?

(OR)

b) Write short notes on photosynthesis in plant.

SECTION – C

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

15. i) Discuss the evidences of Big Bang Theory.

ii) Define soft water.

16. How do you account for the followings

i) Precipitation reaction.

ii) Chemical fertilizers.

iii) Nuclear fission reaction?

17. Explain the coordination compounds in living systems.

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

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B.Sc. Chemistry Degree (Semester) Examinations, April 2017

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 is a chromophore?
   a) $–NO_2$ b) $–SO_3H$ c) –OH d) –COOH
2. What is the complementary colour of purple?
   a) violet b) green c) red d) purple
3. Deficiency of vitamin C causes
   a) Ascorbic acid tingling b) Beriberi
   c) Pellagra d) scurvy
4. How many known vitamins are there?
   a) 6 b) 13 c) 19 d) 26
5. Which of the following heterocyclic compounds is not aromatic?
   a) Pyridine b) pyrrole c) furan d) piperidine
6. Pyridine reacts with HCl
   a) pyridinium chloride b) 2-chloropyridine
   c) 3-chloropyridine d) all of these
7. When aniline is heated with glycerol in the presence of sulphuric acid and nitrobenzene, it gives quinoline. This reaction in called
   a) Fischer synthesis b) Skraup synthesis
   c) Diazotisation d) Corey-House synthesis
8. Base-catalysed condensation of two ester molecules to form an alcohol and keto ester is called
   a) Corey-House reaction b) aldol condensation
   c) Claisen condensation d) transesterification
9. Which of the following will undergo Beckman rearrangement?
   a) Benzaldehyde b) acetone
   c) methyl phenylketoxime d) Benzophenone
10. Sulpha drugs are all structurally related to
    a) Nitrobenzene b) sulphanilamide c) pyridine d) aniline

11. Indicator used in redox titration is
a) Ericochrome black T b) Methyl orange
c) Phenolphthalein d) Methylene blue

12. The correct order of entropy for various states of CO_2 is
a) $CO_2(s)>CO_2(l)> CO_2(g)$ b) $CO_2(l)>CO_2(s)> CO_2(g)$
c) $CO_2(g)>CO_2(l)> CO_2(s)$ d) $CO_2(g)>CO_2(s)> CO_2(l)$

13. The complexes $[Pt(CN)_4]^{2-}$ and $[NiCl_4]^{2-}$ respectively, are
a) paramagnetic, paramagnetic b) diamagnetic, diamagnetic
c) paramagnetic, diamagnetic d) diamagnetic, paramagnetic

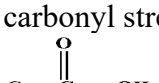
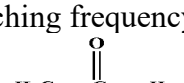
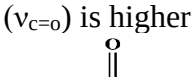
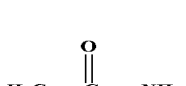
14. The correct order of bond angles in BF_3, NH_3, NF_3 and PH_3 is
a) $BF_3> NH_3> NF_3> PH_3$ b) $PH_3 >BF_3> NF_3>NH_3$
c) $BF_3> PH_3> NH_3> NF_3$ d) $NH_3> NF_3> BF_3> PH_3$

15. For a zero order reaction, the half-life depends on the initial concentration $[C_0]$ of the reactant as
a) $[C_0]$ b) $[C_0]^0$ c) $[C_0]^{-1}$ d) $[C_0]^{1/2}$

16. True statement(s) about Langmuir isotherm is/are
a) valid for monolayer coverage
b) all adsorption sites are equivalent
c) there is dynamic equilibrium between free gas and adsorbed gas
d) all of the above

17. Low spin iron(III) center is present in
a) deoxy for of haemoglobin b) oxy form of haemoglobin
c) hemocyanin d) carbonic anhydrase

18. The kinetics of the reaction $2N_2O_5 \rightarrow 4NO_2 + O_2$ in liquid bromine medium was measured independently for three different initial concentrations of N_2O_5:0.11,0.07 and 0.05molL^{-1}. The half-life of the reaction was found to be 4.5 hours for all these concentrations. The order of the reaction is
a) 0 b) 1 c) 2 d) 0.5

19. The carbonyl stretching frequency ($\nu_{c=o}$) is higher for
(a)  (b)  (c)  (d) 

20. Among the following, the isoelectronic pair is
a) NO and CO b) O^{2-} (superoxide anion) and NO^-
c) NO^+ and CO d) O^{2-} (superoxide anion) and NO^+

21. The carbon-oxygen bond in an organic compound absorbs electromagnetic radiation of frequency 6 x 10^{13} Hz. This frequency corresponds to the region
a) infrared b) microwave c) ultraviolet d) visible

22. The most polar compound among the following is
a) SF_4 b) BF_3 c) XeF_4 d) SO_3

23. The half-life of any zero-order reaction is
a) independent of concentration
b) proportional to the inverse of concentration
c) proportional to concentration
d) proportional to the square of the concentration

24. The pair of semi-metals in the following is
a) Al, Si b) Ge, As c) Sb, Te d) Ca, B

25. The pH of an aqueous solution of Al^{3+} is likely to be
a) neutral b) acidic c) slightly basic d) highly basic

26. The most viscous liquid is
a) water b) methanol c) ethylene glycol d) glycerol

27. The colour of potassium dichromate is due to
a) d-d transition b) transition in K^+ ion
c) ligand to metal charge transfer d) metal to ligand charge transfer

28. Which one of the following configuration will show John-Teller distortion in an octahedral field?
a) High spin d^8 b) High spin d^4 c) High spin d^5 d) Low spin d^6

29. For a zero order reaction, units of the rate constant is expressed as
a) M^1S^{-1} b) M^0S^{-1} c) $M^{-1}S^{-1}$ d) M^0S^0

30. The most abundant element in earth's crust is
a) aluminium b) iron c) silicon d) oxygen

31. The ionic radii of Ca^{2+} and F^- are 100pm and 133 pm respectively, the coordination number of Ca^{2+} in the ionic solid will be
a) 8 b) 6 c) 4 d) 2

32. For irreversible process, the entropy will be
a) ΔS universe > 0 b) ΔS universe > 0
c) ΔS universe = 0 d) ΔS universe ≤ 0

33. Which one of the following does not have sp^2 hybridized carbon?
a) acetone b) acetic acid c) acetonitrile d) acetamide

34. The number of stereoisomers possible for a compound of the molecular formula CH_3-CH=CH-CH(OH)-Me is
a) 3 b) 2 c) 4 d) 6

35. The IUPAC name of neopentane is
a) 2-methylbutane b) 2, 2-dimethylpropane
c) 2-methylpropane d) 2, 2-dimethylbutane

36. Which of the following is the correct order of decreasing SN_2 reactivity? (X= a halogen)
a) $RCH_2X > R_3CX > R_2CHX$ b) $RCH_2X > R_2CHX > R_3CX$
c) $R_3CX > RCHX > R_2CH_2X$ d) $R_2CHX > R_3CX\ RCH_2X$

37. Among the following acids which has the lowest pK_a value?
a) CH_3CH_2COOH b) $(CH_3)_2CH\text{-}COOH$
c) HCOOH d) CH_3COOH

38. The number and type of bonds between two carbon atoms in calcium carbide are
a) two sigma, two pi b) two sigma, one pi
c) one sigma, two pi d) one sigma, one pi

39. Due to the presence of an unpaired electron free radicals are
a) cations b) anions
c) chemically inactive d) chemically reactive

40. One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde havinga molecular mass of 44 u. The alkene is
a) propane b) 1-butene c) 2-butene d) ethane

41. Which one of the following has the minimum boiling point?
a) n-butane b) 1-butane c) 1-butene d) isobutene

42. Point group of BF_3 is
a) C_3v b) D_2h c) D_3h d) $D_\infty h$

43. Which of the following nuclear reactions will generate an isotope?
a) Neutron particle emission b) positron emission
c) α-particle emission d) β-particle emission

44. The ratio of masses of oxygen and nitrogen in a particle gaseous mixture is 1:4 the ratio of number of their molecule is
a) 1 : 4 b) 7 : 32 c) 1 : 8 d) 3 : 16

45. The Bragg's equation for diffraction of X-rays is
a) $2\sin\theta$ b) $\lambda d=2n\sin\theta$ c) $n\lambda=2d\sin\theta$ d) $n\lambda=3d\sin\theta$

46. Consider the following exothermic reaction :

$$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$$

Which of the following changes would not increase the amount of NH_3 produced from given quantitiesof N_2 and H_2?
a) decrease in V b) increase in P
c) remove some NH_3 and re-establish equilibrium d) increase in T

47. The enzyme which can catalyse the conversion of glucose to ethanol is
a) maltase b) diastase c) invertase d) zymase

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

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

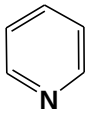
50. Which of the following oxides is an amphoteric oxide?
a) CO_2 b) SiO_2 c) GeO_2 d) PdO_2

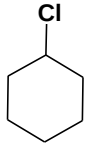
51. The human kidneys purify the blood by _____ through natural membranes
a) osmosis b) diffusion c) dialysis d) emulsification

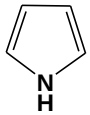
52. Raman spectra is observed in
a) UV region b) visible region
c) IR region d) microwave region

53. Which of the following compounds is not aromatic?

a 

b 

c 

d 

54. The order of stability of carbanion is
a) primary> secondary > tertiary b) secondary > tertiary > primary
c) tertiary> secondary > primary d) tertiary > primary > secondary

55. No two electrons in an atom can have same set of four identical quantum numbers. It is the statement of
a) Aufbau principal b) Hund's rule
c) Pauli's exclusion principle d) none of these

56. Frenkal defect appears in
a) AgI b) ZnS c) AgBr d) All of the these

57. What will be the proportion of moles of metal (Cu:Ni:Ag) at cathode according to the second law of Faraday?
a) 1 : 2 : 1 b) 2 : 2 : 1 c) 1 : 2 : 2 d) 1 : 1 : 2

58. The photosynthesis, the predominant metal present in the reaction center of photosystem II is
a) Zn b) Cu c) Mn d) Fe

59. Amongst the following the most basic compound is
a) p-nitroaniline b) acetanilide c) aniline d) benzylamine

60. Biuret test is not given by
a) carbohydrate b) polypeptides c) urea d) proteins

61. Nylon threads are made up of
a) polyvinyl polymer b) polyester polymer
c) polyamide polymer d) polyethylene polymer

62. HBr reacts with $CH_2=CH-OCH_3$ under anhydrous conditions at room temperature to give
a) CH_3CHO and CH_3Br b) $BrCH_2CHO$ and CH_3OH
c) $BrCH_2-CH_2-OCH_3$ d) $H_3C-CHBr-OCH_3$

63. Butene-1 may be converted to butane by reaction with
a) Zn-HCl b) Sn-HCl c) Zn-Hg d) Pd/H_2

64. Acetylene does not react with
a) Na b) ammonical $AgNO_3$ c) HCl d) NaOH

65. CH_3MgI is an organometallic compound due to
a) Mg-I bond b) C-I bond c) C-Mg bond d) C-H bond

66. Aspirin is known as
a) acetyl salicylic acid b) phehyl salicylate
c) acetyl salicylate d) methyl salicylic acid

67. The correct order of acid strength of the following compounds is
I. phenol II. *p*-cresol III. *m*-nitrophenol IV. *p*-nitrophenol
a) III>II>I>IV b) IV>III>I>II c) II>IV>I>III d) I>II>IV>III

68. What is DDT among the following?
a) Green house gas b) a fertilizer
c) Biodegradable pollutant d) Non-biodegradable pollutant

69. The smog is essentially caused by the presence of
a) O_2 and O_3 b) O_2 and N_2
c) oxides of sulphur and nitrogen d) O_3 and N_2

70. Crossed Cannizzaro reaction can be given by following combination
a) CH_3CHO, HCHO b) C_6H_5CHO, CH_3CHO
c) C_6H_5CHO, HCHO d) all of these

71. Which one has the highest percentage of nitrogen?
a) Calcium nitrate b) Ammonium sulphate
c) Urea d) Ammonium nitrate

72. In a transition series, as the aromatic number increase, paramagnetism
a) increase gradually
b) first increases to a maximum and then decreases
c) decreases gradually
d) first decreases to a minimum and then increases

73. 1 g of hydrogen and 112 g of nitrogen are enclosed in two separate containers each of volume 5 L at 27 ^{0}C. If the pressure of hydrogen is 1 atm, then the pressure of nitrogen would be
a) 12 atm b) 4 atm c) 8 atm d) 16 atm

74. *p*-toluidine and benzyl amine can be distinguished by
a) Sandmeyer's reaction b) Dye test
c) Molisch test d) Gattermann reaction

75. The rate of a reaction double when its temperature changes form 300 K to 310 K. Activation energy of such a reaction will be
(R = 8.314 JK^{-1} mol^{-1} and log 2=0.301)
a) 53.6 kJ mol^{-1} b) 48.6 kJ mol^{-1} c) 58.5 kJ mol^{-1} d) 60.5 kJ mol^{-1}

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VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

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B.Sc. Chemistry Degree (Semester) Examinations, April 2017

Part – IV : Skill Based Subject : Sixth Semester : Paper – III

ANALYTICAL METHODS IN CHEMISTRY

Under CBCS – Credit 2

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

SECTION – A

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

1. Which of 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. TLC is _____ chromatography.
   a) adsorption b) partition c) liquid d) solid
3. Spectroanalytical technique used for _____ analysis.
   a) qualitative b) quantitative
   c) both qualitative and quantitative d) none of these
4. Potential is applied between _____ and _____ electrode.
   a) reference b) working and reference
   c) working and counter d) counter and reference
5. The compounds containing CN is _____ chemicals.
   a) explosive b) poisonous c) flammable d) all of these
6. What do you understand by the term 'analytical chemistry'?
7. Write the principle of chromatography.
8. Define current density?
9. Write Beer's law.
10. Name any two poisonous chemicals.

SECTION – B

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

11. a) Discuss the advantages and limitations of instrumental methods.

(OR)

b) What qualitative and quantitative analysis? Discuss with suitable example.

12. a) Write a note on column chromatography. What are the advantages of column chromatography over TLC?

(OR)

b) i) What is R_f value? **(2)**
   ii) What are the significances of R_f value? **(4)**
   iii) Discuss the factors affecting the R_f value. **(4)**

13. a) Discuss the limitations of Beer-Lamber's law.

(OR)

b) Explain how spectro-analytical technique can be used for qualitative and quantitative analysis.

14. a) Account on storage and handling of corrosive, flammable and toxic chemicals.

(OR)

b) Write a note on waste disposal.

SECTION – C

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

15. How will you use TLC to analyze the mixture of three samples?
16. Explain the principle of cyclic voltammetry. Account on testing the reversibility of an electrochemical reaction by this technique.
17. Write a note on first aid procedures for accident involving acids, alkalis and bromine.