

(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

**B.Sc. (Bot. / Zoo.)** Degree (Semester) Examinations, April 2019 Part – III : Allied Subject : Second Semester : Paper – II

#### **CHEMISTRY FOR BIOLOGIST – II**

Under CBCS - Credit 4Time: 3 HoursMax. Marks: 75

## SECTION – A

# Answer ALL Questions :

 $(10 \times 1 = 10)$ 

- 1. Which one of the following is a base according to Arrhenius?a) CaOb)  $NH_2^-$ c)  $NH_3$ d) NaOH
- 2. Which one of the following is an example for acid according to Usanovich concept?

a) SiO <sub>2</sub>	b) $Na_2O$	c) $SO_3$	d) AlCl <sub>3</sub>
	- / 2 -	5	

- 3. Most favourable conditions for ionic bonding are

  a) low charge on ions, large cation, small anion
  b) low charge on ions, large cation, large anion
  c) high charge on ions, small cation, large anion
  d) high charge on ions, large cation, small anion

  4. The favourable conditions for the formation of H–bonding are
- a) high electronegativity and small size of the atom bonded to H-atom
  b) low electronegativity and large size of the atom bonded to H-atom
  c) high electronegativity and large size of the atom bonded to H-atom
  d) low electronegativity and small size of the atom bonded to H-atom
- 5. An example of a simple protein isa) caseinb) lactalbumin

c) viteline d) haemoglobin

- 6. Primary structure of protein shows
  - a) Orientation of amino acids

c) Amino acid sequence

- b) Arrangement of peptide chains
- d)  $\alpha$  or  $\beta$ -helix space structure

7. Pesticides designed to kill birds are called

a) birdicides b) herbicides c) avicides d) miticides

8. Which among the following accounts for approximately 80% of all pesticide use?

a) herbicide b) insecticide c) bactericide d) fungicide

9. Chlorofluorocarbon is used in

a) Refrigerators b) Air conditioners c) Perfumes d) All of these 10. Eutropication by sewage pollution refers to the \_\_\_\_\_

- of freshwater bodies:
- a) nutrient enrichmentb) toxic chemical accumulationc) nutrient depletiond) heavy metal accumulation

## <u>SECTION – B</u>

#### <u>Answer any FIVE Questions</u> :

 $(5 \times 2 = 10)$ 

- 11. Give an example for Lewis acid and base.
- 12. What is covalent bond?
- 13. Define Lattice energy.
- 14. How peptide bonds are formed?
- 15. What are Zwitter ions?
- 16. Write any two sources of water pollution.
- 17. List out the green house gases.

## <u>SECTION – C</u>

#### **Answer ALL Questions :**

 $(5 \times 5 = 25)$ 

18. a) Discuss in brief about Arrhenius concept of acids and bases.

## (**OR**)

b) What is pH? What do you infer from it? How it is to be maintained?

19. a) Discuss the properties of ionic bond.

#### (**OR**)

- b) What do you mean by hydrogen bonding? What are its types?Give an example for each.
- 20. a) How aminoacids are prepared by Gabriel-phthalimide and Strecker synthesis?

#### (OR)

- b) Give a brief note on the classification of proteins.
- 21. a) List any five characteristics of pesticides.

#### (**OR**)

b) Discuss the role of mercury containing compounds as fungicides.

22. a) Explain the effects of air pollutants.

#### (**OR**)

b) Write a note on the causes of acidity and alkalinity in soil.

## <u>SECTION – D</u>

Answer any THREE Questions :

 $(3 \times 10 = 30)$ 

- 23. Discuss the Bronsted-Lowry concept of acids and bases. What are its applications and limitations?
- 24. Give a detailed account on Born-Haber cycle.
- 25. Discuss in detail the classification and biological functions of vitamin A,C,D and E.
- 26. Explain elaborately the adverse effects of pesticides on environment.
- 27. Describe the causes and control of water pollution.





(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

**B.Sc. Physics** Degree (Semester) Examinations, April 2019 Part – III : Allied Subject : Second Semester : Paper – II

#### CHEMISTRY FOR PHYSICIST - II

Under CBCS – Credit 4 Time: **3** Hours Max. Marks: **75** 

## SECTION – A

## Answer ALL Questions :

 $(10 \times 1 = 10)$ 

1. Lienents in the s	same group have s	imilar	
a) Atomic numbers b) Atomic masses		ses	
c) Chemical pro	perties	d) Atomic radi	i
2. The most electro	2. The most electronegative element in		ole is
a) Ceasium	b) Chlorine	c) Barium	d) Fluorine
3. The equation for	the Beer-Lambert	is law is	
a) $A = c l$	b) A = $\varepsilon c$	c) A = $\varepsilon c l$	d) A = $\varepsilon c M$
4. The light emitted	l in a chemilumine	escent reaction is a	also called
a) Cold light	b) Hot light	c) Bright light	d) UV light
5. The simple basic	unit or the building	ng block of the cr	ystal lattice is
called the			
a) Interfacial an	gle	b) Crystal latti	ce
a) Interfacial an c) Edge of a cys	gle tal	b) Crystal lattie d) Unit cell	ce
<ul><li>a) Interfacial an</li><li>c) Edge of a cys</li><li>6. The total number</li></ul>	gle tal r of crystal system	b) Crystal lattic d) Unit cell s is	ce
<ul><li>a) Interfacial and</li><li>c) Edge of a cys</li><li>6. The total number</li><li>a) 8</li></ul>	gle tal r of crystal system b) 14	b) Crystal lattic d) Unit cell s is c) 7	ce d) 12
<ul> <li>a) Interfacial and</li> <li>c) Edge of a cys</li> <li>6. The total number</li> <li>a) 8</li> <li>7. Which of the following the following statement of the following statement</li></ul>	gle tal r of crystal system b) 14 lowing compound	<ul> <li>b) Crystal lattice</li> <li>d) Unit cell</li> <li>s is</li> <li>c) 7</li> <li>s will not conduct</li> </ul>	ce d) 12 t electricity in
<ul> <li>a) Interfacial and</li> <li>c) Edge of a cys</li> <li>6. The total number</li> <li>a) 8</li> <li>7. Which of the followits aqueous solution</li> </ul>	gle tal r of crystal system b) 14 lowing compound ion?	<ul> <li>b) Crystal lattice</li> <li>d) Unit cell</li> <li>s is</li> <li>c) 7</li> <li>s will not conduct</li> </ul>	ce d) 12 c electricity in
<ul> <li>a) Interfacial and</li> <li>c) Edge of a cys</li> <li>6. The total number</li> <li>a) 8</li> <li>7. Which of the followits aqueous solution and a carbontetrach</li> </ul>	gle tal r of crystal system b) 14 lowing compound tion?	<ul> <li>b) Crystal lattic</li> <li>d) Unit cell</li> <li>s is</li> <li>c) 7</li> <li>s will not conduct</li> <li>b) silver chlori</li> </ul>	ce d) 12 electricity in de
<ul> <li>a) Interfacial and</li> <li>c) Edge of a cys</li> <li>6. The total number</li> <li>a) 8</li> <li>7. Which of the followits aqueous solution and a carbon tetracher</li> <li>c) sodium acetar</li> </ul>	gle tal r of crystal system b) 14 lowing compound tion? loride te	<ul> <li>b) Crystal lattine</li> <li>d) Unit cell</li> <li>s is</li> <li>c) 7</li> <li>s will not conduct</li> <li>b) silver chlorie</li> <li>d) sulphuric ac</li> </ul>	ce d) 12 t electricity in de id
<ul> <li>a) Interfacial and</li> <li>c) Edge of a cys</li> <li>6. The total number</li> <li>a) 8</li> <li>7. Which of the followits aqueous solution a) carbontetracher</li> <li>c) sodium acetar</li> <li>8. The units of specific</li> </ul>	gle tal r of crystal system b) 14 lowing compound tion? floride te te	<ul> <li>b) Crystal lattine</li> <li>d) Unit cell</li> <li>s is</li> <li>c) 7</li> <li>s will not conduct</li> <li>b) silver chlorie</li> <li>d) sulphuric actor</li> </ul>	ce d) 12 c electricity in de id

9. Greater value of standard reduction potential smaller will be tendency

a) to form positive ions	b) to form negative ions
c) gain electrons	d) all are possible
10. When a lead storage battery is dis	scharged
a) sulphuric acid is consumed	b) lead sulphate is consumed
c) $SO_2$ is evolved	d) lead is formed

#### **SECTION – B**

#### **Answer any FIVE Questions :**

- 11. What is meant by modern periodic law?
- 12. Define photochemical reactions.
- 13. What are Miller indices?
- 14. Define Isotropy.
- 15. What are strong and weak electrolytes?
- 16. Define conductance.
- 17. Define EMF of an electrochemical cell.

## **SECTION – C**

#### Answer ALL Questions :

18. a) What is an atomic radius? Discuss their trends along a group and period.

#### **(OR)**

- b) Write a note on electronegativity.
- 19. a) Explain Beer-Lambert law and write the limitations.

#### $(\mathbf{OR})$

b) Differentiate between photochemical & thermal reactions.

20. a) Discuss on seven crystal systems with example.

#### (**OR**)

b) Write a note on the following cubic system. ii) Body centred i) simple iii) Face centred 21.a) Explain Faraday's laws of electrolysis.

#### (**OR**)

b) i) Define single electrode potential ii) What is the potential of an half-cell consisting of zinc electrode

in 0.01 M ZnSO<sub>4</sub> solution at  $25^{\circ}$ C,  $E^{\circ} = 0.763$  V.

22. a) Derive Nernst equation for EMF of cells.

#### $(\mathbf{OR})$

b) Discuss on Weston-Cadmium cell.

#### **SECTION – D**

Answer any THREE Questions :

 $(3 \times 10 = 30)$ 

23. Explain the method of determination of electronegativity by Pauling and Mulliken's method.

24. Discuss the following laws of photochemistry

i) The Grothus-Draper law ii) The Stark-Einstein law

25. i) Derive Bragg's equation

ii) Explain the various symmetry elements with examples

- 26. List out the postulates of Arrhenius theory. Give the merits and demerits.
- 27. How will you determine the pH using hydrogen electrode, glass electrode and quinhydrone electrode?



 $(5 \times 5 = 25)$ 

# $(5 \times 2 = 10)$



(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

**B.Sc. Chemistry** Degree (Semester) Examinations, April 2019 Part – III : Core Subject : Second Semester : Paper – I

#### **GENERAL CHEMISTRY – III**

Under CBCS - Credit 4Time: 3 HoursMax. Marks: 75

## <u>SECTION – A</u>

## Answer ALL Questions :

 $(10 \times 1 = 10)$ 

1. A  $\pi$ -bond is formed by the overlap of

a) *s-s* orbitals b) *s-p* orbitals

c) *p*-*p* orbitals in end to end fashion d) *p*-*p* orbitals in sidewise manner

2. The bond order of a molecule is given by

a) total number of electrons in bonding and antibonding orbitals

- b) the difference between the number of electrons in bonding and antibonding orbitals
- c) twice the difference between the number of electrons in bonding and antibonding orbitals
- d) half the difference between the number of electrons in bonding and antibonding orbitals
- 3. The carbon-carbon bond length in benzene molecule is:

a) 1.54  $A^{\circ}$  b) 1.39  $A^{\circ}$  c) 1.33 $A^{\circ}$  d) 1.20 $A^{\circ}$ 

- 4. When considering electrophilic aromatic substitution reactions electron withdrawing substituents (e.g. nitro) are described as a) *ortho/para* directing and activating
  - b) *ortho/para* directing and deactivating
  - c) meta directing and activating
  - d) meta directing and deactivating
- 5. The enzyme that converts glucose or fructose into ethylcohol isa) diastaseb) invertasec) zymased) maltase

- 6. Phenol is stronger acid than water and itself it isa) weakly acidic b) weakly basic c) alkalid) strong acid
- 7. The molarity is defined as the number of moles of solute present in
  a) one liter of the solvent
  b) one liter of the solution
  c) one kilogram of the solvent
  d) one kilogram of the solution
- 8. The liquid mixture which distill with out change in composition are called
  - a) azeotropic mixtures b) equilibrium mixtures
  - c) zeotropic mixture d) nonequilibrium mixtures
- 9. When a non-volatile solute is dissolved in a pure solvent, the vapour pressure of the pure solvent
  - a) increases b) decreases c) remains the same d) none of these
- 10. Which of the following is a colligative property?
  - a) molar refractivity b) optical rotation
  - c) depression in freezing point d)viscosity

#### <u>SECTION – B</u>

#### <u>Answer any FIVE Questions</u> :

- 11. State Fajans rule.
- 12. Differentiate between pi and sigma bond.
- 13. Complete: Nitrobenzene + nitrating mixture-  $\rightarrow$
- 14. How does ethylene react with alkaline KMnO<sub>4</sub>?
- 15. Why is phenol more acidic than ethanol?
- 16. State Henrys law.
- 17. Define relative lowering of vapour pressure.

## <u>SECTION – C</u>

<u>Answer ALL Questions</u> :

 $(5 \times 5 = 25)$ 

18. a) Account for the paramagnetic nature of oxygen molecule using molecular orbital theory.

#### (**OR**)

- b) Explain inter and intra molecular hydrogen bonding.
- 19. a) Discuss the mechanism of friedel- craft's acylation reaction.

#### (**OR**)

- b) Describe the preparation of Anthracene by Haworth synthesis.
- 20. a) How will you distinguish the primary, secondary and tertiary alcohol by Victor Meyer's method?

#### (**OR**)

- b) i) Give any two methods of preparing benzyl alcohol? (3)ii) How is resorcinol prepared? (2)
- 21. a) Write short note on phenol-water system.

#### (**OR**)

- b) Discuss a brief note on steam distillation.
- 22. a) Describe about Beckmann thermometer.

#### (**OR**)

b) What is elevation of boiling point? Explain its determination by Cottrell's methods.

 $(5 \times 2 = 10)$ 

# <u>SECTION – D</u>

An	swer any THREE Qu	<u>estions</u> :	$(3 \times 10 =$	30)
23.	a) Explain Born Haber	cycle with suitable example	e.	(5)
	b) Using VSEPR theory	y, predict the shape of $PCl_5$	and CH <sub>4</sub> .	(5)
24.	How does naphthalene r	eact with	$(5 \times 2 =$	10)
	i) Br <sub>2</sub> /CCl <sub>4</sub>			
	ii) Acidified KMr	$O_4$		
	iii) Air/V <sub>2</sub> O <sub>5</sub>			
	iv) $H_2SO_4$ (Low to	emperature)		
	v) H <sub>2</sub> SO <sub>4</sub> (High te	emperature)		
25.	a) Write a note on	i) Reimer-Tiemann reaction	on	(2)
		ii) Kolbe-Schmidt reaction	1	(2)
	b) Write any one metho	od of preparing the followin	g compound	
	i) Nitroglycerine	ii) Picric acid iii) Ethyl	mercaptan (2-	+2+2)
26.	i) What are ideal solut	ion?	$(5 \times 2 =$	10)
	ii) What is an azeotrop	e? Give one example.		
	iii) What is meant by n	ormality?		
	iv) State Raoult's law.			
	v) Define molality.			
27.	i) Explain osmotic pres	ssure determination by Berk	ely-Hartely	
	method.			(8)
	ii) Define VantHoff fac	tor		(2)



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B.Sc. Chemistry Degree (Semester) Examinations, April 2019 Part - III : Core Subject : Second Semester : Paper - II

#### **GENERAL CHEMISTRY – IV**

Under CBCS - Credit 4 Time: 3 Hours Max. Marks: 75

## **SECTION – A**

#### **Answer ALL Questions :**

 $(10 \times 1 = 10)$ 

1. Hydrogen bomb involves

a) combination of lighter nuclei into bigger nucleus

b) combustion of oxygen

c) destruction of heavy nucleus into smaller nuclei

d) explosion of TNT

2. The element used for dating ancient remains is \_ d) C-14 a) N-14 b) N-15

- c) C-12
- 3. Anisole can be prepared by the action of methyl iodide on sodium phenoxide. The reaction is called
  - a) Fittig's reaction b) Williamson's reaction
  - c) Wurtz's reaction d) Etard's reaction
- 4. Which of the following is the correct reason for cyclic ether are miscible in water?
  - a) Planer structure b) Larger size
  - c) Molecular weight d) Hydrogen bonding
- 5. Which of the following is not a organometallic reagent?

a) CH <sub>3</sub> CH <sub>2</sub> ONa	b) CH <sub>3</sub> CH <sub>2</sub> Li
c) $CH_3CH_2)_2Zn$	d) CH <sub>3</sub> CH <sub>2</sub> MgBr

6. Alkyl lithium in excess reacts with CO<sub>2</sub> followed by acid hydrolysis to give a) carboxylic acid b) ketone c) primary alcohol d) tertiary alcohol 7. Photochemistry deals with the study of a) photons b) photos c) reaction which proceed with absorption of UV light d) reaction which proceed with absorption of IR light 8. Intersystem crossing is \_\_\_\_\_ a) radiative process b) non-radiative process c) transition process d) phosphoresecence process 9. The reactions with the high value of energy of activation are? a) Fast c) Moderate d) None of these b) Slow 10. If 60% of a first order reaction was completed in 60 minutes, 50% of the same reaction would be completed in approximately b) 60 minutes c) 40 minutes d) 50 minutes a) 45 minutes

## <u>SECTION – B</u>

## **Answer any FIVE Questions :**

- 11. What is meant by artificial transmutation?
- 12. Using Williamson's synthesis, how will you prepare ether?
- 13. How is organolithium prepared?
- 14. State Stark-Einstein's law.
- 15. Differentiate between order and molecularity of a chemical reaction.
- 16. Define the term chemiluminescence.
- 17. What is called PTC?

# <u>SECTION – C</u>

<u>Answer ALL Questions</u> :

 $(5 \times 5 = 25)$ 

18. a) With a neat diagram of n/p ratio against atomic number, explain nuclear stability.

## (OR)

- b) Give an account on radio carbon dating.
- 19. a) Write the structure of the product in the reaction of formation of oxonium salt.

## (OR)

b) Bring out the preparation and properties of mustard gas.

20. a) Name the reaction and predict the product.



b) How is Gilman reagent prepared? Explain its synthetic use.

21. a) Compare the thermal and photochemical reactions.

## (OR)

b) Discuss fluorescence and photosensitization with an example.

22. a) Obtain the expression for second order reaction.

## (OR)

b) Explain the collision theory of reaction rates.

 $(5 \times 2 = 10)$ 

#### <u>SECTION – D</u>

# <u>Answer any THREE Questions</u>: (3 × 10 = 30) 23. i) How is the nuclear shell model explained for the stability of nuclei having magic numbers? (5) ii) What are the steps used for disposal of radioactive wastes?

- Explain.(5)24. i) Discuss the preparation and properties of anisole.(5)
  - ii) Draw and explain the structure of [18] crown 6. (5)
- 25. What is Grinard reagent? How is it prepared? Give any three synthetic applications.
- 26. Sketch and explain the Jablonski diagram.
- 27. i) Define first order reaction. Derive an expression for rate constant of it. (5)
  - ii) Discuss the concept of absolute reaction rate theory. (5)



(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

B.Sc. Chemistry Degree (Semester) Examinations, April 2019 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 Que	<u>stions</u> :		$(10 \times 1 = 10)$
1. Electrolysis of a	q. Sodium acetate	gives	
a) Butane	b) Ethane	c) Propane	d) Methane
2. The starting mate	erial of Strecker S	ynthesis for glyci	ne is
a) HCHO	b) CH <sub>3</sub> CHO	c) CH <sub>3</sub> COOH	d) HCOOH
3. The base-catalyz alcohol and	ed condensation o	f two ester molec	ules gives an
a) β-Ketoester	b) β-Ketoacid	c) γ-Ketoester	d) w-Ketoester
4. The reaction of e	ethyl acetoacetate v	with phenylhydra:	zine produces
a) 4-Methyl ura	cil	b) Aspirin	
c) Barbituric ac	id	d) Antipyrine	
5. Raffinose is an e	xample of		
a) Monosacchar	ide	b) Disaccharid	e
c) Trisaccharide	¢	d) Polysacchar	ide
6. The C-O-C linka	ge which joins the	two components	of an acetal is
called	linkage.		
a) Amide	b) Glycosidic	c) acidic	d) carboxylic
7. The molar viscos	sity is the		
a) Product of m	olar surface and vi	scosity	
b) Sum of mola	r surface and visco	sity	
c) Difference of	f molar surface and	l viscosity	
d) Product of m	olar volume and de	ensity	

- 8. To evaluate the dipole moment of benzene derivatives, we need
  - a) Bond moments b) Atom moments

c) Group moments d) Angle moments

9. The K<sub>D</sub> values for distribution of phenol between H<sub>2</sub>O and CHCl<sub>3</sub> are given as  $C_1/C_2 = 0.371$ , 0.2142. Based on these values phenol is

a) Existing as a single molecule

- b) Existing as a associated molecule
- c) neither single nor associated molecules
- d) distributed properly

**Answer any FIVE Questions :** 

10. The K<sub>D</sub> for the most of the organic compounds is usually \_\_\_\_\_

a) Large b) Small c) Very Large d) Negligible

## <u>SECTION – B</u>

 $(5 \times 2 = 10)$ 

- 11. Write the preparation of acetic acid from acetylene.
- 12. Find out the product of following reaction.



- 13. What isketo-enoltautomerism?
- 14. Define mutarotation.
- 15. Sketch the structure of  $\beta$ -D-(+)-glucose in chair conformation.
- 16. Write short note on the surface tension.
- 17. State the Nernst's distribution law.

# <u>SECTION – C</u>

## <u>Answer ALL Questions</u> :

 $(5 \times 5 = 25)$ 

18. a) Find out the product of the following reactions.



#### (**OR**)

- b) How to influence the strength of anacid by structural effect and substituted halogens? Explain.
- 19. a) Explain the mechanism of Claisen condensation.

## (OR)

b) Write the preparation and properties of following acids:

i) acetoacetic acid ii) glyoxalic acid

20. a) Describe the mechanism of conversion of glucose into fructose and fructose into glucose.

#### (OR)

b) Discuss about any five application of cellulose derivatives.

21. a) Explain the dipole moment and its determination. How molecular structure influences the dipole moment? Give examples.

#### (OR)

b) Write note on the following terms:

i) viscosity ii) molar refraction

22. a) Discuss the classification of solvent extraction systems and give its advantages.

#### (**OR**)

b) Explain the partition chromatography with the help of plate theory.

#### <u>SECTION – D</u>

#### Answer any THREE Questions :

 $(3 \times 10 = 30)$ 

23. Write the preparation and properties of the following compounds.

i) Formic acid ii) Alanine iii) Anthranilic acid

iv) Glycine v) Benzoic acid

24. Discuss the application of malonic ester and acetoacetic ester.

25. Write the full details of sucrose manufacturing method.

26. Explain the following

i) Molar refraction and ii) magnetic properties of substances

27. How to determine  $K_D$  of the solute, which may associate and dissociates with one of the solvents?



(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

**B.Sc. Chemistry** Degree (Semester) Examinations, April 2019 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 :**

a)  $SiO_4^{4-}$ 

 $(10 \times 1 = 10)$ 

- 1. Silicones are called inorganic polymers due to absence of \_\_\_\_\_ in the main backbone chain.
  - a) Nitrogen atom b) Oxygen atom
  - c) Carbon atom d) Hydrogen atom
- 2. The formula of the pyrosilicate ion is:
  - b)  $Si_3O_9^{2-}$ c)  $Si_2O_7^{6-}$ d)  $Si_6O_{18}^{12}$
- 3. Which of the following shows greatest pair effect? a) iod ine b) chlorine c) fluorine d) bromine
- 4. When  $CO_2$  is passed through an aqueous solution of bleaching powder, the gas evolved is
  - a) iod ine c) fluorine d) astatine b) chlorine
- 5. Which of the following hydride shows greatest acidity? a) H<sub>2</sub>O b)  $H_2S$ c) H<sub>2</sub>Se d)  $H_2Te$
- 6. Pickout Hard base in the following
  - a) F⁻ b) H<sup>-</sup> c) I d) N2
- 7. Aluminon reagent is prepared by dissolving 0.1 gram of the substance in 100 ml

d) both a & b a) alcohol b) acid c) water

8. Which one the following reagent exhibit two tautomeric form a) Dimethylglyoxime b) Thiourea c) aluminon d) Magneson 9. The hydride of group III-A element behave as lewis acids. The acceptor ability is maximum for the hydride of:

a) Tl b) Ga c) Al d) B

10. The type of hybridization of boron in diborane is

a) sp-hybridisation b) sp<sup>2</sup>-hybridisation

c)  $sp^3$ -hybridisation d)  $sp^3d^2$ -hybridisation

## <u>SECTION – B</u>

 $(5 \times 2 = 10)$ 

- 11. What are ultramarines? Mention its properties and uses.
- 12. Give the structure and properties of perchloric acid.
- 13. What are non-aqeous solvent? How are they categorized? Give examples.
- 14. Write any four organic reagents used in inorganic analysis.
- 15. Draw the structure of Decaborane.

<u>Answer any FIVE Questions</u> :

- 16. Why does Fluorine differ from the rest of the family members? Bring out the main point of difference.
- 17. Define the term. Symbiosis.

## <u>SECTION – C</u>

**Answer ALL Questions :** 

 $(5 \times 5 = 25)$ 

18. a) What are Feldpars and Zeolites? Explain in detail.

(**OR**)

- b) What are Silicones? How are they prepared? Give an account of their properties and applications.
- 19. a) Describe the modern method for the preparation of Fluorine. Mention any three properties of Fluorine.

## (OR)

b) What are interhalogen compounds and pseudo halogens? Explain in detail.

- 20. a) How are acids and bases are defined in terms ofi) Lowry Bronsted concept ii) Lewis concept? Give suitable examples.(OR)
  - b) Discuss briefly the reactions which takes place in the non-aqueous solvents liquid ammonia and liquid SO<sub>2</sub>.
- 21. a) What are the advantages and disadvantages of DMG, Cupron and Magneson reagent?

#### (**OR**)

- b) Write down the uses of thiourea, uranylzinc acetate Rhodamine-B in inorganic qualitative analysis.
- 22. a) What are wades rules? Discuss the applications of these rules briefly. **(OR)** 
  - b) What do you know about boron hydrides? How are they categorised? Give examples. Why is boron hydride called as electron deficient molecule?

## SECTION – D

<u>Answer any THREE Questions</u> :

 $(3 \times 10 = 30)$ 

- 23. What are Silicates? How are they classified? Explain their structure with a neat diagram.
- 24. a) What are brominating mixture and bleaching powder? (3 + 7)b) How can you estimate the available chlorine in bleaching power?
- 25. a) List out the physical properties of non-aquous solvents. (6 + 4)b) Explain Pearson's HSAB concept. Discuss its applications.
- 26. Write the structure of EDTA. How is Magnesium estimated by using EDTA?
- 27. Describe the preparation, properties, structure and uses of diboranes.





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**B.Sc. Chemistry** Degree (Semester) Examinations, April 2019 Part – III : Core Subject : Sixth Semester : Paper – I

#### **ORGANIC CHEMISTRY – III**

Under CBCS - Credit 4Time: 3 HoursMax. Marks: 75

## SECTION – A

#### **Answer ALL Questions :** $(10 \times 1 = 10)$ 1. The condensation polymer among the following is a) Protein b) PVC c) Polythene d) Rubber 2. Nylon threads are made up from \_\_\_\_\_ polymer a) polyvinyl b) polyester c) polyamide d) polyethylene 3. The colour of a dye depends upon the wavelength of the light absorbed and released in a) visible region b) infra red region c) UV region d) X-rays region 4. Beckmann reaction produces \_\_\_\_\_\_ compound as product a) amide b) ester d) ketone c) oxime 5. Which of the following will undergo Diels-Alder reaction? a) Furan b) Thiophene c) Pyrrole d) Pyridine 6. Which of the following method is used to synthesis isoquinoline? a) Bischler-Napieralski b) Fischer-Indole c) Lipp d) Friedlander 7. $\alpha$ -isomer of citral is called as c) Geranial d) Geraniol a) Nerol b) Citrol 8. How many keto groups are present in progesterone?

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

- 9. The correct increasing order of the various electronic transitions is
- a)  $n \rightarrow \pi^* < \pi \rightarrow \pi^* < \sigma \rightarrow \sigma^* < n \rightarrow \sigma^*$ b)  $\pi \rightarrow \pi^* < n \rightarrow \pi^* < n \rightarrow \sigma^* < \sigma \rightarrow \sigma^*$ c)  $n \rightarrow \pi^* < \pi \rightarrow \pi^* < n \rightarrow \sigma^* < \sigma \rightarrow \sigma^*$ d)  $\sigma \rightarrow \sigma^* < n \rightarrow \sigma^* < \pi \rightarrow \pi^* < n \rightarrow \pi^*$ 10. In FT-IR spectrum, the -OH stretching band appears around a) 3100-3300 cm<sup>-1</sup> b) 3500-3650 cm<sup>-1</sup> c) 1700-1750 cm<sup>-1</sup> d) 2800-3100 cm<sup>-1</sup>

## <u>SECTION – B</u>

## Answer any FIVE Questions :

11. Write the difference between Thermo Plastic and Thermo setting

polymer.

- 12. What is chromophor?
- 13. Define : Dyes.
- 14. Give the IUPAC nomenclature of following compounds



- 15. What is chemotherapy?
- 16. What is finger print region? Give its uses.
- 17. How many proton nmr signals predict the following compounds
  - i) CH<sub>3</sub>CH<sub>2</sub>Br ii) Isopropyl alcohol

SECTION – CAnswer ALL Questions : $(5 \times 5 = 25)$ 18. a) Explain the reaction and mechanism of free radical polymerization.(OR)b) Write note on Followingi) Conducting polymerii) Condensation polymer19. a) Write the preparation and uses of Indigo and Methyl orange dyes.(OR)b) Discus the following rearrangementsi) Wagner-Meerwinii) Curtius20. a) Complete the following reaction and explain.

Phosphoric acid

## (OR)

- b) Explain the structural elucidation of Piperine.
- 21. a) Give the biological importance of Ascorbic acid and Progesteron. (OR)
  - b) Discus about the preparation and uses of Citral and Geraniol.
- 22. a) Explain with suitable examples of Factors influence in chemical shift by electro negativity and Anisotropic effect.

## (OR)

- b) Write short note on following
  - i) Batho chromic shiftiii) Hyper chromic shift
- ii) Hypso chromic shiftiv) Hypo chromic shift

 $(5 \times 2 = 10)$ 

# <u>SECTION – D</u>

Ans	$\frac{1}{3} \times 10 = 3$	<b>(0</b> )
23.	a) Distinguish between synthetic and natural rubbers.	(2)
	b) Give the preparation and uses of caprolactam and epoxy resin.	(5)
	c) What is addition polymerization? Give example.	(3)
24.	a) Write note on following (i) Fluorescein ii) Alizarin $(2^{1/2} +$	21/2)
	b) Explain the reaction with mechanism of Beckman and Orton	
	rearrangement.	(5)
25.	a) Give the preparation and properties of Indole and isoquinoline	. (6)
	b) Explain the extraction process and structural elucidation of	
	Coniine.	(4)
26.	a) Discuss about the synthesis of Camphor.	(5)
	b) Write the preparation and uses of sulphanilamide and	
	sulphathiazole.	(5)
27.	a) Explain the electronic transition ( $\pi$ - $\pi$ *, n- $\pi$ *, $\sigma$ - $\sigma$ *, n- $\sigma$ *) o	f
	UV-Visible spectra.	(5)
	b) Find out the simple organic molecules of following spectral da	ita's
		(5)
	i) Molecular formula-C <sub>3</sub> H <sub>7</sub> NO, UV - $\lambda$ Max -219nm, IR-3413	,
	3236 and 1667cm <sup>-1</sup>	
	<sup>1</sup> H nmr- $\delta(6.5, 2H$ br singlet), $\delta 2.25(2H, quartet)$ , $1.10(3H, trip$	olet)
	ii) Molecular formula- $C_3H_6O_2$ , UV - $\lambda$ Max -200 nm, IR-2940	) and
	1745cm <sup>-1</sup>	
	<sup>1</sup> H nmr-δ 3.5( 3H S), δ2.1(3H,Singlet).	



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**B.Sc. Chemistry** Degree (Semester) Examinations, April 2019 Part – III : Core Subject : Sixth Semester : Paper – II

#### PHYSICAL CHEMISTRY – IV

L	nder CBCS – Credit 4
Time: <b>3</b> Hours	Max. Marks: <b>75</b>

## <u>SECTION – A</u>

# Answer ALL Questions :

 $(10 \times 1 = 10)$ 

1. The units of "reaction rate" are

a)  $L \mod^{-1} s^{-1}$  b)  $L^2 \mod^{-2} s^{-1}$  c)  $s^{-1}$  d)  $\mod L^{-1} s^{-1}$ 

2. A reaction involving two different reactants can never be a \_\_\_\_\_

- a) bimolecular reactionb) unimolecular reactionc) first order reactiond) second order reaction
- 3. One of the following molecules contains 3 vertical planes.

a) Water	b) benzene	c) BrF5	d) 1, 3,5
dichlorobenzene			

4. A liner molecule has \_\_\_\_\_ operations a) 29 b) 4 c) Infinite d) 24

5. The different types of energies associated with a molecule are

- a) Electronic energy b) Vibrational energy
- c) Rotational energy d)All of the mentioned
- 6. Intense band generally observed for a carbonyl group in the IR spectrum is due to
  - a) The force constant of CO bond is large
  - b) The force constant of CO bond is small

- c) There is no change in dipole moment for CO bond stretching
- d) The dipole moment change due to CO bond stretching is large
- 7. Infrared spectroscopy provides valuable information about
  - a) Molecular weight b) Melting point
  - c) Conjugation
- 8. In Raman spectrum, if  $\lambda$  is the wavelength of incident radiation, then the Anti-Stoke's lines will have wavelength equal to

d) Functional group

 $(5 \times 2 = 10)$ 

- a)  $\lambda$  b)  $\lambda + \Delta \lambda$  c)  $\lambda \Delta \lambda$  d) $\lambda^2$
- 9. The nuclei with a spin quantum number greater than \_\_\_\_\_ can exhibit the NMR phenomenon.
  - a) 0 b) 5 c) 10 d) -5
- 10. Which of the following formulae is consistent with a molecular ion of m/z 73 in a mass spectrometry experiment?
  - a)  $C_3H_8N_2$  b)  $C_4H_{11}N$  c)  $C_4H_{10}O$  d)  $C_3H_5NO$

#### <u>SECTION – B</u>

#### **Answer any FIVE Questions :**

- 11. Define the term Half-life period.
- 12. Describe pseudo uni-molecular reaction with suitable example.
- 13. Define symmetry operation.
- 14. Sate the selection rule for IR and Raman spectroscopy.
- 15. Write the equation relating energy with wave number and give the values of constants involved in it (SI units).
- 16. What is meta-stable peak in mass spectrometry?
- 17. Explain spin-spin coupling.

## <u>SECTION – C</u>

#### **Answer ALL Questions :**

 $(5 \times 5 = 25)$ 

18. a) Derive the expression for the rate constant of second order reaction. **(OR)** 

b) Write notes on collision theory and Absolute Reaction Rate Theory.19. a) Explain the terms i) Identity ii) center of symmetry

iii) axis of symmetry iv) plane of symmetry

#### (**OR**)

b) What is a group? What are the characteristics of the group?

20. a) Write notes on principle of ESR spectroscopy and hyperfine splitting. (OR)

b) Discuss the instrumentation of NMR spectroscopy and chemical shift.

21. a) The rotational spectrum of HCl has lines 21.1 cm<sup>-1</sup> apart. Calculate the moment of inertia and bond length in HCl. (H = 1.008 amu; Cl = 34.98 amu;  $h = 6.626 \times 10^{-34} \text{ Js}$ ;  $c = 2.998 \times 10^8 \text{ m s}^{-1}$ ;  $6.024 \times 10^{26} \text{ amu} = 1 \text{ kg}$ ).

#### (OR)

- b) i) State the selection rule for rotational spectra.ii) Explain briefly the types of molecular spectra (with regions of electromagnetic spectrum).
- 22. a) Discuss the IR spectra of diatomic molecule in detail with appropriate equations and example.

#### (**OR**)

- b) i) Write notes on the principle of IR spectroscopy in brief.
  - ii) Explain the term rotation vibration spectra of diatomic molecule.

## <u>SECTION – D</u>

#### **Answer any THREE Questions :**

 $(3 \times 10 = 30)$ 

23. a) Define the term Order of the reaction.

b) Account for the temperature dependency on reaction rate.

c) In an experiment to study hydrolysis of an ester 0.5 M HCl at 300 K was used 5 cm<sup>3</sup> of the reaction mixture was withdrawn after

K was used 5 cm of the feaction mixture was withdrawn are

definite intervals and titrated against 0.2 M NaOH solution.

Calculate the rate constant at 300 K from the following data:

t (sec)	0	600	1200	1800	α
v (cm <sup>3</sup> of NaOH used)	11.5	12.0	12.5	13.0	25.5

24. a) Explain the term rotation reflection operation with suitable example.

b) Define point group.

c) Classify water and ammonia molecule into appropriate point group. Justify it.

25. a) Distinguish between IR and Raman spectroscopy.

b) List out the applications of IR spectroscopy.

26. a) Discuss and analyze the NMR spectrum of ethanol.

b) Write notes on Nitrogen rule and Mclafferty rearrangement.

- 27. a) Explain the terms
- i) Absoption spectrum
  - ii) Emission spectrum
  - iii) Line spectrum
  - iv) Band spectrum

b) The spacing between the lines in the rotational spectrum of HF is  $20.68 \text{ cm}^{-1}$ . Calculate the bond length.



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**B.Sc. Chemistry** Degree (Semester) Examinations, April 2019 Part – III : Elective Subject : Sixth Semester : Paper – II

#### NANOCHEMISTRY

Under CBCS – Credit 5 Time: **3** Hours Max. Marks: **75** 

## SECTION – A

## **Answer ALL Questions :**

 $(10 \times 1 = 10)$ 

- 1. Which of these historical works of art contain nanotechnology?
  - a) Lycurgus cup
  - b) Medieval stained glass windows in churches
  - c) Damascus steel swords
  - d) All of the above

c) anode

- 2. Where do we obtain the magnified image of the specimen in SEM?
  - a) cathode ray tube b) phosphorescent screen
    - d) scanning generator
- 3. Silicon nanowire has a thermal conductivity compared to bulk silicon
  - a) Larger b) Smaller c) Same d) None
- 4. Quantum dots are
  a) Special class of semiconductors
  b) Special class of metals
  c) Special class of Insulators
  d) All the above
- 5. The formula of greigite is \_\_\_\_\_
  - a)  $\operatorname{Fe}_2S_3$  b)  $\operatorname{Fe}_3O_4$  c)  $\operatorname{FeCO}_3$  d)  $\operatorname{Fe}_3S_4$
- 6. The different sized nanoparticles scatter different wave lengths of light incident on it and they appear with
  - a) same colours b) different colours c) colourless d) none of these

- 7. Select the incorrect statement from the following optionsa) Self-assembly is a top-down manufacture technique
  - b) In Self-assembly, weak interaction play very important role
  - c) Self-assembly molecule adopt organized structure which thermodynamically more stable than the single, unassembled component
  - d) Compared to the isolated components, the self-assembly, the selfassembled structure has a high order
- 8. Which of the following scientist have utilized the light scattering from individual gold nano rods in dark field microscope.
  - a) Sonnichsen and Alivisatos b) Mirkin and Mie's
  - c) UC. Berkeley d) Dip-Pen
- 9. Developing the nanomedicine capping agent present the nanoparticles vary in size from \_\_\_\_\_

a) 10 - 100 nm b) 0.1 - 10 nm c) 10 - 1000 nm d) 10 - 1000 mm 10. Nano shells are used in the treatment of which of the following disease?

a) Alzheimer's b) Cancer c) HIV d) Parkinson's

## <u>SECTION – B</u>

#### **Answer any FIVE Questions :**

 $(5 \times 2 = 10)$ 

- 11. Define Nanotechnology.
- 12. List out the Applications of Nanotechnology in electronics.
- 13. Explain the term Quantum dots.
- 14. Define a nanoparticle.
- 15. Explain about Nano Sensors.
- 16. Write short note on Nanomedicines.
- 17. Write about Nanoshells.

# <u>SECTION – C</u>

#### Answer ALL Questions :

 $(5 \times 5 = 25)$ 

18. a) Write the salient features of Nanotechnology.

## (OR)

- b) Explain with a neat diagram TEM setup and its use in analysing nanostructures.
- 19. a) Explain in detail about synthesis of quantum dots.

## (**OR**)

- b) Write on the special features of quantum dot lasers.
- 20. a) Write about the applications of Nanobiology.

## (**OR**)

- b) Explain about Nanocrystals.
- 21. a) Discuss the advantages and basic principles of nanosensors.

## (**OR**)

- b) Discuss in detail application of nanosensor systems.
- 22. a) Explain nano drug delivery system with reference to pore and other special structures.

## (OR)

b) Write short note on Nano medicines.

## <u>SECTION – D</u>

## **Answer any THREE Questions :**

- $(3 \times 10 = 30)$
- 23. Explain in detail size and surface, morphological analysis of nanostructures using SEM.
- 24. Compare the quantum confinement and resulting structures like Quantum dots, quantum wells and their physical significance.
- 25. Write a note on the morphology of NPs and how physical and chemical characteristics depend on them.
- 26. Write elaborately on Nano biosensors.
- 27. Describe the use of gold nanoparticles in diagnostic and therapeutic applications.





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**B.A. / B.Sc.** Degree (Semester) Examinations, April 2019 Part – IV : Non-Major Elective Subject : Second Semester : Paper – I

#### CHEMISTRY IN MEDICINE

Under CBCS - Credit 2Time: 2 HoursMax. Marks: 75

## <u>SECTION – A</u>

Answe	r ALL Ques	<u>tions</u> :		$(10 \times 1 = 10)$
1. A fi	rst aid box co	nsists of:		
a) (	Cotton	b) bandages	c) tincture iodine	d) all the above
2. Alka	ali poisoning	is caused by		
a) (	Caustic Soda	b) Caustic Pota	ish c) Ammonia	d) All the above
3. All i	infectious dise	eases are caused	by	
a) E	Bacteria	b) fungi	c) algae	d) germs
4. Plag	ue has its orig	gin in:		
a) (	Cat	b) bat	c) rat	d) dog
5. Alu	m is:			
a) F	Potassium Alu	minium Sulphat	te b) Potassium Al	uminium Phosphate
c) S	Sodium Alum	inium Sulphate	d) Sodium Alun	ninium Phosphate
6. Whi	ch among the	following meta	l is associated with	chlorophyll
a) (	Ca	b) I	c) Cu	d) Mg
7. The	anaesthetic d	rug which affect	s the peripheral ner	rvous tissue is
a) I	local anaesthe	etics	b) General anac	esthetics
c) V	Volatile Gener	ral anaesthetics	d) both b & c	

#### 8. Cocaine is derived from

a) Coca tree b) Neem tree c) Poppy seeds d) both a & c

9. Flowers of Hibiscus Rosa Sinesis is used as

a) Emollient b) Diaphoretic c) Dysentery d) Nausea 10. Juice of Tinospora cordifolia is good for

a) Kidney b) Lungs c) Liver d) Heart

#### <u>SECTION – B</u>

 $(5 \times 2 = 10)$ 

 $(3 \times 9 = 27)$ 

# 11. What should be in a basic first aid kit?

**Answer any FIVE Questions :** 

12. Define pharmacokinetics?

- 13. Draw the structure of Cocaine.
- 14. Write any two uses of Amethocaine.

15. Define antidote.

16. Write any two uses of Adathoda vasica.

17. What are the most common genetic diseases?

#### <u>SECTION – C</u>

#### Answer ALL Questions :

\_\_\_\_\_

18. a) Write a note on first aid for accident and poisonous bites.

(**OR**)

b) Discuss any two common poisons.

19. a) Write a note on the compounds of iron and mercury used in medicine.(OR)

b) Discuss briefly the biological role of Calcium and Potassium.

20. a) What is thiophental sodium? Discuss its properties and uses.

(**OR**)

b) Write note on insect and water borne disease.

#### <u>SECTION – D</u>

Answer any TWO Questions : (2 × 14 = 28) 21. Explain the terms i) drug ii) Pharmacology iii) Pharmacognesy iv) Pharmacognesy iv) Pharmacodynamics 22. Give on account of the uses of Tulsi, neem and kizhanelli in medicine. 23. Write short notes on following antidotes: i) Alkaloid ii) Alkaloid ii) Mercury 24. What is a local anaesthetic? What are the requirements of a good

local anaesthetic? Discuss any three local anaesthetics.



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**B.Sc. Chemistry** Degree (Semester) Examinations, April 2019 Part – IV : Skill Based Subject : Fourth Semester : Paper – I

#### **CHEMISTRY IN ACTION**

Under CBCS - Credit 2Time: 2 HoursMax. Marks: 75

#### <u>SECTION – A</u>

#### **Answer ALL Questions :** $(10 \times 1 = 10)$ 1. Our bodies function best when oxygen gas has a partial pressure of atm: a) 10 b) 15 c) 20 d) 25 2. The legal limit of blood alcohol content is \_\_\_\_\_ percent by mass: a) 0.1 b) 0.5 c) 1 d) 5 3. Nitric oxide (NO) is: a) paramagnetic b) diamagnetic c) ferromagnetic d) ferromagnetic 4. The two allotropic forms of tin are: a) $\alpha$ -grey & $\beta$ -white b) $\alpha$ -white & $\beta$ -grey c) $\alpha$ -grey & $\beta$ -black d) $\alpha$ -white & $\beta$ -black 5. The formation of the shell of a hen's egg is an example of \_\_\_\_\_ process: a) precipitation b) condensation c) substitution d) decomposition 6. The rate of radioactive decay of 14C obeys \_\_\_\_\_ order kinetics c) second d) third b) first a) zero

7. The entropy o	f the rubber ba	nd when	it goes from the strete	hed
state to natura	lstate			
a) increases		b) decreases		
c) doesn't change		d) none of th	d) none of the above	
8. The main corr	ponent of syng	gas is:		
a) CO	b) CH <sub>4</sub>	c) CO <sub>2</sub>	d) H <sub>2</sub>	
9. The metal in i	ts hydroxyl car	bonate form, that	was used as pigment	
by artists is::				
a) Pb	b) Zn	c) Tc	d) Mo	
10. Wood's metal	is an alloy of			
a) bismuth	b) tin	c) lead	d) all the above	

## <u>SECTION – B</u>

 $(5 \times 2 = 10)$ 

#### Answer any FIVE Questions :

- 11. State the reason behind the collapse of the spacecraft sent by NASA to planet mars.
- 12. Write down the redox reaction taking place in a breathalyzer.
- 13. Why do lakes freeze from top down?
- 14. Define liquid crystals. Name its two types.
- 15. What do you mean by the efficiency of heat engine? Write its formula.
- 16. Give two equations illustrating the decomposition of ammonium nitrate at high temperatures.
- 17. State the theory behind the crumbling of papers.

## SECTION – C

#### <u>Answer ALL Questions</u> :

 $(3 \times 9 = 27)$ 

18. a) Give two examples in everyday life that explains first law of thermodynamics.

#### (**OR**)

- b) Discuss the theory behind the formation of precipitate inside boilers and pipes, highlighting the equations involved. How to get rid of them?
- 19. a) Illustrate the working of microwave ovens.

#### (**OR**)

b) Discuss the pH balance in your stomach with appropriate equations.

20. a) How cis-platin acts as an anticancer drug.

#### (OR)

b) Briefly discuss food irradiation.

## <u>SECTION – D</u>

Answer any TWO Questions :

 $(2 \times 14 = 28)$ 

- 21. Account on the role of chemical fertilizers in increasing crop quality and yield.
- 22. Explain in detail about LASER.
- 23. Discuss Haber's Process of ammonia.
- 24. Explain coordination compounds in living system.



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**B.Sc. Chemistry** Degree (Semester) Examinations, April 2019 Part – IV : Skill Based Subject : Sixth Semester : Paper – I

#### CHEMISTRY AND GENERAL APTITUDE FOR COMPETITIVE EXAMINATIONS

Under CBCS – Credit 2

Time: 2 Hours

Max. Marks: 75

## SECTION – A

**Answer ALL Questions :**  $(75 \times 1 = 75)$ 1. The molarity of a solution obtained by mixing 750 mL of 0.5 M HCl with 250 mL of 2 M HCl will be a) 0.875 M b) 1.00 M c) 1.75 M d) 0.0975 M 2. Which type of defect has the presence of cations in the interstitial sites? a) Schottky defect b) vacancy defect c) Frenkel defect d) metal deficiency defect 3. Based on kinetic theory of gases following laws can be proved a) Boyle's law b) Charles' law c) Avagadro's law (d) all of these 4. The number of d- electrons retained in  $Fe^{2+}$  are a) 3 b) 4 c) 5 d) 6 5. Among the following, the maximum covalent character shown the compound a) FeCb b) SnCb c) AIC la d) MgCb 6. The hybridization of orbitals of N-atom in  $NO_3^-$ ,  $NO_2^+$  and  $NH_4^+$  are respectively b)  $sp^2$ , sp,  $sp^3$ c) sp, sp<sup>3</sup>, sp<sup>2</sup> d) sp<sup>2</sup>, sp<sup>3</sup>, sp a) sp,  $sp^2$ ,  $sp^3$ 7. In which of the following molecules/ions, all the bonds are not equal a)  $SF_4$ b) SiF<sub>4</sub> d)  $BF_4^$ c) XeF<sub>4</sub>

8. Lattice energy of an ionic compound depends upon		16. Regular use of which of the following fertilizers increase the acidity			
a) charge on the ion and size of the ion b) packing ions only		of soil?			
c) size of the ion only	d) cha	rge on the ion only	a) potassium nitrate	b) urea	
9. $\Delta U$ is equal to			c) superphosphate of lime	d) ammonium sulphate	
a) isochoric work	b) isobaric v	vork	17. The oxidation states of Cr, in $[Cr(H_2O)_6]Cl_3$ , $[Cr(C_6H_6)_2]$ and		
c) adiabatic work	d) isotherma	ll work	$K_2[Cr(CN)_2(O)_2(O_2)(NH_3)]$ respectively are		
10. Which of the following are Lewis a	cids?		a) +3, +4 and +6	b) +3, +2 and +4	
a) $PH_3$ and $BCl_3$	b) AlCl <sub>3</sub> and	I SiCl <sub>4</sub>	c) +3, 0 and +6	d) +3, 0 and +4	
c) $PH_3$ and $SiCl_4$	d) $BCl_3$ and	AlCl3	18. Which one of the following com	plexes shows optical isomerism?	
11. The oxidation state of chromium in	the final prod	uct formed by	a) cis[Co(en) <sub>2</sub> Cl <sub>2</sub> ]Cl	b) trans $[Co(en)_2Cl_2]Cl$	
reaction between KI and acidified r	otassium dich	romate solution is	c) [Co(NH <sub>3</sub> ) <sub>4</sub> Ch <sub>2</sub> ]Cl	d) [Co(NH <sub>3</sub> ) <sub>3</sub> Cl <sub>3</sub> ]	
a) +3 b) +2	c) +6	d) +4	19. The number of geometric isome	rs that can exist for square planar	
12. For the linear plot of $\log (x/m)$ versus $\log p$ in a Freundlich adsorption		$[Pt(Cl)(Py)(NH_3)(NH_2OH)]^+$ is			
isotherm, which of the following statements is correct? (k and n are constants)		a) 2 b) 3	c) 4 d) 6		
		<ul> <li>20. The gas leaked from a storage of tank of Union Carbide plant in Bhopal gas tragedy was</li> <li>a) methylisocyante b) methylamine c) ammonia d) phosgene</li> </ul>			
a) 1/n appears as the intercept					
b) only 1/n appears as the slope					
c) $\log(1/n)$ appears as the intercept			21. Identify the compound that exhibit	bits tautomerism	
d) both k and $1/n$ appear in the slope term		a) 2-butene b) lactic acid c) 2-pentanone d) benzaldehyde			
13 Which among the following factors is the most important in making		22. The trans-alkene are formed by	a) Na/lig NUL d) Sr UCl		
fluorine the strongest oxidizing age	nt?	portant in maring	a) $H_2$ -Pa/C, BaSO <sub>4</sub> b) NaBH	4 c) Na/nq.N H <sub>3</sub> d) Sn-HC1	
a) electron affinity	b) ionization	u enthalny	25. Presence of mild group in a bein	zene ring	
c) hydration enthalpy	d) bond diss	ociation energy	a) activates the ring towards ele	ectophine substitution	
14 Which one of the following orea is best concentrated by froth		c) deactivates the ring towards puckershilid substitution			
floatation method?		d) deactivates the ring towards alectrophilic substitution			
a) siderita b) galara	a) malachita	d) magnatita	24 The compound formed on heating	a chlorohonzone with chlorel in the	
a) side if the b) gale if a c) malacrifte d) magnetite $15$ . Total number of long pair of abotton in $L^{-1}$ is $r$ is		$2\tau$ . The compound formed of heath presence of con $H_2SO_4$ is			
	$\sim 0$	d) 12	a) gamme vane $(b)$ DDT	c) freen d) beyachloroethane	

25. CH<sub>3</sub>MgI is an organometallic compound due to a) Mg–I bond b) C–I bond c) C–Mg bond d) C–H bond 26. Silver mirror test is given by which one of the following compounds? a) acetaldehyde b) acetone c) benzene d) benzophenone 27. In the Hofmann bromamide degradation reaction, the number of moles of NaOH and Br<sub>2</sub> used per mole of amine produced are a) four moles of NaOH and two moles of Br<sub>2</sub> b) two moles of NaOH and two moles of Br<sub>2</sub> c) four moles of NaOH and one mole of Br<sub>2</sub> d) one mole of NaOH and one mole of Br<sub>2</sub> 28. Which one of the following is strongest base in aqueous solution? a) trimethylamine b) aniline c) dimethylamine d) methylamine 29. Which one of the following method is neither meant for the synthesis nor for separation of amines? a) Curtius method b) Wurtz reaction c) Hofmann method d) Hinsberg method 30. On heating benzyl amine with chloroform and ethanolic KOH, product obtained is a) benzyl alcohol b) benzaldehyde d) benzyl isocyanide c) benzonitrile 31. Glucose prolonged heating with HI gives d) 6-iodohexanal a) n-hexane b) 1-hexene c) hexanoic acid 32. Which of the vitamins given below is water soluble? a) vitamin C b) vitamin D c) vitamin E d) vitamin K 33. Which of the following compounds can be detected by Molisch's test? a) nitro compounds b) sugars c) amines d) primary alcohols

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34. The secondary structure of a protein refers to				
a) α-helical backbone	a) α-helical backbone			
b) hydrophobic interac	tion			
c) sequence of α-amino	o acids			
d) fixed configuration	of the polypep	tide backbon	e	
35. The compound formed	in the positive	test for nitro	gen with the	
Lassaigne solution of o	rganic compo	und is		
a) $Fe_4[Fe(CN)_6]_3$ b) N	a <sub>3</sub> [Fe(CN) <sub>6</sub> ]	c) $Fe(CN)_3$	d) Na <sub>4</sub> [Fe(CN) <sub>5</sub> NOS]	
36. If pH of 0.0001 M NaC	)H solution wi	ll be		
a) 4 b) 12	2	c) 2	d) 10	
37. Which of the following	about wave fi	unction $\psi$ , is r	not correct?	
a) $\psi$ may be real valed	wave function	1		
b) $\psi$ may be in some ca	ases be a comp	plex function		
c) $\psi$ has a mathematica	alsignificance	only		
d) $\psi$ is proportional to the probability of finding an electron				
38. Which of the following	molecule/ions of	does not conta	in unpaired electrons?	
a) $O_2^{2-}$ b) B <sub>2</sub>	2	c) $N_2^+$	d) O <sub>2</sub>	
39. Which reagent can be used to identify nickel ion?				
a) resorcinol		b) dimethyl glyoxime		
c) diphenyl benzidine		d) potassium ferrocyanide		
40. Which of the following pairs of metal is purified by van Arkel method?				
a) Zr and Ti b) G	a and In	c) Ni and Fe	d) ag and Au	
41. The complex showing a spin-only magnetic moment of 2.82 BM is				
a) $[NiCl_4]^{2-}$ b) $[NiCl_4]^{2-}$	$i(CN)_4]^{2-}$	c) Ni(CO) <sub>4</sub>	d) Ni(PPh3) <sub>4</sub>	
42. Which is the repeating unit of in nucleic acids?				
a) monosaccharides		b) amino acids		
c) nucleotides		d) nucleosides		

43. Which of the following pairs of liquid form an emulsion?				
a) $H_2O$ and $C_2H_5$	ОН	b) $C_2H_5OH$ and $C_2H_5O$ $C_2H_5$		
c) water and coco	onut oil	d) coconut oil a	d) coconut oil and NaOH	
44. The relative lower	ring of vapour press	sure of aqueous s	olution containing	
a non-volatile solu	ute 0.0125. The mo	lality of the solu	tion is	
a) 0.70	b) 0.50	c) 0.80	d) 0.40	
45. Type of isomerism	n shown by the pro	oduct of the react	tion between	
benzaldehyde and	l hydroxyl amine is	3		
a) syn and anti ge	eometrical	b) cis and trans	geometrical	
c) E and Z geome	etrical	d) optical		
46. Auto-oxidation of	f bleaching powder	gives		
a) only calcium c	chlorate	b) only calciun	n chloride	
c) only calcium h	nypochlorite	d) both a and b		
47. Which of the follo	owing molecules do	bes not have a di	ipole moment?	
a) IBr	b) CHCl <sub>3</sub>	c) CH <sub>2</sub> Cl <sub>2</sub>	d) BF <sub>3</sub>	
48. The dissociation energies of methane and ethane to convert them into				
gaseous atoms are	e 360 and 620 kcal	mole respective	ly. The bond	
energy of $C - C$ b	oond is			
a) 260 kcal/mol	b) 180 kcal/mol	c) 130 kcal/mo	ld) 80 kcal/mol	
49. A unit cell of an element of atomic mass 108 and density of 10.5 g cm				
-3 is a cube with edge length 409 pm. The structure of the crystal				
lattice will be				
a) fcc	b) bcc c) sc	d) cannot predi	ct the structure	
50. Which of the following is not an example of addition polymer?				
a) polyethene	b) polystyrene	c) neoprene	d) terylene	
51. In organic analysis, the reagent 2,4-dinitrophenyl hydrazine is used				
for the detection of which of the following functional group?				
a) alcohol	b) acid	c) aldehyde	d) amine	

52. Lassaigne's te	st for the detection of	of nitrogen fails in	l
a) H <sub>2</sub> N-CO-N	NHNH <sub>2</sub> .HCl	b) NH <sub>2</sub> -NH <sub>2</sub> .H	ICl
c) NH <sub>2</sub> -CO-N	$VH_2$	d) C <sub>6</sub> H <sub>5</sub> CONH	$H_2$
53. A colour;ess v	vater soluble organic	liquid decompos	es sodium
carbonate and	liberates CO2. It pro	oduces black prec	ipitate with
Tollen's reage	ent. The liquid is		
a) acetaldehy	de b) acetamide	c) formic acid	d) acetone
54. Reduction of 1	nitrobenzene in the p	presence of Zn/NH	I <sub>4</sub> Cl gives
a) hydrazobei	nzene	b) aniline	
c) azobenzen	e	d) N-phenyl h	ydroxylamine
55. If the dissocia	tion constant of HCN	N is $4.8 \times 10^{-10}$ m	$o \mathrm{ld} \mathrm{m}^{-3}$ , then
calculate the p	$H \text{ of } 0.25 \text{ mol } dm^{-3}$	NaCN solution	
a) 13.3	b) 12.80	c) 11.36	d) 10.09
56. Which of the	following reagent ca	n be used to distir	nguish between
sodium carbo	nate and sodium sulp	ohite?	
a) lime water		b) baryta wate	r
c) acidified K	$_2$ Cr <sub>2</sub> O <sub>7</sub> solution	d) H <sub>2</sub> SO <sub>4</sub> solut	tion
57. HF is not pres	erved in glass bottles	s because	
a) it reacts wi	th aluminium oxide	of the glass	
b) it reacts with	ith silicon oxide of th	he glass	
c) it reacts wi	th the visible part of	the light	
d) it reacts with	ith sodium oxide of t	the glass	
58. If acetic acid i	s 1.0 % ionized in its	s decinormal solu	tion, then pH of
its seminorma	l solution will be		
a) 3.4	b) 4.8	c) 1.6	d) 2.6
59.18 g of glucos	e is added to 178.2 g	g of water. The va	pour pressure of
water for this	aqueous solution at	100 °C is	
a) 759 torr	b) 7.60 torr	c) 76.00 torr	d) 752.40 torr

60. Which one has the highest percentage of nitrogen?				
a) calcium nitrat	e	b) ammonium sulphate		
c) urea		d) ammonium	nitrate	
61. A current strengt	h 2.5 A was passed	through CuSO <sub>4</sub>	solution for 6	
min 26s. The am	ount of copper depo	osited is		
a) 0.3175 g	b) 3.0175 g	c) 7.0135 g	d) 6.0275 g	
62. Chemical kinetic	s is the			
a) study of equil	ibrium reaction b	) study of rate of	f chemical reaction	
c) study of home	ogenous reaction d	) study of hetero	geneous reaction	
63. Second law of the	ermodynamics is			
a) the entropy of	f pure substance is z	zero at the absolution	ute zero of	
temperature				
b) all spontaneo	us processes are irre	eversible		
c) although ener	gy may be converte	ed from one anot	ther it canno be	
created or destroyed				
d) all the above				
64. Joblonski diagram is useful for explaining				
a) fluorescence		b) phosphorescence		
c) both a and b		d) none of the above		
65. Bragg's equation is				
a) n= 2n sin $\theta$	b) $n\underline{\lambda} = 2d \sin \theta$	c) $\lambda = 2d \sin \theta$	d) $2d \sin \theta = n$	
66. When l=0, the shape of orbital is				
a) dumb-bell	b) spherical	c) circle	d) elliptical	
67. The principle involved in atomic bomb is				
a) nuclear fission	n b) nuclear fusion	c) stellar energ	y d) addition	
68. Williamson's synthesis is used to prepare				
a) aldehyde	b) ketone	c) ether	d) polyester	

69. Benzene diazonium chloride is treated with copper powder to give					
chlorobenzen	chlorobenzene. This reaction is called				
a) Sandmaye	a) Sandmayer reaction		b) Carbylamine reaction		
c) Scotten-B	auma	ann reaction	d) Gattermann reaction		
70. The principle	of G	M counter is			
a) carbon dat	ting		b) nuclear reaction		
c) ionisation	of ga	as radiation	d) none of the above		
71. Male reprodu	ctive	e hormone is			
a) progestero	one	b) testosterone	c) estradiol	d) all the above	
72. A train runnin	72. A train running at the speed of 60 km/hr crosses a pole in 9 seconds.				
What is the le	What is the length of the train?				
a) 120 metre	S	b) 180 metres	c) 324 metres	d) 150 metres	
73. A, B and C can do a piece of work in 20, 30 and 60 days					
respectively. In how many days can A do the work if he is assisted					
by B and C on every third day?					
a) 12 days		b) 15 days	c) 16 days	d) 18 days	
74. The sum of ages of 5 children born at the intervals of 3 years each is					
50 years. What is the age of the youngest child?					
a) 4 years		b) 8 years	c) 10 years	d) 12 years	
75. Today is Monday. After 61 days, it will be:					
a) Wednesda	ıy	b) Saturday	c) Tuesday	d) Thursday	

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#### VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

B.Sc. Chemistry Degree (Semester) Examinations, April 2019 Part - IV : Skill Based Subject : Sixth Semester : Paper - I

#### **ANALYTICAL METHODS IN CHEMISTRY** Under CPCC Credit 2

	Under CDCS - Cleuit Z	
Time: <b>2</b> Hours		Max. Marks: 75

## **SECTION – A**

#### **Answer ALL Questions :**

 $(10 \times 1 = 10)$ 

- 1. If a chemical get into your mouth you should
  - a) spit it out b) rinse your mouth d) all of them c) visit a doctor
- 2. Spectrophotometric analysis is a
  - b) chemical method a) instrumental method c) physical method
    - d) biological method
- 3. Chromatography is a physical method that is used to separate and analyse
  - b) Complex mixtures a) Simple mixtures
  - c) Viscous mixtures d) Metals
- 4. The relative adsorption of each components of the mixture is expressed in terms of its

  - a) Acceleration factor b) Retardation factor
  - c) Both a and b
- d) None of these
- 5. Science of chemical characterization is
  - a) Analytical chemistry b) Physical chemistry d) Inorganic chemistry c) Organic chemistry

6.	Identification of a	an element is			
	a) Testing		b) Quantitative analysis		
	c) Qualitative analysis		d) Physical test		
7.	The Beer-Lamber	rt's law deviates w	hen the	•	
	a) Concentration	is high	b) Concentration	b) Concentration is low	
	c) Light is monochromatic		d) Light is not scattered		
8.	The parent value	for acyclic $\alpha$ , $\beta$ -un	saturated ketones	S	
	a) 215 nm	b) 202 nm	c) 210 nm	d) 214 nm	
9.	When diluting an	acid with water, al	lways remember	to	
a) pour water into acid		b) pour acid into water			
	c) add both at the same time		d) dilute with base and then add		
10	Current is measur	red between	and	electrode.	
	a) working and r	eference	b) working and	l counter	
	c) counter and re	ference	d) working onl	у	

#### <u>SECTION – B</u>

 $(5 \times 2 = 10)$ 

#### **Answer any FIVE Questions :**

- 11. What is quantitative analysis?
- 12. Which kind of water is suitable for laboratory use in chemistry?
- 13. Name five strong bases used in the laboratory.
- 14. State the scope of TLC.
- 15. What is the essential requirement for a solvent to be used in UV spectroscopy?
- 16. State Beer-Lambert law.
- 17. What is the purpose of cyclic voltammetry?

## **SECTION – C**

#### Answer ALL Questions :

 $(3 \times 9 = 27)$ 

18. a) Illustrate advantages and limitations of classical methods.

## (**OR**)

b) Explain the applications of column chromatography.

19. a) Write the rules of working with harmful substances.

#### (**OR**)

- b) What are the different stages of chemical analysis?
- 20. a) Write a note on Beer-Lambert's law and discuss the verification this law.

#### (**OR**)

b) Discuss the quantitative determination of manganese by EDTA method.

## <u>SECTION – D</u>

 $(2 \times 14 = 28)$ 

21. Discuss the general safety rules in analytical laboratories.

**Answer any TWO Questions :** 

- 22. Explain briefly about column chromatography could be used for the separation of a mixture of two dyes.
- 23. Discuss the principle, electrodes and instrumentation of cyclic voltammogram.
- 24. Describe physicochemical methods of analysis in analytical chemistry.