		<b>Sanjay Chodawat University, Kolhapur</b> Established as State Private University under Govt. of Maharashtra. Act No XL, 2017		2019-20
<b>Year and Program:</b> 2019-20/ S.Y. B. Sc.		<b>School of Science</b>		<b>Department of Chemistry</b>
<b>Course Code:</b> CHS 202		<b>Chemistry-IV</b>		<b>Semester – Even (IV)</b>
<b>Day and Date:</b> Wednesday 8/11/20		<b>End Semester Examination</b>		<b>Time: 1 1/2 hrs, Max Marks: 100</b> 2.30 - 3.00 pm
<b>PRN:</b>		<b>Seat No:</b>		<b>Section A Marks out of 20:</b>
<b>Signature of student</b>		<b>Signature of Jr Supervisor:</b>		

## Section A

## Instructions:


- 1) All Questions are compulsory.
- 2) For MCQs mark tic (✓) for correct answer. No marks for multiple tics (✓).
- 3) Section A should be submitted to Jr. Supervisor immediately after first 30 min.

Q.1	Choose the correct alternative for following	Marks	Bloom's level	C
		20	level	O
1	Which of the following is not a transition element a) Fe b) Mn c) Na d) Cu	1	1	1
2	Most common oxidation state in lanthanides is a) +2 b) +3 c) +4 d) +5	1	1	1
3	What is maximum oxidation state shown by Mn? a) +7 b) +6 c) +4 d) +5	1	1	1
4	Ligand can also be considered as a) Lewis acid b) Bronsted acid c) Bronsted base d) Lewis base	1	2	2
5	IUPAC name of coordination compound $K_3[Fe(CN)_6]$ is a) Potassium hexacyanoferrate (II) b) Potassium hexacyanoferrate (III) c) Potassium hexacyanoiron (II)	1	2	2

- d) Potassium hexacyanoiron (III)
- 6 According to CFT which of the following is not strong field ligand
    - a)  $\text{CN}^-$
    - b)  $\text{NH}_3$
    - c)  $\text{Cl}^-$
    - d) CO
  - 7 Viscosity of liquids is determined by .....
    - a) Ostwald's viscometer
    - b) Stalagmometer
    - c) drop-pipette
    - d) Tensiometer
  - 8 The equation of state,  $PV = RT$  with usual notation is an equation of ----.
    - a) Boyle's Law
    - b) Charle's Law
    - c) Graham Law
    - d) Gay Lussac
  - 9 Distance travelled by the gas molecule in two successive collision is known as ----.
    - a) Most probable velocity
    - b) mean free path
    - c) collision diameter
    - d) mean velocity
  - 10 Unit of surface tension of liquid is -----.
    - a) Dyne per cm
    - b) Dyne. Cm
    - c) Newton. Meter
    - d) Poise
  - 11 Van der waal's excluded volume per mole i.e. volume correction is denoted by which of the following letter?
    - a) a
    - b) b
    - c) c
    - d) d
  - 12 According to the Kinetic theory of gas, the kinetic energy is directly proportional to ---.
    - a) Temperature
    - b) Pressure
    - c) volume
    - d) density
  - 13 The unit of viscosity of liquid is -----.
    - a) Dyne per cm
    - b) Dyne. Cm
    - c) Newton. Meter
    - d) Poise



		EXM/P/09/00		
14	Solids which exhibit regularity in the arrangement of structural units are called as..... a) Amorphous b) Crystalline c) Liquid crystals d) Regular solids	1	1	4
15	.....are the reciprocal of Weiss indices. a) Miller indices b) Bond angles c) Bond lengths d) None of these	1	3	4
16	$n\lambda = 2d\sin\theta$ is known as .....equation. a) Avogadro's b) Nernst's c) Bragg's d) Wave	1	2	4
17	Number of molecules per unit cell in Face Centered Cubic crystal are ----. a) 1 b) 2 c) 3 d) 4	1	2	4
18	If the crystal shows its original appearance two times to the observe during one complete rotation about an axis, then it is -- --. a) one fold axis of symmetry b) two fold axis of symmetry c) threefold axis of symmetry d) four fold axis of symmetry	1	2	4
19	The law which governs rate of chemical reaction is ---. a) Kohlrausch law b) Boltzmann law c) law of mass action d) Debye-Huckel limiting law	1	2	4
20	The molecularity of following chemical reaction is ----. $aA + bB = \text{Product}$ a) $a + b$ b) $a - b$ c) $a \div b$ d) $b \div a$	1	2	4

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<b>Day and Date:</b> <i>Wednesday 8/11/20</i>	<b>End Semester Examination</b>	<b>Time</b> <i>hrs, Max Marks: 100</i> <i>3.00 pm to 5.30 pm</i>	
<b>PRN:</b>	<b>Seat No:</b>	<b>Section B Marks out of 80:</b>	

## Section B

		Marks	Bloom's level	CO
Q.2	<b>Answer the following questions (Solve any Two)</b>	12		
a)	Discuss the electronic configuration of 3d transition elements.	6	2	1
b)	Explain complex compound forming ability of 3d transition elements.	6	1	1
c)	Answer the following 1. Lutetium does not show oxidation state other than +3. Justify. 2. Explain the position of lanthanides in periodic table.	6	2	1
Q.3	<b>Answer the following questions (Solve any Two)</b>	12		
a)	What is Valence Bond Theory? Give its postulates and Limitations.	6	1	2
b)	Give the postulates of Crystal Field Theory and explain with example.	6	3	2
c)	Write note on Jahn-Teller distortion.	6	4	2
Q.4	<b>Answer the following questions (Solve any Two)</b>	12		
i)	State the postulates of Kinetic Theory of Gases and derive kinetic gas equation.	6	3	3
ii)	Discuss how do the real gases deviate from the ideal behavior? What are the causes of deviation?	6	2	3
iii)	Describe how coefficient of viscosity is determined by Ostwald's viscometer?	6	2	3
b)	<b>Write Note on following (any four)</b>	16		
i)	Applications of van der Waal's equation	4	2	3
ii)	Mean free path and collision diameter	4	2	3
iii)	Critical phenomenon	4	3	3
iv)	Continuity of states	4	3	3



	v)	Drop number method of determination of Surface tension	4	2	3
Q.5	a)	<b>Answer the following questions (Solve any Two)</b>	<b>16</b>		
	i)	What is a) Plane of Symmetry b) Axis of symmetry c) Center of symmetry of a crystal? Illustrate with diagram.	8	2	4
	ii)	State Bragg's condition and derive the Bragg's equation.	8	2	4
	iii)	Derive rate equation for first order reaction.	8	3	4
	b)	<b>Answer the following questions (Solve any Four)</b>	<b>12</b>		
	i)	Write note on Pseudo unimolecular reactions	4	2	4
	ii)	State and explain the Law of constancy of interfacial angles.	4	3	4
	iii)	Explain the Activated complex theory of reaction rate.	4	2	4
	iv)	Explain the terms Order and Molecularity of reaction.	4	2	4
	v)	Show that half time of first order reaction is independent of initial concentration of reactant.	4	1	4