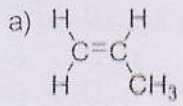
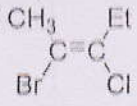
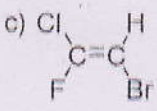
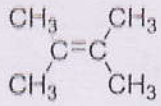
Sanjay Ghodawat University, Kolhapur Established as State Private University under Govt. of Maharashtra Act [illegible]		[illegible]
Year and Program: 2019-20 F. Y. B.Sc.	School of Science	Department of Chemistry
Course Code: CHS 101	Course Title: Chemistry-I	Semester I (Odd)
Day and Date: Wednesday 04-12-2019	End Semester Examination	Time: ½ hrs, Max Marks: 100 10.30 am to 11.00 am
PRN:	Seat No:	Section A Marks out of 20:
Jr. Supervisor sign:	Student Sign:	

Section A

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

Q.1	Choose the correct answer for the following.	Marks 20	Bloom's level	CO
1	The uncertainty principle and the concept of wave nature of matter were proposed by ______ and ______respectively. a) Heisenberg, de Broglie b) de-Broglie, Heisenberg c) Heisenberg, Planck d) Planck, Heisenberg	1	L1	1
2	______are the area around the nucleus of an atom in which the probability of finding electrons is maximum. a) Orbits b) Orbitals c) Electrons d) Nucleus	1	L1	1
3	What is the strength of sodium carbonate solution in g/lit, if 10gm of Na_2CO_3 is dissolved in 200 mL solution? a) 20g/lit. b) 50g/lit. c) 10g/lit. d) 45g/lit.	1	L3	1
4	Which of the following is a nucleophile? a) $AlCl_3$ b) H_3O^+ c) BF_3 d) CN^-	1	L1	2

5	Heterolytic covalent bond cleavage forms a) Carbanion b) Carbocation c) Free radical d) Either a or b	1	L2	2
6	Which of the following has Z-configuration? a)  b)  c)  d) 	1	L1	2
7	The extent of polarization of an anion by a cation was given by _____ rule. a) Born b) Haber c) Fajans d) Pauling	1	L2	3
8	What is the geometry of sp^3d hybridization? a) Trigonal planar b) Square pyramidal c) Trigonal bipyramidal d) Angular shape	1	L1	3
9	The bonding molecular orbital is at _____ level. a) Lower energy b) Higher energy c) Same energy d) Medium energy	1	L2	3
10	The _____ is formed by the transfer of electron from one atom to other. a) Covalent bond b) Ionic bond c) Co-ordinate bond d) Hydrogen bond	1	L2	3
11	The molecular orbitals obtained by subtraction of overlap of two atomic orbitals is called _____ a) Bonding orbitals b) Non-bonding orbitals	1	L1	3

c) Antibonding orbitals
d) Atomic orbitals

12 What is the bond order of C_2H_2 molecule? 1 L3 3
a) 1
b) 3
c) 2
d) 0.5

13 A substance soluble in water has_____ 1 L2 3
a) Hydration energy = lattice energy
b) Lattice energy > hydration energy
c) Lattice energy = hydration energy
d) Hydration energy > lattice energy

14 Dehydration of alcohol leads to _____formation. 1 L2 4
a) Alkanes
b) Alkynes
c) Alkenes
d) Diketones

15 The reactive species formed in halogenation of alkane is _____ 1 L2 4
a) $\cdot CH_3$
b) $\overset{+}{C}H_3$
c) $\overset{-}{C}H_3$
d) CH_4

16 Which of the following is the Wurtz reagent? 1 L1 4
a) Alkyl halide
b) Alkyl halide + Na in ether
c) Alkane + Na in ether
d) R-Mg-X in ether

17 Ozonolysis reaction involves addition of ozone to _____ 1 L1 4
a) Cycloalkane
b) Alkane
c) Alkyne
d) Diene

18 Cyclopentane cannot be prepared by _____ method. 1 L2 4
a) Kolbe synthesis
b) Wurtz reaction
c) Freund's
d) Decarboxylation

19	Lindlar catalyst is ________ a) H_2/Pt b) Zn-Hg/HCl c) Na-Hg/H_2O d) H_2/Pd, $BaSO_4$	1	L2	4
20	Alkynes are represented by general formula ________ a) C_nH_{2n} b) C_nH_{2n+2} c) C_nH_{2n-2} d) C_nH_{n-1}	1	L1	4

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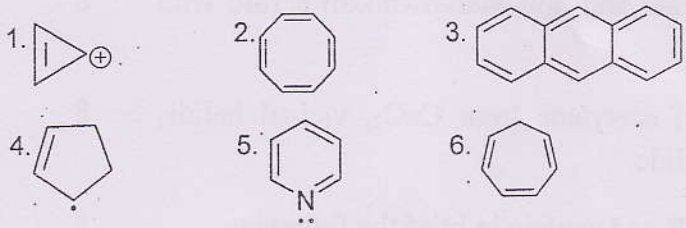
PRN:	Seat No:	Section B Marks out of 80

Section B

			Marks	level	CO
Q.2		Attempt **any two** of the following.	12		
	a)	Calculate the normality of HNO_3 solution, if solution contains 1.2 gm of HNO_3 in 250 cm^3.	6	L3	1
	b)	Explain de Broglie's hypothesis of dual nature of matter and radiation with significance.	6	L2	1
	c)	Balance the following reaction by ion electron method (Acidic medium). $Cr_2O_7^{2-} + Fe^{2+} \longrightarrow Cr^{+3} + Fe^{2+}$	6	L3	1
Q.3		Attempt **any two** of the following.	12		
	a)	Classify the following species on the basis of Huckel's rule as aromatic, non- aromatic or antiaromatic.	6	L3	2



			Marks	level	CO
	b)	Discuss the generation, structure and stability of free radicals.	6	L2	2
	c)	Name the different projection formulae used to represent three dimensional structure of a molecule with suitable examples.	6	L2	2

Q.4	a)	Attempt **any two** of the following.	12		
	i)	Discuss the hybridization, geometry and shape of following molecules. 1. XeF_4 2. PF_6^-	6	L2	3
	ii)	Describe Born-Haber cycle for calculating the lattice energy of sodium chloride.	6	L2	3
	iii)	Calculate lattice energy of sodium chloride in (kJ/mol) from the following data by using Born-Lande equation. $A = 1.65$, $r_0 = 3.0$Å, $n = 7$, $N = 6.02 \times 10^{23}$, $e = 4.8 \times 10^{10}$ e.s.u.	6	L3	3
	b)	Attempt **any four** of the following.	16		
	i)	Write a note on Lattice energy and solvation energy.	4	L1	3
	ii)	Draw molecular orbital diagram for HCl molecule.	4	L3	3
	iii)	Illustrate the characteristics of ionic compounds.	4	L2	3
	iv)	Distinguish between valance bond theory and molecular orbital theory.	4	L4	3
	v)	Explain Fajans rule.	4	L2	3
Q.5	a)	Attempt **any two** of the following.	16		
	i)	Explain Markownikoff's rule and anti-Markownikoff's rule with appropriate example.	8	L2	4
	ii)	Discuss the preparation of acetylene from CaC_2, vicinal halide, germinal halide and tetrahalide.	8	L2	4
	iii)	Identify the product A and B and explain in brief the following reactions.	8	L3	4

I. $CH_3\text{-}CH_2\text{-}Br \xrightarrow{alc.KOH} A \xrightarrow{O_3} B$

II. $HC{\equiv}CH \xrightarrow{NaNH_3} A \xrightarrow{C_2H_5\text{-}I} B$

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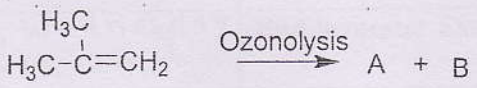
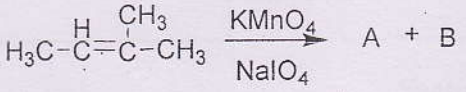
b)	Attempt **any three** of the following.	12		
i)	Write the preparation of alkane by using Grignard reagent.	4	L1	4
ii)	Identify product A and B and rewrite the reaction.	4	L3	4

I. 

II. 

iii)	Write a note on Kolbe's synthesis.	4	L1	4
iv)	Explain Saytzeff's rule with example.	4	L2	4

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