

Brainware University 398, Bamkrishnapur Road, Barasat Kolkata, West Bengal-700125

BRAINWARE UNIVERSITY

Term End Examination 2019 - 20

Programme - Bachelor of Science (Honours) in Biotechnology

Course Name - General Chemistry

Course Code - BBT303

(Semester - 3)

Time	all	otted:	3	H	nure
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Full Marks: 70

 $20 \times 1 = 20$

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group -A

(Multiple Choice Type Question) 1. Answer any twenty from the following (i) Which atom is most likely to form a -1 ion? a. I b. S c. Ag d. P (ii) Which atom is most likely to form a + 3 ion? a. Li b. Sr c. Kr d. Fe (iii) Identify the ions present in (NH₄)₂Cr₂O₇ a. $N^{3-}, H^{+}, Cr^{3+}, O^{2-}$ b. $N^{3-}, H^{-}, Cr^{3+}, O^{2-}$ c. NH₄⁺and Cr₂O₇²d. NH₃and H₂Cr₂O₇ (iv) Homolysis takes place by formation of a. Free radicals b. Carbocations c. Carbanions d. All of these Electromeric effect is a effect (v) a. Temporary b. Permanent c. Intermediate d. All of these Among o-nitrophenol, p-nitrophenol, m-nitrophenol, which one is most acidic (vi)

a. o-nitrophenol

c. m-nitrophenol

b. p-nitrophenol

d. Both a and b

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(vii)	A mol	lecule is said to be called	d aromatic if it	C	ontains	
THE PARK US	ond val	4hπ electrons	t).	$2n\pi$ electrons	
351001-100156	C.	(4n+2)π electrons	d	l.	$(2n+2)\pi$ electrons	
(viii)	Anilin	e is less basic than meth	nyl amine beca	ıus	se	
	a.	Due to electron with inductive effect of NH in aniline	-).	Due to 5 resonating structures in case of aniline	
	c.	Due to electron di mesomeric effect o group in aniline	lonating d f NH2		Both b and c	
(ix)	(ix) Predict the shape of the H ₂ O compound based upon concepts of hybridisation.					
	, a.	Tetrahedral	b		Angular or bent structure	
	c.	Trigonal Planar	d		Pyramidal	
(x)	Numb	er of chlorine atoms whi	ich form equato	ri	al bonds in PCl ₅ molecule are	
	a.	1	b.		2	
	c.	3	d.		4	
(xi)	(xi) The percentage p-character in sp ³ hybridization is					
	a.	25%	b.		50%	
	c.	75%	d.		80%	
(xii)	The str	tructure of IF ₇ is				
	a.	Octahedral	b.	•	Trigonal bipyramid	
	c.	Square pyramid	d.]	Pentagonal bipyramid	
(xiii)	iii) Isostructural species are those which have the same shape and hybridization. Among the given species identify the isostructural pairs.					
	a.	NF ₃ and BF ₃	b.	1	BF ₄ ⁻ and NH ₄ ⁺	
	c.	BCl ₃ and BrCl ₃	d.	ì	NH ₃ and NO ₃ ⁻	
(xiv)	In acety	vlene molecule, between	two carbon ato	on	ns there are	
	a.	three sigma bonds	b.	t	wo sigma and one pi bonds	
	c.	one sigma and two pi bo	onds d.	t	hree pi bonds	
(xv)	The s-or	rbital does not show pre	ference to any	di	rection because	
	a.]	It is the smallest orbital	b.	I	t is present in every atom	
	c. l	It is spherically symmet	ric d.	I	t is the first orbital	

(xvi)	The stereoisomers which rotates the plain polarized towards right is known as						
	a.	R	b.	S			
	c.	D	d.	d			
(xvii)	Compounds which have different arrangements of atoms in space while having same atoms bonded to each other are said to have						
	a.	position isomerism	b.	functional grou	up isomerism		
	c.	chain isomerism	d.	stereoisomeris	m		
(xviii)	If a solution of a compound (30.0 g/100 mL of solution) has a measured rotation of +15° in a 2 dm tube, the specific rotation is:						
	a.	+50°	b.	+250	Library		
		+15°		+4.0°	Brainware University 398, Bamkrishnapur Road, Barasat Kolkata, West Bengal-700125		
(xix)		n is the most stable form of n-but		_	Milmon		
	a.			Staggered			
	c.	Eclipsed	d.	Partially eclip	sed		
(xx)	Let there be four groups OH,D,H,NH ₂ attached to the chiral carbon, Which one will have least priority sequence						
	a.	ОН	. b.	D			
	c.	H	d.	NH_2			
(xxi)	Non superimposable mirror images are known as						
	a.	Enantiomers	b.	Diasteromers			
	c.	Optical isomers	d.	Isomers			
(xxii) Assign configuration to the given com							
	н	ĆH,					
	н,с	H					
		. Z configuration	h	E configuration	on		
	-	_		S configuration			
,		R configuration			OII		
(XXIII)		th one of the following is a green					
	a			Benzene			
		. Carbon tetrachloride		Toluene			
(xxiv)							
	a				Carbondioxide		
	c	Diethyl ether	d	. Xylene			

(xxv) Homolysis takes place by formation of

a. Free radicals

b. Carbocations

c. Carbanions

d. All of these

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		Group – B	
		(Short Answer Type Questions)	4 x 5 = 20
Ar	iswer a	any four from the following	
2.	Wh	at is lattice energy? Write down the expression of lattice energy, U.	2+3
3.	Wr	ite a short note on Fajan's rule on polarization of ionic compounds.	5
4.	Use	the following information to calculate the heat of sublimation for assium:	5
5.	Ele Ion Lat Hea Box Wh	at of formation for KCl(s) = -437 kJ/mol ectron affinity for Cl = -349 kJ/mol eization energy for K = 418 kJ/mol etice energy for KCl = 717 kJ/mol eat of formation for Cl(g) = 122 kJ/mol end dissociation energy for Cl ₂ (g) = 243 kJ/mol enat is carbanion? State with orbital diagram the hybdrisation of resonance bilised carbanion.	2+3
6.	Dra dia	aw all the isomers of tartaric acid. Designate them as enantiomers, steroisomers.	5
7.	Wh	nat do you mean by atom economy? Ethane reacts with chlorine molecule to m ethyl chloride. Calculate the atom economy.	2+3
		Group – C	
		(Long Answer Type Questions) 3:	x 10 = 30
An	swer a	ny three from the following	
8	(a)	Write down the properties of ionic compounds.	5
J	(b)	How do you account for the fact that pure liquid hydrogen chloride does not conduct electricity though a dilute aqueous solution of it does	5
9	(a)	What do you mean by green solvents? Explain the need of green solvents	3+3
	(b)	Name two nongreen and two green solvents	2+2

What is Inductive effect? Draw all the resonating structures of CH₂= CH-10. (a) CN and Nitrobenzene Which one has higher dipole moment? C₂H₅Cl and CH₂=CH-Cl (b) 3 (a) Explain the order of acidity. 11 3+3 HCOOH and CH₃COOH (i) H-C≡C-COOH, CH₂=CH-COOH, CH₃COOH (b) 4 OH .CH₃ CH₃ Arrange the following three molecules in increasing order of acidity and explain why? 12. 5+5 Explain why William Januaria NF3 is pyramidal but BF3 Planer (2013) Station i) Ethylene is planer but Ethene is not ii)

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