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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 allotted: 3 Hours

Full Marks: 70

[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)

20 x 1 = 20

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 $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$

a. $\text{N}^{3-}, \text{H}^+, \text{Cr}^{3+}, \text{O}^{2-}$	b. $\text{N}^{3-}, \text{H}^+, \text{Cr}^{3+}, \text{O}^{2-}$
c. NH_4^+ and $\text{Cr}_2\text{O}_7^{2-}$	d. NH_3 and $\text{H}_2\text{Cr}_2\text{O}_7$
 - (iv) Homolysis takes place by formation of

a. Free radicals	b. Carbocations
c. Carbanions	d. All of these
 - (v) Electromeric effect is a effect

a. Temporary	b. Permanent
c. Intermediate	d. All of these
 - (vi) Among o-nitrophenol, p-nitrophenol, m-nitrophenol, which one is most acidic

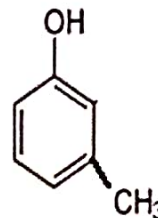
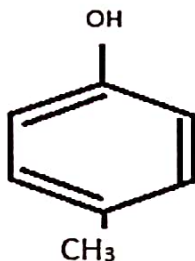
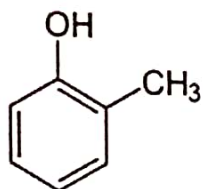
a. o-nitrophenol	b. p-nitrophenol
c. m-nitrophenol	d. Both a and b

- (vii) A molecule is said to be called aromatic if it contains
- a. $4n\pi$ electrons
 - b. $2n\pi$ electrons
 - c. $(4n+2)\pi$ electrons
 - d. $(2n+2)\pi$ electrons
- (viii) Aniline is less basic than methyl amine because
- a. Due to electron withdrawing inductive effect of NH_2 group in aniline
 - b. Due to 5 resonating structures in case of aniline
 - c. Due to electron donating mesomeric effect of NH_2 group in aniline
 - d. Both b and c
- (ix) Predict the shape of the H_2O compound based upon concepts of hybridisation.
- a. Tetrahedral
 - b. Angular or bent structure
 - c. Trigonal Planar
 - d. Pyramidal
- (x) Number of chlorine atoms which form equatorial bonds in PCl_5 molecule are
- a. 1
 - b. 2
 - c. 3
 - d. 4
- (xi) The percentage p-character in sp^3 hybridization is
- a. 25%
 - b. 50%
 - c. 75%
 - d. 80%
- (xii) The structure of IF_7 is
- a. Octahedral
 - b. Trigonal bipyramid
 - c. Square pyramid
 - d. Pentagonal bipyramid
- (xiii) 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. BF_4^- and NH_4^+
 - c. BCl_3 and BrCl_3
 - d. NH_3 and NO_3^-
- (xiv) In acetylene molecule, between two carbon atoms there are
- a. three sigma bonds
 - b. two sigma and one pi bonds
 - c. one sigma and two pi bonds
 - d. three pi bonds
- (xv) The s-orbital does not show preference to any direction because
- a. It is the smallest orbital
 - b. It is present in every atom
 - c. It is spherically symmetric
 - d. It is the first orbital

- (xvi) The stereoisomers which rotates the plain polarized towards right is known as
- R
 - S
 - D
 - d
- (xvii) Compounds which have different arrangements of atoms in space while having same atoms bonded to each other are said to have
- position isomerism
 - functional group isomerism
 - chain isomerism
 - stereoisomerism
- (xviii) If a solution of a compound (30.0 g/100 mL of solution) has a measured rotation of $+15^\circ$ in a 2 dm tube, the specific rotation is:
- $+50^\circ$
 - $+25^\circ$
 - $+15^\circ$
 - $+4.0^\circ$
- (xix) Which is the most stable form of n-butane?
- Gauche
 - Staggered
 - Eclipsed
 - Partially eclipsed
- (xx) Let there be four groups OH,D,H,NH₂ attached to the chiral carbon , Which one will have least priority sequence
- OH
 - D
 - H
 - NH₂
- (xxi) Non superimposable mirror images are known as
- Enantiomers
 - Diastereomers
 - Optical isomers
 - Isomers
- (xxii) Assign configuration to the given compound
-
- Z configuration
 - E configuration
 - R configuration
 - S configuration
- (xxiii) Which one of the following is a green solvent
- Ethyl Lactate
 - Benzene
 - Carbon tetrachloride
 - Toluene
- (xxiv) Which one of the following is an alternative solvent
- Methanol
 - Supercritical Carbondioxide
 - Diethyl ether
 - Xylene

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10. (a) What is Inductive effect? Draw all the resonating structures of $\text{CH}_2=\text{CH-CN}$ and Nitrobenzene 2+5
- (b) Which one has higher dipole moment? $\text{C}_2\text{H}_5\text{Cl}$ and $\text{CH}_2=\text{CH-Cl}$ 3
- 11 (a) Explain the order of acidity. 3+3
- (i) HCOOH and CH_3COOH
- (ii) $\text{H-C}\equiv\text{C-COOH}$, $\text{CH}_2=\text{CH-COOH}$, CH_3COOH
- (b) 4



Arrange the following three molecules in increasing order of acidity and explain why?

12. Explain why 5+5
- i) NF_3 is pyramidal but BF_3 Planer
- ii) Ethylene is planer but Ethene is not

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