FIRST MID TERM EXAMINATION

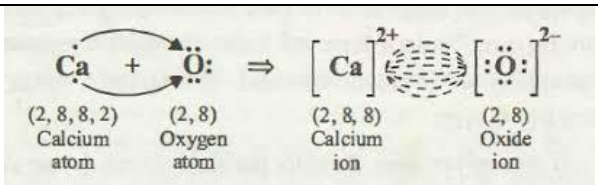
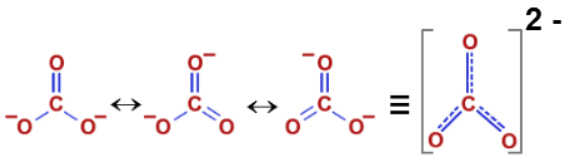
SEPTEMBER 2018

CLASS XI

Marking Scheme – CHEMISTRY[THEORY]

SET A

Q.NO.	Answers	Marks (with split up)
1.	Unnilquadium, Unq	½ + ½
2.	Dot structure	1
3.	Dry cleaning with liquid CO_2, bleaching with hydrogen peroxide, environmental friendly catalyst [any two suitable methods]	½ + ½
4.	Diagram	½ + ½
5.	Presence of isotopes	1
6.	a) Ratio of number of moles of a component to the total number of moles of all the components. b) Molecular mass= 2x vapor density	1 1
7.	$c=\upsilon\lambda$ $\upsilon=3x10^8/600x10^{-9}$ $\upsilon = 5x10^{14}Hz$ Wave no.$=1/\lambda$ $=1/600\ x10^{-9}$ $=1.67x10^6m^{-1}$	½ ½ ½ ½
8.	Same number of electrons Cl^-, K^+[any correct species]	1 ½+½
9.	<table><tr><td>Photochemical smog</td><td>Classical smog</td></tr><tr><td>Happens in warm,dry sunny climate</td><td>Cool and humid</td></tr><tr><td>Oxidizing in nature</td><td>Reducing in nature</td></tr></table> Or Certain gases act like a blanket, absorbing IR radiation and preventing it from escaping into outer space ,to keep the temperature of earth suitable for life to exist. CO_2, CH_4 ,H_2O[any two]	1 each 1 ½ each
10.	(n -1) d^{1-10} ns^{0-2} Variable oxidation state/colored salts/catalyst [any two]	1 ½ each
11.	Chlorofluorocarbons Skin cancer/cataract/loss of phytoplankton	1 ½ each
12.	The **energy** required to break apart an ionic solid and convert its component atoms into gaseous ions.	1

	. 	1
13.	The process by which a body of water becomes enriched in dissolved nutrients (such as phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen. Rain with a pH below 5.6 Affects monuments, corrodes metals, changes pH of soil, waterbodies [any two harmful effects]	1 1 1
14.	Reagent that gets used up completely in a chemical reaction/reagent present in lesser number of moles. LR=HCl=0.1x100/1000=0.01moles Volume of hydrogen=0.01x22.4/2=0.112L	1 1 1
15.	a) **Formal Charge** = [no. of valence electrons on atom] – [non-bonded electrons] + ½[number of bondpairs]. b) Resonance 	1 1 1
16.	i)B ii) D iii) C	1 each
17.	Eo=2.13eVx1.6x10^{-19}J=3.41x10^{-19}J E=hc/λ=4.97x10^{-19}J Ke=1.56x10^{-19}J Or a) Λ=h/mv =6.626x10^{-34}/2.2x10^{-3}x300 =1x10^{-33}m b) Wave number=109677[1/n_1^2-1/n_2^2] =109677[1/4-1/9] =15232.9cm^{-1}	1 1 1 ½ ½ ½ ½ ½ ½
18.	a) Lesser nuclear charge per electron b) Half filled stable orbitals in nitrogen c) Electron enters smaller n=2 and experiences electron repulsions	1 1 1
19.	Statement	1 each
20.	a) Group 14, period 4 b) A qualitative measure of the ability of an atom in a chemical compound to attract shared electrons to itself c) Ne, Vander Waals radii larger than covalent radii	½ each 1
21.	a) 4f b) 1s,2p,4s,3d c)3e	1 each
22.	Low ionization enthalpy of metallic element /high electron gain enthalpy of nonmetallic element/large lattice enthalpy	1 each

23.	Fe^{3+}configuration Stable due to half-filled orbitals symmetry/higher exchange energy	1 1 1
24.	1p,3f:n≠l Pairing of electrons in the orbitals belonging to the same subshell does not take place until each orbital is singly occupied. Nitrogen $1s^2\ 2s^2\ 2p_x^1 2p_y^1 2p_z^1$	½ each 1 1
25.	a) Simplest whole number ratio of various atoms present in a Compound. b) BH_3 E.F =C_2H_4O n=88/44=2 MF = $C_4H_8O_2$ **OR** i) Number of moles of solute present in a litre of the solution ii) Molality as it is temperature independent iii) M=%d10/M_B=11.4moles/L iv) S=22.5%	1 1 1 ½ ½ 1 1 1½ 1½
26.	a) Orbitals with same energy b) It is impossible to determine simultaneously, the exact position and exact momentum (or velocity) of an electron. c) Uncertainty in speed 0.2m/s uncertainty in position=h/4Πm =$6.626x10^{-34}/4x3.14x2.5x10^{-3}x0.2$ =$1.05x10^{-31}$m **OR** i. could not explain Zeeman effect /stark effect/finer details of line spectrum of hydrogen [any two] ii. $E=-2.18x10^{-18}/25=-8.72x10^{-20}$J R=52.9x25/1=1322.5pm	1 1 1 ½ ½ 1 1each 1½ 1½
27.	a) H_2O-2lp, 2bp, bent/v shape/105^o CH_4 -4bp, tetrahedral/109.5^o ClF_3 -2lp,3bp, T shape b) Less than 8e around central atom/ $BeCl_2$ More than 8e around central atom /PCl_5	1 1 1 1 1

	OR	
	i. Shared pair of electrons between bonded atoms are bond pairs & valence electron that do not take part in bonding are lone pairs.	1
	Explanation with an example	1
	ii. a)due to lone pair repulsion it occupies equatorial position	1
	b) NH_3 is more polar as the dipoles are all in one direction whereas in NF_3 the dipole due to lp electron is in opposite direction to give a smaller net dipole [figure]	2