INDIAN SCHOOL MUSCAT

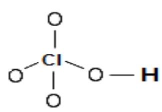
FIRST MID TERM EXAMINATION

SEPTEMBER 2018

CLASS XI

Marking Scheme – CHEMISTRY [THEORY]

SET A

Q.NO.	Answers	Marks (with split up)
1.	Definition	1
2.	a)wave nature b)particle nature	½ +½
3.	S, R, Q, P, T	1
4.		1
5.	Definition	1
6.	Two points of differences	1+1
7.	$\bar{\nu} = \frac{1}{\lambda} = 109677 \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right) cm^{-1}$ $n_i = 1$ to $n_f = 2$ wave number = 109677 (1/1 – 1/4) =82257.5 cm^{-1}	½ ½ 1
8.	Species with same no of electrons but different atomic no $K^+/Ar/Cl^-/S^{2-}/P^{3-}/Sc^{3+}$ Correct electronic configuration OR Atomic size/nuclear charge/electronic configuration/screening effect	1 ½ ½ 1 1
9.	a) Unnilquadium, Unq b) 3rd group, 3rd period	½+½ ½+½
10.	Equation F c on N = 0 , O = -1 & 0	½ ½+½+½
11.	Green chemistry is a production process with minimum pollution to the environment which involves reduction in material .It is used in (i) In dry cleaning of clothes: (ii) In bleaching of paper	1 ½+½

<table>
<tr><td></td><td>(iii) synthesis of chemicals</td><td></td></tr>
<tr><td>12.</td><td>ozone and PAN are eye irritants.Ozone and nitric oxide cause headache, chest pain, cough and difficulty in breathing. cracking of rubber and damages plant life. corrosion of metals, stones, building materials and painted surface .(any two)

Use of catalytic converters in automobiles, Some plants like Pinus, Juniparus can metabolize nitrogen oxides.(any two)</td><td>½+½

½+ ½</td></tr>
<tr><td>13.</td><td>Statement
<table>
<tr><td></td><td>Sample I</td><td>Sample II</td></tr>
<tr><td>Mass of H</td><td>5.9</td><td>11.2</td></tr>
<tr><td>Mass of O_2</td><td>94.1</td><td>88.8</td></tr>
<tr><td>Mass of O_2 that combines with Ig hydrogen</td><td>$\frac{94.1 \times 1}{5.9}$
= 16</td><td>$\frac{88.8 \times 1}{11.2}$
8</td></tr>
</table>
Simple whole no ratio is 2:1</td><td>1

1+1</td></tr>
<tr><td>14.</td><td>a) 392/98=4 moles
b) 44.8/22.4=2 moles
c) $9.033 \times 10^{23} / 6.022 \times 10^{23}$=1.5 moles

OR

a)
<table>
<tr><td>Element</td><td>mass</td><td>moles</td><td>Ratio</td></tr>
<tr><td>C</td><td>93.7</td><td>93.7/12= 7.8</td><td>1.24x 4=5</td></tr>
<tr><td>H</td><td>6.29</td><td>6.29/1= 6.29</td><td>1x4= 4</td></tr>
</table>
Empirical frmula=C_5H_4

b) Ppm=$10/100 \times 10^6$ =10^5 ppm</td><td>1x3

1½

1½</td></tr>
<tr><td>15.</td><td>a) The negative sign means that the energy of the electron in the atom is lower than the energy of a free electron at rest. A free electron at rest has energy zero. As the electron gets closer to the nucleus its energy decreases and hence electronic energy becomes more and more negative
b) A sample of hydrogen contains large number of atoms hence large numbers of different type of downward transitions take place
c) Energy of an electron remains the same as long as it remains in the same orbit.</td><td>1X 3</td></tr>
<tr><td>16.</td><td>a) n-l-1=6-3-1=2</td><td>1x3</td></tr>
</table>

	b) s &d orbital shapes c) 4 electrons	
17.	Definitions	1x3
18.	**a) mvr = n h/2π** **2 πr=nh/mv** But λ = h/mv ie **2 πr=** nλ b) $r_n = \frac{52.9 \times n^2}{Z}$ pm $=\frac{52.9 x 1^2}{3^2}$ =5.8 pm	1½ 1½
19.	a) elements in which the last electron enters the d-orbitals of the penultimate shell b) $(n-1)d^{1-10}$, ns^{1-2} c) They exhibit more than one valency&hard with high mp &bp ,form coloured compounds,form alloys.	1x3
20.	a) O^{2-} - the number of electrons increases hence the effective nuclear charge per electron decreases in anion b) Mg-Completely filled 3s/penetration effect of 3s c) F-effective nuclear charge and small size	½+½ ½+½ ½+½
21.	a) Stable configurationand added electron should go to next higher level which needs energy b) To preserve the structure &principle of classification c) Small size/high electronegativity/ionisation enthalpy/absence of d orbitals	1x3
22.	Correct definitions	1x3
23.	a) Due to small size&high electro negativity of N than P,more repulsions between bond pairs around nitrogen in ammonia b) two equatorial lone pairs making the final structure T-shaped c) Bond dipoles do not get cancelled in OCS.	1x3
24.	a) 4 bps,&1 lp-K shape b) 4Bps, 0 lp-Tetrahedral	1½ 1½
25.	a) (i) &(ii) Correct statement b) $h = 6.63 \times 10^{-34}$ Js K.E. = 246 KJ mol^{-1} = 4.084×10^{-19} J $atom^{-1}$ – ½ K.E. = $h\nu - h\nu_o$ - ½ $h\nu_o = h\nu - K.E. = 6.63 \times 10^{-34} \times 3 \times 10^8 / 4 \times 10^{-7} - 4.084 \times 10^{-19}$ - ½ + ½ Minimum energy = 8.88×10^{-20} J ½ Maximum wavelength = 2.23×10^{-6} m - ½	1x2 3

	OR a) stable d^5 configuration b) in accordance with Hunds rule c) Correct statement d) $\Delta x \cdot \Delta v \geq \frac{h}{4\pi m}$ - ½ $\Delta x \cdot \Delta v = 6.63 \times 10^{-34}/4 \times 3.14 \times 25 \times 10^{-6}$ - ½ $= 2.11 \times 10^{-30}\ m^2/s$ - ½ Small $\Delta x \cdot \Delta v$ it is insignificant - ½	 1 1 1 2
26.	a) Definitions b) CH_4 , SO_2, BCl_3,CO_2 c) Low IE/large negative EGE/High Lattice enthalpy (any two) **OR** a) Definition b) Correct structures c) Could not explain incomplete octet/expanded octet/noble gas compounds/stability (any two) Examples d) Due to lp-bp repulsion	1x3 1 ½+½ 1 1 ½+½ ½+½
27.	a) Elements exist as isotopes with different percentage composition b) (i)CH_2O (ii) H_3PO_4 c) (i) mole fraction of NaOH= $\frac{4/40}{4/40+36/18}$ =0.047 Mole fraction of H_2O= 0.953 V=mxd=(4+36)1=40 ml (ii)M=$\frac{4 \times 1000}{40 \times 40}$=2.5 M **OR**	1 ½+½ 1½ 1½ 1x2

	a) Correct Statement b) $2Na + 2H_2O \rightarrow 2\ NaOH + H_2$ 46 36 80 2 ½ 2.3 10 Mass of NaOH = 80 x2.3/46= 4 gm 1 Volume of Hydrogen = $\frac{22.4 \times 2.3}{46}$ = 1.12 L 1 Sodium ½	3