INDIAN SCHOOL MUSCAT

HALF YEARLY EXAMINATION

SEPTEMBER 2019

SET A

CLASS XII

Marking Scheme – SUBJECT [THEORY]

Q.NO.	Answers	Marks (with split up)
1.	d	1
2.	c	1
3.	d	1
4.	d	1
5.	a	1
6.	c	1
7.	d	1
8.	b	1
9.	c	1
10.	a&c	1
11.	Na &K ions	1
12.	Ammoniated electron	1
13.	methemoglobinemia (‘blue baby’ syndrome	1
14.	90^0	1
15.	intensity	1
16.	**mvr = nh/2π**	1
17.	Li+	1
18.	NO,NO_2	1
19.	S Block	1
20.	6 electrons	1
21.	a) □MgO+ Mg3N2 b) CaSiO3	1 1
22.	Solvay process $NH_3 + H_2O + NaCl + CO_2 \rightarrow NaHCO_3$ (s) + NH_4Cl $2\ NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2$	½ 1 ½
23.	• Radiant energy is emitted or absorbed discontinuously in the form of small packets of energy called quanta • The amount of energy associated with each quantum of radiation is proportion to the frequency of radiation • A body can emit or absorb energy only in terms of integral multiples of quantum (any two points)	1x2

	OR Any 2 points of difference	 2
24.	a) When the electron is at infinity the energy of the electron is assumed to be zero, because there is no attractive or repulsive interaction . As it enters the atom , it does work to overcome the repulsive interaction and loses its energy. b) Sample of H2 contains large number of atoms , hence large number of different types of transition takes place. OR a) Definition b) Represents the orbital/orientation of subshell in magnetic field	1 1 1 1
25.	Δv = 0.02 % of 500 m/s = 0.02100×500 = 0.1 m/s $\Delta x = h/4\pi m.\Delta v$ $\Delta x = 6.63\times10^{-34}/ 4\times3.14x9 .1\times10^{-31}x0.1$ $= 5.8\times10^{-4}$ m	½ ½ 1
26.	a) Box diagram b) 9 sigma and 2 pi bonds	1 ½ +½
27.	a) C2H4 due to sp3 hybridisation b) CO2 due to absence of lp/regular geometry	1 1
28.	Definitions OR a) • cracking of rubber and extensive damage to plant life. It also causes corrosion of metals, stones,building materials, rubber and painted surfaces • Catalytic converters to convert oxides of nitrogen ,planting trees like pinus which can metabolise nitrogen oxides b) • Any one difference	1x3 1 1 1
29.	a) $Na_2CO_3 + H_2O \rightarrow NaHCO_3 + Na^+ + OH^-$ b) Hydration energy is low c) Being small in size, Li^+ cannot stabilize peroxide ion	3x1
30.	a) $Fe[Ar]4s^23d^6$ $Fe^{2+} = [Ar]4s^03d^6$ $Fe^{3+} = [Ar]4s^03d^5$ Fe^{3+} is more stable than Fe^{2+} as Fe^{3+} is half filled due symmetry &exchange energy b) 2s,4p OR a) No of wavelengths per unit length b) $[Ar]4s^13d^{10}$	 ½+½ 1 ½ +½ 1x3

	c) 4-1=3	
31.	a) i) 5 bps no lps trigonal bipyramidal ii)3 bps 2 lpsT shape a) Correct structure OR a) Any two factors b) Due to large size and less electronegativity of Cl c) Different symmetry	1 1 ½ +½ ½ +½ ½ +½ 1
32.	a) Na-lesser efective nuclear charge b) Be-given subshell is completely filled/penetrating effect c) Cl-less interelectronic repulsion due to larger size	½ +½ ½ +½ ½ +½
33.	Definition, ns^{1-2} ,$(n-1)d^{1-10}$ any two properties	1x3
34.	En = -2.18 x 10-18 /n^2 x Z^2 J/atom =0.0872x10^{-18} J/atom rn = $\frac{52.9 \times n^2}{Z}$ pm=52.9x5^2 =1322.5pm	1½ 1½
35.	a) & b) Statement of the law b) $h\nu = h\nu_o$ h = 6.63 x 10^{-34} Js K.E. = = 2.67x 10^{-19} J $atom^{-1}$ K.E. = $h\nu - h\nu_o$ $h\nu_o = h\nu$ – K.E. = 6.63 x 10^{-34} x 3 x 10^8/ 2 x 10^{-7} ─ 2.67x 10^{-19} Minimum energy = 7.725x10^{-19} a) Maximum wavelength = 2.57 x 10^{-7}m OR a) Any two characteristics b) definition c)E = 2.18 x $10^{-18}(1/n_1^2 - 1/n_2^2)$ J/atom = 2.18 x $10^{-18}(1/2^2 - 1/5^2)$ =**4.5 x10^{-19} J** $\nu = \Delta E / h$ =4.5 x10^{-19}/6.63 x 10^{-34} =**6.78 x10^{14} Hz** $\lambda = c / \nu$ =3x10^8/ 6.91 x10^{14} = **442** nm	1x2 1 1 1 ½+½ 1 1 1 1

36.	a) P is less electronegative and bigger than N , repulsion between bps is less in PH3 b) Regular geometry,dipolemoment cancel each other c) Sp3 Energy level diagram Orbital overlapping diagram Tetrahedral geometry OR a) Three resonance strs b) Formal charge on O=0,1 and +1 c) MO configuration Bond order=2 Paramagnetic	1 1 ½ 1 1 ½ 1½ 1½ ½ 1 ½
37.	a) Same number of valence electrons b) Due to half filled configuration c) Species with same number of electrons,Na^{+},O^{2-} d) Untriquadium,Utq OR a) Cations have more effective nuclear charge,anions have lesser effective nuclear charge than parent atom, Na and Na+ Cl &Cl- b) Preserve the structure & criteria of classification c) 4^{th} pd and 4^{th} group d) Absence of d orbital in Boron	1 1 1+1 ½+½ 1 1 ½+½ ½+½